August 20, 2024

Mr. Jean-Philippe Wilkins
Harnois Groupe Immobilier inc.
Director, Operations and Real Estate Development
80, route 153
Saint-Thomas (QC)
JOK 3L0

Subject : **Phase I Environmental site assessment (ESA)**
Property located at 1660 Merivale Road, Nepean, Ottawa, ON
Reference Number : HARN1660P1

Mr. Wilkins,

We are pleased to present this Phase I Environmental Site Assessment report, conducted for the property located at 1660 Merivale Road, Nepean, Ottawa, Ontario.

We trust this report will meet your expectations. Should you have any questions or require further information, please feel free to contact our team who will be more than pleased to assist you.

Sincerely,



Num@riquement sign®par Mathieu B@lisle, ing.
5043064
Date : 2024-08-21 08:57-04:00

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GROUPE
C. LAGANIÈRE

PHASE I ENVIRONMENTAL SITE ASSESSMENT



Property located at
1660 Merivale Road,
Nepean, Ottawa, Ontario.

Final Report
August 20, 2024

Reference Number:
HARN1660P1

PHASE I ENVIRONMENTAL SITE ASSESSMENT

Property located at 1660 Merivale Road, Nepean, Ottawa, Ontario.
Part of Lot 30, Concession 1 of Rideau Front

Privileged and Confidential Document presented to:

Harnois Groupe Immobilier inc.

Prepared and verified by :

Num®riquement sign®par Mathieu B®lisle, ing. 5043064
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Guylaine Lebel, P.Eng., M.Eng.
Executive Director | CEME
Groupe C. Laganière (1995) inc.

Reference Number: HARN1660P1

REVISIONS FOLLOW-UP				
Revision	Date	Description	Prepared by	Verified by

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EXECUTIVE SUMMARY

The property under study is currently occupied by a gas station with a convenience store and a car wash. As part of a renovation project to be submitted to the City, Phase I and II Environmental Site Assessments (ESAs) are required. The intent of these assessments is not to register a Record of Site Condition.

Groupe C. Laganière (1995) inc. (hereafter "GCL") has been commissioned by Harnois Groupe Immobilier inc. (hereafter "Harnois"), the owner of the Site, to conduct a Phase I ESA on the property located at 1660, Merivale Road, Nepean, Ottawa, Ontario. This report is in accordance with the service proposal dated June 6, 2024. (Reference Number: 2024-126-CE-REV2).

The goal of the mandate is to identify potential or actual contamination risks at the site due to current, past, and/or neighboring activities.

The general information obtained from this study is presented in the table below:

Site Address	1660 Merivale Road, Nepean, Ottawa, Ontario
Geographical Coordinates of the Land	Lat. : 45,343350 Long.: -75,729600
Lot Number	Part of Lot 30, concession 1 of Rideau Front
Land Area (m^2)	1 968,10 m^2
Landowner	Harnois Groupe immobilier Inc.
Land Occupants	+ Commercial use: • Proxy (convenience store with car wash) • Esso Service-Station
Former land occupants	+ Commercial use: • Convenience store since 1984 with or without a restaurant • Car wash since 1984 • Gas station since 1968 • Mechanical garage from 1968 to 1984
Current Use	Commercial
Projected Future Use	Commercial
Municipal Zoning	AM10 (Arterial Mainstreet Zone)
Permitted Usage	+ Commercial + Residentials
Neighbours	+ North: Viewmount Drive followed by a parking and a mall + South: Residential buildings + East: Merivale Road followed by a school + West: Glenmanor Drive followed by residential buildings
General Site Description	+ Two buildings: a convenience store and a car wash

	+ Convenience store: one-story building without a basement, featuring sales, office and storage areas as well as a cold room and wash room; + Car wash building: one-story without a basement, with a washing area and mechanical room and storage room
Topography and Surface	+ Light descending slope to the southwest, more pronounced toward the south of the car wash + Convenience store (95 m²): concrete slab primarily, with a ceramic cover, generally in good condition + Car wash (110 m^2): concrete slab + Pump island: concrete slab, generally in good condition + Circulation area: asphalt pavement in poor condition, with numerous cracks + Grass and tree cover along the west and south limits of the site, in the northeast corner, site entrances and northwest of the car wash
Potential Contamination Sources	+ Underground storage tanks in the northeast corner since 1984, possibly since 1968 at this location + Pump islands north of the store since 1984 + Underground pipes between the underground tanks and the pump islands + Former pump island north and east of the store from 1968 to 1984 + Former mechanical garage west of the store from 1968 to 1984 + Car wash in the south section since 1984
Real Contamination identified	+ Groundwater : BTEX, PH F1-F4, Ha and Pb contamination in some wells since 2011, mostly on the east side of the site
Potential Receptors and Exposure Pathways	+ Sewer on site and under neighboring streets; + Buildings on site and south neighboring buildings
Selected Standards	+ On. Reg 153/04, Table 3 Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition / Fine textured soils
Geology	+ Sand and gravel backfill material up to 1 or 2 meters thick + Brown to grey silt till up to 3 to 5 m BGS + Limestone bedrock at depths of 2,7 to more than 5,49 m BGS
Hydrogeology	+ Groundwater flows to the southwest + Groundwater level is around the interface of the bedrock and the surface soils or in the bedrock, at depths varying between 2.3 m and 5.0 m BGS

Potential Contamination Substances	+ Gasoline (underground tanks, pump islands, underground pipes, former pump islands, former mechanical garage, car wash): BTEX, PH F1 to F4, Ha, Pb + Oils, used oils, lubricants (former mechanical garage, car wash): PAH's, MTX
Potentiel Light Non-Aqueous phase liquids (LNAPL)	+ Gasoline: BTEX, PH F1 to F4

Following a thorough analysis of the information gathered, the following environmental risks were identified:

Risk #	Risk Identification	Area (m^2)	Analytical Parameters
1	Underground storage tanks in the northeast corner of the site probably since the 1960s	150	BTEX, PH F1 to F4, Ha, Pb
2	Pump islands north of the store since 1984	250	BTEX, PH F1 to F4, Ha, Pb
3	Underground pipes connecting the pump islands and the underground tanks	200	BTEX, PH F1 to F4, Ha, Pb
4	Former pump islands north and east of the store from the 1960s to 1984	2x 50	BTEX, PH F1 to F4, Ha, Pb
5	Former mechanical garage west of the store from the 1960s to 1984	175	BTEX, PH F1 to F4, Ha, PAH, MTX
6	Car wash in the south area since 1984	125	BTEX, PH F1 to F4, Ha, PAH, MTX
7	BTEX, PH F1-F4, Ha and locally Pb contamination in groundwater	-	BTEX, PH F1-F4, Ha and Pb

Therefore, a Phase II ESA is recommended for the identified risk areas.

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LIST OF ACRONYMS

APEC	Areas of Potential Environmental Concern
ANSI	Areas of Natural and Scientific Interest
BAnQ	Bibliothèque et Archives nationales du Québec
BTEX	Benzene, toluene, ethylbenzsne, xylsnes
CMP	Contamination Management Plans
CSA	Canadian Standard Association
EPA	Environmental Protection Act
ERIS	EcoLog Environmental Risk Information Services Ltd
ESA	Environmental Site Assessment
F1-F4	Petroleum Hydrocarbons F1 to F4
GCL	Groupe C. Laganière (1995) Inc.
Ha	Hexane
NRC	Natural Resources Canada
MAH	Monocyclic Aromatic Hydrocarbons
MECP	Ministry of the Environment, Conservation and Parks of Ontario
MM	Ministry of Mines of Ontario
MTX	Metals and metalloids
O.Reg 153/04	Ontario Regulation 153/04 – Records of Site Conditions
PAH	Polycyclic Aromatic Hydrocarbons
Pb	Lead
PCA	Potentially Contaminating Activities
PH	Petroleum Hydrocarbons
TSSA	Technical Standards and Safety Authority
VOC	Volatile Organic Compounds

1. INTRODUCTION

1.1 Context

The property is occupied by a gas station with a convenience store and a car wash. As part of a project to be submitted to the City, the conduction of Phase I and II Environmental Site Assessments (ESAs) are required. These assessments are not intended to register a Record of Site Condition.

1.2 Mandate and Objective

Groupe C. Laganière (1995) inc. (hereafter "GCL") has been commissioned by Harnois Groupe Immobilier inc. (hereafter "Harnois"), the owner of the site, to conduct a Phase I ESA on the property located at 1660, Merivale Road, Nepean, Ottawa, Ontario (hereafter "the Site"). This is in accordance with the service proposal dated June 6, 2024, (Reference Number: 2024-126-CE-REV2).

The goal of the mandate is to identify potential or actual contamination risks at the site due to current, past, and/or neighboring activities.

This Phase I ESA was conducted following the standard methodologies outlined in Ontario Regulation 153/04 (O.Reg. 153/04)– Record of Site Condition – Part XV.I of the Environmental Protection Act (EPA) and in the Canadian Standard CSA-Z768-01 – Phase I Environmental Site Assessment.

1.3 Site Description

Table 1 below provides a general description of the site. The general location of the site is illustrated in Figure 1 of Appendix 2. For the purposes of this study, Merivale Road is oriented in a north-south axis.

Table 1 : Description of the site

Site Address	1660 Merivale Road, Nepean, Ottawa, Ontario
Geographical Coordinates of the Land	Lat. : 45,343350 Long.: -75,729600
Lot number	Part of Lot 30, Concession 1 of Rideau Front
Land Area (m^2)	1 968,10 m^2
Landowner	Harnois Groupe immobilier Inc.
Land Occupants	+ Commercial: • Proxy • Esso Service-Station
Current Use	+ Commercial
Projected Future Use	+ Commercial
Municipal Zoning	AM10 (Arterial Mainstreet Zone)
Permitted Usage	+ Commercial + Residential
Site Description	+ Convenience store in the middle + Car wash in the south section

	+ Gas pump to the north of the store + Underground storage tanks at the northeast corner + Paved parking and circulation areas around the buildings
Building Construction Date	1984
Building Modification Date	No major modification
Current and Previous Heating Systems	Electric and natural gas
Drinking Water Supply	Aqueduct
Wastewater Treatment System	Municipal sewer

1.4 Adjacent Properties

The Site is located at the southwest corner of the intersection of Merivale Road and Viewmont Drive. It is surrounded by a mix of commercial, residential and public sites. The adjacent properties are as follows :

- North : Viewmount drive followed by a parking lot and a commercial mall;
- South : Residential buildings;
- East : Merivale Road followed by a school;
- West: Glenmanor Drive, followed by residential buildings.

The zoning by-laws for the adjacent properties are as follows:

- Residential to the west (R2M) and southwest (R1FF);
- Mixt commercial and residential to the southeast (AM10[2205]) and to the north (AM10[2676]);
- Institutional to the east (I1A[409]).

2. SCOPE OF THE INVESTIGATION

The objective of the mandate is to identify potential or actual contamination risks at the site due to current, past, and/or neighboring activities.

The scope of work of this Phase I ESA included:

- Reviewing the site's historical occupancy using relevant aerial photographs, directories, land title deeds and other sources;
- Reviewing geological and hydrogeological maps and well records, if available;
- Reviewing of the EcoLog Environmental Risk Information Services Ltd (ERIS) report for the site and neighbouring properties;
- Reviewing environmental records owned by different public institutions;
- Reviewing available environmental reports for the site;
- Conducting a site inspection and interviews with representatives;
- Reviewing the current use of neighbouring properties.

This Phase I ESA did not include any sampling, intrusive inspection or analysis of soil, groundwater or any other material.

GCL does not guarantee the completeness or accuracy of the information obtained. Appendix 9 outlines the limitations and general conditions related to the completed study.

3. RECORDS REVIEW

3.1. General

3.1.1. Phase I Study Area Determination

The site is located southwest of the intersection of Merivale Road and Viewmount Drive. The Phase I ESA included a review of the properties within a 250-meter radius of the site. This radius was used to determine if the neighboring properties may have impacted the soil and groundwater environmental quality at the site.

The neighboring properties are currently occupied by malls to the north and northeast, a high school to the east and residential properties to the west and south. Figure 1 in Appendix 1 illustrates the different uses of the neighboring properties within this radius.

3.1.2. First Developed Use Determination

Based on the information gathered, including title deeds, aerial photographs, historical plans and previous studies, the site was vacant and likely agricultural until its acquisition by Imperial Oil Limited Limited, a petroleum company, in 1956. The first building on the site was constructed in the 1960s, likely around 1968.

3.1.3. Fire Insurance Plans and Documents

An information request was sent on June 14, 2024 to *Opta, Intelligence informationnelle inc.*, part of SCM Gestion des Risques (RMS) and SCMTech de SCM Services d'Assurances. On June 20, 2024, Opta responded that a single inspection report, dated 1977, was available, but no fire insurance plan could be found.

This inspection report was deemed relevant and therefore was ordered from *Opta*. A copy of this document is provided in Appendix 6. The main information from this report is summarized in Table 2 below.

Table 2 : Insurance Inspection Report

Date	Building	Heating system	Site Occupation	Neighbour Occupation
Nov. 1977	+ 30'x60' + Concrete floor + Construction year not specified	+ Suspended oil-fired heaters + Fuel oil tank type and location not specified	+ Auto repair garage	+ Not specified

3.1.4. Chain of Titles

Research of deeds of sale and title history was completed by ERIS on July 14, 2024. This research aimed to identify past site owners, types of transactions, changes in cadastral designation and any contamination or restriction of use notices. It also sought to determine if the site was owned or occupied by industrial or heavy commercial entities that could have contaminated the site. The title search traced ownership back to 1916 and is presented in Appendix 8.

According to this title search, the property is located in part of Lot 30, Concession 1 of Rideau Front. No changes in the cadastral designation was noted. The site has been owned by petroleum companies from 1956 to the present. The ownership history is as follows:

- From 1956 to 2022: *Imperial Oil Limited Limited*
- From 2022 to present : *Harnois Groupe Immobilier Inc*.

No leases, contamination, or restriction of use notices were identified by this title search.

3.1.5. City Directories

City directories list the residents or companies occupying the territory by address. For the Nepean area, directories are available from the 1960s to the 2020s. ERIS searched these directories to obtain information about the site.

According to this search, the site has been used as a gas station since 1971:

- 1971: Beckstead service center service station
- 1976 to 2012: Esso
- 2017 and 2021: Canadian Tire

A restaurant was also listed for the site in 1997 and 2017.

3.1.6. Environmental Reports

Numerous environmental reports concerning the site and/or adjoining properties were brought to the attention of GCL. These reports are summarized in the following sections. The full reports are presented in Appendix 6, along with the TSSA response to the access to information request, or in Appendix 7.

3.1.6.1 Phase I–Environmental Assessment - Barenco 2011

- Barenco inc., *Phase I Environmental Assessment 1660 Merivale Road Ottawa, Ontario*. November 9, 2011, Job Number 11010.

A Phase I – Environmental Assessment was conducted by *Barenco Inc.* in October 2011 on behalf of *Imperial Oi Limited*.

This study noted the presence of a gas station operated by Imperial Oil Limited Limited on the site since approximately 1968. The land had been owned by Imperial Oil Limited Limited since 1956.

In 2011, the site featured a service kiosk in the centre of the site with an attached canopy, three pump islands and four underground fibreglass fuel tanks (three with a capacity of 22,700 liters (L) and one with a capacity of 45,460 L) installed in 1987 in the northeast corner. Additionally, there was a car wash in the southern portion of the site. The neighbouring properties are residential to the west and south, and commercial to the north and east.

The report concluded that environmental risks were identified due to the gas station's operations on the site. Specifically, the risks included the underground tanks in the northeast corner, a former mechanical garage from 1968 to 1984 located to the west of the current kiosk and the presence of unknown backfill material on the site.

3.1.6.2 Phase II/Baseline Environmental Assessment – Barenco 2011

- Barenco inc., *Phase II Environmental Assessment 1660 Merivale Road Ottawa, Ontario*. September 14, 2011, Job Number 11010.
- Barenco inc., *Baseline Environmental Assessment 1660 Merivale Road Ottawa, Ontario*. December 5, 2011, Job Number 11010.

Soil and groundwater Phase II and baseline environmental assessment were conducted by *Barenco Inc*. in September 2011 on behalf of *Imperial Oil Limited Limited* as part of a due diligence prior to the replacement of underground tanks. A granulometric analysis of natural soils was carried out by *EXP Associates Inc*. using soils collected during the environmental characterization.

Over this initial characterization, five boreholes were drilled to bedrock, with bedrock coring to a depth of 5.8 m. Observation wells were installed in each borehole. The wells were located to the west (TH1 and TH2) and east (TH4 and TH5) of the pump islands, as well as to the west of the underground tanks (TH3).

The studies determined that the natural soils on the site are till composed of sandy and clayey silt with a hydraulic conductivity of approximately 10^-5 cm/s. Bedrock was encountered between 2.7 and 3.4 m below ground surface (BGS).

The analyses demonstrated the absence of soil contamination in the five boreholes.

Groundwater was encountered between 3.15 and 4.21 m BGS, generally around the level of the top of the bedrock. No free phase was observed in the wells. Groundwater flow was directed towards the southwest, as indicated by the measured water level elevations.

Groundwater analyses revealed contamination above Table 3 standards in three of the five wells (TH3, TH4 and TH5) for petroleum hydrocarbon parameters F1 to F4, Hexane (Ha) and BTEX.

In October 2011, two additional boreholes were drilled further south, west and east of the car wash. Observation wells were also installed in the bedrock. No contamination above selected standard was detected in the soils and groundwater from these wells.

3.1.6.3 Tank Replacement Program– Barenco 2011

- Barenco inc., *Tank Replacement Program 1660 Merivale Road Ottawa, Ontario*. December 23, 2011, Job Number 11010.

A tank replacement program was conducted in December 2011 on behalf of *Imperial Oil Limited Limited*, with the service station operating under the ESSO banner.

The four underground tanks present on the site were emptied, cleaned, dismantled and then removed in October 2011. The underground piping connecting the tanks to the pump islands and ventilation pipes was left in place.

The bottom of the excavation and part of the walls consisted of bedrock or crushed stone. Samples were taken from the walls of the excavation where sand and gravel backfill material was present at nine locations on each wall. On-site measurements with a gas detector were taken. Fourteen soil samples from the walls were underwent chemical analysis. Low concentrations of BTEX were detected in some soil samples, but none exceeded the Table 5 standard.

Four piles of approximately 50 tonnes each of excavation material that could be reused were temporarily placed near the excavation. Sub-samples from each pile were taken during storage. Two of these samples were submitted for laboratory analysis, which confirmed the absence of contamination. A total of 627 tonnes of soil that could not be reused as backfill material was disposed of off-site.

The new tanks were installed in the excavation made for the removal of the old tanks. The excavation was backfilled with crushed stone from the uncontaminated material and other crushed stone.

3.1.6.4 Phase II–ESA / EXP 2013 - 2014

- Exp Energy Services Ltd., *Phase II Environmental Site Assessment Adjacent to 1660 Merivale Road Ottawa, Ontario*. December 5, 2013, Project Number 11010.
- Exp Energy Services Ltd., Supplemental *Phase II Environmental Site Assessment Adjacent to 1660 Merivale Road Ottawa, ON*. November 20, 2014, Project Number 11010.

An environmental characterization of soils and groundwater was conducted by Exp Energy Services Ltd (EXP) (formerly Barenco inc.) on behalf of Imperial Oil Limited Limited.

Five boreholes were drilled along the streets north of the property (Viewmount Drive, TH8 and TH9) and east of the property (Merivale Road, TH10 to TH12) to delineate the contaminated groundwater plume.

No soil contamination above Table 3 standard was detected. However, F1 and F2 contamination above Table 3 standards was found in the groundwater in the three wells located along Merivale Road. The groundwater level was found in the bedrock, encountered at 2.44 m BGS. The groundwater flow direction is towards the southwest. Well TH9 was dry.

In 2014, EXP conducted another characterization campaign in the neighboring streets, further from the site. Three additional wells (TH100 to TH102) were installed further east and northeast. No soil contamination above Table 3 standard was detected in samples from these boreholes. However, the groundwater in wells TH101 and TH102, located east of wells TH10 to TH 12 on Merivale Street, was contaminated above Table 3 standards with F1 and F2. The

well located northeast, TH100, did not show any contamination. Groundwater from well TH9 was contaminated above Table 3 standards with F1, F2, and F3.

3.1.6.5 Groundwater Monitoring– EXP 2014 et Golder 2015-2021

- Exp Energy Services Ltd., *2014 Ground Water Monitoring and Sampling Program 1660 Merivale Road Ottawa, Ontario*. October 8, 2014, Project Number 11010.
- Golder Associates, *Ground Water Monitoring and Sampling Program adjacent to 1660 Merivale Road Ottawa, ON*. May 6, 2016, Project Number 1536518-1155.
- Golder Associates, *2015 Supplemental Subsurface, Groundwater Monitoring and Sampling Investigation 1660 Merivale Road Ottawa, Ontario*. May 6, 2016, Project Number 1536518-1155.
- Golder Associates, *2016 Groundwater Monitoring and Sampling Report adjacent to 1660 Merivale Road Ottawa, ON*. November 21, 2016, Project Number 1544125-1155.
- Golder Associates, *2016 Groundwater Monitoring and Sampling Report Former Imperial Oil Limited retail Fuel Outlet 1660 Merivale Road Ottawa, Ontario*. January 31, 2017, Project Number 1544125-1155.
- Golder Associates, *2017 Groundwater Monitoring and Sampling Report adjacent to 1660 Merivale Road Ottawa, ON*. August 11, 2017, Project Number 1669090-1155.
- Golder Associates, *2017 Groundwater and Soil Vapor Probe Monitoring and Sampling Report Former Imperial Oil Limited retail Fuel Outlet 1660 Merivale Road Ottawa, Ontario*. February 16, 2018, Project Number 1669090-1155.
- Golder Associates, *2018 Groundwater and Soil Vapor Probe Monitoring and Sampling Report 1660 Merivale Road Ottawa, Ontario*. December 14, 2018, Project Number 1791706-1155.
- Golder Associates, *2019 Groundwater and Soil Vapor Probe Monitoring and Sampling Report 1660 Merivale Road Ottawa, Ontario*. January 31, 2020, Project Number 1791706-1155.
- Golder Associates, *2020 Groundwater and Soil Vapor Probe Monitoring and Sampling Report 1660 Merivale Road Ottawa, Ontario*. December 18, 2020, Project Number 1791706-1155.
- Golder Associates, *2021 Groundwater and Soil Vapor Probe Monitoring and Sampling Report 1660 Merivale Road Ottawa, Ontario*. September 9, 2021, Project Number 20447743-1155.
- Golder Associates, Supplemental Subsurface Investigation *1660 Merivale Road Ottawa, Ontario, Former Retail Fuel Outlet*. June 30, 2022, Project Number 21506016-1155.

Groundwater characterizations in wells on the site and in the surrounding streets were conducted by EXP and Golder Associates (Golder) on behalf of Imperial Oil Limited Limited. Sampling campaigns were carried out from 2014 to 2022.

In 2015, two wells (MW15-01 and MW15-02) were installed to the south of the car wash, near the southern boundary adjacent to the residential area. Two soil vapor probes (SV16-01 and SV16-02) were also installed in 2016 near the southern site boundary. Additionally, a damaged well (TH10) was replaced with MW16-01 on Merivale Road. In December 2021, two new wells (MW21-01 and MW21-02) were installed near the western boundary of the site, and two wells (MW22-01 and MW22-02) were installed east of Merivale Road in 2022. Three new vapor

probes were also installed near the southern (SV21-03), eastern (SV21-02), and western (SV21-01) boundaries of the site.

From 2011 to 2022, no groundwater contamination above Table 3 standards was detected in wells located on the west side of the facilities, including TH2, TH6, MW15-01, MW21-01, and MW21-02, and until 2019 in TH1. However, F2 to F4 contamination above Table 3 standards was measured in TH1 in 2020, and the well was damaged in 2021.
Contamination of F1 and F2 in well TH3 showed a decrease over time, meeting Table 3 standards by 2015, with only a brief rise in F2 concentration above Table 3 standards in 2021.

Concentrations of BTEX, Ha, F1, F2, and F3 in well TH4 also decreased over time. However, light non-aqueous phase liquid (LNAPL) was observed in the groundwater in 2021, leading to the sample not being analyzed. Lead (Pb) concentration was above Table 3 standards only in 2018. By 2022, concentrations were similar to those observed before 2021. All those concentrations were above Table 3 standards.

In well TH5, concentrations of BTEX, Ha, and F1 decreased, while those of F2, F3, and F4 initially increased in 2013 before declining in 2014 and rising again in 2016, with further increases from 2019 to 2021. Pb concentration was above Table 3 standards only in 2020-2021. All those concentrations were above Table 3 standards. LNAPL was observed in this well in 2022.

Well TH7 showed increasing concentrations of BTEX, F1, and F2 above Table 3 standards until 2014, falling below Table 3 standards by 2018. Well MW15-02, installed in 2015 south of TH7, exhibited BTEX, F1, and F2 contamination above Table 3 standards in 2015 and 2016 but has since been below this standard since 2017.

Overall, contamination appears to have slightly migrated southward and westward, with the main contamination still present in wells TH4 and TH5, located south and east of the pump islands.

Soil vapor samples from the probes installed were analyzed from 2016 to 2021, with concentrations found to be below the selected standards.

Groundwater monitoring was also conducted until 2017 in the wells located in the surrounding streets, with a general decrease in water concentrations noted in most wells from 2013 to 2021.

3.1.6.6 Contaminant Management Plan / Risk assessment – EXP 2015 et Golder 2016

- Exp Energy Services Ltd., *Interim Contaminant Management Plan 1660 Merivale Road Ottawa, Ontario*, April 2, 2015, Project Number 11010.
- Golder Associates, *Screening Level Risk Assessment – Right of-way adjacent to 1660 Merivale Road Ottawa, ON*, May 3, 2016, Project Number 1536518-1155.
- Golder Associates, *Contaminant Management Plan Adjacent to 1660 Merivale Road Ottawa, ON*, May 19, 2017, Project Number 1669090-1155.

An interim Contaminant Management Plan was recommended by EXP in 2015. This plan included annual monitoring of floating phase contaminants and groundwater analysis. Additionally, it suggested the installation of additional test holes and monitoring wells upgradient, cross-gradient, and downgradient to further delineate groundwater impacts.

In 2016, Golder Associates also recommended a Contaminant Management Plan for groundwater contamination in the surrounding streets. This plan involved annual monitoring of floating phase contaminants and groundwater analysis.

Golder Associates conducted a risk level analysis related to groundwater contamination in the rock in 2016. This analysis demonstrated that the groundwater contamination in the rock beneath the street did not pose a risk to human health or ecological receptors.

3.1.6.7 Soil and Groundwater Quality Investigation– GHD 2022

A soil and groundwater characterization was conducted by GHD for the Canadian Tire Corporation (CTP) in August 2022. This study aimed to compare the current state of contamination to that present in 2011, before CTP began operating the service station on the site.

Groundwater was sampled from existing wells on the site, and drilling was conducted near these wells to sample the soils. One of the wells (TH1) was no longer functional and was replaced with MW1-22.

The concentrations measured in soil samples taken above the bedrock and in the backfill materials were all below the applicable standards according to Table 3 of the MOE.

Groundwater concentrations in wells TH1, TH2, TH3, TH6, TH7, and MW15-02 were all below the Table 3 standards. However, exceedances were measured for BTEX, F1, and F2 in wells TH4 and TH5, which are located to the east and south of the pump islands.

3.1.6.8 Professional Advice – Soil and Groundwater Quality and Conformity of Previous Studies– GCL 2022

In 2022, GCL conducted a review of previous studies for Harnois Energies. The objective was to evaluate whether Canadian Tire Petroleum, the tenant of the site from 2011 to 2022, had impacted the soil or groundwater at the site.

The previous studies reviewed in this report include those presented in sections 3.1.6.1 to 3.1.6.4, 3.1.6.6, and 3.1.6.7, as well as the groundwater monitoring on-site up to 2016 and off-site up to 2017, as detailed in section 3.1.6.5.

The review concluded that persistent groundwater contamination is present on-site, mainly in the areas to the east and south of the pump islands. A general reduction in concentrations was observed over time, with occasional increases likely due to solubilization caused by variations in groundwater levels.

3.1.6.9 Soil and Groundwater Environmental Quality on site

In summary, according to all the listed previous studies, no soil contamination above Table 3 standards for the parameters BTEX, PH F1 to F4, Ha, MTX and/or PAH was detected in any of the soil characterization conducted on-site.

Regarding groundwater, concentrations above Table 3 standards were measured on-site in the following wells:

- TH1 (2020): F2 to F4
- TH3 (2011 to 2014 and 2021): F1 and F2

- TH4 (all years): BTEX, Ha, F1 to F3, Pb in 2018, LNAPL in 2021
- TH5 (all years): BTEX, Ha, F1 to F4, Pb in 2020-2021, LNAPL in 2022
- TH7 (2014 to 2017): BTEX, F1 and F2
- MW15-02 (2015 and 2016): BTEX, F1 and F2

No concentrations above Table 3 standards were measured in wells TH2, TH6, MW16-01, MW21-01 and MW21-02.

Soil vapor monitoring probes were sampled for BTEX/VOC measurements, with all results being below the selected standards.

3.2. Environmental Source information

3.2.1. Public source information

A review of relevant existing data in public inventories, directories and other lists was performed by ERIS. The analysis focused on properties located within a 250-meter radius of the site. The information collected may indicate potential environmental concerns for the site. The ERIS review, including the list of the consulted public inventories, directories and other lists, as well as the properties within the selected radius, is presented in Appendix 8.

The following main points of concern for the site were noted from this analysis:

- Listed as a gas retail store (Private and retail fuel storage tanks, 1996);
- Four single wall underground gasoline storage tanks (three of 22 700L and one of 45 460L) registered in 1987 (List of expired Fuels Safety Facilities, oct 2023/ Fuel storage Tank historic, 2010);
- Four 25 000 L double wall fiberglass underground liquid fuel storage tanks registered in 2011 (Fuel Storage Tank, oct 2023);
- Registered from 2013 to 2022 as a generator of waste oils and lubricants, oil skimming and sludges, and light fuels (Ontario Regulation 347 Waste Generators Summary, 2022)
- Spill registered in 1988 from a container overflow of about 4.5 L of gasoline (Ontario Spills, 2023)
- Spill registered in 1992 due to plugged tank vent, resulting in 4-5 L spill of gasoline (Ontario Spills, 2023).

Additionally, some neighbouring properties were noted in the ERIS analysis, including:

- Merivale High School: Generator of different solvents, paints and fuel products (Ontario Regulation 347 Waste Generators Summary, 2022);
- 160 Viewmount: 450 L furnace oil tank spill on the floor slab and ground contamination (Ontario Spills, 2023);
- 1642 Merivale Road: 10-gallon hydraulic oil spill from a Waste Management truck (Ontario Spills, 2023);
- 1642 Merivale Road: Multiple stores listed as generators of solvents, petroleum distillates and other products (Ontario Regulation 347 Waste Generators Summary, 2022);

- 1705 Merivale Road: Freon-22 leak to the atmosphere (Ontario Spills, 2023).
- 1642 Merivale Road: Occupied by a dry cleaner, pesticide store and other commercial stores.

According to the Phase I ESA summarized in 3.1.6.1 and presented in Appendix 6, the dry-cleaning store in the mall did not handle chemicals on-site, and only small quantities of pesticides were stored in the pesticide store.

The information gathered about the neighbouring properties does not represent a significant environmental risk for the property under study, considering their distance from the site, the limited volume of the spills, and/or the interior activities generally on a concrete floor.

3.2.2. Access to information requests

To complete the site information, access to information requests were submitted on June 14, 2024 to the MECP, the City of Ottawa and to TSSA to obtain any documented environmental information concerning the site.

The relevant information provided by these authorities is summarized in Table 3 below, while the complete documentation can be found in Appendix 6.

Table 3 : Access to information requests

Authority / Date of Answer	Type of Document - Date	Description of the Document	Considered as Environmental Risk
MECP	Occurrence report - 1992	**Spill of 4-5 L of gasoline** : The gasoline spilled onto the ground covered with snow due to a plugged tank vent. The gasoline was absorbed with a dry sorbent material and was disposed of offsite.	☒
	Hazardous waste information	Generation of wastes liquids by Imperial Oil Limited or Canadian Tire : 221-L, 251-L and 252-L	☐
City of Ottawa – Building branch **July 2 2024**	None	No site plan available	☐
City of Ottawa – HLUI **July 25 2024**	List of occupants of the site	Gasoline Service Stations: **1970**: Beckstead Service Station **1980**: Moe's Esso **2001**, 2006, 2012: Esso **1970**, 1980, 2005: Imperial Oil Limited **2017**: Canadian Tire Gas+	☒

Authority / Date of Answer	Type of Document - Date	Description of the Document	Considered as Environmental Risk
City of Ottawa – HLUI **July 25 2024**	List of occupants of the neighbouring sites	+ 1651 Merivale (800m N) Service station + 1642 Merivale (200-400 m N) • Browns cleaners (1980 to 2012) • Computer, ink, jewel sales stores	☒
TSSA **June 20, 2024**	Inspection reports	+ **1992 to 2022**: Several inspection reports, some indicating non-compliance with TSSA standards, and others to follow-up on corrections + **1995**: Apparent losses of regular gasoline, according to DIP records + **1992**: Spill (as reported by MECP)	☒
	Contaminant Management Plan	+ 2022 by Golder. See section 3.1.6	☒
	Groundwater monitoring reports	+ 2013 to 2022 by Barenco, EXP and/or Golder Associates. Refer to section 3.1.6	☒
	Correspondence	+ 2013 to 2022 by TSSA Reception of document or analysis of document	☒
	Environmental Assessment Phase I and II	+ 2011 by Barenco. See section 3.1.6	☒

3.3. Physical Setting Sources

3.3.1. Aerial Photographs

A review of available aerial photographs was conducted by ERIS. An aerial photograph was consulted for each decade, when available, and at any major change in land use as determined by the property's history. For this study, a review of aerial photographs from five different years was carried out, covering the period from 1950 to 1993. Furthermore, available satellite images of *Google Earth*™ from 2004 to 2022 were examined.

A detailed description of these aerial photographs and satellite images is provided in Table 4. The aerial photographs supplied by ERIS are also presented in Appendix 4.

In summary, the site was vacant until at least 1960. In 1975, the site was occupied by a building located west of the current store. This building was replaced by the existing store, including a canopy and a second building in the south section between 1982 and 1994.

Table 4 : Observation of Aerial Photographs

Aerial Photograph			Description of Observed Elements on the Site	Description of Observed Elements on Adjacent Properties	
Source	Year	Scale			
National air photo library	1950	1 : 10 000	The site is vacant and situated in an agricultural area.	North : South : East : West :	A road followed by an agricultural field and a house. Vacant agricultural fields. A road followed by vacant agricultural fields. Vacant agricultural fields.
National air photo library	1960	1 : 10 000	The site remains vacant, but the surface appears to be reworked or backfilled.	North : South : East : West :	No changes have been observed since 1950. Five residential buildings were constructed to the southeast. No change have been observed since 1950. Some residential buildings were built further west. This area appears to have been backfilled.
National air photo library	1975	1 : 10 000	A building was constructed in the center of the site. A paved area is present to the north and east of the building.	North : South : East : West :	The residential building has been demolished. New residential buildings were constructed to the southwest. Merivale Street appears to have been enlarged. Most of the current buildings east of this street were constructed. The street and residential buildings to the west were built.
National air photo library	1982	1 : 10 000	No changes have been observed since 1975.	North : South : East : West :	The current building with a parking area was constructed north of the street. No changes have been observed since 1975. No changes have been observed since 1975. No changes have been observed since 1975.
National air photo library	1993	1 : 10 000	The original building was replaced by a new structure to the east, which includes what appears to be a canopy to the north of the building. Another building is present to the south of the central one. The paved area was extended to the west and south.	North : South : East : West :	No changes have been observed since 1982. No changes have been observed since 1982. No changes have been observed since 1982. No changes have been observed since 1982.

Aerial Photograph			Description of Observed Elements on the Site	Description of Observed Elements on Adjacent Properties	
Source	Year	Scale			
Google Earth	2004		No changes have been observed since1993	North : South : East : West :	A building was constructed in the southeast section of the parking area north of Viewmount Drive and four buildings were built east of Merivale Road. No changes have been observed since 1993. No changes have been observed since 1993. No changes have been observed since 1993.
Google Earth	2012		A concrete slab appears to be present in the northeast corner of the site	North : South : East : West :	No changes have been observed since 2004.
Google Earth	2022		No changes have been observed since2012	North : South : East : West :	No changes have been observed since 2012. No changes have been observed since 2012. The building was extended to the northwest. No changes have been observed since 2012.

3.3.2. Topography, Hydrology, Geology

3.3.2.1 Topography

According to the topographic maps of the studied area (Ottawa 31G05), the site is located at an elevation of approximately 93 meters. The site is situated in an area with a general slope descending from north to south, and then southeast towards Nepean Creek, which is located approximately 360 meters southeast of the site. This creek subsequently joins the Rideau Canal to the east of the site.

Topographic maps from 1925, 1948, 1958, 1976, and 1998 were studied on the BAnQ website. These maps depict the site and the surrounding properties. Excerpts from these maps are presented in Appendix 1. The main observations made from these maps are summarized in Table 5.

Table 5 : Observation of Topographic Maps

Topographic Maps		Description of Observed Elements on the Site	Description of Observed Elements in the Area
Year	Scale		
1925 and 1948	1 : 63 360	+ Site is vacant	+ Merivale Road is present. + Canadian National Railway is present to the south. + Nepean Creek is present to the southeast and continues west of Merivale Road. + An east-west road is present to the north. + Isolated buildings are present around Merivale Road and the east-west road .
1958	1 : 50 000	+ Site is vacant	+ New developments are evident to the northwest.
1976	1 :50 000	+ Site looks vacant	+ The surrounding area is developed, including most of neighbouring sites. + Viewmount Drive is shown in its current form. + A school is present to the east of Merivale Road. + An isolated building is present north of Viewmount Drive. + Nepean Creek is no longer shown west of Merivale Road.
1998	1 :50 000	+ One building is showed on site	+ A shopping center is shown north of Viewmount Drive

The consultation of topographic maps showed that a building has been present on the site since at least 1998, and that the surrounding area was developed between 1958 and 1976.

A topographic plan by VRSB Arpenteurs-Géomètres, obtained from Harnois and presented in Appendix 5, shows the buildings, and infrastructure, as well as surface elevations. The plan indicates a slight elevation change from the northeast corner (approximately 87.8 m) to the southwest corner of the pavement (approximately 86.5 m). A significant drop in elevation is present south of the car wash, from 86.5 m to 85.3 m.

3.3.2.2 Geology

According to the Paleozoic Geology map of the Ottawa area from the Ministry of Natural Resources of Ontario (Map P2716, 1984), the bedrock in the site area is of lower to middle Ordovician age. It is part of a narrow band of the Oxford Formation, composed of sublithographic to fine crystalline dolostone, extending from east to west. This formation is surrounded to the north and south by the Rockcliffe Formation, which consists of interbedded fine-grained light greenish-gray quartz sandstone, shaly limestone, and shale.

Historical environmental studies indicate that the bedrock on the site is composed of limestone, encountered at depths ranging from 2.7 m to more than 5.5 m BGS.

3.3.2.3 Surficial deposits and unconsolidated deposits

According to the surficial geology map of the Ottawa area from the Geological Survey of Canada (Map 1506A, 1982), the site is located in an area of offshore marine deposits composed of clay and silt underlying erosional terraces. However, the northeastern part of the site is at the boundary between these deposits and glacial deposits composed of till.

Historical environmental studies on site report that the surficial deposits are composed of sand and gravel, approximately 1 to 2 meters thick, followed by brown to gray silt till.

3.3.2.4 Hydrology et Hydrogeology

The regional hydrographic network indicates that groundwater flow in the area is directed towards Nepean Creek, located approximately 360 meters to the southeast. This creek flows east towards the Rideau Canal, which then flows north to the Ottawa River.

Historical environmental studies suggest that groundwater flow is generally directed to the southwest. The groundwater level is around the interface between the bedrock and surface soils or within the bedrock, at depths varying between 2.3 m and 5.0 m BGS.

3.3.3 Fill Materials

Fill materials are likely present around all infrastructure, such as underground tanks and pipes, civil works (e.g., aqueducts, sewers, electrical wiring), pavement, building foundations, and site leveling. It should be noted that the car wash area is approximately 1.5 meters higher than the southern boundary of the site.

Previous studies indicate that a relatively homogeneous layer of sand and gravel, sometimes referred to as backfill material, is present under the pavement, with a thickness ranging from 1 to 2 meters. Samples from this layer were analyzed, and none exhibited concentrations above Table 3 standards.

3.3.4 Water Bodies, Areas of Natural Significance and Ground Water Information

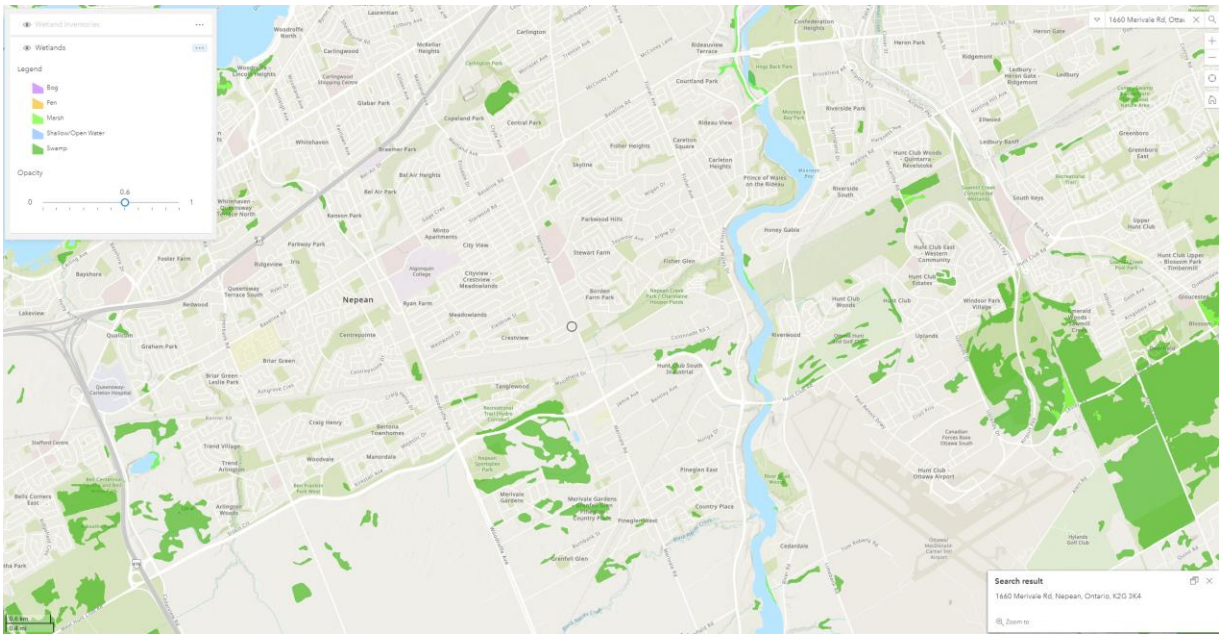
3.3.4.1 Water Bodies

No water bodies are present within a 250-meter radius of the site. The nearest water body is Nepean Creek, a tributary of the Rideau Canal, located approximately 350 meters southeast of the site.

3.3.4.2 Wetlands and Areas of Natural Significance

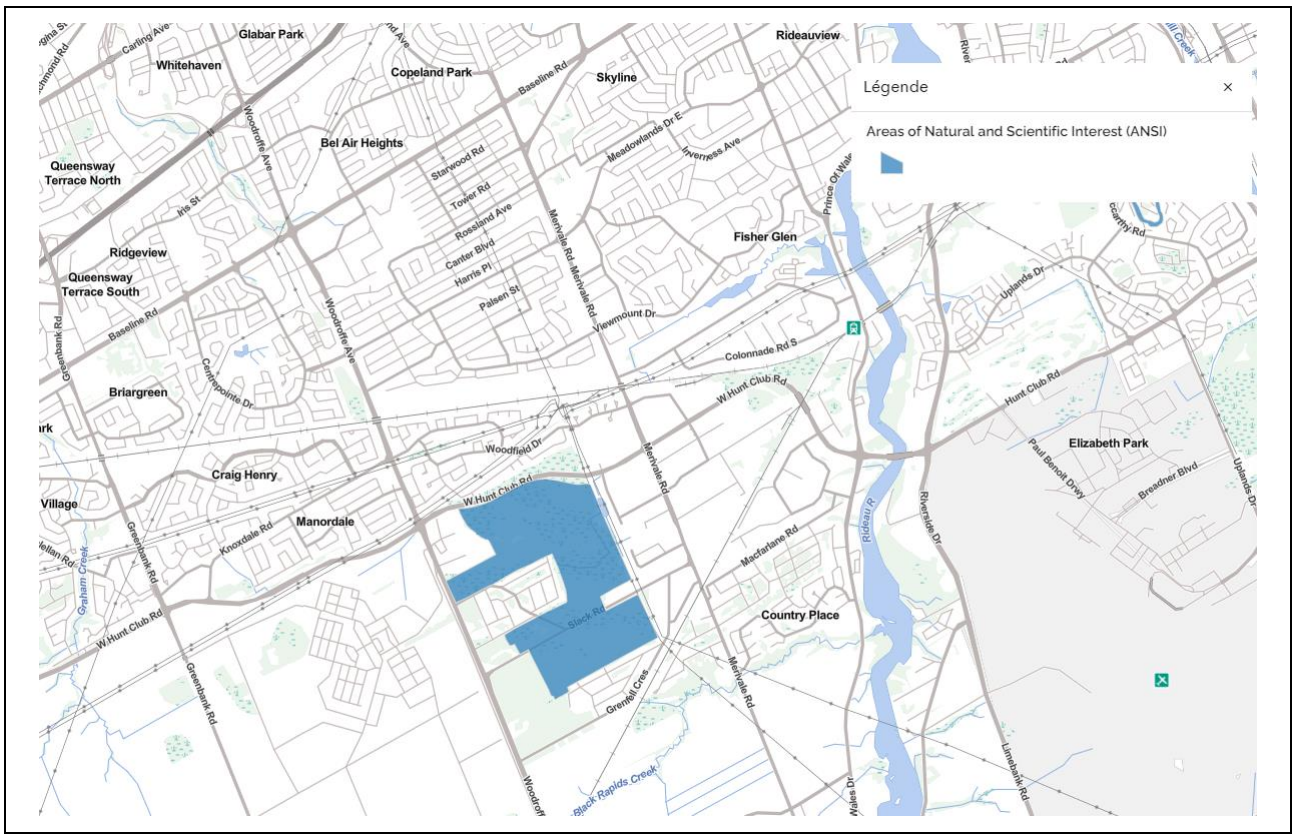
Research on wetlands was conducted on July 31, 2024, using the Ducks Unlimited Canada website. No wetlands were identified within a 250-meter radius of the site. A map showing the wetlands in the area is presented in Figure 1.

Figure 1 : Wetlands – Ducks Unlimited Canada



Research on areas of natural significance was also conducted on July 31, 2024, using the Ontario GeoHub map of Areas of Natural and Scientific Interest (ANSI) from Land Information Ontario. No ANSI sites were identified within a 250-meter radius of the site. A map showing the ANSI sites in the area is presented in Figure 2.

Figure 2 : ANSI – Land information Ontario



3.3.4.3 Potable Water Information

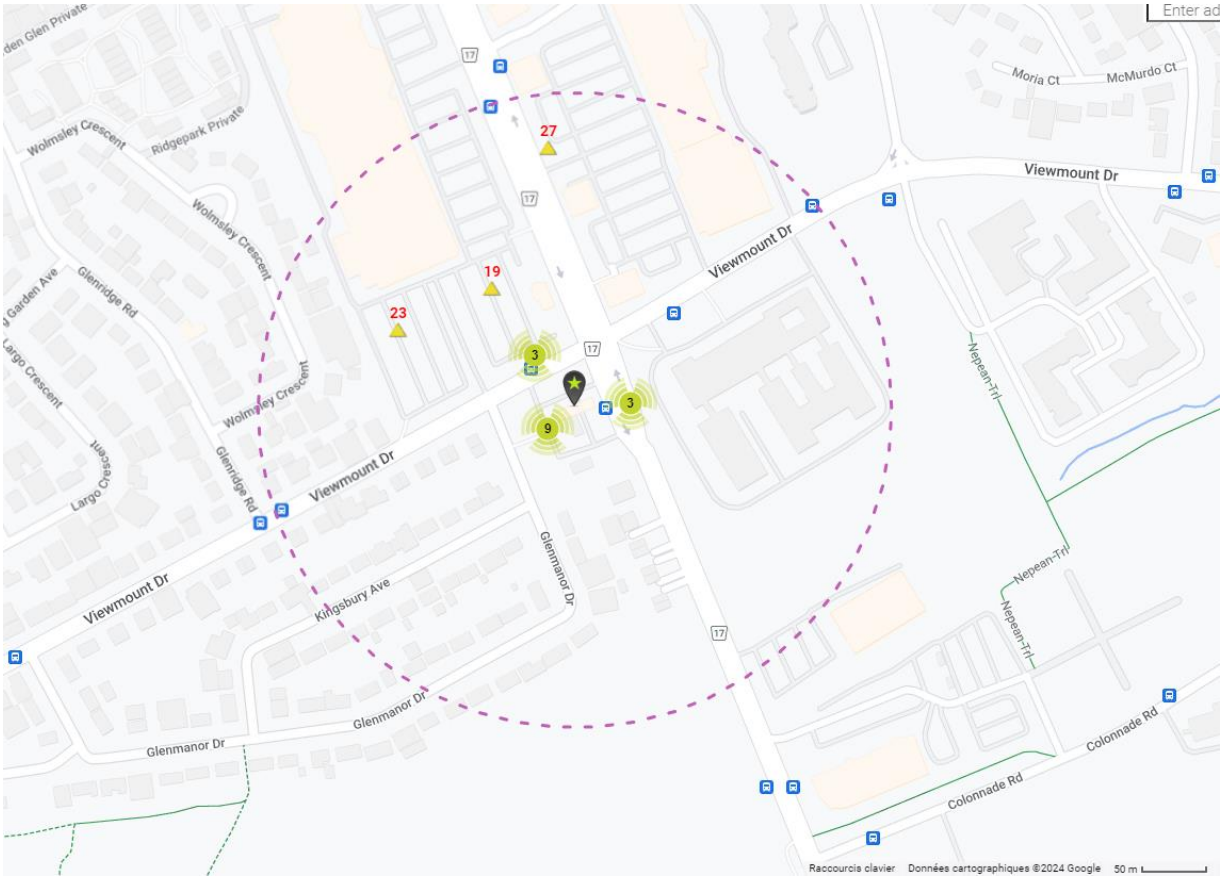
The City of Ottawa has a municipal aqueduct network for potable water. According to the Mississippi-Rideau Source Protection Plan (see Appendix 8), the City has two municipal surface water intakes in the Ottawa River, located approximately 6 km northeast (upgradient) and 8.5 km northwest (upgradient) of the site. Municipal potable water wells are also used in agricultural zones. The site is not located within the protection zones of these municipal water intakes.

3.3.5 Well Records

A total of 18 water wells was listed in the ERIS search results. Complementary information was obtained from the Well Records map on the MECP website. These wells appear to be used for environmental groundwater monitoring. Figure 3 from the ERIS system shows the location of these wells within a 250-meter radius. The wells on-site and in the neighboring streets are represented by triangles or grouped into icons indicating the number of wells in each small area represented by the icon.

The stratigraphy is generally described as sand and gravel fill material to a depth of 1 or 2 meters BGS, followed by silty gravel till down to the bedrock, which is found at depths ranging from 3 to 6 meters BGS. Water levels are generally not mentioned, with some exceptions indicating water levels between 3.0 and 4.1 meters BGS.

Figure 3 : Water Wells – ERIS



3.4. Site Operating Records

Harnois was requested to provide relevant documents concerning the site. Several environmental studies and contamination management plans (CMPs) from 2011 to 2022 were provided by Harnois. These documents are presented in Section 3.1.6.

No additional documents or plans were provided by Harnois. However, one of the reports analyzed in 2022 is a Phase I ESA conducted by Barenco in 2011. In the context of this ESA, Imperial Oil Limited, the owner at the time, provided site plans. These plans are listed and described in chronological order below:

- **Feb., 1968 - Survey plan**: The site boundaries are shown, but no buildings are depicted.
- **Jan. to Nov 1984 - Site plans**: Two buildings are shown on the site: a sales kiosk in the middle and a car wash to the southwest. A change in elevation is indicated south of the car wash. Four underground tanks (three with a capacity of 25,000 L and one with a capacity of 45,000 L) are shown in the northeast corner of the site. A canopy with three pump islands is located north of the sales kiosk. The plans also show former pump islands to be removed, one north of the sales kiosk and one to the east. Additionally, a three-bay service station is indicated for removal. Underground drainage, sewer, aqueduct, and electrical infrastructure are also shown on these plans.

- **April 1984 - Canopy detail drawing**: This plan illustrates the connection details for the canopy.
- **January 1984 - Piping details plan**: This plan provides details of the piping for the underground tanks, including a plan view of the pipes connecting the tanks to the pump islands.
- **February 1992 - Floor/equipment plan for the kiosk**: This plan details the interior of the store, including the toilets and freezer to the southeast, the mechanical room to the southwest, and what appears to be a food counter.
- **August 2009 - Sketch**: This sketch appears to show the updated piping arrangements between the underground tanks and the pump islands.

These documents are available in Appendix 5.

4. INTERVIEWS

Questions were addressed to Mr. Jean-Philippe Wilkins, Director, Operations and Real-Estate Development, and authorized representative of the owner, and to Mr. Martin Caron, Chief Property Manager for Harnois, which owns the site since 2022.

The owner's representative informed the interviewer that no modifications have been made to the petroleum infrastructure or the buildings since they took ownership, except for a banner change. However, the suspended natural gas infrared tube heaters in the car wash's mechanical room have been replaced with a similar new system.

Mr. Caron mentioned that all of Harnois' sites are equipped with spill kits. For the site under study, no spills or leaks exceeding one liter of gasoline have been registered since 2022, and therefore, no spill registry has been filled out. Minor spills of approximately 0.1 liters may have occurred occasionally. In the event of a spill, absorbent material is used to absorb the product and contain the spill. The used absorbent material is then placed in an identified 208-liter drum located west of the site and managed by Veolia for disposal at an authorized site when convenient. It typically takes more than a year to fill the drum due to the small quantities of absorbent used.

5. SITE RECONNAISSANCE

5.1 General Requirements

The site visit was conducted on July 8, 2024, from approximately 10:00 to 11:00 a.m. by Mr. Mathieu Bélisle, P.Eng., M.App.Sc., and Project Manager at GCL. The visit took place on a sunny day, and the gas station and car wash were operating normally for a weekday.

A photographic report, which includes relevant views and brief descriptions, is presented in Appendix 3. A plan showing the orientations of the photographs precedes the photographic report.

5.2 Site Observations

5.2.1 General Site Observations

Table 6 presents the physical characteristics of the site.

Table 6 : Property description

Aspect	Description
Use (commercial, industrial or other)	+ Commercial: gas station with a convenience store and a car wash
Site limits (Visibility, fence, ditch, watercourse)	+ South and west limits: fence + South limit: trees + North and east limits: open area
Site Access	+ Two car access east of the site from Merivale Road + Two car access north of the site from Viewmount Drive + One pedestrian access west of the site from Glenmanor Drive
General description of the site	+ Convenience store in the center (1984) + Car wash south of the store (1984) + Asphalted area around the main building in poor condition numerous cracks + Pump island and canopy north of the store + Underground storage tanks in the northeast corner of site

Aspect	Description
General description of the buildings	✚ Convenience store: • One story without a basement, • Concrete slab covered with ceramic and/or floor vinyl tiles • Steel frame with brick and/or metal exterior cladding • Sales area in the north section with access from the east and west sides • Office and storage area, including a cold room south of the sales area • Toilet room located southeast, accessible from outside ✚ Car wash : • one story without basement • Concrete slab cover • Steel frame with a brick and/or metal exterior cladding • Washing area in the north with access from the east and west sides • Mechanical room in southwest section • Storage room in southeast section
General description of the petroleum infrastructures	✚ Canopy north of the store with three dispensers on individual pump islands with a concrete slab generally in good condition ✚ Four 25,000 L double wall fiberglass underground gasoline storage tanks located in the northeast corner of the site, covered by a concrete slab ✚ No above-ground petroleum tanks
Other installations	✚ Propane gas tanks rack located east of the store ✚ Air pressure service kit located northwest of the car wash ✚ Garbage bins located west of the asphalted area
Other known underground infrastructure	✚ Sewer and aqueduct southeast of the store ✚ Electricity wires between the streetlamps and between the buildings ✚ Natural gas line southwest of the car wash
Presence of lakes and/or water course	✚ No
Presence of wells	✚ No potable water well on site ✚ Groundwater monitoring wells (some damaged)
Condition (vegetation, drainage network, surface water and sediment)	✚ Grass and tree cover along the west and south limits of the site, in the northeast corner, between the site entrance north and east, and northwest of the car wash ✚ Water drains east and west of the car wash

Aspect	Description
Topography	+ Small descending slope from northeast to southwest, more pronounced south of the car wash
Sensitive or critical environments for diversity	+ No
Sensitive users	+ No
Archeological potential	+ No

5.2.2 Enhanced Site Investigation

The general operation on site includes a gas station located north of the convenience store. Underground storage tanks are situated in the northeast corner of the site, while gasoline dispensers are positioned on individual pump islands under the canopy north of the store. A car wash is located south of the store. No industrial activities are conducted on site.

Table 7 presents the site observations and identified environmental risk.

Table 7 : Observation and Potentiel Risk Aspects

Aspect	Observed		Description	Considered as environmental risk
	Yes	No		
Heating and cooling systems (type et localisation)	☒	☐	+ Electric heating and climate control systems for the store including a rooftop unit + Suspended natural gas infrared tube heater for the car wash + Natural gas used for the car wash hot water system	☐
Former heating system	☐	☒	+ No information available	
Soil pile, fill, excavation and reworking zones	☒	☐	+ Significant denivelation south of the car wash, with the potential presence of backfill materials	☒
Spills, leaks, explosions and visible traces on the ground	☒	☐	+ Some stains were observed on the concrete slab of the pump islands	☒
Ground stain (hydrocarbons or other)	☒	☐	+ Some stains were noted on the concrete slab of the pump islands	☒
Area likely to produce biogas (organic matter backfill)	☐	☒	+ No	☐

Aspect	Observed		Description	Considered as environmental risk
	Yes	No		
Barrel, raw material, residual material, equipment (description and volume)	☒	☐	+ Car wash soap stored in the mechanical room southwest of the car wash + Drums for used absorbent located west of the pavement	☐
Residual hazardous materials	☒	☐	+ Used absorbent is collected in a drum and managed through Veolia	☐
Visible information on drums, canisters, tanks, etc.	☐	☒	+ Soap, wax and drying agent in the car wash	☐
Storage and transshipment area	☒	☐	+ Storage area south of the convenience store + Cleaning products stored in the mechanical room of the car wash	☐
Presence of reservoir (location, contents, capacity, size, age, piping and venting, general condition)	☒	☐	+ Underground storage tanks located in the northeast corner of the site + Vent pipes are situated northeast of the tanks	☒
Presence of oil/water separators	☐	☒		☐
Wastewater discharge points	☐	☒	+ Sewer east of the building	☐
Drain and sump	☒	☐	+ Drains east and west of the car wash, west of the store, and west of the site. No stains noted	☐
Presence of transformers or other equipment that may contain oils and/or PCBs	☐	☒	+	☐
Other high-risk components e.g. elevators, hydraulic cylinders, freight elevators, compactors	☒	☐	+ Gasoline dispensers on three pump islands north of the store	☒

Table 8 presents the visual observations made regarding the presence of substances requiring special attention. It should be noted that no exhaustive verification, wall openings, or sampling of materials was conducted within the scope of this mandate. A description of these substances, their effects, and the regulatory context surrounding them is provided in Appendix 10.

Table 8 : Substance Requiring Special Attention

Substance	Observed		Description
	Suspected (S)	Not S	
Asbestos	☐	☒	Given the age of the buildings (1984), the presence of asbestos-containing materials is unlikely.
Polychlorinated biphenyls (PCB's)	☐	☒	Given the age of the buildings (1984), presence of PCB's is unlikely.
Halocarbons	☐	☒	Given the presence of a cold room in the convenience store, which has likely been in place since 1984, the presence of halocarbons is possible
Urea-formaldehyde insulating foam (UFIM)	☐	☒	Given the age of the buildings (1984), presence of UFIM isolating materials is unlikely.
Pb based paints	☐	☒	Given the age of the buildings (1984), presence of Pb based paints is not suspected.
Moisture	☐	☒	No traces of moisture were observed during the site visit.

5.3 Immediate neighborhood

Attention was given to the immediate neighbors during the site visit to identify potential environmental hazards that could pose a risk to the property under study. This summary assessment was conducted from the boundaries of the property and/or from public roads. The key findings are presented in Table 9.

Table 9 : Neighbours description and potential risk elements

Aspect	Description	Considered as environmental risk
Neighbour's activities	+ North: Viewmount Drive followed by a parking area and mall	☐
	+ South : Residential buildings	☐
	+ East : Merivale Road followed by a high school	☐
	+ West : Glenmanor Drive followed by residential buildings	☐

Aspect	Observed		Description	Considered as environmental risk
	Yes	No		

Aspect	Description			Considered as environmental risk
Underground or aboveground storage tank	☐	☒		☐
Potable water well, observation well, ditch	☐	☒		☐
Water course (water level, flow rate)	☐	☒		☐
Sensible use or ecosystem	☐	☒		☐

5.4 Written Description of Investigation

A gas station and a car wash were operating on site during the inspection. The car wash appeared to be in good condition, and no concerns were noted regarding this activity.

For the gas station, no major stains were observed during the visit. However, minor stains were noted around the pump islands, and the asphalt surface around the canopy was cracked. Overall, the main environmental concerns on site are the underground storage tanks, the dispensers at the pump islands, and the underground pipes connecting these infrastructures.

6. REVIEW AND EVALUATION OF INFORMATION

6.1 Current and Past Uses

Table 10 lists the activities observed on site, from this day back to when the site was still vacant.

Table 10 : Reverse chronological list of activities on site

Owner	Occupant	Activities	Period	Description of activities considered as an environmental risk
Harnois	Esso, Proxy	Gasoline Service Station with convenience store and car wash	2022 until now	Four underground storage tanks, three pump islands, underground pipes
Imperial Oil Limited	Canadian Tire, Tim Hortons	Gasoline Service Station with convenience store, restaurant and car wash	2012 to 2022	Four underground storage tanks, three pump islands, underground pipes
Imperial Oil Limited	Esso	Gasoline Service Station with convenience store and car wash	1984 to 2012	Four underground storage tanks, three pump islands, underground pipes
Imperial Oil Limited	Moe's Esso	Mechanical garage with Service Station	Early 1980s	Underground storage tanks, two pump islands, underground pipes, Mechanical garage
Imperial Oil Limited	Beckstead Service Station	Mechanical garage with Service Station	1968 to 1970s	Underground storage tanks, two pump islands, underground pipes, Mechanical garage
Imperial Oil Limited	Vacant	Vacant	1956 to 1968	
Individuals	Vacant	Vacant	Up to 1956	

6.2 Potentially contaminating activity

The activities that have occurred on-site since its initial construction were compared to Table 2 of Section 19 from O. Reg. 153/04. The following potentially contaminating activity (PCA) listed in this table was identified as having occurred on the site à:

- 28: Gasoline and Associated Products Storage in Fixed Tanks (from the 1960's to now)

6.3 Areas of Potential Environment Concern

The areas of potential environmental concern (APEC) identified on site in this Phase I ESA are summarized in table 11.

Table 11 : Environmental risks

Area No.	APCE	PCA	Surface (m^2)	Potential Contaminants	Media Potentially impacted
1	Underground storage tanks in the northeast corner of the site since 1968	Gas station from the 1960s to present	150	BTEX, PH F1 to F4, Ha, Pb	Soil, Groundwater
2	Pump islands north of the store since 1984		250	BTEX, PH F1 to F4, Ha, Pb	Soil, Groundwater
3	Underground pipes connecting the pump islands and the underground tanks		200	BTEX, PH F1 to F4, Ha, Pb	Soil, Groundwater
4	Former pump islands north and east of the store from the 1960s to 1984		2x 50	BTEX, PH F1 to F4, Ha, Pb	Soil, Groundwater
5	Former mechanical garage west of the store from the 1960s to 1984	Mechanical garage from the 1960's to 1984	175	BTEX, PH F1 to F4, Ha, PAH, MTX	Soil, Groundwater
6	Car wash in the south section since 1984	Car wash since 1984	125	BTEX, PH F1 to F4, Ha, PAH, MTX	Soil, Groundwater

These APECs are presented in Figure 2 of Appendix 2. Note that 5 L gasoline spills were registered for the site in 1988 and 1992, occurring in the areas of the underground tanks and the pump islands. These spills corroborate the APECs presented in Table 12.

Furthermore, according to numerous previous studies, groundwater contamination is present on site and is considered a real environmental concern (REC) due to the APECs. The groundwater level is located at the contact between the bedrock and the soil surface or within the bedrock fractures at a depth of approximately 3 to 5 meters BGS. The groundwater is contaminated primarily with BTEX, PH F1 to F4, and Ha, with occasional exceedances of Pb in two wells in 2018 and 2020–2021.

Additionally, according to the numerous studies, the backfill material is relatively homogeneous and consists of sand and gravel without signs of debris or contamination. It was likely newly imported backfill used for pavement, buildings, and other infrastructure foundations. All available backfill concentration measurements comply with Table 3 standards. Although a systematic validation of backfill has not been performed, it is not considered a significant APEC based on the available information.

In addition to groundwater and soil, gas vapor measurements taken at the site limits have not indicated any concerns regarding volatilization or infiltration risks.

As presented in section 3.2.1, no significant APEC issues were identified from properties off-site based on the public sources reviewed by ERIS. No environmental concerns from neighboring properties were noted during the site visit.

6.4 Phase I Conceptual Model

The Phase I ESA results are synthesized by developing a qualitative conceptual model of the site. This model helps identify potential contaminant sources, the types of contaminants, and the primary migration and exposure pathways.

Figure 4 schematically illustrates the potential current sources of contamination on site and their migration and exposure pathways. Table 12 summarizes the information related to the property's description, the main potential receptors, and potential sources of contamination.

Figure 2 of Appendix 2 provides a plan view of the potential contaminant sources.

Figure 4 : Conceptual Model

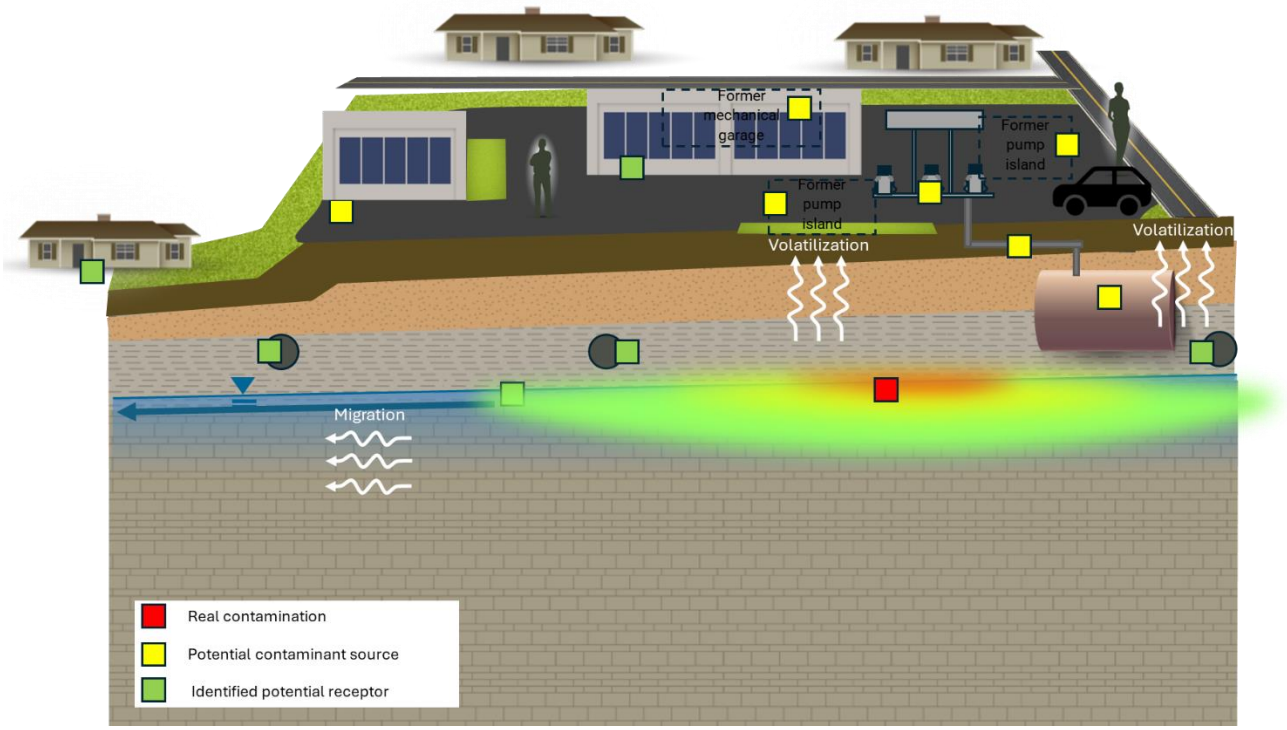


Table 12 : Summary of information

Site Address	1660 Merivale Road, Nepean, Ottawa, Ontario
Geographical Coordinates of the Land	Lat. : 45,343350 Long.: -75,729600
Lot number	Part of Lot 30, concession 1 of Rideau Front
Land Area (m^2)	1 968,10 m^2
Landowner	Harnois Groupe immobilier Inc.
Land Occupants	+ Commercial : • Proxy (convenience store with car wash) • Esso Service-Station
Former land occupants	+ Commercial: • Convenience store since 1984 with or without restaurant • Car wash since 1984 • Service station since 1968 • Mechanical garage from 1968 to 1984
Current Use	Commercial
Future Use	Commercial
Municipal Zoning	AM10 (Arterial Mainstreet Zone)
Permitted Uses	+ Commercial + Residentials
Neighbours	+ North: Viewmount Drive followed by a parking and a mall + South: Residential buildings + East: Merivale Road followed by a school + West: Glenmanor Drive followed by residential buildings
Site Description	+ Two buildings: Convenience store and car wash + Convenience store: one story without a basement, featuring sales, office and storage areas as well as a cold room and wash room + Car wash: one story without a basement, with a washing area and mechanical room and storage room
Topography and Surface	+ Small descending slope to the southwest, more pronounced south of the car wash + Convenience store (95 m^2): concrete slab primarily with ceramic cover, generally in good condition + Car wash (110 m^2): concrete slab + Pump island: concrete slab, generally in good condition + Circulation area: asphalt pavement in poor condition, with numerous cracks + Grass and tree cover along the west and south limits of the site, in the northeast corner, site entrances and northwest of the car wash
Potential Contamination sources	+ Underground storage tanks in the northeast corner since 1984, possibly since 1968 at this location + Pump islands north of the store since 1984 + Underground pipes between the underground tanks and the pump islands + Former pump island north and east of the store from 1968 to 1984

	+ Former mechanical garage west of the store from 1968 to 1984 + Car wash in the south section since 1984
Real contamination identified	+ Groundwater : BTEX, PH F1-F4, Ha and Pb contamination in some wells since 2011, mostly in the east side of the site
Potential receptors and exposure pathways	+ Sewer on site and under neighboring streets; + Buildings on site and south neighboring buildings
Selected Standards	+ On. Reg 153/04, Table 3 Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition / Fine textured soils
Geology	+ Sand and gravel backfill material up to 1 or 2 meters thick + Brown to grey silt till up to 3 to 5 m BGS + Limestone bedrock at depths of 2,7 to more than 5,49 m BGS
Hydrogeology	+ Groundwater flows to the southwest + Groundwater level is around the interface of the bedrock and the surface soils or in the bedrock, at depths varying between 2.3 m and 5.0 m BGS
Potential Contamination Substances	+ Gasoline (underground tanks, pump islands, underground pipes, former pump islands, former mechanical garage, car wash): BTEX, PH F1 to F4, Ha, Pb + Oils, used oils, lubricants (former mechanical garage, car wash): PAH's, MTX
Potentiel Light Non-Aqueous phase liquids (LNAPL)	+ Gasoline: BTEX, PH F1 to F4

The conceptual model identified potential sources of contamination related to the petroleum infrastructure on site, which has been present since approximately 1968. Currently, these infrastructures include four underground storage tanks in the northeast corner of the site and three pump islands located southwest of these tanks, with underground pipes connecting them.

Additional potential sources of contamination were identified, including a mechanical garage that operated on site from the 1960s to 1984, located west of the current store, and former pump islands that were situated north and east of the current store. No soil verifications have been conducted at the locations of these former infrastructures.

7. CONCLUSION AND RECOMMENDATIONS

The property is occupied by a gas station with a convenience store and a car wash. As part of a project to be submitted to the City, Phase I and II Environmental Site Assessments (ESAs) are required. These assessments are not intended to register a Record of Site Condition.

GCL has been commissioned by Harnois, the owner of the site, to conduct a Phase I ESA on the property located at 1660, Merivale Road, Nepean, Ottawa, Ontario. This is in accordance with the service proposal dated June 6, 2024, (Ref No: 2024-126-CE-REV2).

The objective of the mandate is to identify potential or actual contamination risks at the site due to current, past, and/or neighboring activities.

Based on the analysis of the information gathered, the following environmental risks have been identified:

Table 13 : Environmental Risks

Risk #	Risk Identification	Area (m^2)	Analytical Parameters
1	Underground storage tanks in the northeast corner of the site probably since the 1960s	150	BTEX, PH F1 to F4, Ha, Pb
2	Pump islands north of the store since 1984	250	BTEX, PH F1 to F4, Ha, Pb
3	Underground pipes connecting the pump islands and the underground tanks	200	BTEX, PH F1 to F4, Ha, Pb
4	Former pump islands north and east of the store from the 1960s to 1984	2x 50	BTEX, PH F1 to F4, Ha, Pb
5	Former mechanical garage west of the store from the 1960s to 1984	175	BTEX, PH F1 to F4, Ha, PAH, MTX
6	Car wash in the south section since 1984	125	BTEX, PH F1 to F4, Ha, PAH, MTX
7	BTEX, PH F1-F4, Ha and locally Pb contamination in groundwater	-	BTEX, PH F1-F4, Ha and Pb

Therefore, a Phase II ESA is recommended for the identified risk areas.

8. REFERENCE

CSA, 2022. *Z768-01 Évaluation environnementale de site, Phase I,* Association canadienne de normalisation, 32 pages.

Gelogical Survey of Canada, 1982. Surfical Geoligy - Ottawa, Map 1506A (31G5).

MECP, Brownsfield Registry website, consulted by ERIS.

MECP, Environment Registry website, consulted by ERIS.

MECP, Guide : site assessment, cleanup of brownfields, filing of records of site condition, 2004 consulted in July 2024.

MECP, Guide for completing phase one environmental site assessments under Ontario Regulation 153/04, 2004 consulted in July 2024.

MECP, Hazardous Waste Information Network website, consulted by ERIS.

MNRF, Make a Map : Natural Heritage Areas, consulted in July 2024.

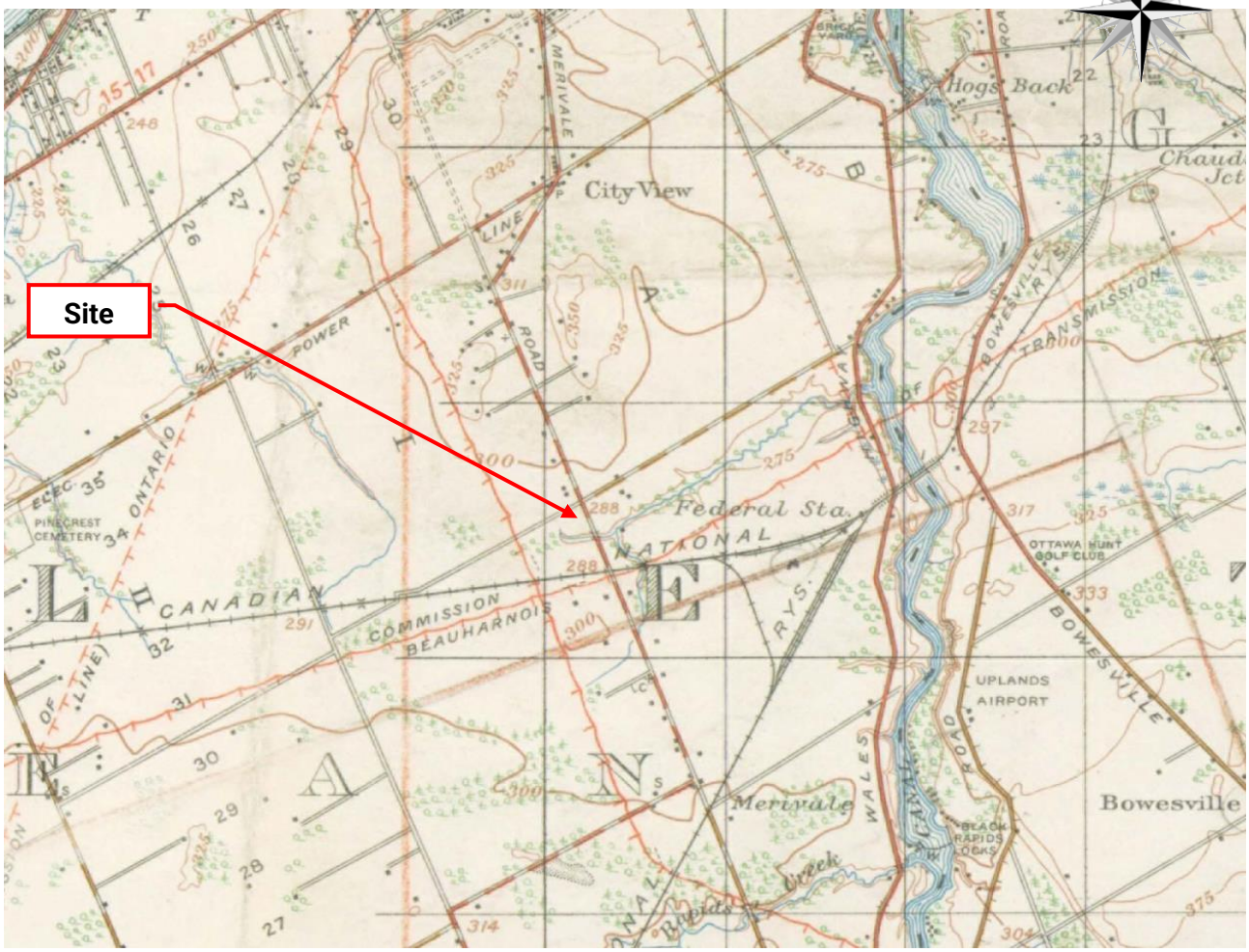
MNRO, 1984. Paleozoic Geology Ottawa Area, Map P.2176.

NRC, 1925 to 1998. Topographic Map – Ottawa Area, Sheet N ° 31G05.

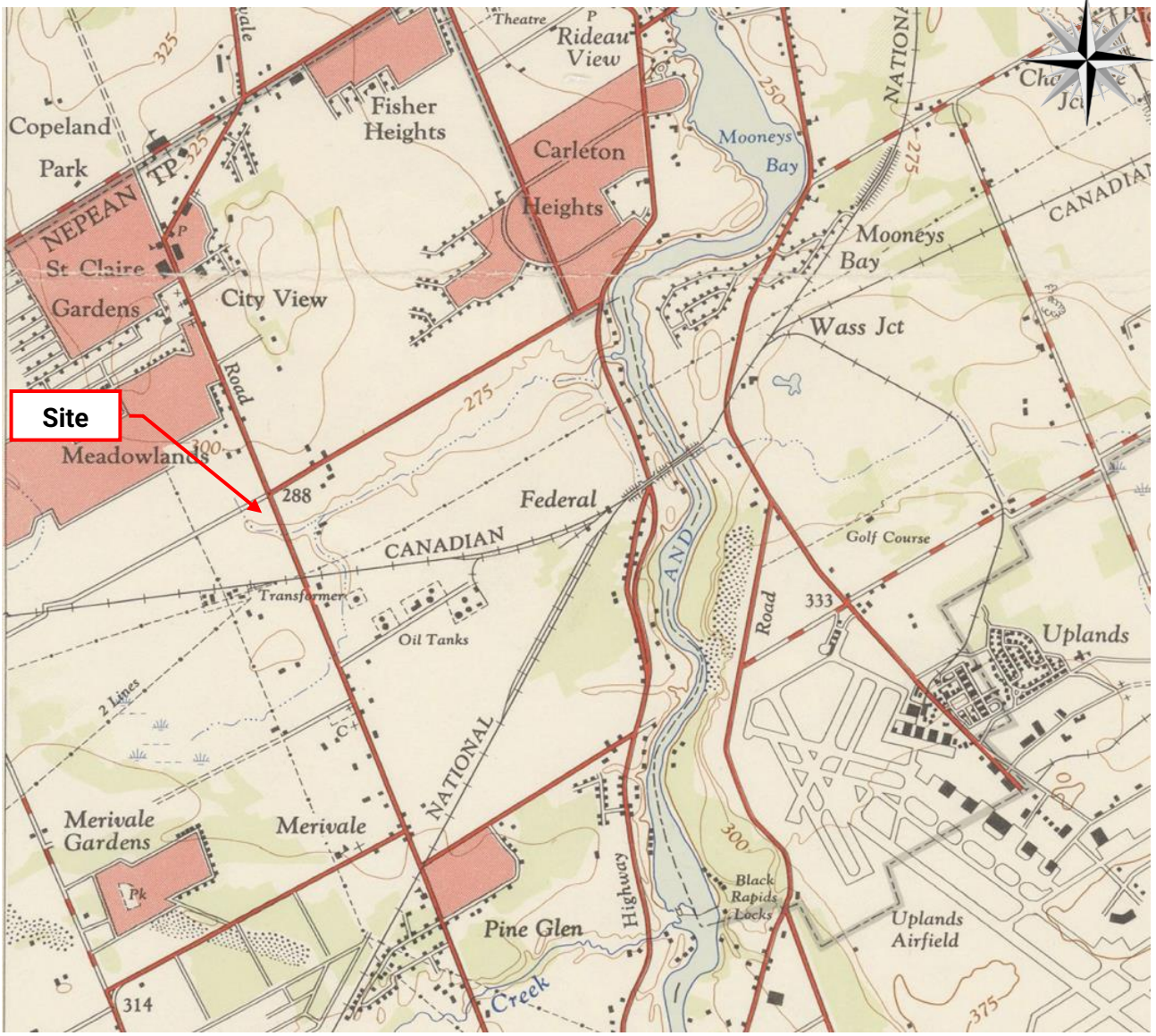
Oil Gas & Salt Ressources Librairy website, consulted by ERIS.

Ontario Regulation 153/04 (as amended by Regulation 362/23) from Part XV.1 of the Environmental Protection Act, December 2023.

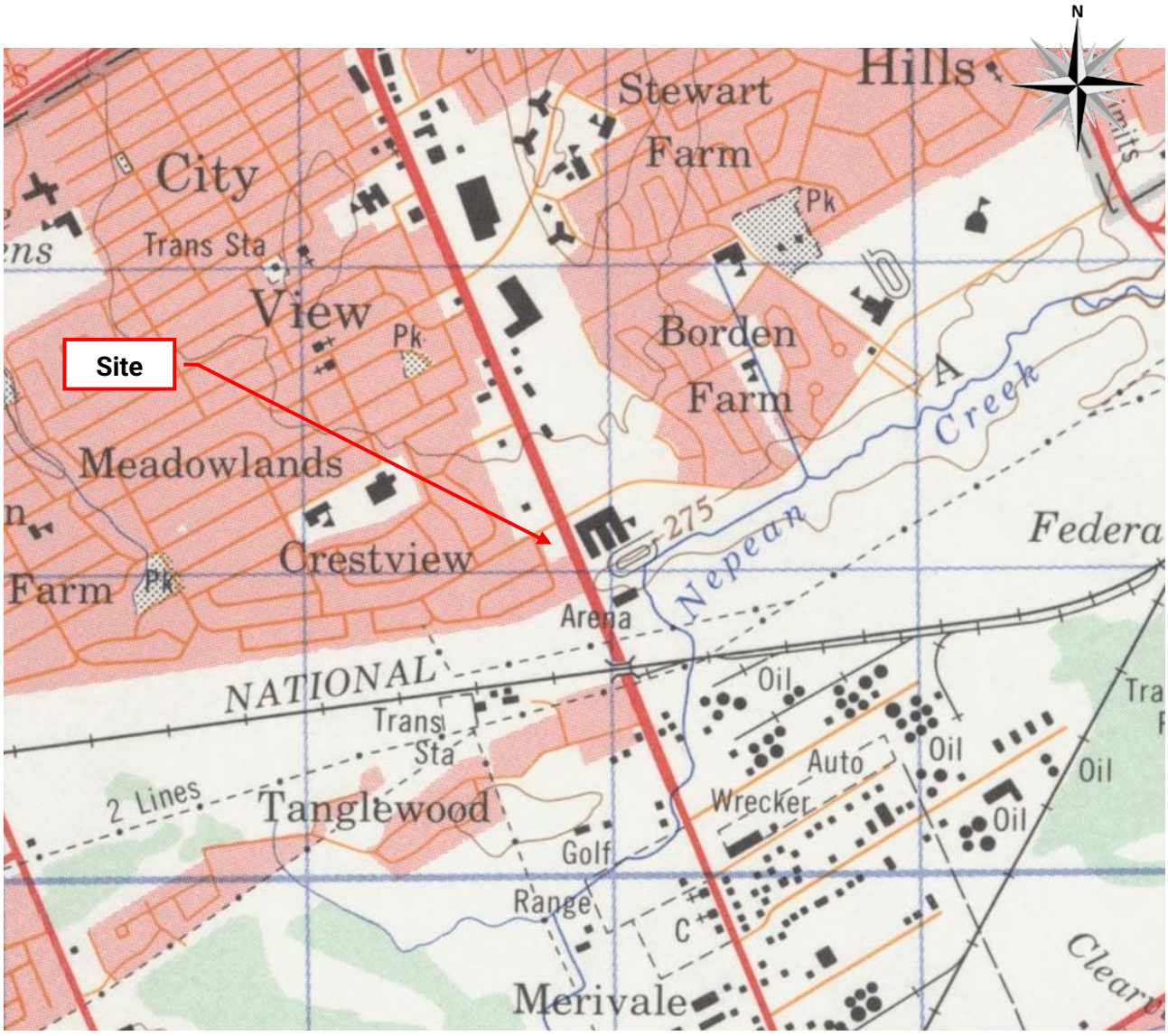
APPENDIX 1
Topographic Maps



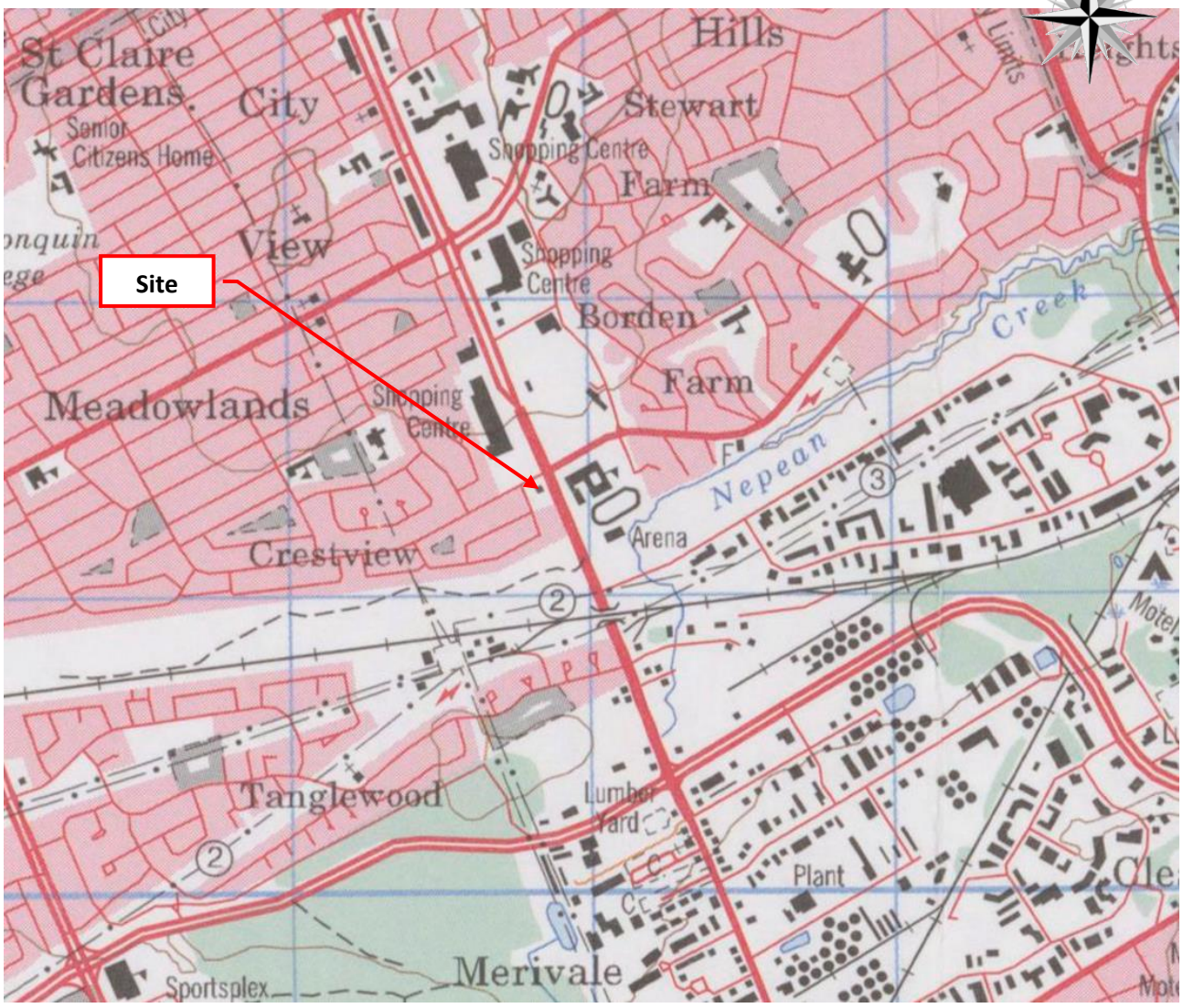
EXTRACT FROM TOPOGRAPHIC MAP - 1925			Échelle de la carte 1 : 63 360
Project :	Phase I ESA	Site :	1660, Merivale Road, Nepean, Ottawa, Ontario
File :	HARN1660P1	Rédigé par:	Mathieu Bélisle, Ing., M.Sc.A.,P. Eng.
Source :	BAnQ	Vérifié par :	Guylaine Lebel, Ing., M.Ing., P. Eng.



EXTRACT FROM TOPOGRAPHIC MAP - 1958			Map Scale 1 : 50 000
Project :	Phase I ESA	Site :	1660, Merivale Road, Nepean, Ottawa, Ontario
File :	HARN1660P1	Rédigé par:	Mathieu Bélisle, Ing., M.Sc.A.,P. Eng.
Source :	BAnQ	Vérifié par :	Guylaine Lebel, Ing., M.Ing., P. Eng.

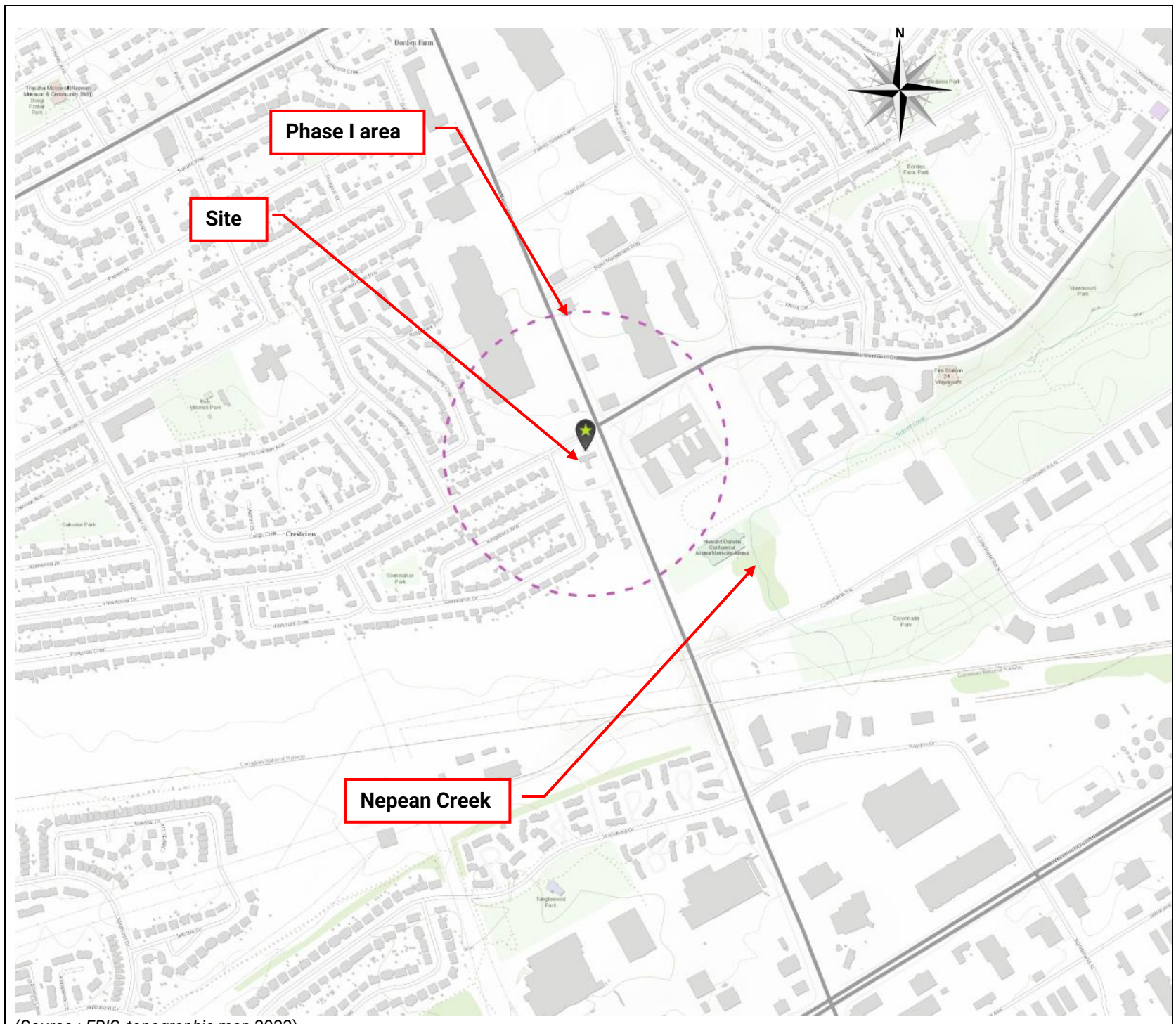


EXTRACT FROM TOPOGRAPHIC MAP - 1976			Map Scale 1 : 50 000
Project :	Phase I ESA	Site :	1660, Merivale Road, Nepean, Ottawa, Ontario
File :	HARN1660P1	Rédigé par:	Mathieu Bélisle, Ing., M.Sc.A.,P. Eng.
Source :	BAnQ	Vérifié par :	Guylaine Lebel, Ing., M.Ing., P. Eng.

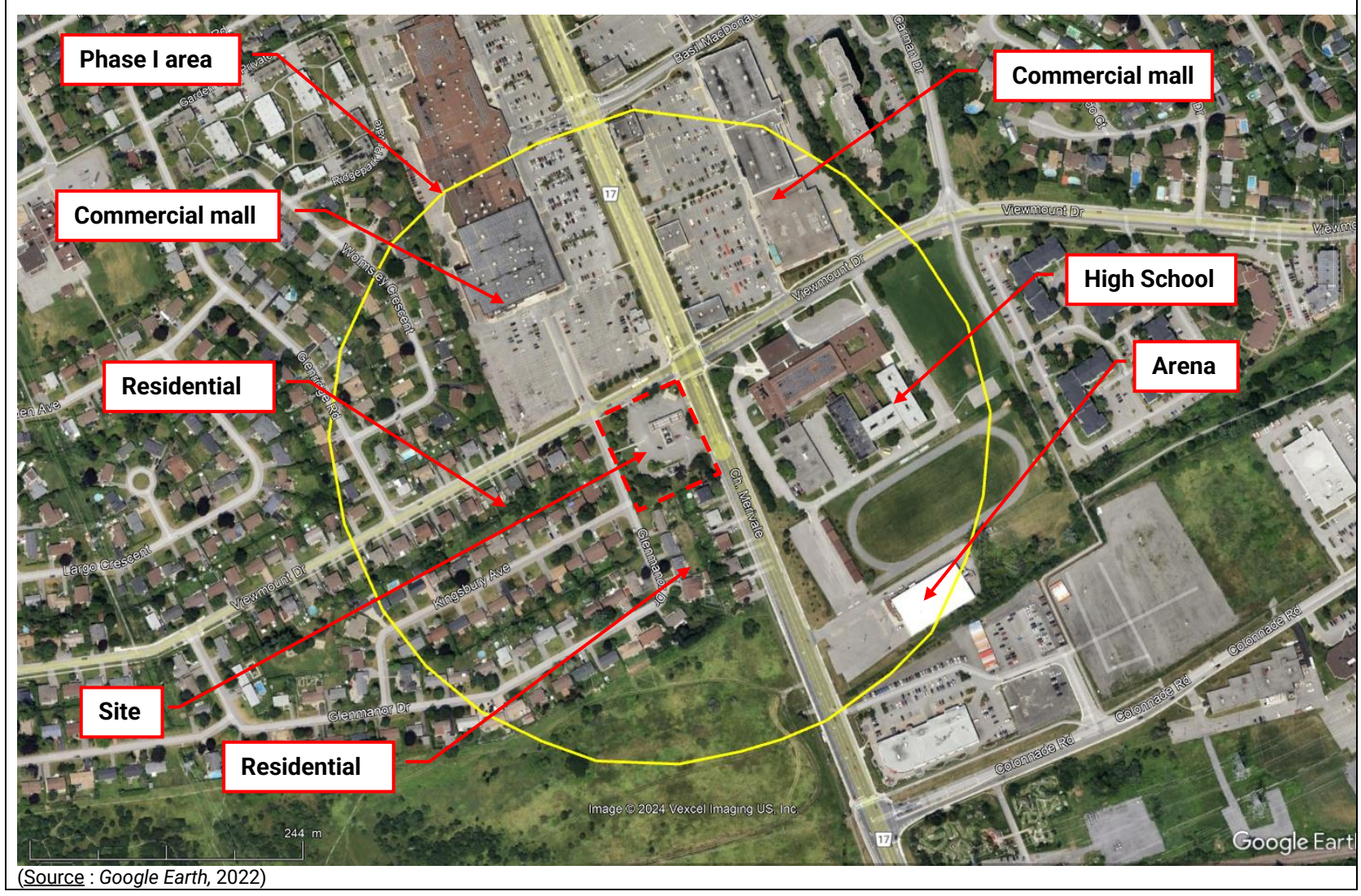


EXTRACT FROM TOPOGRAPHIC MAP - 1998			Map Scale 1 : 50 000
Project :	Phase I ESA	Site :	1660, Merivale Road, Nepean, Ottawa, Ontario
File :	HARN1660P1	Rédigé par:	Mathieu Bélisle, Ing., M.Sc.A.,P. Eng.
Source :	BAnQ	Vérifié par :	Guylaine Lebel, Ing., M.Ing., P. Eng.

APPENDIX 2
Figures



(Source : *ERIS, topographic map* 2022).

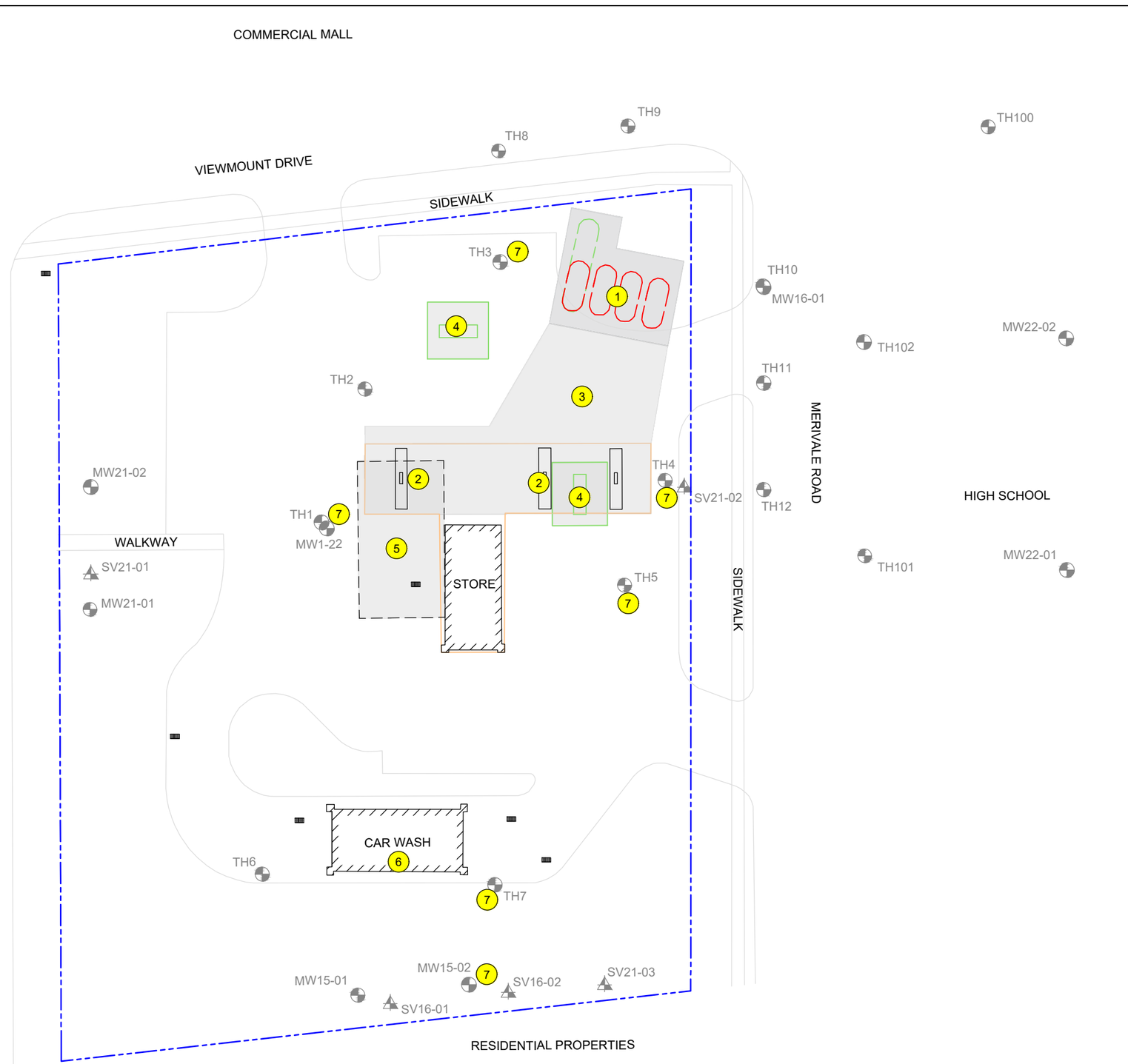


(Source : *Google Earth,* 2022)

GENERAL SITE LOCATION			**Figure 1**
Client :	*Harnois Groupe Immobilier Inc.*	Site :	1660 Merivale Road, Nepean, Ottawa, Ontario
Project :	Phase I ESA	Produced by:	Mathieu Bélisle, Ing., M.Sc.A., P. Eng.
File **:**	HARN1660P1	Verified by :	Guylaine Lebel, Ing., M.Ing., P. Eng.

Note: For the purpose of this study, Merivale Road is oriented in a north-south axis.





0 2 4 8 12 16 20

Unit of measurement : meter

LEGEND:

- Site limit
- Paving and sidewalk limit
- Current building
- Approximate location of former buildings
- Current underground storage tank
- Former underground storage tank
- Pump island
- Approximate location of former pump island
- Canopy
- Previous monitoring well
- Previous soil vapour probe
- Drain

ENVIRONNEMENTAL RISK

1. Underground storage tanks probably since the 1960s
2. Pump islands since 1984
3. Underground pipes connecting the pump islands and the underground tanks
4. Former pump islands from the 1960s to 1984
5. Former mechanical garage from the 1960s to 1984
6. Car wash since 1984
7. Groundwater contamination

SOURCE: -Previous studies
-VRSB Arpenteurs-Géomètres, Plan Topographique, dossier : 230454, Minute : 4390, April 6, 2024

NOTE: This figure was prepared from unauthenticated documents. The position may vary from reality. For indicative purpose only.

GROUPE C. LAGANIÈRE
Revalorisation de propriétés
Unlocking property value

	ÉCHELLE: Graphic	DATE
DRAWN BY:	David Sauvé, Tech.	July 4, 2024
CHECKED BY:	Mathieu Bélisle, ing., M.Sc.A., P.Eng.	August 8, 2024
APPROVED BY:	Guylaine Lebel, ing., M.Ing., P.Eng.	August 19, 2024

CLIENT:
HARNOIS GROUPE IMMOBILIER INC.

ADRESS:
1660 MERIVALE ROAD, NEPEAN, ON.

PROJECT:
PHASE 1 ENVIRONMENTAL SITE ASSESSMENT

TITLE:
LOCATION OF ENVIRONMENTAL RISKS

CONFIDENTIAL AND PRIVILEGED DOCUMENT

REF. NO.: HARN1660P1 | FIGURE 2

APPENDIX 3
Photographic Report

GROUPE
C. LAGANIÈRE

Note: For the purpose of this study, Merivale Road is oriented in a north-south axis.





0 2 4 8 12 16 20

Unit of measurement : meter

LEGEND:

- Study area
- Paving, sidewalk and curb boundary
- Current building boundary
- Pump island
- Canopy

SOURCE: -Previous studies
Google Earth

NOTE: This figure was prepared from unauthenticated documents. The position may vary from reality. For indicative purpose only.

GROUPE C. LAGANIÈRE
Revalorisation de propriétés
Unlocking property value

	ÉCHELLE: Graphic	DATE
DRAWN BY:	David Sauvé, Tech.	July 21, 2024
CHECKED BY:	Mathieu Bélisle, ing., M.Sc.A., P.Eng.	August 7, 2024
APPROVED BY:	Guylaine Lebel, ing., M.Ing., P. Eng	August 12, 2024

CLIENT:
HARNOIS GROUPE IMMOBILIER INC.

ADRESS:
1660 MERIVALE ROAD, NEPEAN, OTTAWA ON.

PROJECT:
PHASE 1 ENVIRONMENTAL SITE ASSESSMENT

TITLE:
PHOTO LOCATIONS AND DIRECTION

CONFIDENTIAL AND PRIVILEGED DOCUMENT

REF. NO.: HARN1660P1 | PHOTOGRAPHIC REPORT

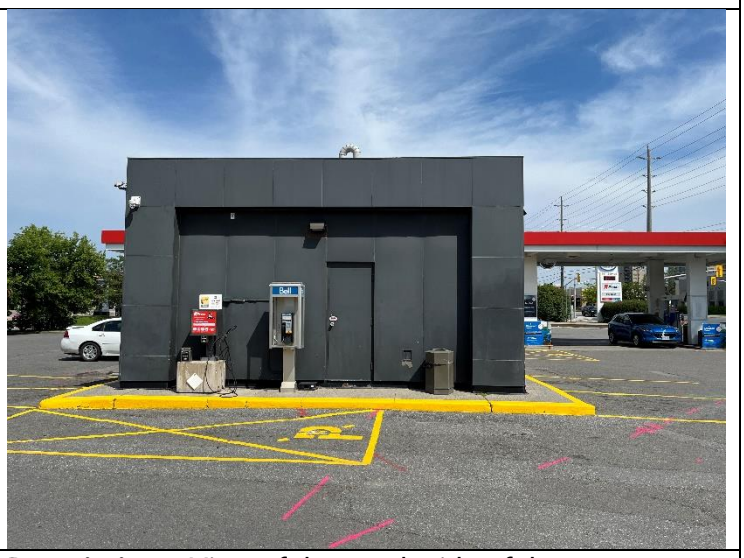
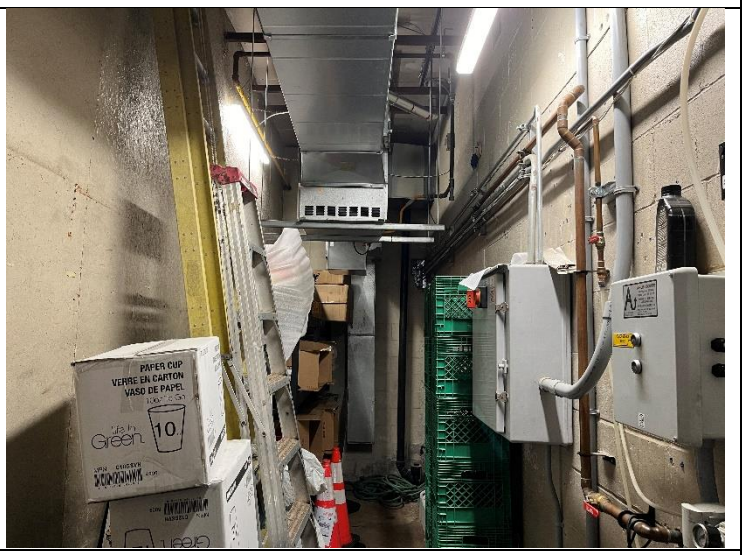
Photo 1 : Exterior of the site	Photo 2 : Exterior of the site
	
Description : View of the east side of the store and of two wells at the location of TH5.	**Description :** View of the north side of the store and of the canopy.
Photo 3 : Exterior of the site	**Photo 4 : Exterior of the site**
	
Description : View of the west side of the store and of the canopy.	**Description :** View of the south side of the store.

Photo 5 : Exterior of the site	Photo 6 : Exterior of the site
	
Description : View of the concrete slab above the underground tanks in the northeast corner of the site.	**Description :** View of the east side of the canopy.
Photo 7 : Exterior of the site	**Photo 8 : Exterior of the site**
	
Description : View of the west side of the site were the waste bins are located.	**Description :** View of the west side of the carwash.

Photo 9 : Exterior of the site	Photo 10 : Exterior of the site
	
Description : View of the east side of the carwash.	**Description :** View of the north side of the carwash.
Photo 11 : Exterior of the site	**Photo 12 : Interior of the store**
	
Description : View of the south side of the carwash and of the natural gas entry southwest of the carwash.	**Description :** General view of the store.

Photo 13 : Interior of the store	Photo 14 : Interior of the carwash
	
Description : Electric entry in the southwest corner of the store.	**Description :** General view of the carwash.
Photo 15 : Interior of the carwash	**Photo 16 : Interior of the carwash**
	
Description : General view of the mechanical room southwest of the carwash.	**Description :** General view of the storage room southeast of the carwash.

APPENDIX 4
Aerial Photographs

HISTORICAL AERIALS

Project Property: HARN1660
1660 Chemin Merivale
Nepean ON K2G 3K4

Project No: 01-13987

Requested By: Groupe C. Laganière (1995) Inc.

Order No: 24061400277

Date Completed: June 19,2024

Aerial Maps included in this report are produced by the sources listed above and are to be used for research purposes including a phase I report. Maps are not to be resold as commercial property. ERIS provides no warranty of accuracy or liability. The information contained in this report has been produced using aerial photos listed in above sources by ERIS Information Inc. (in the US) and ERIS Information Limited Partnership (in Canada), both doing business as 'ERIS'. The maps contained in this report do not purport to be and do not constitute a guarantee of the accuracy of the information contained herein. Although ERIS has endeavored to present information that is accurate, ERIS disclaims, any and all liability for any errors, omissions, or inaccuracies in such information and data, whether attributable to inadvertence, negligence or otherwise, and for any consequences arising therefrom. Liability on the part of ERIS is limited to the monetary value paid for this report.

Environmental Risk Information Services
A division of Glacier Media Inc.
1.866.517.5204 | info@erisinfo.com | erisinfo.com

Date	Source	Scale	Comments
2023	Maxar Technologies	10,000	
1993	National Air Photo Library	10,000	
1982	National Air Photo Library	10,000	
1975	National Air Photo Library	10,000	
1960	National Air Photo Library	10,000	
1950	National Air Photo Library	10,000	



Year: 2023
Source: MAXAR
Scale: 10,000
Comment:

Address: 1660 Chemin Merivale, Nepean, ON
Approx Center: -75.7295684,45.3434035

Order No: 24061400277

ERIS



Year: 1993
Source: NAPL
Scale: 10,000
Comment:

Address: 1660 Chemin Merivale, Nepean, ON
Approx Center: -75.7295684,45.3434035

Order No: 24061400277

ERIS



Year: 1982
Source: NAPL
Scale: 10,000
Comment:

Address: 1660 Chemin Merivale, Nepean, ON
Approx Center: -75.7295684,45.3434035

Order No: 24061400277

ERIS



Year: 1975
Source: NAPL
Scale: 10,000
Comment:

Address: 1660 Chemin Merivale, Nepean, ON
Approx Center: -75.7295684,45.3434035

Order No: 24061400277

ERIS



Year: 1960
Source: NAPL
Scale: 10,000
Comment:

Address: 1660 Chemin Merivale, Nepean, ON
Approx Center: -75.7295684,45.3434035

Order No: 24061400277

ERIS



Year: 1950
Source: NAPL
Scale: 10,000
Comment:

Address: 1660 Chemin Merivale, Nepean, ON
Approx Center: -75.7295684,45.3434035

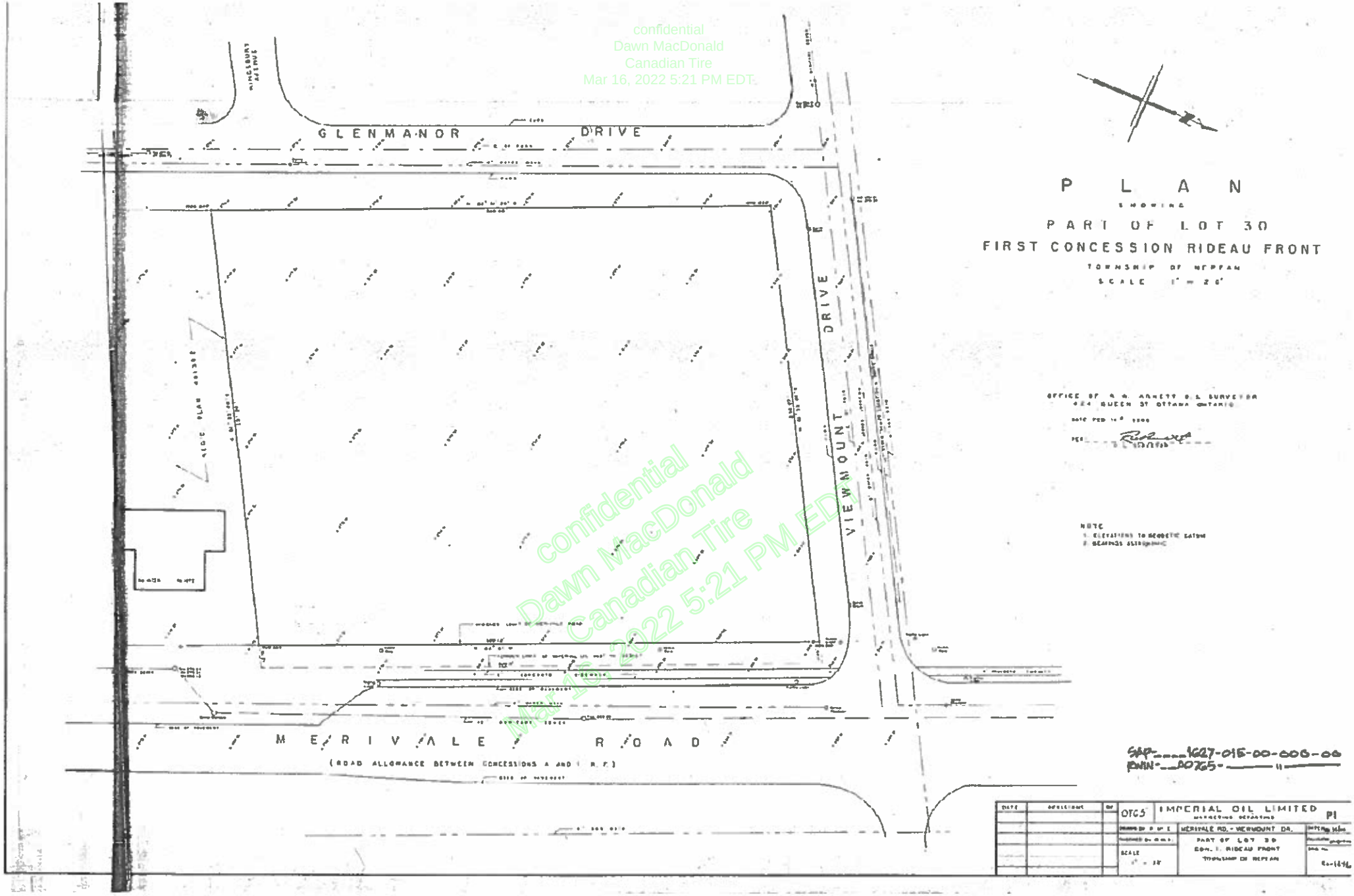
Order No: 24061400277

ERIS

APPENDIX 5
Historical Plans

GROUPE
C. LAGANIÈRE

confidential
Dawn MacDonald
Canadian Tire
Mar 16, 2022 5:21 PM EDT



confidential
Dawn MacDonald
Canadian Tire
Mar 16, 2022 5:21 PM EDT

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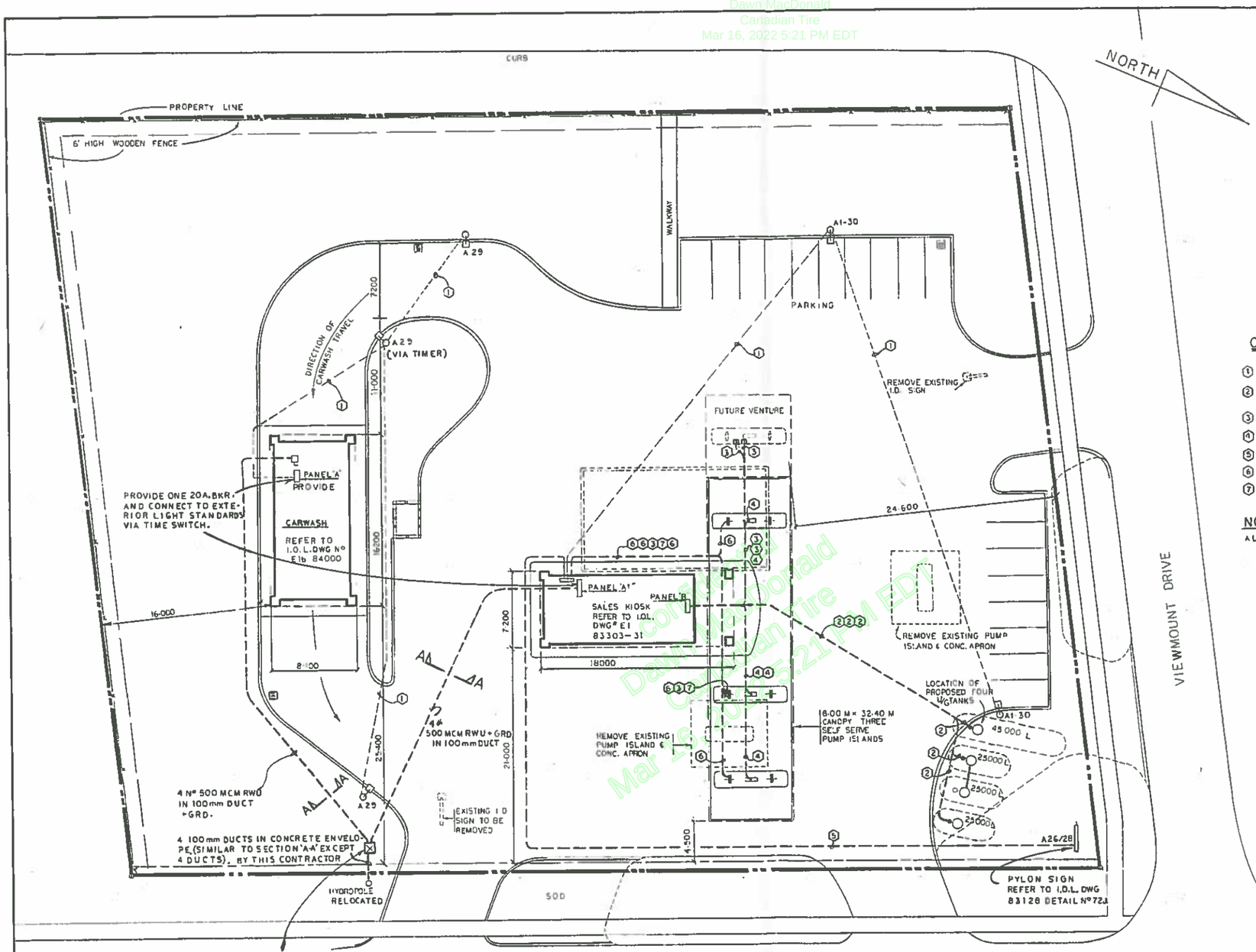
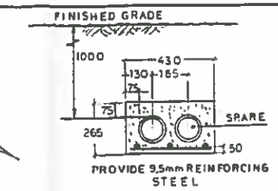
Dawn MacDonald
Canadian Tire
Mar 16, 2022 5:21 PM EDT

confidential
Dawn MacDonald
Canadian Tire
Mar 16, 2022 5:21 PM EDT





SECTION 'A-A'

2-100mmø DUCTS

N. T. S.

CONDUIT SCHEDULE

1. 2#10 RWU + GRD IN 19mmø CONDUIT.
2. 2#12 RWU + GRD IN 25mmø CONDUIT AND ONE 12mmø CONDUIT (EMPTY)
3. 38mmø CONDUIT (EMPTY)
4. 12#12 RWU IN 32mmø CONDUIT
5. 3#10 RWU + GRD IN 25mm CONDUIT (FOR SIGN)
6. 4#12 RWU + GRD IN 38mm CONDUIT
7. 16#12 RWU + GRD IN 38mm CONDUIT

NOTE:

ALL CONDUCTORS SHALL BE COPPER

PRIMARY CABLE AND TRANSFORMER BY NEPEAN HYDRO.
PRECAST TRANSFORMER PAD AND BASE BY THIS CONTRACTOR

SECONDARY CABLE LUGS, AND CONNECTING LUGS TO TRANSFORMER SECONDARY TERMINALS BY THIS CONTRACTOR.

SAP-____1627-05P-00-000-00
RWIN-__A0765-_____"

REGISTERED PROFESSIONAL ENGINEER
T. A. FEKETE
PROVINCE OF ONTARIO

DATE	REVISIONS	BY	DATE	REVISIONS	BY

ESSO PETROLEUM CANADA
MARKETING DEPARTMENT
0765

DRAWN BY TR	SITE PLAN - ELECTRICAL	DATE APRIL 18 1984	
CHECKED BY TAF	GAS BAR & MINI CARWASH	DIVISION ONTARIO	
SCALE 1:200	MERIVALE ROAD AND VIEWMOUNT DRIVE NEPEAN ONTARIO	DRG. NO. SA-3914.E-1	

confidential
Dawn MacDonald
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Mar 16, 2022 5:21 PM EDT

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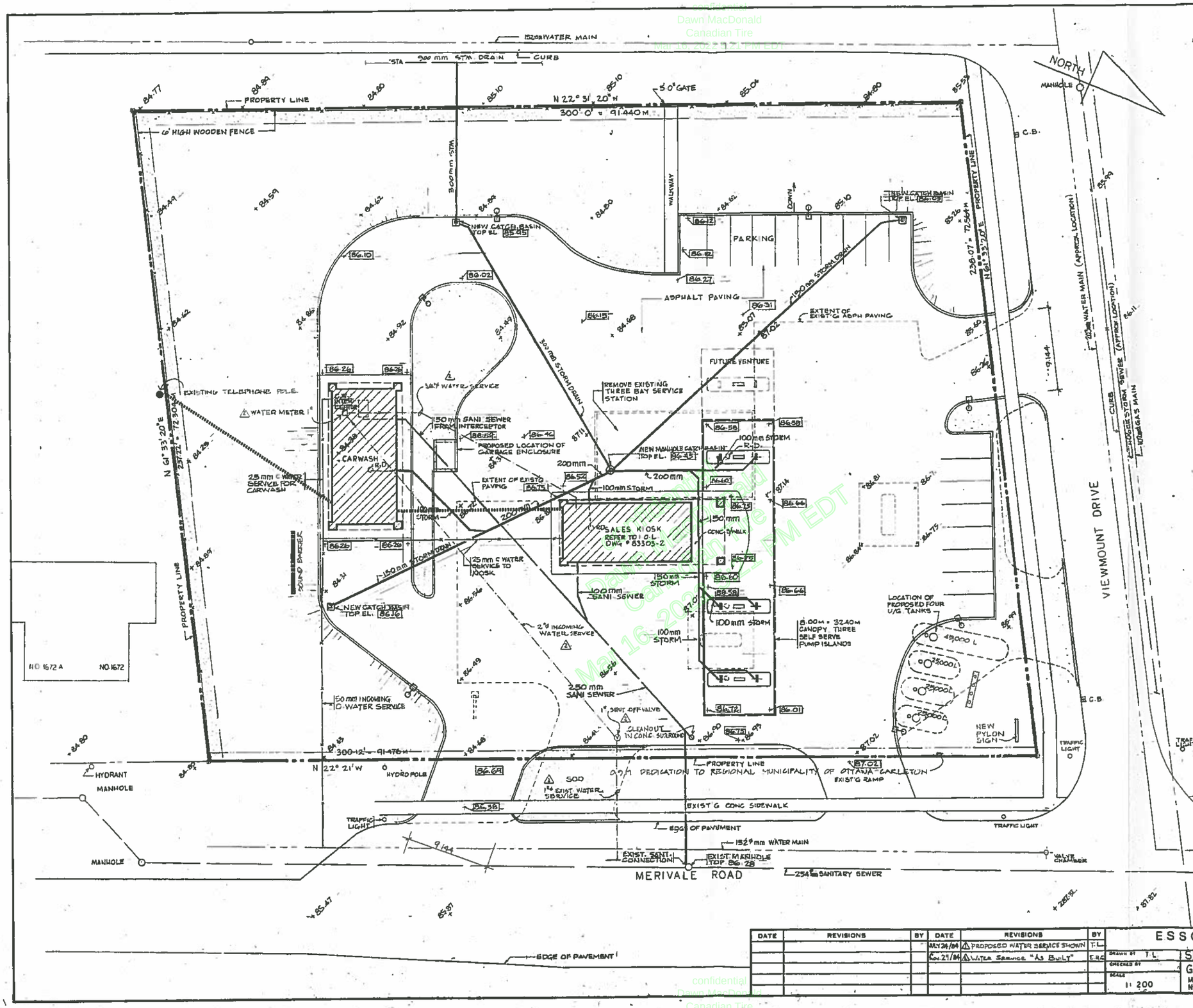

LEGEND

- INDICATES BANKED AREAS
- DIRECTION OF TRAFFIC
- IRON BAR
- MH MANHOLE
- C.B. CATCH BASIN
- DOTTED LINES INDICATE EXISTING CONSTRUCTION TO BE REMOVED
- SODDING
- POURED CONC. CURB
- 6' HIGH WOODED FENCE
- ILLUMINATED SIGN BOX PYLON SIGN
- LIGHT POLE STANDARD & LIGHT FIXTURE
- EXIST. GRADE ELEVATION
- PROPOSED GRADE ELEVATIONS
- SOUND BARRIER
- 50 MM PHONE CONDUIT

SURVEY INFORMATION

INFORMATION TAKEN FROM PLAN OF SURVEY OF PART LOT 80, FIRST CONCESSION, RIDEAU FRONT, CITY OF NEPEAN, AS PREPARED BY R.W. ARNETT, O.L.S., 424 QUEEN ST. OTTAWA ONT., DATED FEBR. 14, 1968

SITE PLAN INFORMATION

AREA OF PROPERTY	6623 M²
PROPOSED SALES KIOSK	129.6 M²
PROPOSED CARWASH	131.22 M²

SAP-----1627-03A-00-000-02
RWIN-----A0765-----"----

DATE	REVISIONS	BY	DATE	REVISIONS	BY
			MAY 24/84	△1 PROPOSED WATER SERVICE SHOWN	T.L.
			Nov. 29/84	△1 WATER SERVICE "AS BUILT"	E.H.C.

ESSO PETROLEUM CANADA
MARKETING DEPARTMENT

DRAWN BY T.L.	SITE PLAN - DRAINAGE & GRADING	DATE JAN. 16 1984
CHECKED BY	GAS BAR & MINI CARWASH	DIVISION ONTARIO
SCALE 1:200	MERIVALE RD. & VIEWMOUNT DRIVE NEPEAN, ONTARIO	DWG. NO. SA-3914-D

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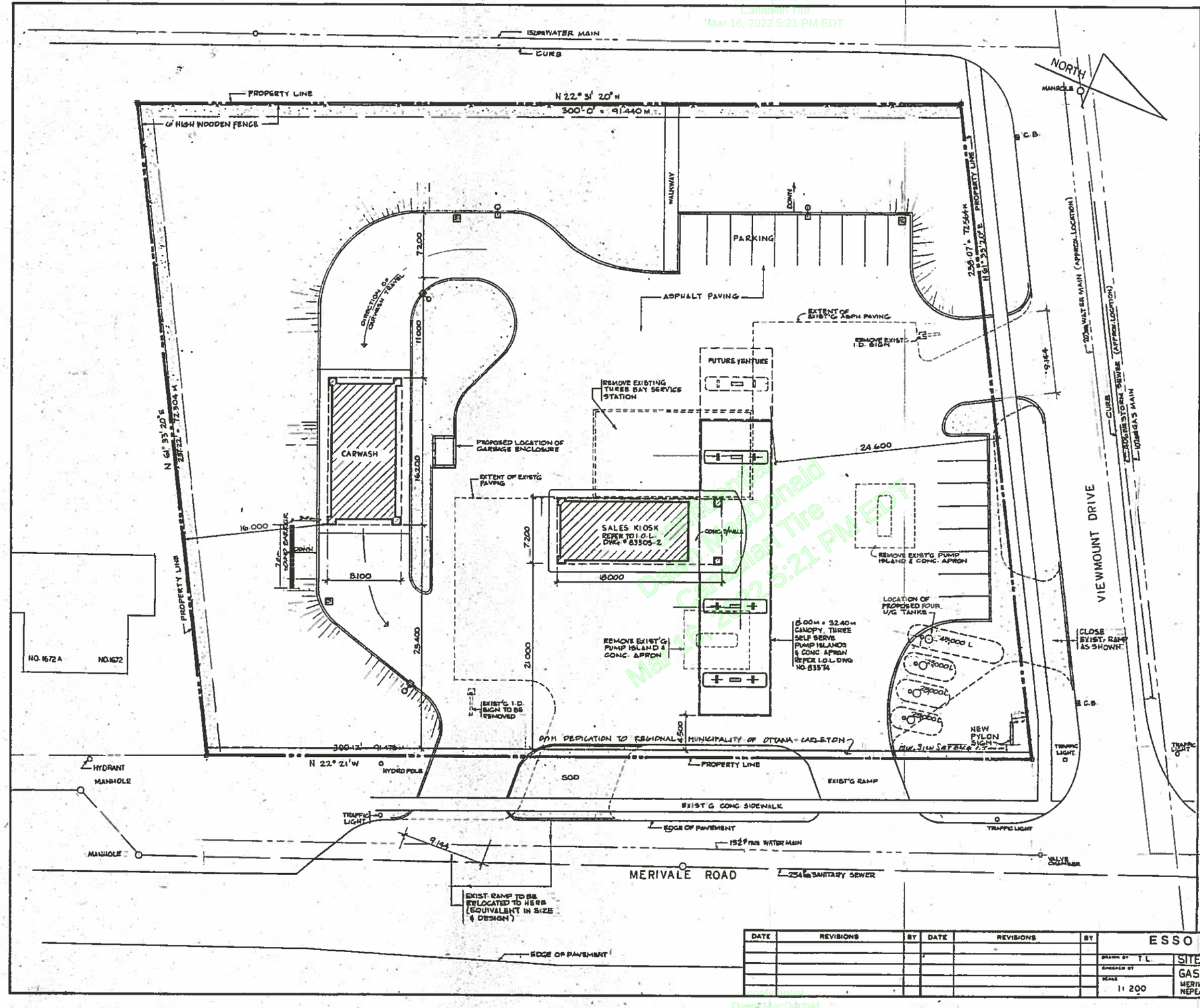

LEGEND

- INDICATES BANKED AREAS
- DIRECTION OF TRAFFIC
- IRON BAR
- MH MANHOLE
- C.B. CATCH BASIN
- DOTTED LINES INDICATE EXISTING CONSTRUCTION TO BE REMOVED
- SODDING
- POURED CONC. CURB
- 6' HIGH WOODED FENCE
- ILLUMINATED SIGN BOX PYLON SIGN
- LIGHT POLE STANDARD & LIGHT FIXTURE
- SOUND BARRIER

SURVEY INFORMATION

INFORMATION TAKEN FROM PLAN OF SURVEY OF PART LOT 30, FIRST CONCESSION, RIDEAU FRONT, CITY OF NEPEAN, AS PREPARED BY R.W. ARNETT, O.L.S., 424 QUEEN ST. OTTAWA, ONT., DATED FEBR. 14, 1968

SITE PLAN INFORMATION

AREA OF PROPERTY	6623 m²
PROPOSED SALES KIOSK	129.6 m²
PROPOSED CARWASH	131.22 m²

SAP-----1627-02P-00-000-00
RWIN-----A0765-----"

DATE	REVISIONS	BY	DATE	REVISIONS	BY

ESSO PETROLEUM CANADA SS#765
MARKETING DEPARTMENT

DRAWN BY T.L.	SITE PLAN	DATE JAN. 16 1984
CHECKED BY	GAS BAR & MINI CARWASH	DIVISION ONTARIO
SCALE 1:200	MERIVALE RD. & VIEWMOUNT DRIVE NEPEAN, ONTARIO	DWG. NO. SA-3914

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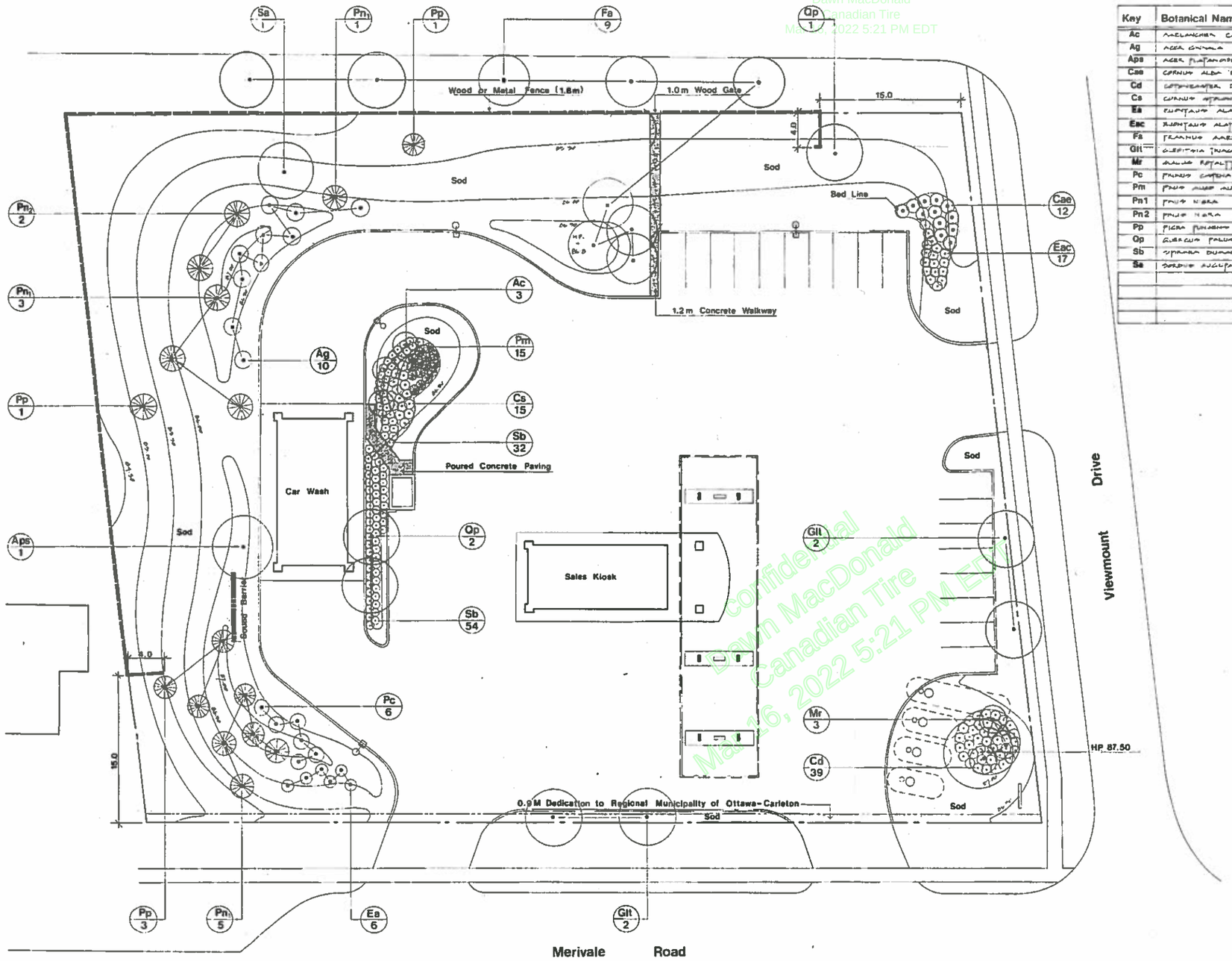

Plant List

Key	Botanical Name	Common Name	Cal.	Ht.	Spr.	Cond.	Remarks	Qty.
Ac	MELANCHER CANADENSIS	DOWNY SERVICEBERRY		120 cm		SB	MULTI STEMMED	3
Ag	ACER GINNALA	AMUR MAPLE		120 cm		SB	UNIFORM SPECIMEN	10
Aps	ACER PLATANOIDES 'SCHWEDLERII'	SCHWEDLER MAPLE	60 mm			SB		1
Cae	CORNUS ALBA 'ELEGANTISSIMA'	SILVERLEAF DOGWOOD		60 cm		POTTED		12
Cd	COTONEASTER DAMMERII	BEARBERRY COTONEASTER		30 cm				39
Cs	CORNUS STOLONIFERA	RED OSIER DOGWOOD		20 cm				15
Ea	EUONYMUS ALATUS	BURNINGBUSH		60 cm				6
Eac	EUONYMUS ALATUS 'COMPACTUS'	DWARF BURNINGBUSH		40 cm				17
Fa	FRAXINUS AMERICANA	WHITE ASH	30 mm			SB		9
Glt	GLEDITSIA TRIACANTHOS 'SHADEMASTER'	SHADEMASTER HONEYLOCUST	60 mm			SB		4
Mr	MALUS ROYALTY	ROYALTY CRABAPPLE	45 mm			SB		3
Pc	PRUNUS CASTENA	PURPLELEAF SANDCHERRY		90 cm		POTTED	MULTI STEMMED	6
Pm	PINUS MUGO MUGO	MUGO PINE		30 cm		POTTED		15
Pn1	PINUS NIGRA	AUSTRIAN PINE		175 cm		SB		9
Pn2	PINUS NIGRA	AUSTRIAN PINE		250 cm		SB		2
Pp	PICEA PUNGENS	COLORADO SPRUCE		250 cm		SB		5
Qp	QUERCUS PALUSTRIS	PIN OAK	60 mm			SB		3
Sb	SPIRAEA BUMALDA 'GOLDFLAME'	GOLDFLAME SPIREA		40 cm		POTTED		86
Sa	SORBUS AUCUPARIA	EUROPEAN MOUNTAIN ASH	60 mm			SB		1

LIGHT STANDARD
SAP-----1627-06P-00-000-01
RWIN---A0765-------"------

Legend & Notes

1. All shrubs defined by bed lines shall be equally spaced within the bed area designation & mulched with approved mulch 50mm.
2. All shrubs defined by saucers shall be spaced to allow clear passage of mowers.

Contractor must verify all dimensions on the job and report any discrepancy to the landscape architect before proceeding with the work.

All drawings and specifications shall remain the property of the landscape architect.

All drawings to be used for construction only when signed by the landscape architect.

SIGNED .....

DATE .....

No	Revision	Date	By	Approved	Date
1	LIGHT STANDARD ADDED	OCT. 10/85	G.H.		

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Milus Bollenberghe Topps
Landscape Architects
95 Bridgeland Avenue
Toronto Ontario
M6A 2V3 (416)789-7933

	Esso Petroleum Canada		0765
Drawn By JA	Landscape Plan SA 3914L	Date February 1984	
Checked By PD	Gas Bar & Mini Car Wash Merivale Road & Viewmount Drive Nepean Ontario	Division Ontario	
Scale 1:200		Job No	

Paul: As Built sketch for project P11008 completed in July/Aug of 2008

Rec'd Aug. 26/09

Aug 17/09

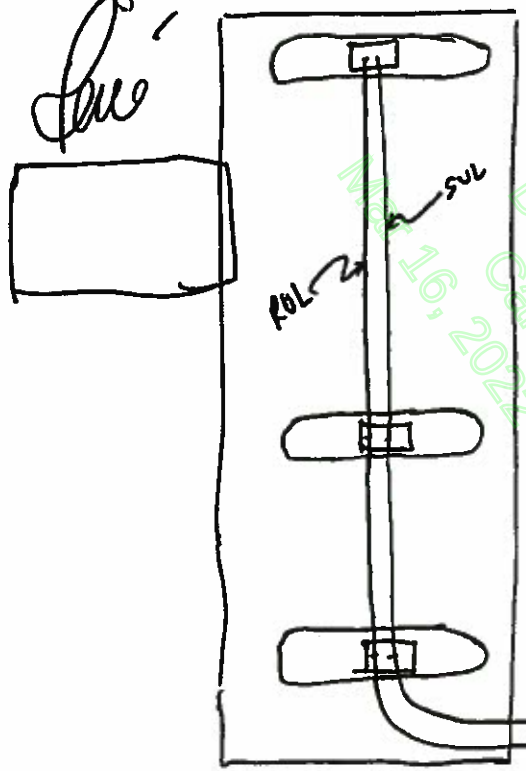
8800627-04A-00-001, REV.00

AUG. 26/09

1660 Merivale Rd & Viewmount

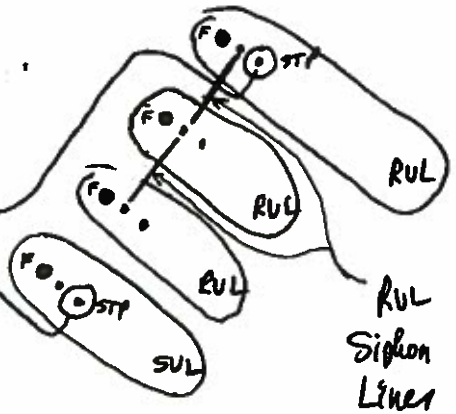
Nepean

→ New Piping Arrangement



NEW 1½"Ø

OPW FLEXWORKS COAXIAL in 4"Ø Goodyear



← VIEWMOUNT →

← MERIVALE →

IMPERIAL OIL, FUELS MARKETING
621 - 420 Main St. East, MILTON, Ontario L9T 5G3
René Kooistra T: 416-906-2488
Maintenance Specialist F: 905-319-3107
rene.kooistra@esso.ca

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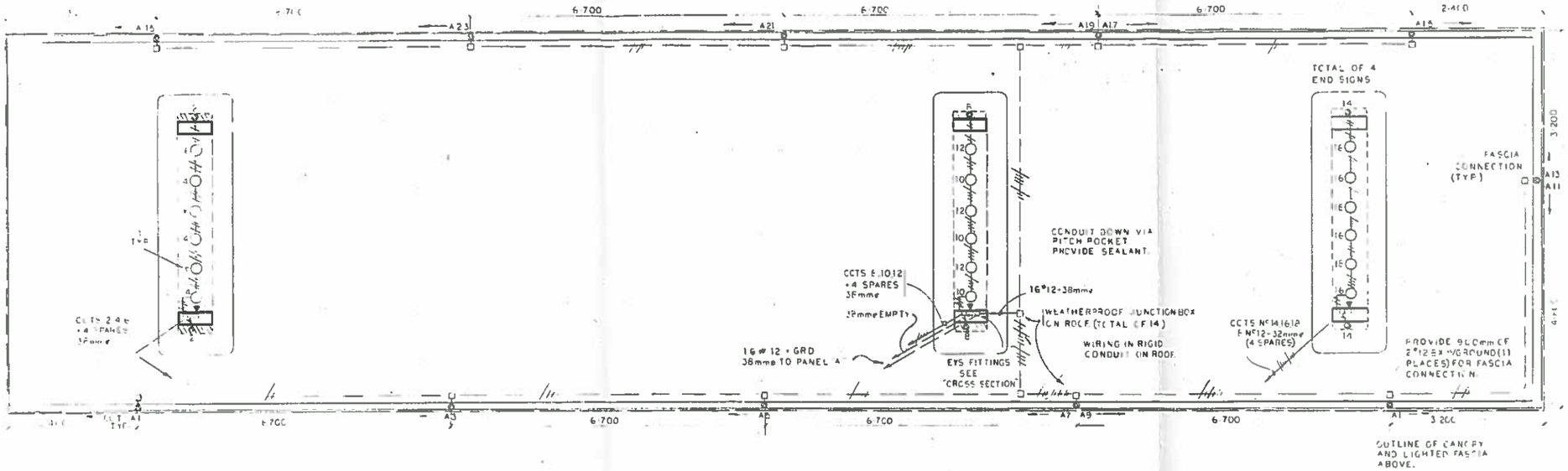
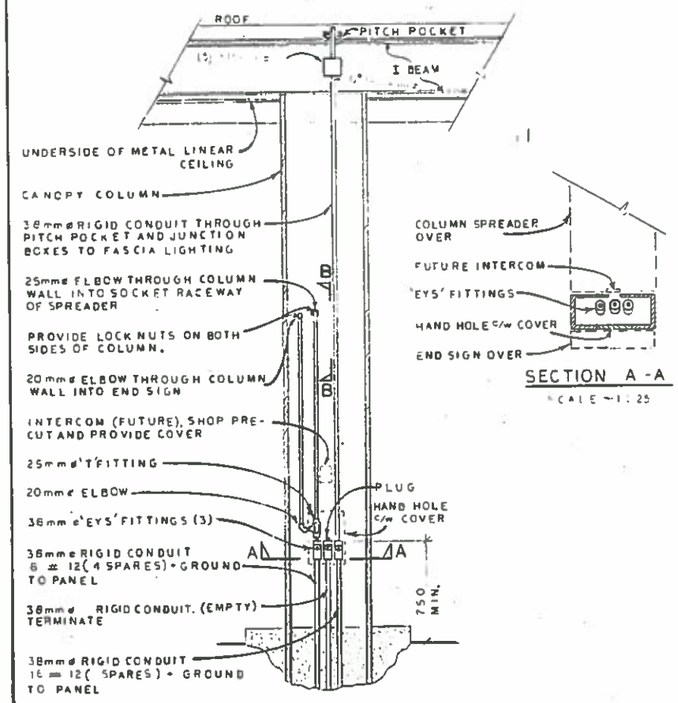
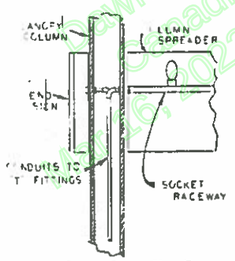




CROSS-SECTION THROUGH SERVICE COLUMN

SCALE ~ 1:25



SECTION B-B

SCALE ~ 1:25

SECTION A-A

SCALE ~ 1:25

☐ ∘ VIA TIME SWITCH
☐ ∘∘ PROVIDE BREAKER LOCKING DEVICES

PANEL A1

☐ A. 120/208V 3Ø 4W MAINS
☐ A. V Ø. W. MAINS
☐ RECESSED ☐ SURFACED MOUNTED
☐ DOUBLE LUGS

DESCRIPTION	LOAD	BKR A	CCT		CCT	BKR A	LOAD	DESCRIPTION
FASCIA LTG	1500	20	1		2	20	600	END SIGN
			3		4		900	SPREADER
			5		6		900	SPREADER
			7		8		600	END SIGN
			9		10		900	SPREADER
			11		12		900	SPREADER
			13		14		600	END SIGN
			15		16		900	SPREADER
			17		18		900	SPREADER
			19		20	1		SPARE
			21		22			SPACE
			23		24			-"-
	1		25		26	20A	1150	PYLON SIGN
SPARE			27		28	2P	1150	
			29		30	20	1400	AREA LIGHTING
	19500		TOTAL LOAD 28100				8600	

78 AMPS/PHASE

☐ ∘ VIA TIME SWITCH
☐ ∘∘ PROVIDE BREAKER LOCKING DEVICES

PANEL B

☐ A. 120/208V 3Ø 4W MAINS
☐ A. V Ø. W. MAINS
☐ RECESSED ☐ SURFACED MOUNTED
☐ DOUBLE LUGS

DESCRIPTION	LOAD	BKR A	CCT		CCT	BKR A	LOAD	DESCRIPTION
MDP#		15	1		2	15		STP 1400
DISPENSER LIGHT		15	3		4	20		
SPARE		15	5		6	1		STP EXTRA
MDP# 2		15	7		8	2P		
SPARE		15	9		10	15		STP 2000
SPARE		15	11		12	2P		
MDP# 3		15	13		14	1		SPARE
SPLIT RECEPTACLE		15	15		16	2P		
		2P	17		18	15		SPARE
SPARE		15	19		20			SPACE
SPACE			21		22			"
"			23		24			"

NOTES

1. ALL BRANCH WIRING SHALL BE Nº 12 RWU 90 X-LINK + GROUND WIRE.
2. ALL RIGID CONDUITS SHALL BE 'ROBROY' CONDUIT - SIZES AS SHOWN.
3. PROVIDE 20A. 1 POLE BREAKER FOR EACH CIRCUIT. (BOLT ON TYPE)
4. INSTALL FISH WIRE IN EMPTY CONDUITS.

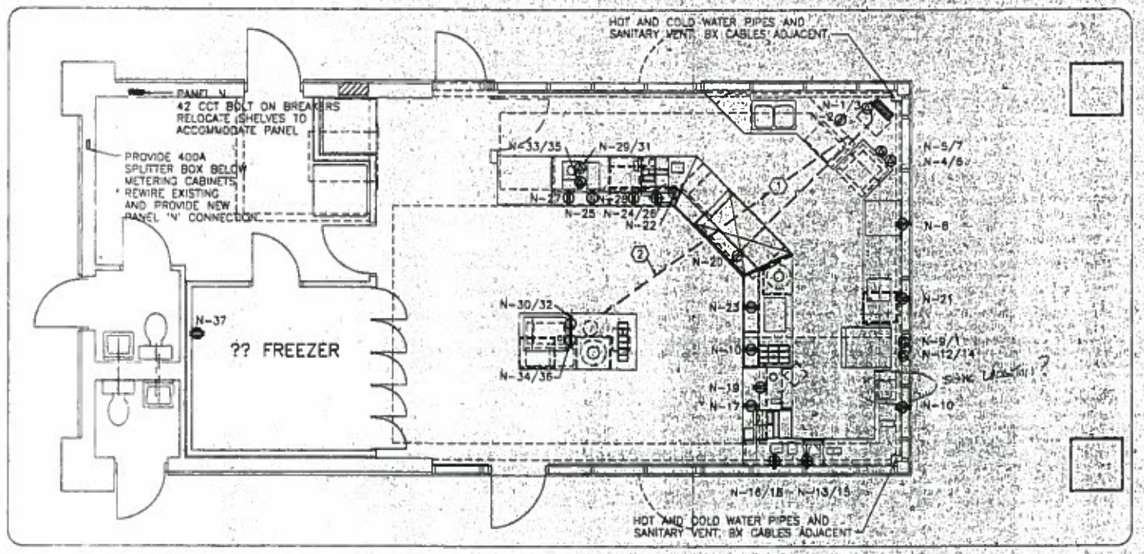
SAP-____1627-07P-00-EA1-00
IRWIN-__A0765-_____"_____

REGISTERED PROFESSIONAL ENGINEER — T.A. FEKETE — PROVINCE OF ONTARIO

DATE	REVISIONS	BY	DATE	REVISIONS	BY

ESSO PETROLEUM CANADA — MARKETING DEPARTMENT — 0765

DRAWN BY - T.R	CANOPY DETAILS	DATE APRIL 15 1984
CHECKED BY TAF	GAS BAR & MIN CAR WASH	DIVISION ONTARIO
SCALE AS NOTED	MERVALE ROAD AND WIEWMOUNT DRIVE NEPEAN ONTARIO	DRG NO SA-3914-E-2



FLOOR/EQUIPMENT PLAN 1 : 50

ELECTRICAL LEGEND

- SURFACE MOUNTED DUPLEX RECEPTACLE SURFACE MOUNTED RUNNING IN EMT THERMAL SEAL THROUGH COOLER WALL
- UNDER COUNTER SPLIT RECEPTACLE
- ISOLATED GROUND
- 208V EQUIPMENT RECEPTACLE TO SUIT EQUIPMENT
- UNDER COUNTER DUPLEX RECEPTACLE

REFERENCE NORTH

PANEL N
200 A
MAIN BREAKER

	DESCRIPTION	W	BRKR	CCT			CCT	BRKR	W	DESCRIPTION	
3#12	COMPRESSOR/CONDENSOR		20A	1			2	15A		MICROWAVE OVEN	
	FOR RETARDER		2P	3			4	25A		PIZZA OVEN	3#10
3#10	PIZZA OVEN		25A	5			6	2P			
			2P	7			8	15A		REFRIGERATOR	
3#10	YOGURT MACHINE		25A	9			10	15A		RECEPTACLE	
			2P	11			12	25A		YOGURT MACHINE	3#10
	SPLIT RECEPTACLE		15A	13			14	2P			
	ISO GROUND		2P	15			16	15A		SPLIT RECEPTACLE	
	CUSTOMER DISPLAY		15A	17			18	2P			
	RECEPTACLE		15A	19			20	15A		DOUGH RETARDER	
	HOT DOG STEAMER		15A	21			22	15A		CUSTOMER DISPLAY	
	HOT DOG MACHINE		15A	23			24	15A		SPLIT RECEPTACLE	
	DONUT DISPLAY		5A	25			26	2P		ISO. GROUND	
	DONUT DISPLAY		15A	27			28	15A		RECEPTACLE	
3#12	BUNN-O-MATIC		20A	29			30	15A		SPLIT RECEPTACLE	
			2P	31			32	2P			
3#12	BUNN-O-MATIC		20A	33			34	15A		SPLIT RECEPTACLE	
			2P	35			36	2P			
	FREEZER IN WALK IN		15A	37			38	15A		MENU BOARD	
	TRACK LIGHTS		15A	39			40	15A		MENU BOARD	
	SPARE			41			42			SPARE	

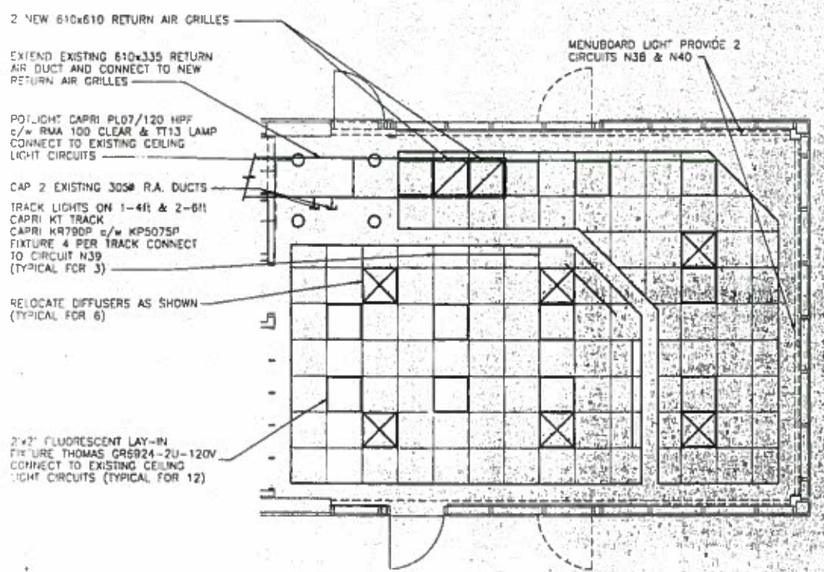
ALL CIRCUITS TO BE 2#12 UNLESS NOTED OTHERWISE

① RUN 3/4" CONDUIT ⊕#14 WIRE FOR CONDENSER UNIT TO FANCOIL CONTROL INTERCONNECT

② RUN PVC CONDUIT IN EXCAVATION FOR DRAIN AND WATER LINE, RUN SEPERATE GROUND WIRE IN CONDUIT, PROVIDE JUNCTION BOXES AT BOTH ENDS OF CONDUIT RUN

NOTE:
VERIFY FINAL EQUIPMENT LOCATIONS ON SITE PRIOR TO INSTALATION OF ELECTRICAL

SERVICES AND EQUIPMENT
CONTRACTOR TO MAKE CONNECTION TO EACH MENU BOARD SECTION AS DELIVERED TO SITE



REFLECTED CEILING PLAN 1 : 50

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Toronto, Ontario
M5V 3G6
(416) 596-1930/8199
Fax (416) 596-0644
Toronto, Ontario
M5M 2Z8

RETAIL / COMMERCIAL DEPARTMENT

CANADIAN TIRE CORPORATION, LIMITED

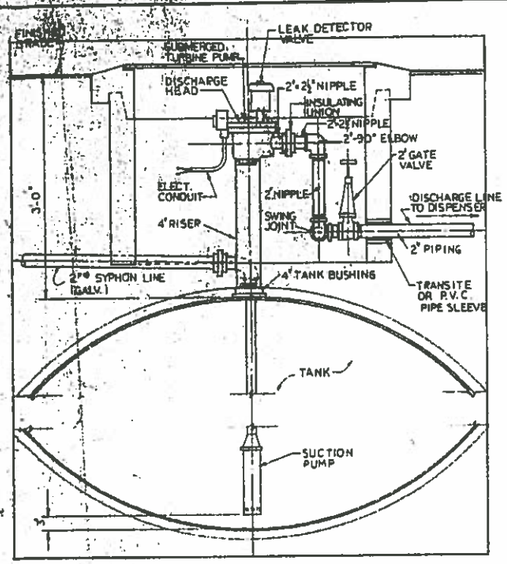
No.	Revision	Date	By
1	DRAWING APPROVED	FEB 1 '22	

SCALE AS NOTED
DATE FEB 1992
DRAWN
DESIGN
CHECKED
APPROVED

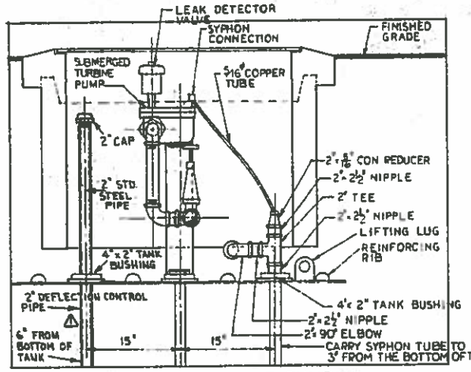
FLOOR/EQUIPMENT PLAN
ELECTRICAL

DRAWING NO. 55-0765-8 SHT 2

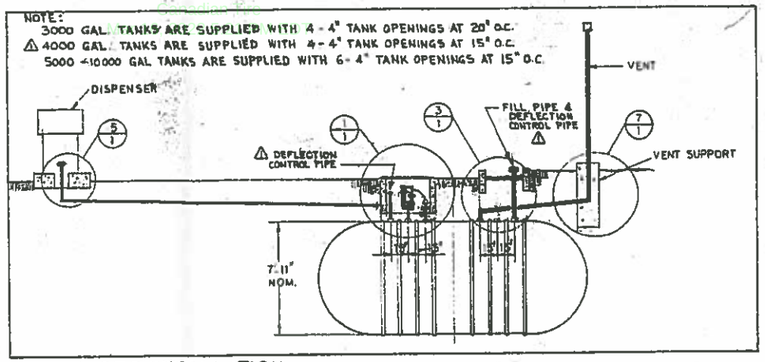
SAP-----1627-08P-00-E01-01
RWIN---A0765-----11



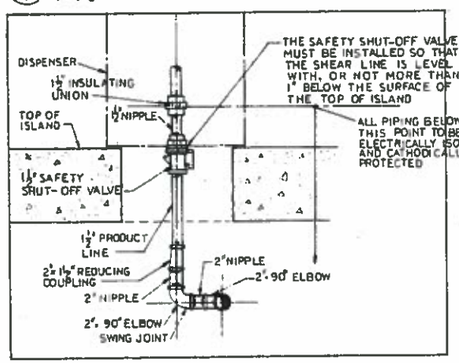
1 DETAIL OF SUBMERSIBLE TURBINE PUMP (S.T.P.)
1"=1'-0"



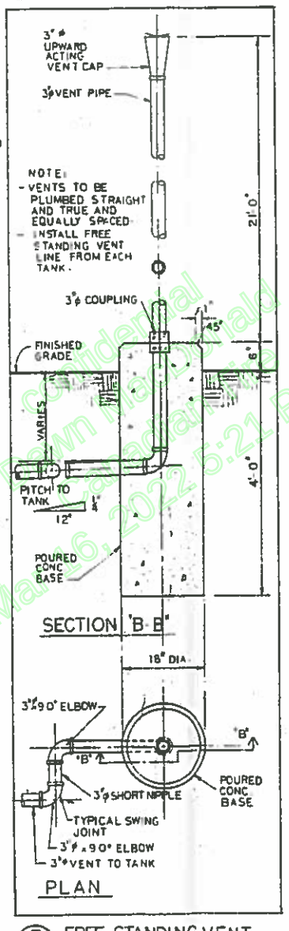
4 DETAIL OF SUBMERSIBLE PUMP (S.T.P.)
1"=1'-0"



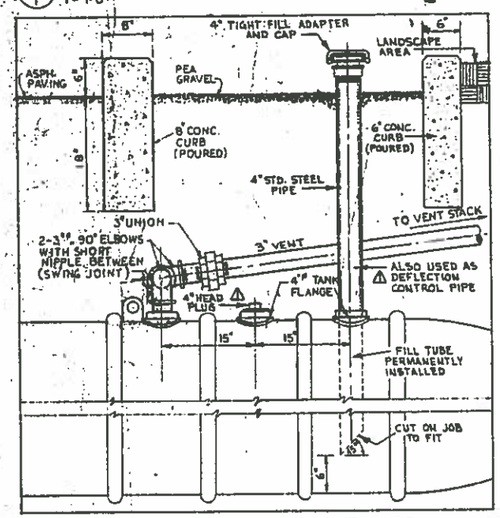
TYPICAL S.T.P. INSTALLATION
1/4"=1'-0"



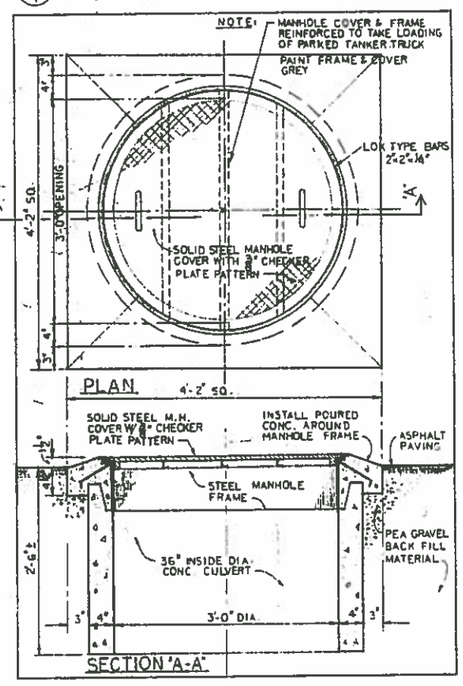
5 DETAIL OF DISPENSER INSTALLATION
1"=1'-0"



7 FREE STANDING VENT
¾"=1'-0"



3 FILL CAP INSTALLATION BEHIND CURB
1"=1'-0"



6 TYPICAL MANHOLE INSTALLATION
1"=1'-0"

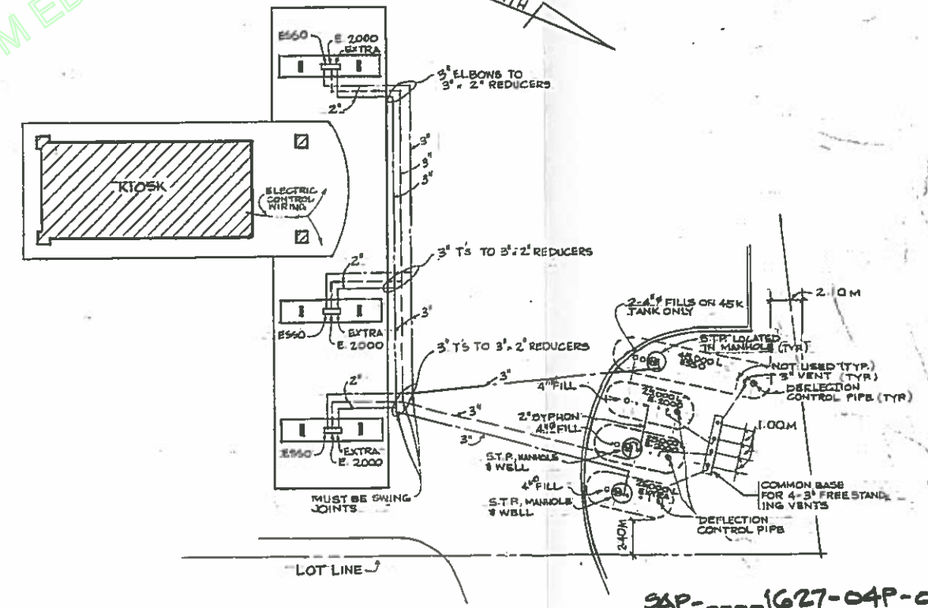
SPECIFICATION

INSTALLATIONS

1. All piping installations to comply with the Local Gasoline Handling Code.
2. Bottom of all tanks to be level and at the same elevation (min. cover 3'-0").
3. Vent lines and discharge lines shall have a slope of ¼" per foot back to tank.
4. All lines shall be braced with concrete block at 5'0" intervals to prevent sagging.
5. The use of close nipples, street elbows or 45° elbows for swing joints is not permitted.
6. Plugs in tank openings will not be removed until piping is ready for connection.
7. All installations shall be consistent with local municipal regulations.
8. Unless otherwise specified all pipe will be galvanized standard weight and conform to A.P.I. 5L test requirements. All fittings will be galvanized 150 P.S.I.
9. Tanks to be held in place with petroleum product only. No product to be placed in tanks until fill pipes and vent lines installed and all other tank openings plugged to minimize vapor accumulation in excavation.
10. △ Lifting lugs to be used for all movements of tanks.
11. Min. 12" back fill beneath tanks (i.e. over natural ground hole or concrete slab).
12. Min. 24" backfill between tanks and around sides of tanks.
13. Min. cover 2', max. cover 5'
14. Back fill material. Pea gravel not less than 1/8" or greater than 3/4", clean free flowing and naturally rounded aggregate. Alternate stone or gravel crushings not less than 1/8" or greater than 1/2" clean free flowing material.
15. Rake and fill all voids beneath tank and between ribs in max. 12" layers throughout the backfilling process.
16. △ Should wet conditions require a concrete anchor, it is to be placed beneath the tanks and of acceptable design to the tank supplier and with anchor straps suitable to the rib design of the tanks.

TESTING

1. All discharge piping shall be pressure tested independently prior to backfilling. Tankage and piping will be isolated from the submerged turbine pumping units and island dispensers while undergoing the pressure test.
2. All pressure tests will be carried out with compressed air.
3. All discharge piping will be tested at a pressure of 50 P.S.I.G. not to exceed 100 P.S.I.G.
4. During the pressure test all valves will be maintained in a open position.
5. Prior to backfilling the record of the pressure test will be identified by the location, piping run, date of test, and carry the signature of the contractor performing the test and approval signature of the I.O.L. representative.



PIPING INSTALLATION PLAN
1: 200

SAP-____1627-04P-00-000-01
RWIN-__A0765-_____11

DATE	REVISIONS	BY
△ MAY 11/77	RELOCATE FILL PIPE, ADDITIONAL VENTS, ADD 2" DEFLECTION CONTROL PIPE	

IMPERIAL OIL LIMITED 0765
MARKETING DEPARTMENT

DRAWN BY T. L	PIPING DETAILS FOR SUBMERGED TURBINE PUMP	DATE JAN. 16 1984
CHECKED BY	MERIVALE & VIEWMOUNT NEPEAN, ONTARIO	DIVISION ONTARIO
SCALE AS SHOWN		DRG. NO. SA-3914-1
		PROJECT NO. SA-3914-T

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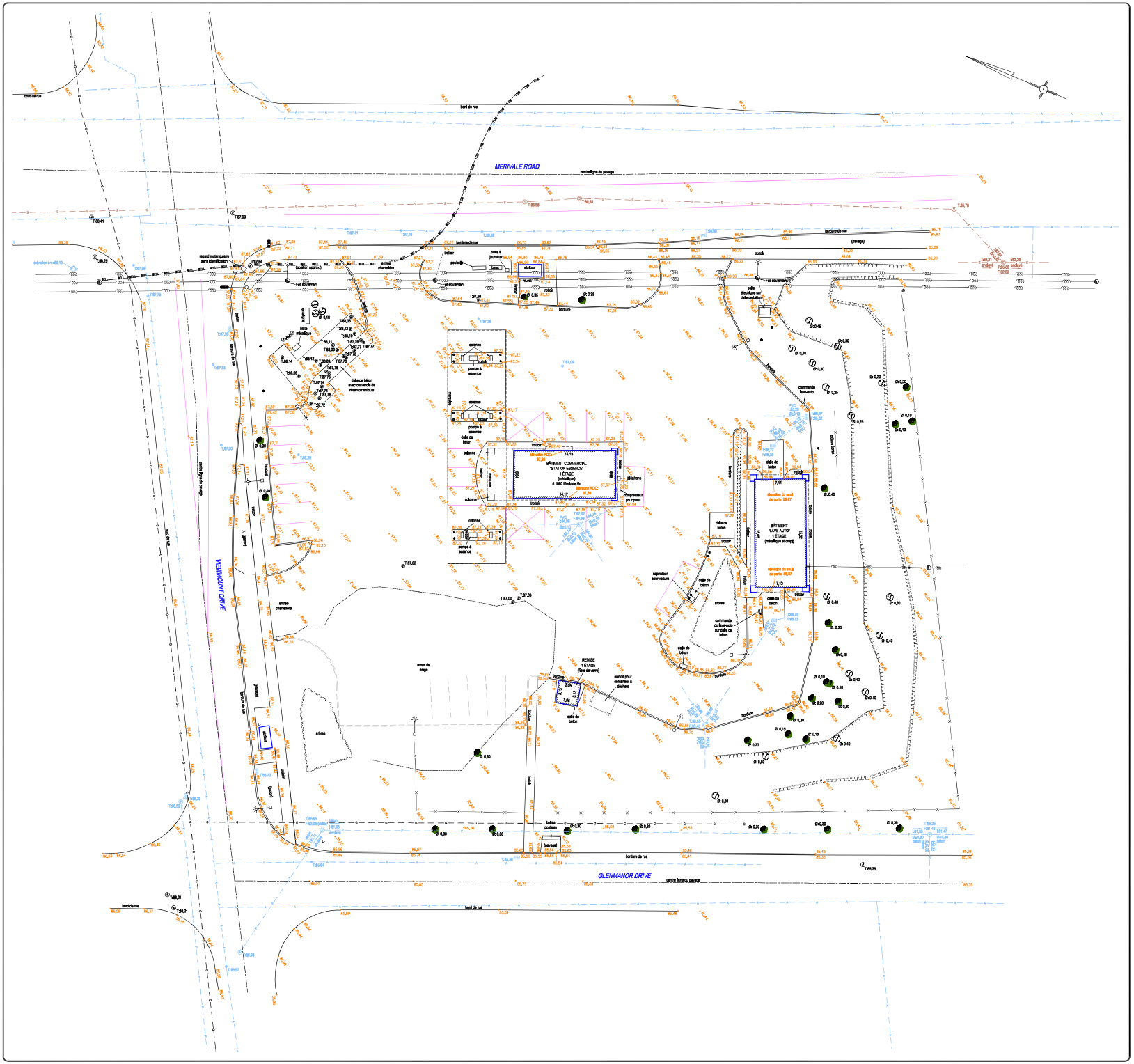

MERIVALE ROAD
centre ligne du pavage
VERMOUNT DRIVE
GLENMANOR DRIVE
bordure de rue
bord de rue
BÂTIMENT COMMERCIAL "STATION ESSENCE" 1 ÉTAGE (installation) 1660 Merivale Rd
Élévation RDC: 87.50
BÂTIMENT "LAVE-AUTO" 1 ÉTAGE (installation et usage)
Élévation du seuil de porte: 88.07
REMISE 1 ÉTAGE (Rez-de-vente)
cabine
colonne
pompe à essence
îlot
îlot de béton
abris
arbres
entrée
entrée chambre
entrée pour conteneur à déchets
aire de neige
commande lave-auto
aspirateur pour voiture
compresseur pour pneu
téléphone
Senseurs
Intex portable
boîte électrique sur dalle de béton
boîte à journaux
banc
poubelle
boîte de contrôle
boîte de télécommunication
regard rectangulaire sans identification
regard carré (position approx.)
fils aériens
clôture
clôture à mailles de chaîne
clôture en bois
clôture en métal
clôture en métal (usagé)
dalle de béton avec couvercle de réservoir enfoui
dalle de béton
bâtiment
bâtiment (usagé)
bâtiment (démoli)
bâtiment (démoli et usagé)
bâtiment (usagé et démoli)
bâtiment (usagé et démoli)
bâtiment (usagé et démoli

APPENDIX 6
Responses to access to information requests

GROUPE
C. LAGANIÈRE

Ministry of the Environment, Conservation and Parks

Corporate Services Branch
40 St. Clair Avenue West
Toronto ON M4V 1M2

Ministère de l'Environnement, de la Protection de la nature et des Parcs

Direction des services ministériels
40, avenue St. Clair Ouest
Toronto ON M4V 1M2

Ontario

July 15, 2024

Mr. Mathieu Bélisle
35 av. Laganière
Montreal, Quebec
mbelisle@gr-laganiere.com

Dear Mathieu Bélisle:

RE: MECP FOI A-2024-03939 – Record Release Letter

This letter is further to your request made pursuant to the Freedom of Information and Protection of Privacy Act (the Act) relating to:

1660 Merivale Road, Nepean
Timeframe: January 1, 1950 to July 14, 2024

Your final fee payment was received by this office. If payment was not in Canadian dollars, please contact our office immediately.

Attached is a copy of the records.

You may request a review of my decision within 30 days from the date of this letter by contacting the Information and Privacy Commissioner/Ontario at http://www.ipc.on.ca. Please note there may be a fee associated with submitting the appeal.

If you have any questions, please contact Roxanne Chambers at (807) 456-3035 or roxanne.chambers@ontario.ca.

Yours truly,

Roxanne Chambers

for
Josephine DeSouza
Manager, Access and Privacy Office

Attachment

Ontario

Ministry of the Environment

OCCURENCE REPORT

Location of Occurence: NEPEAN CITY 1660 MERIVALE RD. **Reg:** 4 **Dist:** OT **Municipality:** 20104		**Source:** ESSO PETROLEUM CANADA SERVICE STATION **Sector:** PE **Source:** SS **SIC:** 6331 **UTM:** **N:** [] **E:** [] **Zone:** []	
Entered: 1992/03/02 11:12	**ORIS No.** 9240000422	**Abstracts:**	**Diaries:**
Received By: LISA LOCKERBY		**Batch:** 767	**I. E. B. No.**
Occurence Type: S	**Subtype:** L	**Occurence Date:**	1992/02/29
Work Plan:		**Occurence Time:**	23:00
Reported By: CLOUED GROULX GRW PETROLEUM LIMITED		**Report to MOE :** 1992/03/02 11:12 **MOE at Scene:** :	
Telephone No. 613-723-5823 **x**	**Alternate No.** - - **x**	**Assigned To:**	DAN HARRISON
Address: 386 STANHERD ROAD NEPEAN **Postal Code:**		**ERP Contacted:** **Callout: []** **NSP: [N]** **ERP Name:**	

Syn: ESSO PETROLEUM: 4-5 L GASOLINE TO GRND DUE TO PLUGGED TANK VENT.

Brief Summary:
CALLER REPORTED A SPILL OF 4-5 L GASOLINE WHILE MAKING A DELIVERY AT THE IMPERIAL SERVICE STATION LAST SATURDAY NIGHT. THE TANK VENT PLUGGED WHICH CREATED PRESSURE IN THE HOSE & RESULTED IN A LEAKING MANIFOLD CONNECTION. GASOLINE MIXED WITH SNOW & CONTAINED IN 4 FT2 AREA. NO SEWERS INVOLVED. GRW PETROLEUM DRIVER CLEANED UP THE SPILL USING SPEEDY-DRY. SAC ADVISED CALLER THAT SPILLS MUST BE REPORTED FORTHWITH & THAT SAC IS OPEN 24 HR/DAY.CALLER WILL NOTIFY MCCR.
THIS REPORT FAXED TO MCCR

If there are related reports, record initial/master ORIS No. here >> 9201832

Followup Action: X **Abatement IEB Other**
BF Date:
NO FURTHER ACTION REQUIRED. CLEAN UP COMPLETED.

File Closed: X **Abatement: IEB Other**
Suspected Violation: 00

Report Prepared By:	**Date:**	**IEB Investigator:**	**IEB BF Date**
DAN HARRISON	07/04/92		
Approving Officer	**Date:**	**Reviewing Officer:**	**Date**
GEORGE CLARKE	08/11/92		

Specify number(s) for routing Original [ ] [ ] [ ] [ ] **Continued** [ ] **Yes**
Specify number(s) for copy distribution [ ] [ ] [ ] [ ] [ ]

1. Investigator/E.O. **2. D. O. /File** **3. SAC (initial spills)**
4. Reg. Dir. /_____ Mgr. **5. IEB Reg. Spv** **6. IEB H.O./file** **7. Other _____**

SAC Action Class: 1:16 **2:** 25

Material 1: GASOLINE — **Code :** 12
Amount : 5 L — **UN No.:** 1203
Material 2: — **Code :**

Amount :	**UN No.:**
Material 3:	**Code :**
Amount :	**UN No.:**
Cause. . . . . :	**Code. . : 11**
Reason. . . . . :	**Code. . : 12**
Person in Control: GRW PETROLEUM	**Waste GenNum :**
Owner . . . . . : ESSO	**Waste GenNum :**
Agencies Involved . . . . :	

Clean up and Restoration Carried out by:

[v] Controller	[v] Owner	[N] Other
Y	N	

% Cleaned up: 99 **Estimated Cost:**

Were Directions or Approval Given Under

EPA Part X [v]	Regulation 362 [v]	Manifest No.
N	N	

Waste Class :	**Code . . : 000**
Hauler :	**Code . . :**
Disposal Site : TRAIL ROAD WASTE DISPOSAL SITE	**Code . . : A461303**

Environmental Impact:	Nature of Impact:	
N		**Code . . :**

People/Business Damaged
(Other than to Owner/Controller) : NONE
Nature of Damage: **Code . . :**

Ontario

Hazardous Waste Information

These are historical waste records from the Hazardous Waste Infomation Network (HWIN) and System (HWIS), and paper manifests when available, operated by the Ontario Ministry of the Environment. As of January 1, 2023, Resource Productivity and Recovery Authority's (RPRA) Hazardous Waste Program Registry and HazTrack mobile app replace HWIN and the use of paper manifests.

Generator Details (HWIN)

Registration/Notification Number
ON3917879

Legal Company Name

Primary Name:	Imperial Oil	Division Name:	N/A

Company Operating Name

Primary Name:	Imperial Oil	Division Name:	Construction

Mailing Address

Division Building:	N/A	P.O. Box:	N/A
Address Line 1:	90 Wynford Drive	Address Line 2:	N/A
Town/City:	Toronto	Postal/Zip Code:	M3C1K5
County (if in ON):	METROPOLITAN TORONTO	Province/State (if in CAN/US):	ONTARIO
County (if outside ON):	N/A	Province/State (if outside CAN/US):	N/A

Site Location

Division Building:	N/A	P.O. Box:	N/A
Address Line 1:	1660 Merivale Road	Address Line 2:	N/A
Town/City:	Ottawa	Postal/Zip Code:	K2G 1E2
County (if in ON):	OTTAWA CARLTON (RM)	Province/State (if in CAN/US):	ONTARIO
County (if outside ON):	N/A	Province/State (if outside CAN/US):	N/A

Inactive Waste Classes (ON3917879)

No inactive waste listings.

Active Waste Classes (ON3917879)

Active Off-Site Waste Classes

Waste Class	Hazardous Waste Number (per waste stream)	Reg.347 Schedules	Disposal Method	Part 2B required	Part 2B complete	Phsyical State	Off-Site	Status
221 - I	D001	5, 13	Land Disposal	Y	Y	Liquid	Off-Site	Active
221 - L	N/A					Liquid	Off-Site	Active
251 - L	N/A					Liquid	Off-Site	Active
252 - L	N/A					Liquid	Off-Site	Active

Generator Details (HWIN)

Registration/Notification Number
ON7078515

Legal Company Name

Primary Name:	Imperial Oil	Division Name:	N/A

Company Operating Name

Primary Name:	Imperial Oil	Division Name:	N/A

Mailing Address

Division Building:	N/A	P.O. Box:	N/A
Address Line 1:	505 Quarry Park Blvd SE	Address Line 2:	N/A
Town/City:	Calgary	Postal/Zip Code:	T2C 5N1
County (if in ON):		Province/State (if in CAN/US):	ALBERTA
County (if outside ON):	CANADA	Province/State (if outside CAN/US):	N/A

Site Location

Division Building:	N/A	P.O. Box:	N/A
Address Line 1:	1660 Merivale Road	Address Line 2:	N/A
Town/City:	Ottawa	Postal/Zip Code:	K2G 1E2
County (if in ON):	OTTAWA CARLTON (RM)	Province/State (if in CAN/US):	ONTARIO
County (if outside ON):	N/A	Province/State (if outside CAN/US):	N/A

Inactive Waste Classes (ON7078515)

No inactive waste listings.

Active Waste Classes (ON7078515)

Active Off-Site Waste Classes

Waste Class	Hazardous Waste Number (per waste stream)	Reg.347 Schedules	Disposal Method	Part 2B required	Part 2B complete	Phsyical State	Off-Site	Status
221 - I	D001	5, 13	Land Disposal	Y	Y	Liquid	Off-Site	Active
221 - L	N/A					Liquid	Off-Site	Active
251 - L	N/A					Liquid	Off-Site	Active
252 - L	N/A					Liquid	Off-Site	Active

Generator Details (HWIN)

Registration/Notification Number
ON4889867

Legal Company Name

Primary Name:	Canadian Tire Corporation, Limited	Division Name:	N/A

Company Operating Name

Primary Name:	Canadian Tire Corporation, Limited	Division Name:	N/A

Mailing Address

Division Building:	N/A	P.O. Box:	770 stn K
Address Line 1:	2180 Yonge St. 15th Floor (south)	Address Line 2:	N/A
Town/City:	Toronto	Postal/Zip Code:	M4P 2V8
County (if in ON):	METROPOLITAN TORONTO	Province/State (if in CAN/US):	ONTARIO
County (if outside ON):	N/A	Province/State (if outside CAN/US):	N/A

Site Location

Division Building:	N/A	P.O. Box:	N/A
Address Line 1:	1660 Merivale Road	Address Line 2:	N/A
Town/City:	Nepean	Postal/Zip Code:	K2G 3K4
County (if in ON):	OTTAWA CARLTON (RM)	Province/State (if in CAN/US):	ONTARIO
County (if outside ON):	N/A	Province/State (if outside CAN/US):	N/A

Inactive Waste Classes (ON4889867)

No inactive waste listings.

Active Waste Classes (ON4889867)

Active Off-Site Waste Classes

Waste Class	Hazardous Waste Number (per waste stream)	Reg.347 Schedules	Disposal Method	Part 2B required	Part 2B complete	Phsyical State	Off-Site	Status
221 - I	D001	5, 13	Land Disposal	Y	Y	Liquid	Off-Site	Active
251 - I	D001	5, 13	Land Disposal	Y	Y	Liquid	Off-Site	Active

File Number: D06-03-24-0068

July 25, 2024

Mathieu Belisle
Groupe C. Laganiere

Sent via email mbelisle@gr-laganiere.com

Dear Mathieu Belisle,

Re: Information Request
1660 Merivale Road Ottawa, Ontario ("Subject Property")

Internal Department Circulation:

The Planning, Infrastructure and Economic Development Department has the following information in response to your request for information regarding the Subject Property:

- **Environmental Remediation Unit:** The Environmental Remediation Unit has 10 environmental reports issued for the site and/or adjacent right-of-way dating from 2011 to 2022. To request copies of these reports, please submit an access to information request at the following link: https://ottawa.ca/en/city-hall/open-transparent-and-accountable-government/access-information-and-protection-privacy/access-information#section-633034ae-8518-4ba9-a5fb-b2e66443e9bf

- **Ottawa Public Health - Environmental Health:** all public inspection results are publicly available on the Ottawa Public Health website: https://www.ottawapublichealth.ca/en/public-health-services/public-health-inspections.aspx

- **Sewer Use Program:** No records found for this property.

- **Solid Waste Services:** No records found for this property.

Documents Provided:

HLUI Summary Report and HLUI Map

The HLUI Summary Report Excel spreadsheet identifies HLUI area, point and line features within 250 metres of the Subject Property, as shown on the provided HLUI Map PDF. Within 500 metres of the Subject Property, landfills and Environmental Risk Management Area (ERMA) are also identified if applicable. 1660 Merivale Road1660 Merivale Road

For more information on how to interpret the HLUI data identified in the attached excel sheet ('ADDRESS – HLUI Summary report.xlsx'), please refer to the Overview and User Guide."

HLUI Map

The HLUI Map PDF shows HLUI area, point and line features within 250 metres of the Subject Property. Within 500 metres of the Subject Property, landfills and Environmental Risk Management Area (ERMA) are also identified if applicable.

Additional information may be obtained by contacting:

Ontario's Environmental Registry

The Environmental Registry found at https://ero.ontario.ca/ contains "public notices" about environmental matters being proposed by all government ministries covered by the Environmental Bill of Rights. The public notices may contain information about proposed new laws, regulations, policies and programs or about proposals to change or eliminate existing ones. By using keys words i.e. name of proponent/owner and the address one can ascertain if there is any information on the proponent and address under the following categories: Ministry, keywords, notice types, Notice Status, Acts, Instruments and published date (all years).

The Ontario Land Registry Office

Registration of real property is recorded in the Ontario Land Registry Office through the Land Titles Act or the Registry Act. Documents relating to title and other agreements that may affect your property are available to the public for a fee. It is recommended that a property search at the Land Registry Office be included in any investigation as to the historic use of your property. The City of Ottawa cannot comment on any documents to which it is not a party.

Court House
161 Elgin Street 4th Floor
Ottawa ON K2P 2K1
Tel: (613) 239-1230
Fax: (613) 239-1422

Ottawa Public Health

Ottawa Public Health inspects many different types of establishments. To view inspection results, please visit the Ottawa Public Health website: Public Health Inspections - Ottawa Public Health

Please note that Ottawa Public Health is not the lead agency on land use contamination in the City of Ottawa – contact the Ministry of Environment Conservation and Parks (MECP) for further information.

Please note, as per the HLUI Disclaimer, that the information contained in the HLUI database has been compiled from publicly available records and other sources of information. The HLUI may contain erroneous information given that the records used as sources of information may be flawed. For instance, changes in municipal addresses over time may introduce error. Accordingly, all information from the HLUI database is provided on an "as is" basis with no representation or warranty by the City with respect to the information's accuracy or exhaustiveness in responding to the request.

Furthermore, the HLUI database and the results of this search in no way confirm the presence or absence of contamination or pollution of any kind. This information is provided on the assumption that it will not be relied upon by any person for any purpose whatsoever. The City of Ottawa denies all liability to any persons attempting to rely on any information provided from the HLUI database.

Please note that in responding to your request, the City of Ottawa does not guarantee or comment on the environmental condition of the Subject Property. You may wish to contact the Ontario Ministry of Environment and Climate Change for additional information.

If you have any further questions or comments, please contact HLUI@ottawa.ca.

Sincerely,

Spencer Mulvaney
Student Planner
Development Review
Planning, Development and Building Services Department

Enclosures: (2)
1. HLUI Map
2. HLUI Summary Report

cc: File no. D06-03-24-0068

HLUI SUMMARY REPORT
AREA FEATURES

OBJECTID	ACTIVITY_NAME	FACILITY_TYPE	SOURCE_UPDATE_SORTED	QAQC	YEAR	YEAR_1	ST_NUM	ST_NAME	ST_SUFFIX	ST_DIR	MUNICIPALITY	ST_NUM2017	ST_NAME2017	ST_SUFFIX2017	ST_DIR2017	POSTAL_CODE2017	PIN2017	MUNICIPALITY2017	NAICS	SIC	COMMENTS	STORAGE_TANK
3585	DOW HONDA	Automobile Dealers-New (	2017-SalesGenie	1	2017	SalesGenie 2017					NEPEAN	1	COLONNADE	RD		K2E0C3	40520826	NEPEAN	44111001	févr-11		
5758	BROWNS CLEANERS	Laundries and Cleaners	2006-ES	1			1642	MERIVALE	RD			1642	MERIVALE	RD		K2G4A1	46610087	NEPEAN	812320			
5759	BROWNS CLEANERS MERIVALE MALL NEPEAN	Laundries and Cleaners	2012-ES	1			1642	MERIVALE	RD			1642	MERIVALE	RD		K2G4A1	46610087	NEPEAN	812320			
5760	COMPUTER BOOKS FOR LESS	Retail trade	2006-ES	1			1642	MERIVALE	RD			1642	MERIVALE	RD		K2G4A1	46610087	NEPEAN	443120			
5761	ISLAND INK JET	Retail trade	2006-ES	1			1642	MERIVALE	RD			1642	MERIVALE	RD		K2G4A1	46610087	NEPEAN	443120			
5762	GOLDEN RATIO TECH SERVICES	Other services (except pul	2012-ES	1			21	GLENMANOR	DR			21	GLENMANOR	DR		K2G3E8	46600080	NEPEAN	811210			
6758	HYDRO	Electric Power Systems In	2001-ES	2	2001	c. 2001	1670	MERIVALE	RD		NEPEAN	1672	MERIVALE	RD		K2G3K4	46570116	NEPEAN	221122		NO PIN FOR 1670 - PIN	
6769	WOOLCO DEPARTMENT STORE #6364 MERIVALE MALL	Vendor	2004-GWStudy	2	2004	GW Study 2004	Renfrew Watershed				OTTAWA	1642	MERIVALE	RD		K2G4A1	46610087	NEPEAN				
6770	PEOPLES JEWELLERS	Jewellery Stores and Wat	2001-ES; 2006-ES; 2012-ES	1	2001	c. 2001	1642	MERIVALE	RD		NEPEAN	1642	MERIVALE	RD		K2G4A1	46610087	NEPEAN	448310			
6771	BROWN'S CLEANERS	Laundries and Cleaners	1980-M; 2001-ES; 2006-ES; 201	1	1980-2017	c. 1980; c.	1642	MERIVALE	RD		NEPEAN	1642	MERIVALE	RD		K2G4A1	46610087	NEPEAN	561740; 812310	972		
6772	DIRECT FILM	Platemaking, Typesetting	1980-M	1	1980	c. 1980	1642	MERIVALE	RD		NEPEAN	1642	MERIVALE	RD		K2G4A1	46610087	NEPEAN	323120; 443130	282; 657	Located in the Merivale m	
6773	INTERNATIONAL NEWS	Combined Publishing and	2005-SelectPhone	1	2005	c. 2005	1642	MERIVALE	RD			1642	MERIVALE	RD		K2G4A1	46610087	NEPEAN	511110		#'K1	
6774	LANTERN COMMUNICATIONS	Communications and Ene	2001-ES	1	2001	c. 2001	1642	MERIVALE	RD		NEPEAN	1642	MERIVALE	RD		K2G4A1	46610087	NEPEAN	335920			
7833	BECKSTEAD SERVICE STATION	Gasoline Service Stations	1970-M	1	1970		1660	MERIVALE	RD		NEPEAN	1660	MERIVALE	RD			46570123	NEPEAN				
7834	MOE'S ESSO	Gasoline Service Stations	1980-M	1	1980		1660	MERIVALE	RD		NEPEAN	1660	MERIVALE	RD			46570123	NEPEAN				
9944	ESSO	Gasoline Service Stations	2001-ES; 2006-ES; 2012-ES	1	2001-2012	ES 2001; I	1660	MERIVALE	RD			1660	MERIVALE	RD		K2G3K4	46570123	NEPEAN	447110; 447190			
9945	IMPERIAL OIL LIMITED	Gasoline Service Stations	1970-M; 1980-M; 2005-Property/	1	1970-2016	c. 1970; c.	1660	MERIVALE	RD		NEPEAN	1660	MERIVALE	RD		K2G3K4	46570123	NEPEAN	447110; 447190	633; 635		
9946	CANADIAN TIRE GAS+	Service Stations-Gasoline	2017-SalesGenie	1	2017	SalesGenie 2017					NEPEAN	1660	MERIVALE	RD		K2G3K4	46570123	NEPEAN	44719005	janv-41		

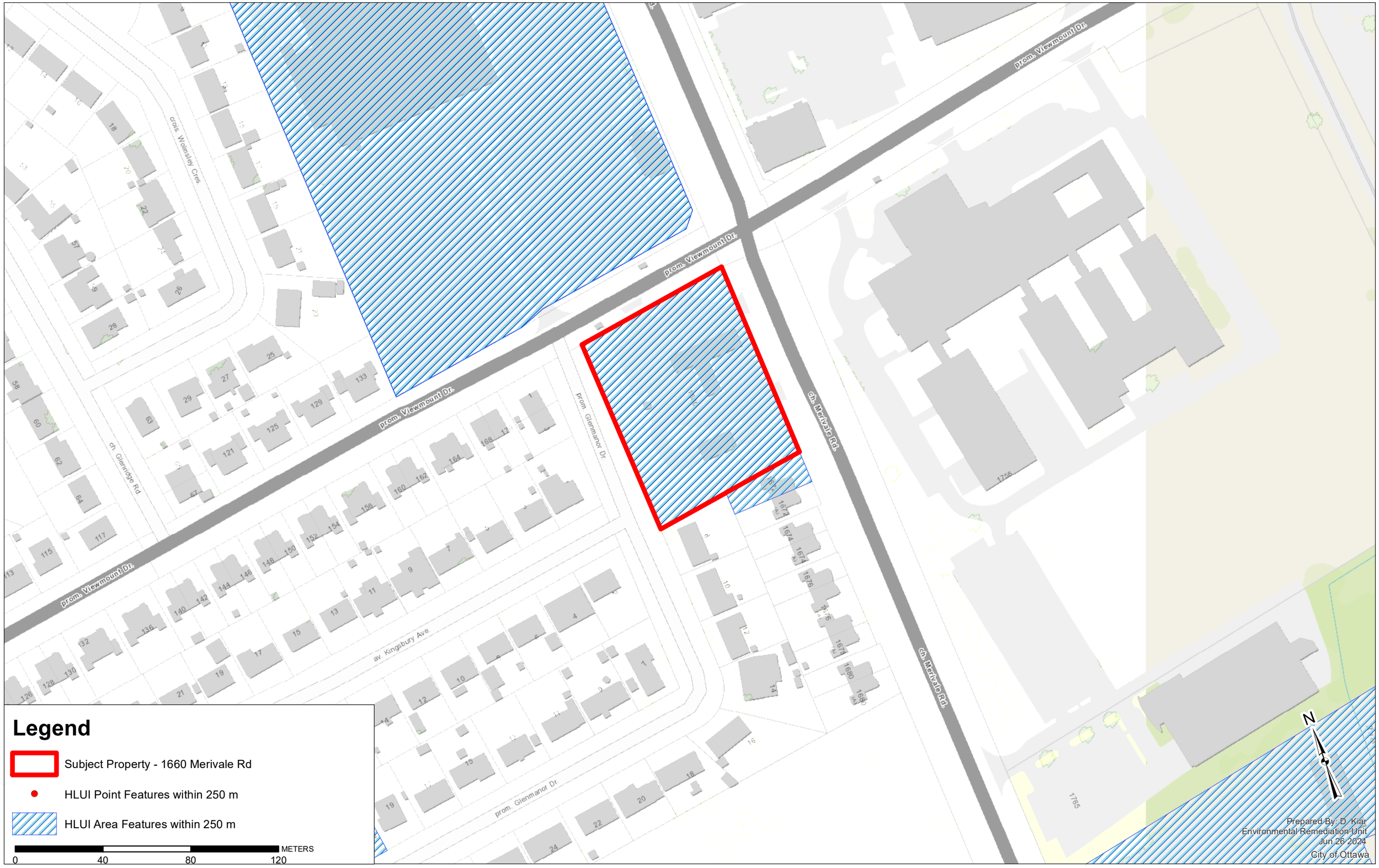
HLUI SUMMARY REPORT
POINT FEATURES

OBJECTID	ACTIVITY_NAME	FACILITY_TYPE	TANK_LOCATION	TANK_CONTENT	TANK_SIZE	TANK_TYPE	TANK_STATUS	SOURCE	INSTALLED_ST_NUM	INSTALLED_ST_NAME	INSTALLED_ST_ABR	INSTALLED_ST_DIR
8674	SUNYS PETROLEUM INC	Gasoline Station-FS		gasoline	45400	Cancelled	Current	GW Study 2004	1651	MERIVALE	RD	<Null>
8675	SUNYS PETROLEUM INC	Gasoline Station-FS		gasoline	31800	Cancelled	Current	GW Study 2004	1651	MERIVALE	RD	<Null>
8676	SUNYS PETROLEUM INC	Gasoline Station-FS		diesel	22700	Cancelled	Current	GW Study 2004	1651	MERIVALE	RD	<Null>

HLUI SUMMARY REPORT
POINT FEATURES

COMMENT	MTM_X	MTM_Y
1651 MERIVALE RD	365122,0345	5023157,285
1651 MERIVALE RD	365122,0345	5023157,285
1651 MERIVALE RD	365122,0345	5023157,285

HISTORIC LAND USE INVENTORY (HLUI) - REPORT REFERENCE MAP



Mathieu Belisle

De: Beaudoin, Jenna <jenna.beaudoin@ottawa.ca>
Envoyé: 2 juillet 2024 14:43
À: Mathieu Belisle
Objet: 1660 Merivale - ABPR-2024-003245

Good afternoon,

Further to your application to access building permit records, unfortunately we are unable to locate the documents requested regarding the above-mentioned address.

Please be advised this ABPR Application is now closed.

Kind Regards,

Jenna Beaudoin
Building Technical Clerk
Building Code Services Branch
City of Ottawa
101 Centrepointe Dr
Ottawa, ON
K2G 5K7

613-580-2424 ext. 13330
jenna.beaudoin@ottawa.ca

Mail Code: 04-11

'

This e-mail originates from the City of Ottawa e-mail system. Any distribution, use or copying of this e-mail or the information it contains by other than the intended recipient(s) is unauthorized. Thank you.

Le présent courriel a été expédié par le système de courriels de la Ville d'Ottawa. Toute distribution, utilisation ou reproduction du courriel ou des renseignements qui s'y trouvent par une personne autre que son destinataire prévu est interdite. Je vous remercie de votre collaboration.

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345 Carlingview Drive
Toronto, Ontario M9W 6N9
Tel.: 416.734.3300
Fax: 416.231.1626
Toll Free: 1.877.682.8772

www.tssa.org

17 June 2024

Mathieu Belisle
Groupe C. Laganière (1995) Inc.
35 Av Laganière
Montréal-est, QC, H1B 5T1

Subject: **1660 Merivale Rd, Nepean, Ontario, Canada, K2G 3K4**
Your File No.: **HARN1660**
WO No.: **14350826**

Dear Madam/Sir:

We are in receipt of your correspondence wherein you requested the release of information regarding the above noted address.

Requested records relating to the following Program(s) were located:

Program	Record	Documents Attached
Fuels Safety	☒	☒
Boiler/Pressure Vessel**	☐	☐
Elevating & Amusement Devices	☐	☐
Other	☐	☐

**For BPV, if it has been indicated that records have been located but are not attached, it is likely that TSSA may not be the keeper of the records you are looking for, see note below.

TSSA does not make any representations or warranties with respect to the accuracy or completeness of any records released. The requestor assumes all risk in using or relying on the information provided.

Should you have any questions, please contact Public Information at publicinformationservices@tssa.org.

Yours truly,

M. Fowler

Melanie Fowler
Public Information Services Agent

Limitations and Notices:

General:

TSSA, as a safety regulator, uses inspection resources to address the greatest harm posed to the public. Thus, inspection only follows-up on safety orders it issues based on the degree of risk posed by the non-compliance identified in the order(s). All high-risk orders will result in a follow-up inspection by TSSA until the non-compliance is resolved. TSSA no longer follows-up on low or medium risk orders referred to as safety tasks, therefore, TSSA can no longer provide you with a report indicating the safety tasks (low and medium-risk orders) have been resolved. This information should be obtained from the device/facility owner or their contractor. One can also engage a third-party contractor to confirm device/facility compliance.

The Public Information Department, (PID), can only provide ***existing*** records for a specific location, facility, or device. If an inspection or any other type of record does not exist, PID cannot instruct TSSA to do work, such as an inspection, to create a record. TSSA, as an outcome-based regulator, deploys all of its resources, including, inspections to address the greatest harm posed to the public; and as such, cannot deploy resources to create records to satisfy an inquiry.

Please Note: *While the PID provides existing records for a specific location, facility, or device; it does not interpret or provide further explanations of the content contained in the document.*

Change of Ownership

Please be advised, if the new owner has acquired a property that contains TSSA regulated devices, i.e. elevators, boilers and pressure vessels, they would be required to complete a change of ownership to obtain new licences. Visit our website at www.tssa.org under the Licencing & Registration section for the Change of Ownership process or contact our Customer Service department at 1.877.682.8772

TSSA Fuels Safety:

If you have environmental concerns regarding this property, you should consider hiring an environmental consultant to conduct an environmental assessment of the property in question.

- Sites that have not been licensed since 1987 may not be in TSSA records.
- Be advised, TSSA Fuels Safety Division did not register:
    - private fuel underground/ aboveground storage tanks prior to January of 1990; and
    - furnace oil tanks prior to May 1, 2002.
- If records being released to you relate to private fuel outlets ("PFOs") or fuel oil furnace tanks, please note the following:
    - PFOs are defined in O. Reg. 217/01 (Liquid Fuels), where "private outlet" means "any premise, other than a retail outlet, where gasoline or an associated product is put into the fuel tanks of motor vehicles or floating motorized watercraft or into portable containers". After 2001, PFOs were no longer required to be licenced in Ontario. Thus, TSSA's records and information regarding PFOs is dated and unverified.
    - Underground furnace fuel oil tanks were required to be registered with TSSA commencing in 2001. These underground tanks are registered; however, TSSA does not inspect or verify the registered tank information. It is incumbent on the fuel distributor to ensure that the tanks are registered. Above ground fuel oil furnace tanks do not require TSSA registration.
    - Please be advised that while the TSSA releases information relating to PFOs or fuel oil furnace tanks pursuant to the TSSA's Access and Privacy Code, the TSSA cautions against reliance on this information.

- In particular, because PFOs do not require a license and there is no requirement to submit any documentation to TSSA for review or approval, TSSA has limited information on these facilities. The TSSA cautions that any information provided may be inaccurate, incomplete, or out of date.

- Fuels Safety Division does not register

  - private waste oil tanks in apartments, office buildings, residences etc.; and
  - aboveground gas or diesel tanks.

- The *Technical Standards and Safety Act* and associated regulations do not require the registration of private fuel outlets, nor does it require that any documentation on these facilities be submitted to or reviewed or approved by TSSA. As a result, TSSA has limited information on these facilities. TSSA cautions that any information provided may be inaccurate, incomplete or out of date.

TSSA Elevating & Amusement Devices Program Notice:

- All orders and/or directions issued by the TSSA Inspector have a compliance date and the owner or designated contractor are required to comply within the specified time limit. Compliance is the responsibility of the owner or operator of the device.

- All written declarations of compliance (where eligible) should be sent to TSSA. Once a declaration of compliance has been received, the outstanding order will be resolved.

- Each report shows the details and date of the inspection conducted by TSSA at the requested location.

- The Ontario Amusement Devices Regulation (O. Reg. 221/01) was adopted in 2001. Since that time, TSSA retains copies of technical dossiers of new amusement devices in Ontario (as per TSSA's retention policy). However, for rides that existed prior to the adoption of the Regulation, which were subject to a "grandfathering-in" clause, technical dossiers were not required to be filed with the TSSA. However, if the amusement ride remains in operation, as per ASTM requirements, the owner/licensee must possess an operations document for the device in question.

Federal Elevators

- Please be advised that without the express written consent of the owner, the TSSA does not release any information with respect to federal elevators or federal elevating equipment. The TSSA is a provincial regulator for the province of Ontario and federal elevators do not fall within the scope of TSSA's provincial mandate and the *Technical Standards and Safety Act* and associated Regulations. Further, the TSSA's Access and Privacy Code only applies to information collected, used, or disclosed by the TSSA in the course of TSSA's administration of the *Act*. Therefore, information with respect to federal elevators or federal elevator equipment is outside of the administration of the *Act,* and outside of the scope of the TSSA's Access and Privacy Codes.

Indigenous Lands

- Please be advised that the TSSA does not release any information with respect to indigenous lands, which are outside of the TSSA's mandate, without the express written permission from the Band. The *Technical Standards and Safety Act*, associated regulations, and TSSA's Access and Privacy Code does not apply to indigenous lands.

TSSA Boilers and Pressure Vessels (BPVs) Program Notice:

- Be advised, TSSA does not typically periodically inspect BPVs. These inspections are usually performed by insurance companies.

- **Inspection reports may not be submitted to TSSA by insurance companies; therefore, while TSSA may have some evidence of a BPV at a location on file, there may be no inspection records pertaining to BPVs located at the address provided.

- As of July 1, 2018, BPVs in Ontario may not be operated unless the Director has issued a current certificate of inspection (COI) to the owner or operator. A COI will be issued to the owner or operator of the BPV by TSSA after TSSA has received a Record of Inspection (ROI) from the insurer/third-party inspector, the associated fees have been paid and the BPV has passed a periodic inspection.

- Please note that if the BPV in question is insured, the insurance company may have additional inspection records. Please contact the insurer directly should you wish to obtain further information.

Fuels Inventory - 1660 Merivale Rd, Nepean, Ontario, Canada, K2G 3K4

Inventory Address	Inventory City	Inventory Province	Inventory Postal Code	Asset Type / Inventory Item	Inventory Status Reason Code	Inventory Number	FS Propane Fixed Capacity	FS Capacity Level	FS Capacity	FS Capacity UOM	FS Corrosion Protection	FS Description	FS Fuel Type	FS Installation Year	FS Tank Material	FS Tank Type Liquid
1660 MERIVALE RD	NEPEAN	ON	K2G 3K4	FS CYLINDER EXCHANGE	Active	30553277	0	L1	0	L						
1660 MERIVALE RD	NEPEAN	ON	K2G 3K4	FS GASOLINE STATION - SELF SERVE	Active	9714891	100000		100000	L						
1660 MERIVALE RD	NEPEAN	ON	K2G 3K4	FS LIQUID FUEL TANK	Active	64512671			25000	L	Fiberglass		Gasoline	2011	Fiberglass (FRP)	Double Wall UST
1660 MERIVALE RD	NEPEAN	ON	K2G 3K4	FS LIQUID FUEL TANK	Active	64512672			25000	L	Fiberglass		Gasoline	2011	Fiberglass (FRP)	Double Wall UST
1660 MERIVALE RD	NEPEAN	ON	K2G 3K4	FS LIQUID FUEL TANK	Active	64512673			25000	L	Fiberglass		Gasoline	2011	Fiberglass (FRP)	Double Wall UST
1660 MERIVALE RD	NEPEAN	ON	K2G 3K4	FS LIQUID FUEL TANK	Active	64512674			25000	L	Fiberglass		Gasoline	2011	Fiberglass (FRP)	Double Wall UST
1660 MERIVALE RD	NEPEAN	ON	K2G 3K4	FS LIQUID FUEL TANK	Dismantled	10869783			22700	L	Fiberglass	2009VBS	Gasoline	1987	Fiberglass (FRP)	Single Wall UST
1660 MERIVALE RD	NEPEAN	ON	K2G 3K4	FS LIQUID FUEL TANK	Dismantled	10869809			22700	L	Fiberglass	2009VBS	Gasoline	1987	Fiberglass (FRP)	Single Wall UST
1660 MERIVALE RD	NEPEAN	ON	K2G 3K4	FS LIQUID FUEL TANK	Dismantled	10869826			22700	L	Fiberglass	2009VBS	Gasoline	1987	Fiberglass (FRP)	Single Wall UST
1660 MERIVALE RD	NEPEAN	ON	K2G 3K4	FS LIQUID FUEL TANK	Dismantled	10869768			45460	L	Fiberglass	2009VBS	Gasoline	1987	Fiberglass (FRP)	Single Wall UST

TECHNICAL STANDARDS and SAFETY AUTHORITY

345 Carlingview Drive
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Toll free 1-877-682-8772
www.tssa.org

Inspection Report

Work Order # 14201101
Inspection Report # 10147940

Inspection Address: 1660 MERIVALE RD NEPEAN ON K2G 3K4 Canada	Reference Number(s): 9714891	Inspection Completion Date: May 24, 2024
	Facility Type: Liquid Fuels	Equipment Type:
Customer Name and Address: HARNOIS GROUPE IMMOBILIER INC. 80 RTE 158 ST THOMAS QC J0K 3L0 Canada	Task Type: FS Follow-up Inspection - New LF	
	The facility/equipment is inspected in accordance with Ontario's Technical Standards & Safety Act and the appropriate regulations and codes. When an Inspector's order is issued, time limits for compliance reflect the severity of the violation and serve to avoid disruption of service.	

INSPECTION NOTES

Inspection Order(s) are issued pursuant to my authority under section 21. (1) of the Technical Standards and Safety Act, 2000.

Where inspection orders are issued, TSSA will perform a follow-up inspection to confirm compliance. The responsible party is expected to make all the necessary corrections within the compliance time specified.

TSSA Inspector David Barclay travelled to 1660 Merivale Rd; Nepean (Harnois Groupe Immobilier Inc) on May 24, 2024 to conduct a follow up inspection regarding orders previously issued. While onsite verifying compliance this Inspector discovered the transition sump contains approx. 5" of water, missing electronic sump sensor. Received and reviewed annual inspection report regarding shear valve/ leak sensor sump testing, resolved.

*Require installation of sump sensor within transition sump which is currently missing.
*Require a copy of the annual inspection report regarding the testing of the "natural gas appliances" within the car wash.

FYI:
Technical Standards and Safety Act. 37 (1) - Offences
Every person who,
(a) contravenes or fails to comply with any provision of this Act, the regulations or a Minister's order;
(b) knowingly makes a false statement or furnishes false information under this Act, the regulations or a Minister's order;
(c) contravenes or fails to comply with a term or condition of an authorization;
(d) contravenes or fails to comply with an order or requirement of a director or an inspector, or obstructs an inspector,
is guilty of an offence and on conviction is liable to a fine of not more than $50,000 or to imprisonment for a term of not more than one year, or to both, or, if the person is a body corporate, to a fine of not more than $1,000,000. 2000, c. 16, s. 37 (1); 2009, c. 28, s. 14 (1).

INSPECTION ORDER(S) ISSUED TO: HARNOIS GROUPE IMMOBILIER INC.

INDIVIDUAL(s) ENSURING COMPLIANCE: Katrine Boucher

As a not-for-profit regulatory authority, TSSA operates on a cost recovery basis.
(Note: This is not an invoice)

TECHNICAL STANDARDS and SAFETY AUTHORITY

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Inspection Report

Work Order # 14201101
Inspection Report # 10147940

No.	Inspection Order(s)	Issued Date	Compliance Date
1.	**ONTARIO REGULATION 212/01. (GASEOUS FUELS) 15 - Duty to maintain in safe operating condition. An owner or user of an appliance, equipment, a work or any other thing employed in the handling or use of gas shall ensure that the appliance, equipment, work or thing employed in the handling or use of gas is maintained in a safe operating condition. O. Reg. 212/01, s. 15.** **Comply with section 15 of the O.Reg 212/01, and as an owner or user of an appliance, equipment or work, or any other thing employed in the handling or use of gas, ensure that it is maintained in a safe operating condition.**	**Mar 07, 2023**	**Aug 23, 2024**
2.	**Liquid Fuels Handling Code Clause 4.5.2.9** **All sumps where product can collect shall be electronically monitored.** **Comply with clause 4.5.2.9 of the Liquid Fuels Handling Code, and ensure the sump(s) are electronically monitored.** **Transition sump next to storage tank vent pipes is not electronically monitored.**	**Mar 07, 2023**	**Aug 23, 2024**

No.	Resolved / Revoked Inspection Order(s)	Issued Date	Status
1.	Liquid Fuels Handling Code Clause 4.6.9 Shear valves and leak detection systems shall be maintained and tested at least once per year or in accordance with the manufacturer's instructions and a written record of the maintenance and testing shall be retained. Yearly maintenance of shear valves and leak detection system	Mar 07, 2023	Resolved
2.	Technical Standards and Safety Act. 37 (1) - Offences Every person who, (a) contravenes or fails to comply with any provision of this Act, the regulations or a Minister's order; (b) knowingly makes a false statement or furnishes false information under this Act, the regulations or a Minister's order; (c) contravenes or fails to comply with a term or condition of an authorization; (d) contravenes or fails to comply with an order or requirement of a director or an inspector, or obstructs an inspector, is guilty of an offence and on conviction is liable to a fine of not more than $50,000 or to imprisonment for a term of not more than one year, or to both, or, if the person is a body corporate, to a fine of not more than $1,000,000. 2000, c. 16, s. 37 (1); 2009, c. 28, s. 14 (1). Comply with Technical Standards and Safety Act. 37 (1)	Jan 07, 2024	Resolved

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Inspection Report

Work Order # 14201101
Inspection Report # 10147940

This report is issued under the *Technical Standards and Safety Authority Act*. 2000, s. 17(1)

17. (1) An inspector may conduct an inspection and may, as part of that inspection, enter and inspect at any reasonable time the lands and premises where any of the things, parts of the things or classes of things to which this Act, the regulations or a Minister's order apply are used, operated, installed, made, manufactured, repaired, renovated or offered for sale for the purpose of,

(a) ensuring compliance with this Act, the regulations or Minister's order;
(b) ensuring that an authorization holder remains entitled to the authorization; or
(c) determining whether a hazardous condition exists. 2006, c. 34, s. 25 (5)

Customer Signature & Position / Date:	**Inspector Name:**	**Inspector Contact Number:**
	David Barclay	**+1 613-808-2727**

Report Received By:	**Customer Contact Number:**	**Inspector Email:**
Katrine Boucher via: katrineboucher@harnoisenergies.com	**(450) 759-7979**	**dbarclay@tssa.org**

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Inspection Report

Work Order # 14129021
Inspection Report # 10132021

Inspection Address: 1660 MERIVALE RD NEPEAN ON K2G 3K4 Canada	Reference Number(s): 9714891	Inspection Completion Date: Jan 5, 2024
	Facility Type: Liquid Fuels	Equipment Type:
Customer Name and Address: HARNOIS GROUPE IMMOBILIER INC. 80 RTE 158 ST THOMAS QC J0K 3L0 Canada	Task Type: FS Follow-up Inspection - New LF	
	The facility/equipment is inspected in accordance with Ontario's Technical Standards & Safety Act and the appropriate regulations and codes. When an Inspector's order is issued, time limits for compliance reflect the severity of the violation and serve to avoid disruption of service.	

INSPECTION NOTES

Inspection Order(s) are issued pursuant to my authority under section 21. (1) of the Technical Standards and Safety Act, 2000.

Where inspection orders are issued, TSSA will perform a follow-up inspection to confirm compliance. The responsible party is expected to make all the necessary corrections within the compliance time specified.

TSSA Inspector David Barclay travelled to 1660 Merivale Rd; Ottawa (Harnois Groupe Immobilier Inc) on January 5, 2024 to conduct a follow up inspection regarding orders previously issued. Consulted with Jackie - Manager while verifying compliance discovering none of the orders have been complied with. An extension of the compliance date to "April 30, 2024" has been issued for the installation of the electronic monitoring of the transition sump next to the storage tank vent pipes, and the remaining orders that have not been complied with. If the work cannot be resolved by this date a Variance application will need to be submitted with the associated fees, for TSSA Engineering to consider approving a variance allowing this installation to be completed at a future date.

INSPECTION ORDER(S) ISSUED TO: HARNOIS GROUPE IMMOBILIER INC.

INDIVIDUAL(s) ENSURING COMPLIANCE: Karina Lauzon

No.	Inspection Order(s)	Issued Date	Compliance Date
1.	**Liquid Fuels Handling Code Clause 4.6.9** **Shear valves and leak detection systems shall be maintained and tested at least once per year or in accordance with the manufacturer's instructions and a written record of the maintenance and testing shall be retained.** **Yearly maintenance of shear valves and leak detection system**	**Mar 07, 2023**	**Apr 30, 2024**

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(Note: This is not an invoice)

2.	**ONTARIO REGULATION 212/01. (GASEOUS FUELS) 15 - Duty to maintain in safe operating condition. An owner or user of an appliance, equipment, a work or any other thing employed in the handling or use of gas shall ensure that the appliance, equipment, work or thing employed in the handling or use of gas is maintained in a safe operating condition. O. Reg. 212/01, s. 15.** **Comply with section 15 of the O.Reg 212/01, and as an owner or user of an appliance, equipment or work, or any other thing employed in the handling or use of gas, ensure that it is maintained in a safe operating condition.**	**Mar 07, 2023**	**Apr 30, 2024**
3.	**Liquid Fuels Handling Code Clause 4.5.2.9** **All sumps where product can collect shall be electronically monitored.** **Comply with clause 4.5.2.9 of the Liquid Fuels Handling Code, and ensure the sump(s) are electronically monitored.** **Transition sump next to storage tank vent pipes is not electronically monitored.**	**Mar 07, 2023**	**Apr 30, 2024**
4.	**Technical Standards and Safety Act. 37 (1) - Offences** **Every person who,** **(a) contravenes or fails to comply with any provision of this Act, the regulations or a Minister's order;** **(b) knowingly makes a false statement or furnishes false information under this Act, the regulations or a Minister's order;** **(c) contravenes or fails to comply with a term or condition of an authorization;** **(d) contravenes or fails to comply with an order or requirement of a director or an inspector, or obstructs an inspector,** **is guilty of an offence and on conviction is liable to a fine of not more than $50,000 or to imprisonment for a term of not more than one year, or to both, or, if the person is a body corporate, to a fine of not more than $1,000,000. 2000, c. 16, s. 37 (1); 2009, c. 28, s. 14 (1).** **Comply with Technical Standards and Safety Act. 37 (1)**	**Jan 07, 2024**	**Apr 30, 2024**

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Inspection Report

Work Order # 14129021
Inspection Report # 10132021

This report is issued under the *Technical Standards and Safety Authority Act*. 2000, s. 17(1)

17. (1) An inspector may conduct an inspection and may, as part of that inspection, enter and inspect at any reasonable time the lands and premises where any of the things, parts of the things or classes of things to which this Act, the regulations or a Minister's order apply are used, operated, installed, made, manufactured, repaired, renovated or offered for sale for the purpose of,

(a) ensuring compliance with this Act, the regulations or Minister's order;

(b) ensuring that an authorization holder remains entitled to the authorization; or

(c) determining whether a hazardous condition exists. 2006, c. 34, s. 25 (5)

Customer Signature & Position / Date:	**Inspector Name:**	**Inspector Contact Number:**
	David Barclay	**+1 613-808-2727**

Report Received By:	**Customer Contact Number:**	**Inspector Email:**
Karina Lauzon via: karinalauzon@harnoisenergies.com	**(450) 759-7979**	**dbarclay@tssa.org**

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Inspection Report

Work Order # 14065172
Inspection Report # 10118176

Inspection Address: 1660 MERIVALE RD NEPEAN ON K2G 3K4 Canada	Reference Number(s): 9714891	Inspection Completion Date: Oct 11, 2023
	Facility Type: Liquid Fuels	Equipment Type:
Customer Name and Address: HARNOIS GROUPE IMMOBILIER INC. 80 RTE 158 ST THOMAS QC J0K 3L0 Canada	Task Type: FS Follow-up Inspection - New LF	
	The facility/equipment is inspected in accordance with Ontario's Technical Standards & Safety Act and the appropriate regulations and codes. When an Inspector's order is issued, time limits for compliance reflect the severity of the violation and serve to avoid disruption of service.	

INSPECTION NOTES

Inspection Order(s) are issued pursuant to my authority under section 21. (1) of the Technical Standards and Safety Act, 2000.

Where inspection orders are issued, TSSA will perform a follow-up inspection to confirm compliance. The responsible party is expected to make all the necessary corrections within the compliance time specified.

TSSA Inspector David Barclay travelled to 1660 Merivale Rd; Ottawa (Harnois Groupe Immobilier Inc) on October 11, 2023 to conduct a follow up inspection regarding orders previously issued. This Inspector has found none of the orders issued have been complied with. An extension to the compliance date to December 31, 2023 has been issued for the orders that have not been complied with. If the work cannot be resolved by this date a Variance Application will need to be submitted with the associated fees, for TSSA Engineering to consider approving a Variance allowing this installation to be completed at a future date.

INSPECTION ORDER(S) ISSUED TO: HARNOIS GROUPE IMMOBILIER INC.

INDIVIDUAL(s) ENSURING COMPLIANCE: Katrine Boucher

No.	Inspection Order(s)	Issued Date	Compliance Date
1.	**Liquid Fuels Handling Code Clause 4.6.9** **Shear valves and leak detection systems shall be maintained and tested at least once per year or in accordance with the manufacturer's instructions and a written record of the maintenance and testing shall be retained.** **Yearly maintenance of shear valves and leak detection system**	**Mar 07, 2023**	**Dec 31, 2023**
2.	**ONTARIO REGULATION 212/01. (GASEOUS FUELS) 15 - Duty to maintain in safe operating condition. An owner or user of**	**Mar 07, 2023**	**Dec 31, 2023**

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(Note: This is not an invoice)

	an appliance, equipment, a work or any other thing employed in the handling or use of gas shall ensure that the appliance, equipment, work or thing employed in the handling or use of gas is maintained in a safe operating condition. O. Reg. 212/01, s. 15. **Comply with section 15 of the O.Reg 212/01, and as an owner or user of an appliance, equipment or work, or any other thing employed in the handling or use of gas, ensure that it is maintained in a safe operating condition.**		
3.	**Liquid Fuels Handling Code Clause 4.5.2.9** **All sumps where product can collect shall be electronically monitored.** **Comply with clause 4.5.2.9 of the Liquid Fuels Handling Code, and ensure the sump(s) are electronically monitored.**	**Mar 07, 2023**	**Dec 31, 2023**

This report is issued under the *Technical Standards and Safety Authority Act*. 2000, s. 17(1)

17. (1) An inspector may conduct an inspection and may, as part of that inspection, enter and inspect at any reasonable time the lands and premises where any of the things, parts of the things or classes of things to which this Act, the regulations or a Minister's order apply are used, operated, installed, made, manufactured, repaired, renovated or offered for sale for the purpose of,
(a) ensuring compliance with this Act, the regulations or Minister's order;
(b) ensuring that an authorization holder remains entitled to the authorization; or
(c) determining whether a hazardous condition exists. 2006, c. 34, s. 25 (5)

Customer Signature & Position / Date:	**Inspector Name:** **David Barclay**	**Inspector Contact Number:** **+1 613-808-2727**

Report Received By:	**Customer Contact Number:**	**Inspector Email:**
Katrine Boucher via: **katrineboucher@harnoisenergies.com**	**(450) 759-7979**	**dbarclay@tssa.org**

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TECHNICAL STANDARDS and SAFETY AUTHORITY

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Inspection Report

Work Order # 8260594
Inspection Report # 10075240

Inspection Address: 1660 MERIVALE RD NEPEAN ON K2G 3K4 Canada	Reference Number(s): 9714891	Inspection Completion Date: Jul 25, 2023
	Facility Type: Liquid Fuels	Equipment Type:
Customer Name and Address: HARNOIS GROUPE IMMOBILIER INC. 80 RTE 158 ST THOMAS QC J0K 3L0 Canada	Task Type: FS Follow-up Inspection - New LF	
	The facility/equipment is inspected in accordance with Ontario's Technical Standards & Safety Act and the appropriate regulations and codes. When an Inspector's order is issued, time limits for compliance reflect the severity of the violation and serve to avoid disruption of service.	

INSPECTION NOTES

Inspection Order(s) are issued pursuant to my authority under section 21. (1) of the Technical Standards and Safety Act, 2000.

Where inspection orders are issued, TSSA will perform a follow-up inspection to confirm compliance. The responsible party is expected to make all the necessary corrections within the compliance time specified.

TSSA Inspector David Barclay travelled to 1660 Merivale Rd; Ottawa (Harnois Groupe Immobilier Inc) on July 25, 2023 to conduct a follow up inspection regarding orders previously issued. Consulted with attendant onsite while verifying compliance and discovered the following:

*Missing electronic leak detection within the transition sump next to the underground petroleum vent pipes.
*Require a copy of the maintenance and testing report regarding the annual shear valve and leak detection system.
*Require a copy of the annual maintenance and testing of the natural gas appliances within the Car Wash building.

A compliance date of Sept. 25, 2023 has been issued.

INSPECTION ORDER(S) ISSUED TO: HARNOIS GROUPE IMMOBILIER INC.

INDIVIDUAL(s) ENSURING COMPLIANCE: Philippe Grondin

No.	Inspection Order(s)	Issued Date	Compliance Date
1.	**Liquid Fuels Handling Code Clause 4.6.9** **Shear valves and leak detection systems shall be maintained and tested at least once per year or in accordance with the manufacturer's instructions and a written record of the maintenance and testing shall be retained.** **Yearly maintenance of shear valves and leak detection system**	**Mar 07, 2023**	**Sep 25, 2023**

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2.	**ONTARIO REGULATION 212/01. (GASEOUS FUELS) 15 - Duty to maintain in safe operating condition. An owner or user of an appliance, equipment, a work or any other thing employed in the handling or use of gas shall ensure that the appliance, equipment, work or thing employed in the handling or use of gas is maintained in a safe operating condition. O. Reg. 212/01, s. 15.** **Comply with section 15 of the O.Reg 212/01, and as an owner or user of an appliance, equipment or work, or any other thing employed in the handling or use of gas, ensure that it is maintained in a safe operating condition.**	**Mar 07, 2023**	**Sep 25, 2023**
3.	**Liquid Fuels Handling Code Clause 4.5.2.9** **All sumps where product can collect shall be electronically monitored.** **Comply with clause 4.5.2.9 of the Liquid Fuels Handling Code, and ensure the sump(s) are electronically monitored.**	**Mar 07, 2023**	**Sep 25, 2023**

This report is issued under the *Technical Standards and Safety Authority Act*. 2000, s. 17(1)

17. (1) An inspector may conduct an inspection and may, as part of that inspection, enter and inspect at any reasonable time the lands and premises where any of the things, parts of the things or classes of things to which this Act, the regulations or a Minister's order apply are used, operated, installed, made, manufactured, repaired, renovated or offered for sale for the purpose of,

(a) ensuring compliance with this Act, the regulations or Minister's order;
(b) ensuring that an authorization holder remains entitled to the authorization; or
(c) determining whether a hazardous condition exists. 2006, c. 34, s. 25 (5)

Customer Signature & Position / Date:	**Inspector Name:**	**Inspector Contact Number:**
	David Barclay	**+1 613-808-2727**

Report Received By:	**Customer Contact Number:**	**Inspector Email:**
katrineboucher@harnoisenergies.com via: philippegrondin@harnoisenergies.com	**(450) 759-7979**	**dbarclay@tssa.org**

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Inspection Report

Work Order # 8192203
Inspection Report # 10056449

Inspection Address: 1660 MERIVALE RD NEPEAN ON K2G 3K4 Canada	Reference Number(s): 9714891	Inspection Completion Date: Feb 17, 2023
	Facility Type: Liquid Fuels	Equipment Type:
Customer Name and Address: HARNOIS GROUPE IMMOBILIER INC. 80 RTE 158 ST THOMAS QC J0K 3L0 Canada	Task Type: FS Follow-up Inspection - New LF	
	The facility/equipment is inspected in accordance with Ontario's Technical Standards & Safety Act and the appropriate regulations and codes. When an Inspector's order is issued, time limits for compliance reflect the severity of the violation and serve to avoid disruption of service.	

INSPECTION NOTES

Inspection Order(s) are issued pursuant to my authority under section 21. (1) of the Technical Standards and Safety Act, 2000.

Where inspection orders are issued, TSSA will perform a follow-up inspection to confirm compliance. The responsible party is expected to make all the necessary corrections within the compliance time specified.

TSSA Inspector David Barclay travelled to 1660 Merivale Rd; Ottawa (Harnois Groupe Immobilier Inc) on February 17, 2023 to conduct a follow up inspection regarding orders previously issued. Consulted with Jackie - Management on site during inspection verifying compliance with orders issued. This Inspector has not received copies of the annual inspection reports regarding the shear valves and leak detection system, and the maintenance conducted to the natural gas appliances within the car wash mechanical room. Also a sump sensor has not been installed within the transition sump.

*Electronic sump sensor to be installed within the transition sump next to the storage tank vent pipes.

*Require a copy of the annual inspection report regarding the maintenance and testing of the shear valve and leak detection system.

*Require a copy of the annual maintenance report regarding the natural gas appliances within the car wash mechanical room.

A 90 day compliance date has been issued regarding the above orders, and a follow up inspection will be conducted.

INSPECTION ORDER(S) ISSUED TO: HARNOIS GROUPE IMMOBILIER INC.

INDIVIDUAL(s) ENSURING COMPLIANCE: Philippe Grondin

No.	Inspection Order(s)	Issued Date	Compliance Date
1.	**Liquid Fuels Handling Code Clause 4.6.9** **Shear valves and leak detection systems shall be maintained and tested at least once per year or in accordance with the**	**Mar 07, 2023**	**Jun 02, 2023**

As a not-for-profit regulatory authority, TSSA operates on a cost recovery basis.
(Note: This is not an invoice)

	manufacturer's instructions and a written record of the maintenance and testing shall be retained. **Yearly maintenance of shear valves and leak detection system**		
2.	**ONTARIO REGULATION 212/01. (GASEOUS FUELS) 15 - Duty to maintain in safe operating condition. An owner or user of an appliance, equipment, a work or any other thing employed in the handling or use of gas shall ensure that the appliance, equipment, work or thing employed in the handling or use of gas is maintained in a safe operating condition. O. Reg. 212/01, s. 15.** **Comply with section 15 of the O.Reg 212/01, and as an owner or user of an appliance, equipment or work, or any other thing employed in the handling or use of gas, ensure that it is maintained in a safe operating condition.**	**Mar 07, 2023**	**Jun 02, 2023**
3.	**Liquid Fuels Handling Code Clause 4.5.2.9** **All sumps where product can collect shall be electronically monitored.** **Comply with clause 4.5.2.9 of the Liquid Fuels Handling Code, and ensure the sump(s) are electronically monitored.**	**Mar 07, 2023**	**Jun 02, 2023**

This report is issued under the *Technical Standards and Safety Authority Act*. 2000, s. 17(1)

17. (1) An inspector may conduct an inspection and may, as part of that inspection, enter and inspect at any reasonable time the lands and premises where any of the things, parts of the things or classes of things to which this Act, the regulations or a Minister's order apply are used, operated, installed, made, manufactured, repaired, renovated or offered for sale for the purpose of,
(a) ensuring compliance with this Act, the regulations or Minister's order;
(b) ensuring that an authorization holder remains entitled to the authorization; or
(c) determining whether a hazardous condition exists. 2006, c. 34, s. 25 (5)

Customer Signature & Position / Date:	**Inspector Name:** **David Barclay**	**Inspector Contact Number:** **+1 613-808-2727**

Report Received By:	**Customer Contact Number:**	**Inspector Email:**
Philippe Grondin via: **philippegrondin@harnoisenergies.com**	**(450) 759-7979**	**dbarclay@tssa.org**

As a not-for-profit regulatory authority, TSSA operates on a cost recovery basis.
(Note: This is not an invoice)

TECHNICAL STANDARDS and SAFETY AUTHORITY

345 Carlingview Drive
Toronto, Ontario M9W 6N9
Toll free 1-877-682-8772
www.tssa.org

Inspection Report

Work Order # 8178123
Inspection Report # 10053967

Inspection Address: 1660 MERIVALE RD NEPEAN ON K2G 3K4 Canada	Reference Number(s): 9714891	Inspection Completion Date: Oct 12, 2022
	Facility Type: Liquid Fuels	Equipment Type:
Customer Name and Address: HARNOIS GROUPE IMMOBILIER INC. 80 RTE 158 ST THOMAS QC J0K 3L0 Canada	Task Type: FS Owner Change New Inspection - LF Station	
	The facility/equipment is inspected in accordance with Ontario's Technical Standards & Safety Act and the appropriate regulations and codes. When an Inspector's order is issued, time limits for compliance reflect the severity of the violation and serve to avoid disruption of service.	

INSPECTION NOTES

Inspection Order(s) are issued pursuant to my authority under section 21. (1) of the Technical Standards and Safety Act, 2000.

TSSA Inspector David Barclay travelled to 1600 Merivale Rd; Nepean (Harnois Groupe Immobilier Inc) on October 12, 2022 to conduct a petroleum facility inspection regarding Change of License Holder. Consulted with Mr. Araji - Manager on site during inspection of the petroleum and propane facility licenses, emergency stop, camera system, Veederoot, signage, spill kit, fire extinguishers, dispensing equipment, stp and dispenser sumps, vehicular protection, fill and vent pipes, propane cylinder storage, car wash natural gas appliances, testing of intercom, and discovered the following deficiencies:

*Transition sump near the petroleum storage tank vent pipes is not electronically monitored.
*Require copy of the annual inspection report regarding the shear valve and leak detection system.
*Require copy of the annual inspection report regarding the natural gas appliances within the Car Wash.

*A compliance date of January 10, 2023 has been issued.

Inspection Complete.

INSPECTION ORDER(S) ISSUED TO: HARNOIS GROUPE IMMOBILIER INC.
INDIVIDUAL(s) ENSURING COMPLIANCE: Philippe Grondin

No.	Inspection Order(s)	Issued Date	Compliance Date
1.	**Liquid Fuels Handling Code Clause 4.6.9** **Shear valves and leak detection systems shall be maintained and tested at least once per year or in accordance with the manufacturer's instructions and a written record of the maintenance and testing shall be retained.** **Shear Valve and Leak Detection Inspection Report.** **Require copy of annual inspection report regarding Shear Valve and Leak Detection Inspection.**	**Oct 16, 2022**	**Jan 10, 2023**

As a not-for-profit regulatory authority, TSSA operates on a cost recovery basis.
(Note: This is not an invoice)

2.	**ONTARIO REGULATION 212/01. (GASEOUS FUELS) 15 - Duty to maintain in safe operating condition. An owner or user of an appliance, equipment, a work or any other thing employed in the handling or use of gas shall ensure that the appliance, equipment, work or thing employed in the handling or use of gas is maintained in a safe operating condition. O. Reg. 212/01, s. 15.** **Natural gas appliance inspection report.** **Require copy of the annual inspection report regarding the natural gas appliances within the Car Wash.**	**Oct 16, 2022**	**Jan 10, 2023**
3.	**Liquid Fuels Handling Code Clause 4.5.2.9** **All sumps where product can collect shall be electronically monitored.** **Comply with clause 4.5.2.9 of the Liquid Fuels Handling Code, and ensure the sump(s) are electronically monitored.** **Transition sump located near petroleum storage tank vent pipes is not electronically monitored.**	**Oct 16, 2022**	**Jan 10, 2023**

This report is issued under the *Technical Standards and Safety Authority Act*. 2000, s. 17(1)

17. (1) An inspector may conduct an inspection and may, as part of that inspection, enter and inspect at any reasonable time the lands and premises where any of the things, parts of the things or classes of things to which this Act, the regulations or a Minister's order apply are used, operated, installed, made, manufactured, repaired, renovated or offered for sale for the purpose of,
(a) ensuring compliance with this Act, the regulations or Minister's order;
(b) ensuring that an authorization holder remains entitled to the authorization; or
(c) determining whether a hazardous condition exists. 2006, c. 34, s. 25 (5)

Customer Signature & Position / Date:	**Inspector Name:**	**Inspector Contact Number:**
	David Barclay	**+1 613-808-2727**

Report Received By:	**Customer Contact Number:**	**Inspector Email:**
Philippe Grondin via: philippegrondin@harnoisenergies.com	**(450) 759-7979**	**dbarclay@tssa.org**

As a not-for-profit regulatory authority, TSSA operates on a cost recovery basis.
(Note: This is not an invoice)

Sabreen Sherwani
Project Manager
587.476.2051
sabreen.sherwani@esso.ca

July 18th, 2022

Farzana Islam
Technical Standards and Safety Authority (TSSA)
345 Carlingview Drive
Toronto, ON M9W 6N9

Re: IOL's response to TSSA's letter dated April 11th, 2022-Groundwater Monitoring Program-1660 Merivale Road, Ottawa, Ontario (TSSA Service Request #791084)

Dear Ms. Islam,

Please find enclosed the *2021 Supplemental Subsurface Investigation Report* prepared by Golder dated June 30, 2022 which documents findings of the scope outlined in the 2022 Action Plan dated February 4, 2022. An excerpt report that focuses on MW22-01 and MW22-02 has been provided to the Ottawa Carleton District Schoolboard (OCDSB).

As requested, two monitoring wells, MW22-01 and MW22-02, were installed on the OCDSB to the east of 1660 Merivale Road Ottawa, ON ("Site") while two additional monitoring wells, MW21-02 and MW21-01, were installed onsite at the western property boundary. At all four of these locations, the concentrations in both soil and groundwater were below the applicable criteria; therefore, concentrations in groundwater are delineated cross-gradient (east and west) and down-gradient (south) of the retail fuel outlet. At upgradient locations, TH9 and TH8 are both compliant for all parameters except for F3 concentrations at TH8 which are slightly above criteria (590 ug/l compared to a criteria of 500 ug/l). Monitoring wells MW16-01, TH8, TH9, TH11, TH12, TH100 to TH102 will be monitored and sampled on an annual basis in accordance to the 2017 Offsite Containment Management Plan prepared by Golder dated May 19, 2017. Similarly, the onsite monitoring wells (TH1 to TH7) will be monitored and sampled on an annual basis as outlined in the 2015 Interim Containment Management Plan prepared by EXP dated April 2, 2015.

The soil vapour analytical results for SV16-01, SV16-02, SV21-03, SV21-01 and SV21-02 were all below the residential Health-Based Indoor Air Criteria.

The retail fuel outlet and carwash at 1660 Merivale Road Ottawa, ON has been sold to Harnois Energies who will be managing both the onsite and offsite Containment Management Plans. Please direct any further inquiries and concerns to Jean-Philippe Wilkins at jeanphilippewilkins@harnoisenergies.com. As delineation has been obtained, Imperial Oil Limited will decommission the offsite wells, MW22-01 and MW22-02, in accordance to O. Reg 903 by August 31, 2022.

Best regards,

Sabreen Sherwani
Project Manager, Execution

REPORT

2021 Supplemental Subsurface Investigation

1660 Merivale Road, Ottawa, Ontario
Former Retail Fuel Outlet
SAP No. 88001627

Submitted to:

Imperial Oil Limited
505 Quarry Park Blvd SE
Calgary, Alberta
T2C 5N1

Submitted by:

Golder Associates Ltd.
309 Exeter Road, Unit #1
London, Ontario
N6L 1C1

+1 519 652 0099

21506016-1155

June 30, 2022

THIS REPORT CONTAINS PROVISIONS LIMITING LIABILITY, THE SCOPE OF THE REPORT AND THIRD PARTY RELIANCE

These documents and the information contained therein are confidential, property of Imperial Oil and any disclosure of same is governed by the provisions of each of the applicable provincial and territorial freedom of information legislation, the Privacy Act (Canada) 1980-81-82-83, c.111, Sch.II"1", and the Access to Information Act (Canada) 1980-81-82-83, c.111, Sch.I"1", as such legislation may be amended from time to time.

Distribution List

1 Electronic Copy: Imperial Oil Limited

1 Electronic Copy: Golder Associates Ltd.

Executive Summary

Site Background

Site location	1660 Merivale Road, Ottawa, Ontario
Type of facility	Former Retail Fuel Outlet
Current Site condition	Canadian Tire Gas Station and Car Wash
Site zoning	Arterial Mainstreet (AM) – commercial/mixed use zone
Adjacent land use	North: Viewmount Drive followed by Arterial Mainstreet (AM) – commercial businesses East: Merivale Road followed by Minor Institutional (I1) – school South: Arterial Mainstreet (AM) – residential properties West: Residential (R2) – residential properties

Field Work

Dates of field work	December 1 and 3, 2021 (on-site drilling, groundwater monitoring and sampling) December 9 and 10, 2021 (soil vapour sampling) March 16 to 30, 2022 (off-site drilling and on-site groundwater monitoring and sampling) April 13, 2022 (off-site roadway groundwater monitoring and sampling)
Number of boreholes drilled	2 in December 2021 (MW21-01 and MW21-02) 2 in March 2022 (MW22-01 and MW22-02)
Number of monitoring wells installed	2 in December 2021 (MW21-01 and MW21-02) 2 in March 2022 (MW22-01 and MW22-02)
Number of groundwater wells sampled	2 in December 2021 10 in March 2022 7 in April 2022
Number of soil vapour probes sampled	5

Site Stratigraphy and Hydrogeology

Predominant soil type	Coarse-textured
Depth to shallow groundwater	March 2022 (on-site wells) – from 1.67 to 3.14 metres below ground surface (mbgs) April 2022 (roadway) – from 2.61 to 3.09 mbgs

Overburden groundwater flow direction	South
Light non-aqueous phase liquid (LNAPL)	Detected in one monitoring well (TH5) Sheen detected in two monitoring wells (TH8 and TH9)

Nearby Receptors

Groundwater use within 300 metres (m)	The City of Ottawa sources drinking water from the Ottawa River, approximately 5.5 kilometres (km) north of the Site (City of Ottawa 2022, internet site). One domestic/livestock water supply well was identified approximately 245 m northeast of the Site. It is unknown if this well is currently used for drinking water supply.
Surface water body within 500 m	Nepean Creek is approximately 330 m east of the Site. The Rideau River is approximately 2.5 km east of the Site.

Selected Criteria

Benzene, toluene, ethylbenzene, xylenes (BTEX), petroleum hydrocarbons (PHC) fractions F1 to F4, volatile organic compounds (VOCs), lead	**Soil:** Ministry of the Environment (MOE, now Ministry of the Environment, Conservation and Parks [MECP]) Ontario Regulation (O.Reg.) 153 (MOE 2011) Table 3 Full Depth Generic Site Condition Standards for industrial/commercial/community property use for coarse textured soil in a non-potable groundwater condition. **Groundwater:** MECP O. Reg. 153 (MOE 2011) Table 3 Full Depth Generic Site Condition Standards for all types of property use for groundwater in coarse textured soil in a non-potable groundwater condition. **Soil Vapour:** Health-Based Indoor Air Criteria (HBIAC) – Industrial lower risk level provided by MECP Modified Soil vapour screening level (SVSL) for residential land use calculated by dividing HBIAC by an attenuation factor of 0.02.

Soil Analytical Results Exceeding Selected Criteria

BTEX, PHC Fractions F1 to F4	No exceedances were identified.
n-Hexane	No exceedances were identified.
Lead	No exceedances were identified.

Groundwater Analytical Results Exceeding Selected Criteria

BTEX, PHC Fractions F1 to F4	Exceedances were identified at five locations (MW16-01, TH4, TH8, TH11, and TH101).
Dissolved Lead	No exceedances were identified.

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1.0 INTRODUCTION

Golder Associates Ltd. (Golder) was retained by Imperial Oil Limited (Imperial) to conduct a Supplemental Subsurface Investigation (SSI) at the former retail fuel outlet located at 1660 Merivale Road in Ottawa, Ontario (the Site). The Site location is presented in Figures 1 to 3.

This report documents the methods and results of the SSI conducted between December 1 and 10, 2021, March 16 to 30, 2022, and April 13, 2022.

1.1 Objective

The objective of the investigation was to further delineate soil impacts previously identified on-site and complete groundwater monitoring and sampling of existing and new monitoring wells.

1.2 Scope of Work

The scope of work for this investigation consisted of the following activities:

December 2021

- Drilling two boreholes to a maximum depth of 6 mbgs and completing both boreholes as monitoring wells;
- Collecting soil samples for analysis of BTEX, PHC Fractions F1 to F4, n-hexane, and lead;
- Developing and monitoring the newly installed monitoring wells;
- Collecting groundwater samples from the newly-installed monitoring wells for analysis of BTEX, PHC Fractions F1 to F4, and dissolved lead; and
- Collecting soil vapour samples from five soil vapour probes for analysis of BTEX, PHC Fractions F1 and F2, and VOCs.

March/April 2022

- Drilling two off-site boreholes to a maximum depth of 4.8 mbgs and completing both boreholes as monitoring wells;
- Collecting soil samples for analysis of BTEX, PHC Fractions F1 to F4, n-hexane, and lead;
- Developing and monitoring the newly installed monitoring wells;
- Collecting groundwater samples from existing and newly-installed monitoring wells for analysis of BTEX, PHC Fractions F1 to F4, and dissolved lead; and
- Preparing an SSI report documenting and detailing the methods and results of the investigation activities.

1.3 Summary of Previous Work

Previous environmental assessments were reviewed by Golder to assess the historical Site conditions and as a source of information for reporting. A summary of the relevant information identified as part of this review follows.

General Findings From Previous Phase I Environmental Site Assessments (ESAs):

- The Site operated as a gas station and service garage from 1968 to 1984, and an operating gas station with a carwash from 1984 to present (Barenco 2011b).

- Former infrastructure included a kiosk, an attached canopy, three dispensers on individual pump islands, four fibreglass underground storage tanks (USTs), and a car wash (Barenco 2011b).
- On-site areas of potential environmental concern (APECs) were identified as the four USTs, the six dispensers, and product piping, the former service garage, and the unknown source of imported fill that was brought to the Site during construction of the carwash. Potential contaminants of concern (PCOCs) were considered to be BTEX, PHC Fractions F1 to F4, polycyclic aromatic hydrocarbons (PAHs), VOCs, metals, and polychlorinated biphenyls (PCBs) (Barenco 2011b).

General Findings From Previous Phase II ESAs:

- In 2011, five boreholes were advanced to a maximum depth of 5.8 mbgs, and completed as monitoring wells (TH1 to TH5). Soil samples collected from the boreholes were submitted for BTEX, PHC Fractions F1 to F4, hexane, 2-and 3-ring PAHs, and selected metals. All soil samples yielded concentrations of all parameters below the Table 3 standard. Groundwater samples from the newly-installed monitoring wells were submitted for analysis of BTEX, PHC Fractions F1 to F4, and dissolved lead. Groundwater samples from three monitoring wells yielded concentrations of one or more of benzene, ethylbenzene, hexane, and PHC Fractions F1 to F4. Groundwater was encountered between 3.25 and 4.21 mbgs. Groundwater flow was inferred to the southwest (Barenco 2011a).
- In 2011, two boreholes were advanced on-site, and completed as monitoring wells (TH6 and TH7). Soil samples were submitted for analysis of BTEX, PHC Fractions F1 to F4, hexane, PAHs, and select metals. All soil samples yielded concentrations of all parameters below the Table 3 standards. Groundwater samples were collected from the newly-installed monitoring wells and submitted for analysis of BTEX, PHC Fractions F1 to F4, and dissolved lead. All groundwater samples yielded concentrations of all parameters below the Table 3 standards. Groundwater flow was inferred to the southwest (Barenco 2011c).
- A tank replacement program was undertaken in 2011. Approximately 870 litres (L) of residual products were purged from the four USTs. The four USTs were removed from the Site. One of the tanks stored gasoline and had a 45,000L capacity. The other three tanks had a capacity of 25,000 L, two of which were used for storage of regular unleaded gasoline and the third was used for storage of super unleaded gasoline. The product piping lines connecting the USTs to the dispensers and the vent lines were not removed during this investigation. During this investigation, the following standards were used: the Table 5 standards for commercial/industrial/community property use and fine and medium textured stratified soils. Soil samples collected from the tank excavations were submitted for analysis of one or more of BTEX, PHC Fractions F1 to F4, lead, and 2-and 3-ring PAHs. All soil samples yielded concentrations of all parameters below the Table 5 standards (Barenco 2011d).
- In 2012, five boreholes were advanced to a maximum depth of 5.0 mbgs, and completed as monitoring wells (TH8 to TH12). These boreholes were advanced off-site, along Viewmount Drive (TH8 and TH9) and Merivale Road (TH10 to TH12). Soil samples collected were submitted for analysis of BTEX, PHC Fractions F1 to F4, hexane, select PAHs, and lead. All soil samples yielded concentrations of all parameters below the Table 3 standards. Groundwater samples were submitted for analysis of BTEX, PHC Fractions F1 to F4, hexane and dissolved lead. The groundwater samples for one monitoring well yielded concentrations of PHC Fractions F1 and F2 above the Table 3 standards. All other groundwater samples yielded concentrations of all parameters below the Table 3 standards. Groundwater was encountered between 2.75 and 3.03 mbgs. Groundwater flow was inferred to the south (exp 2013).

- In 2014, three boreholes were advanced along Viewmount Drive and Merivale Road, to a maximum depth of 5.0 mbgs, and completed as monitoring wells (TH100 to TH102). Soil samples were submitted for analysis of BTEX, PHC Fractions F1 to F4, hexane, methyl-t-butyl ether (MTBE), and dissolved lead. All soil samples yielded concentrations of all parameters below the Table 3 standards. Groundwater samples were submitted for analysis of BTEX, PHC Fractions F1 to F4, hexane, MTBE, and dissolved lead. Groundwater samples from three of the four monitoring wells sampled yielded concentrations of one or more of PHC Fractions F1 to F4 above the Table 3 standards. Groundwater was encountered between 3.02 and 3.60 mbgs. Groundwater flow was inferred to the southwest (exp 2014).

Previous Remediation Activities:

- At the time of writing this report, there were no remediation reports available to Golder to review.

2.0 SITE BACKGROUND

2.1 Site Description

The Site is a former retail fuel facility, currently operating as a Canadian Tire retail fuel outlet and car wash, located southwest of the intersection of Merivale Road and Viewmount Drive in Ottawa, Ontario. The Site is a square-shaped property and approximately 0.65 hectares in size.

The general features of the Site are illustrated in Figures 2 and 3. Site photographs are presented in Appendix A.

2.2 Land Use

The Site is zoned as Arterial Mainstreet (AM) (City of Ottawa 2022, internet site) and surrounding properties are zoned as Arterial Mainstreet, Minor Institutional and Residential.

3.0 REGULATORY FRAMEWORK AND SELECTED CRITERIA

The MECP standards considered to be applicable at the Site are those specified in Table 3 of the document titled “Soil, Ground Water, and Sediment Standards for Use Under Part XV.1 of the *Environmental Protection Act*,” dated April 15, 2011 (MOE 2011) (hereafter referred to as Table 3 Standards. More specifically for soil, Table 3 is defined as Full Depth Generic Site Condition Standards for industrial/commercial/community property use for coarse textured soil in a non-potable groundwater condition. More specifically for groundwater, Table 3 is defined as Full Depth Generic Site Condition Standards for all types of property use for groundwater in coarse textured soil in a non-potable ground water condition.

The soil vapour results were compared against the SVSL for residential land use. In order to derive soil vapour screening criteria, the Ontario Ministry of the Environment and Climate Change (MOECC) (now MECP's) Modified Generic Risk Assessment (MGRA) “Approved Model” Health Based Indoor Air Criteria (HBIAC; November 1, 2016) were divided by the MECP residential attenuation factor of 0.02 (MOECC 2016).

3.1 Site Sensitivity

The Site would not be considered environmentally sensitive, based on the following:

- No part of the Site is on or within 30 m of an area of natural significance (MNRF 2022, internet site).

3.2 Groundwater Condition

The groundwater condition is considered non-potable based on the following:

- The City of Ottawa sources drinking water from the Ottawa River, approximately 5.5 km north of the Site (City of Ottawa 2022, internet site). One domestic/livestock water supply well was identified approximately 245 m northeast of the Site. It is unknown if this well is currently used for drinking water supply.

3.3 Shallow Soil Property

The Site is not considered to be a shallow soil property, based on the following:

- The available borehole logs and geologic records indicate that more than one-third of the area of the Site consists of soil greater than 2 m in depth beneath the ground surface, excluding any non-soil surface treatment greater than 0.5 m thick.

3.4 Nearby Water Body

A water body, in whole or in part, is not on the Site or within 30 m of the Site boundaries.

3.5 Soil Texture

The applicable soil texture for the Site is based on the following:

- Coarse textured soils, as determined by borehole logs.

3.6 Property Use

The applicable property use is as follows:

- Industrial/Commercial/Community property use, as the Site is currently zoned Arterial Mainstreet (AM), which allows for commercial and industrial properties.

3.7 Full Depth or Stratified Site Condition Standards

The full depth rather than the stratified generic site condition standards were selected.

4.0 FIELD WORK AND METHODS

4.1 Pre-Investigation Activities

Prior to any drilling, public and private utility locates were conducted to avoid underground facilities during the subsurface activities.

4.2 Borehole Drilling and Monitoring Well Installation

Two boreholes were drilled on the Site in 2021, and were completed as monitoring wells (MW21-01 and MW21-02). Two boreholes were drilled on an adjacent property (1755 Merivale Road) in 2022, and were completed as monitoring wells (MW22-01 and MW22-02).

Prior to drilling, boreholes were hydro-excavated to 2.4 mbgs, for utility clearance. The hydro-vac truck was operated by Badger Daylighting, from Ottawa, Ontario. Borehole drilling was completed using a track-mounted Geoprobe 7822DT. The drill rig was operated by Strata Drilling Group from Ottawa, Ontario. Boreholes were advanced through the bedrock using the air rotary method.

All non-dedicated sampling equipment (i.e., sidewall sampler) was decontaminated after each use by removing all soil with a brush and scrubbing with a phosphate-free detergent and water, and then rinsing with tap water.

Monitoring well completion consisted of 0.010-inch slot screens, and 10-20 silica sand was placed around the screen to a level of approximately 0.3 m above the top of the screen. Well annuli above the sand pack were sealed with hydrated bentonite chips. Monitoring wells were completed with lockable flushmount steel casings set in concrete.

The monitoring well locations are presented in Figure 2. The MECP well record for the new well installed is presented in Appendix B and boreholes logs with well completion details are presented in Appendix C.

4.3 Soil Sampling

The soil conditions identified during the subsurface investigations were recorded on Golder's standard field logs. The soil was logged consistently with the Unified Soil Classification System (ASTM 2009).

Each soil sample collected was split, with half being placed in laboratory-supplied sample jars for analysis and half placed into resealable plastic bags for combustible gas measurements. These measurements were completed by allowing a quarter-filled soil bag to equilibrate for about 30 minutes at a temperature at or above 15 degrees Celsius (°C). Soil in the bag was broken apart and the probe of a combustible RKI Eagle Organic Vapour Monitor (OVM) with methane elimination was inserted into the bag. The peak headspace reading was then recorded for the sample. The OVM readings are provided on the borehole logs.

The OVM was bump tested daily to 15% lower explosive limit (LEL) using a hexane standard. If the bump test differed more than 10% from the known concentration, the OVM was adjusted to match the exact concentration of the calibration gas. Calibrations were logged at the start of each day.

Soil for volatile analysis was placed into 40 millilitre (mL) glass, septum-topped vials prefilled with 10 mL of methanol preservative and a single 120-mL glass jar. Disposable syringe soil sampling devices were used to extrude approximately 5 grams (g) of soil into each vial. Soil for semi-volatile analysis was placed in a single 120 mL glass jar. Soil for metal analysis was placed in a single 250-mL glass jar.

Ten samples, including two duplicates, were collected and submitted to Bureau Veritas Laboratories (BVL) for analysis of one or more of BTEX, PHC Fractions F1 to F4, n-hexane, and lead.

Soil samples for laboratory analysis were selected based on physical observations (e.g., evidence of staining, soil colour and/or texture, evidence of odours), field screening results (e.g., highest readings), and/or in accordance with the sampling and analytical plan. All samples were submitted under chain-of-custody to BVL in Mississauga, Ontario, a Standards Council of Canada (SCC) accredited laboratory.

4.4 Groundwater Well Development

Following drilling and prior to groundwater sampling, the newly-installed wells were developed by surging and pumping water from the well, with the objective of removing fine particulate matter from the well and restoring the hydraulic interface between the well and the geologic formation. High density polyethylene (HDPE) tubing and surge blocks were used to develop the monitoring wells. Purged water was retained on the Site in a 205-L drum. Once the field program was completed, the drum was transported off the Site and appropriately disposed of at an approved facility in accordance with O. Reg. 347, as amended by O.Reg. 777/20 (MOE 2000).

4.5 Groundwater Monitoring and Sampling

Groundwater monitoring was completed on the accessible new and existing monitoring wells. A summary of the monitoring data is provided in Table 1. A Site plan showing monitoring well locations is provided in Figures 2 and 3.

Depth to groundwater was measured and, if present, the thickness of LNAPL using an oil/water interface probe. If LNAPL was detected, its presence was confirmed visually using a bailer. Prior to use in each well, the interface probe was cleaned using a phosphate-free detergent and water solution and rinsed with distilled water to minimize the potential for cross-contamination. Depth to groundwater measurements were taken from the top of the polyvinyl chloride casing.

Groundwater samples were collected using the low-flow sampling method. Water was pumped from each well, at a rate of 0.1 and 0.2 litres per minute (L/min), using HDPE tubing connected to a peristaltic pump with a portion of silicon tubing. Routine water quality indicator parameters were measured during pumping using a multi-parameter water quality meter and flow through cell. The parameters measured included dissolved oxygen, electrical conductivity, oxidation-reduction potential, pH, temperature, and turbidity. Calibration of the meter was completed as per the manufacturer's instructions. Purged water was collected in pails, transferred to a drum and retained on the Site. Once the field program was completed, the drum was transported off the Site and appropriately disposed of at an approved facility in accordance with O.Reg. 347, as amended by O.Reg. 777/20 (MOE 2000).

In December 2021, three samples including one field duplicate and two groundwater samples were collected and submitted to BVL for analysis of BTEX, PHC Fractions F1 to F4, and dissolved lead. A field blank and trip blank were also submitted for analysis.

In March 2022, 11 samples, including one field duplicate, and 10 groundwater samples were collected and submitted to BVL for analysis of BTEX, PHC Fractions F1 to F4, and dissolved lead. A field blank and trip blank were also submitted for analysis.

In April 2022, eight samples, including one field duplicate, and seven groundwater samples were collected and submitted to BVL for analysis of BTEX, PHC Fractions F1 to F4, and dissolved lead. A field blank and trip blank were also submitted for analysis.

Groundwater samples were placed in laboratory-supplied containers suitable for the analytes, and where applicable, the appropriate laboratory-supplied preservative was added to the samples. Sample containers were properly filled, placed in an ice filled cooler and submitted under chain-of-custody to BVL for analysis.

4.6 Soil Vapour Probe Purging and Leak Testing

Five soil vapour probes (SV16-01, SV16-02, and SV21-01 to SV21-03) were sampled on December 9 and 10, 2021. Prior to sample collection, each soil vapour probe was purged of three probe volumes using a pump calibrated to approximately 200 mL per minute (mL/min) prior to field screening. Purge gas was collected into a 1-L Tedlar bag using a vacuum chamber to eliminate cross-contamination from the sampling pump. The concentrations of methane, carbon dioxide, oxygen and combustible gases in the screening sample were measured using an RKI6000 GX and Landtec GEM 2000.

Flow rate and vacuum pressure were also measured during the field screening. Flow rates were measured using a Bios International Defender 510M primary standard calibrator. Vacuum pressures were measured using Dwyer Magnehelic® differential pressure gauges.

Tubing connections between the probe and field screening equipment were made using 6.25 millimetre (mm) (0.25 inch) PTFE tubing. The soil vapour field gas readings are presented in Table 4.

4.7 Soil Vapour Sampling

Following purging and field screening, vapour probes were allowed to re-equilibrate for approximately 30 minutes before collecting a sample for laboratory submission. Soil vapour samples were collected into a laboratory-supplied 1.4-L SummaTM canister. Tubing connections between the probe and sampling media were made using 6.25 mm (0.25 inch) PTFE tubing.

Soil vapour samples were collected following procedures outlined in the United States Environmental Protection Agency Method TO-15. A flow regulator supplied by BVL was used to regulate the volumetric soil vapour flow rate into the SummaTM canister at a flow rate of approximately 175 mL/min during an approximate 8-minute sampling period.

The 1.4-L Summa canisters, certified by BVL to be free of contaminants, were fitted with a vacuum gauge for sample collection. Prior to sampling, the initial Summa canister vacuums were confirmed to be on the order of 26 inches Mercury when gauged.

Soil vapour samples were collected and submitted to the BVL Mississauga facility, an SCC-accredited laboratory, for analysis of BTEX, PHC Fractions F1 and F2, and VOCs.

Six samples, including one field duplicate, and five soil vapour samples, were submitted to BVL for analysis. One field blank and one trip blank were also submitted for analysis.

4.8 Weather Conditions during Soil Vapour Sampling

Date	Temperature (°C)	Relative Humidity (%)	Barometric Pressure (kilopascals [kPa])
December 9, 2021	-7.2 to -6.9	68 to 70	100.91 to 100.96
December 10, 2021	-5.4 to -7.3	82 to 86	100.20 to 100.28

The weather information above was taken from the meteorological station (*2021 Historical Hourly Data Report. Ottawa International Airport*) located closest to the Site.

5.0 RESULTS

5.1 Site Stratigraphy

A description of the soil profile for the four boreholes advanced at the Site during this investigation is presented in the borehole logs provided in Appendix C.

- Fill materials consisting of sand, gravel and cobbles were observed from surface to 1.5 mbgs, overlying sandy clay and a thin layer of sand to 2.4 mbgs. Bedrock was encountered from 2.4 mbgs to 6.0 mbgs, the maximum depth of investigation.

Based on field observations and previous investigations, coarse-grained soils represent the dominant soil type at the Site.

5.2 Site Hydrogeology

5.2.1 Groundwater Monitoring Results

The groundwater monitoring results from the activities conducted at the Site in December 2021, March 2022, and April 2022 are presented in Table 1 and summarized below:

Field Parameters	March 2022 (on-site)		April 2022 (roadway)	
	Minimum	Maximum	Minimum	Maximum
LNAPL (mm)	Not detected	2	Not detected	Sheen
Depth to groundwater in shallow monitoring wells (mbgs)	1.67	3.14	2.61	3.09

The groundwater elevations are presented in Table 1. The groundwater flow was inferred to the south (Figure 4).

5.3 Soil Analytical Results

The soil analytical results are illustrated in Figure 5, and summarized in Table 2. Copies of the laboratory certificates of analysis are included in Appendix D.

All soil samples yielded concentrations of BTEX, PHC Fractions F1 to F4, n-hexane, and lead below the applicable standards.

5.4 Groundwater Analytical Results

The groundwater analytical results are illustrated in Figure 6, and summarized in Table 3. Copies of the laboratory certificates of analysis are included in Appendix D.

Groundwater samples from five monitoring wells yielded concentrations of one or more of BTEX and PHC Fractions F1 to F4 above applicable standard. All groundwater samples yielded concentrations of lead below the applicable standard.

5.5 Soil Vapour Analytical Results

The soil vapour analytical results are illustrated in Figures 7 and 8. The analytical results are summarized in Tables 4 to 6. Copies of the laboratory certificates of analysis are included in Appendix D.

All soil vapour samples yielded concentrations of BTEX, PHC Fractions F1 and F2, and VOCs below the applicable SVSL.

6.0 FIELD AND LABORATORY QUALITY ASSURANCE/ QUALITY CONTROL (QA/QC)

A quality assurance/quality control (QA/QC) program was followed to manage and quantify the quality of the investigation results. The program included field procedures, laboratory procedures and the use of QC samples to quantify the results of the program. Two duplicate soil samples, three duplicate groundwater samples, three water field blanks, three water trip blank samples, one soil vapour duplicate sample, one ambient air field blank, and one air trip blank were submitted as part of this program. A discussion of the QA/QC program is included in Appendix E.

The analytical results of the soil, groundwater and soil vapour samples collected by Golder field staff between December 1 and 10, 2021, March 16 to 30, 2022, and April 13, 2022 as part of the SSI, are considered reliable.

7.0 CONCLUSIONS

A summary of the findings from this investigation program follows.

- Fill materials consisting of sand, gravel and cobbles were observed from surface to 1.5 mbgs, overlying sandy clay and a thin layer of sand to 2.4 mbgs. Bedrock was encountered from 2.4 to 6.0 mbgs, the maximum depth of investigation.
- Measurable LNAPL was detected in one monitoring well (TH5), and sheen was observed in two monitoring wells (TH8 and TH9).
- The depths to groundwater ranged from 1.67 to 3.14 mbgs in March 2022, and 2.61 to 3.09 mbgs in April 2022.
- The groundwater flow was inferred to the south.
- The applicable standards for the contaminants of concern, based on the results of the water well survey completed, were considered to be the MECP Table 3 Full Depth Generic Site Condition Standards for industrial/commercial/community property use for coarse textured soil in a non-potable groundwater condition.
- All soil samples yielded concentrations of BTEX, PHC Fractions F1 to F4, n-hexane, and lead below the applicable standards.
- Groundwater samples from five monitoring wells yielded concentrations of one or more of BTEX and PHC Fractions F1 to F4 above applicable standard. All groundwater samples yielded concentrations of lead below the applicable standard.
- The applicable criteria for the contaminants of concern in soil vapour were considered to be the SVSL for residential land use, calculated by dividing the HBIAC MECP MGRA (November 2016), by an attenuation factor of 0.02.
- All soil vapour samples yielded concentrations of BTEX, PHC Fractions F1 and F2, and VOCs below the applicable SVSL.
- Based on the review of the QA/QC results, the data presented in this report are considered to be reliable.

8.0 REFERENCES

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The investigation undertaken by Golder Associates Ltd. with respect to this report and any conclusions or recommendations made in this report reflect Golder Associates Ltd.’s judgement based on the site conditions observed at the time of the site inspection on the date(s) set out in this report, and on information available at the time of preparation of this report. This report has been prepared for specific application to this site and it is based, in part, upon visual observation of the site, subsurface investigation at discrete locations and depths, and specific analysis of specific chemical parameters and materials during a specific time interval, all as described in this report.

Unless otherwise stated, the findings cannot be extended to previous or future site conditions, portions of the site which were unavailable for direct investigation, subsurface locations which were not investigated directly, or chemical parameters, materials or analysis which were not addressed. Substances other than those addressed by the investigation described in this report may exist within the site, substances addressed by the investigation may exist in areas of the site not investigated and concentrations of substances addressed which are different than those reported may exist in areas other than the locations from which samples were taken.

If site conditions or applicable standards change or if any additional information becomes available at a future date, modifications to the findings, conclusions and recommendations in this report may be necessary.

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Signature Page

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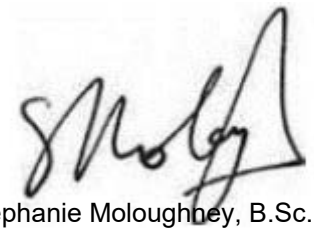
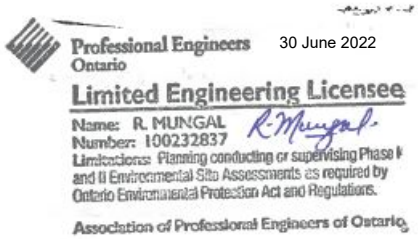


Stephanie Moloughney, B.Sc., OCGC

Environmental Scientist

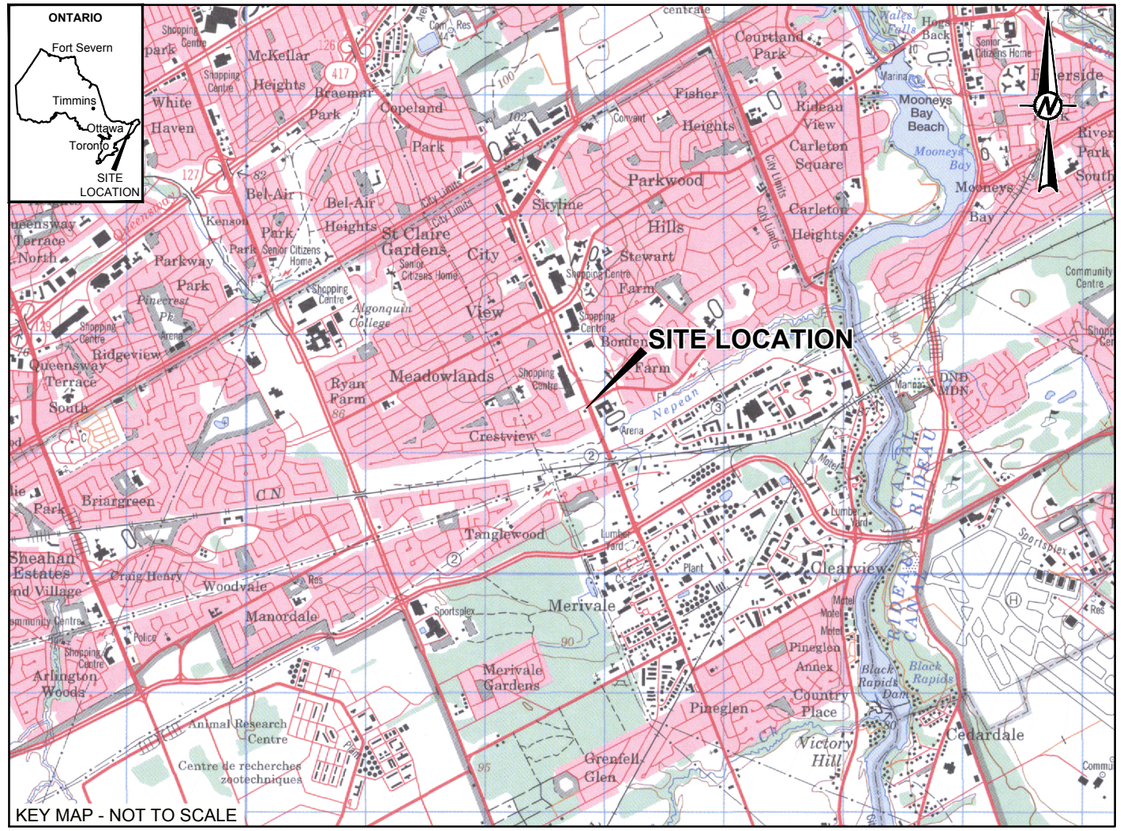


Roopnarine Mungal, B.Sc.(Hons), M.Phil.(Chem.; Chem.Eng.); LEL, QPESA

Senior Principal, Environmental Consultant

SM/IS/RM/hf





LEGEND

PROPERTY BOUNDARY

REFERENCE

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BING IMAGERY SUPPLIED BY AUTODESK AND MICROSOFT © 2022 MICROSOFT CORPORATION AND ITS DATA SUPPLIERS.

TOPOGRAPHIC MAP 31G/05 OBTAINED FROM Canmatrix. © 1998 HER MAJESTY THE QUEEN IN RIGHT OF CANADA. DEPARTMENT OF NATURAL RESOURCES.
PROJECTION: TRANSVERSE MERCATOR; DATUM: NAD83; COORDINATE SYSTEM: UTM ZONE 18.

0 50 100
(APPROX.) METRES

CLIENT
IMPERIAL OIL LIMITED

CONSULTANT
WSP GOLDER

YYYY-MM-DD	2022-06-30
DESIGNED	SMoloughney
PREPARED	KWray
REVIEWED	CVettotazzo
APPROVED	RMungal

PROJECT
FORMER RETAIL FUEL OUTLET
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
SITE LOCATION PLAN

PROJECT NO.	PHASE-TASK	REV.	FIGURE
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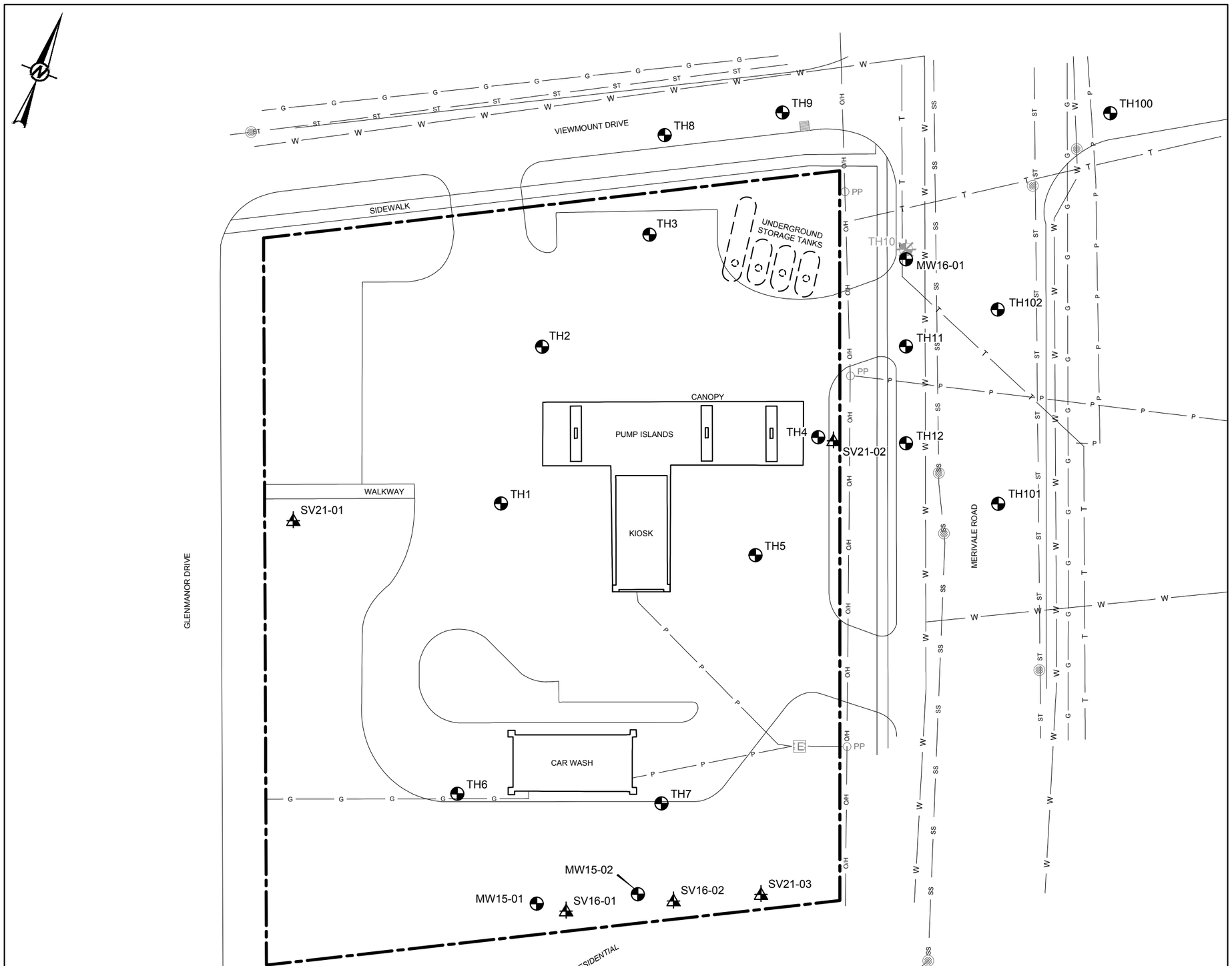

LEGEND

- PROPERTY BOUNDARY
- O/H — OVERHEAD POWER LINE
- G — UNDERGROUND GAS LINE
- P — UNDERGROUND POWER LINE
- SS — UNDERGROUND SANITARY LINE
- ST — UNDERGROUND STORM SEWER LINE
- T — UNDERGROUND TELEPHONE LINE
- W — UNDERGROUND WATERLINE
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL (DECOMMISSIONED)
- SOIL VAPOUR PROBE LOCATION
- CATCH BASIN
- E — ELECTRICAL PEDESTAL
- MANHOLE
- PP — POWER POLE

REFERENCE

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CLIENT
IMPERIAL OIL LIMITED

PROJECT
FORMER RETAIL FUEL OUTLET
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
SITE PLAN WITH HISTORICAL FACILITIES

CONSULTANT
WSP GOLDER

YYYY-MM-DD	2022-06-30
DESIGNED	SMoloughney
PREPARED	KWray
REVIEWED	CVettotazzo
APPROVED	RMungal

PROJECT NO.	PHASE-TASK	REV.	FIGURE
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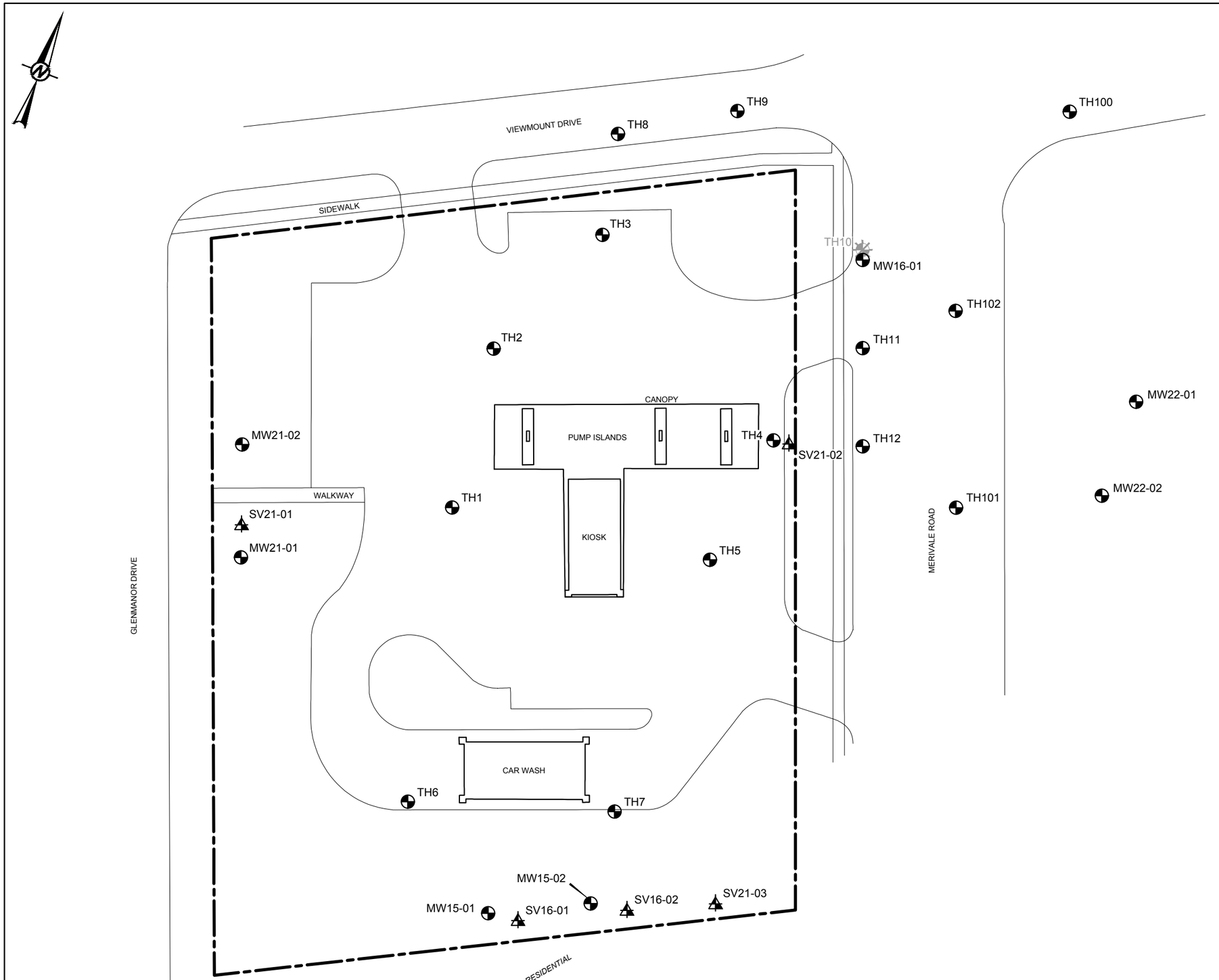

LEGEND

- PROPERTY BOUNDARY
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL (DECOMMISSIONED)
- SOIL VAPOUR PROBE LOCATION

REFERENCE

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CLIENT
IMPERIAL OIL LIMITED

PROJECT
FORMER RETAIL FUEL OUTLET
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
SITE PLAN WITH SOIL VAPOUR PROBE AND MONITORING WELL LOCATIONS

CONSULTANT
WSP GOLDER

YYYY-MM-DD	2022-06-30
DESIGNED	SMoloughney
PREPARED	KWray
REVIEWED	CVettotazzo
APPROVED	RMungal

PROJECT NO.	PHASE-TASK	REV.	FIGURE
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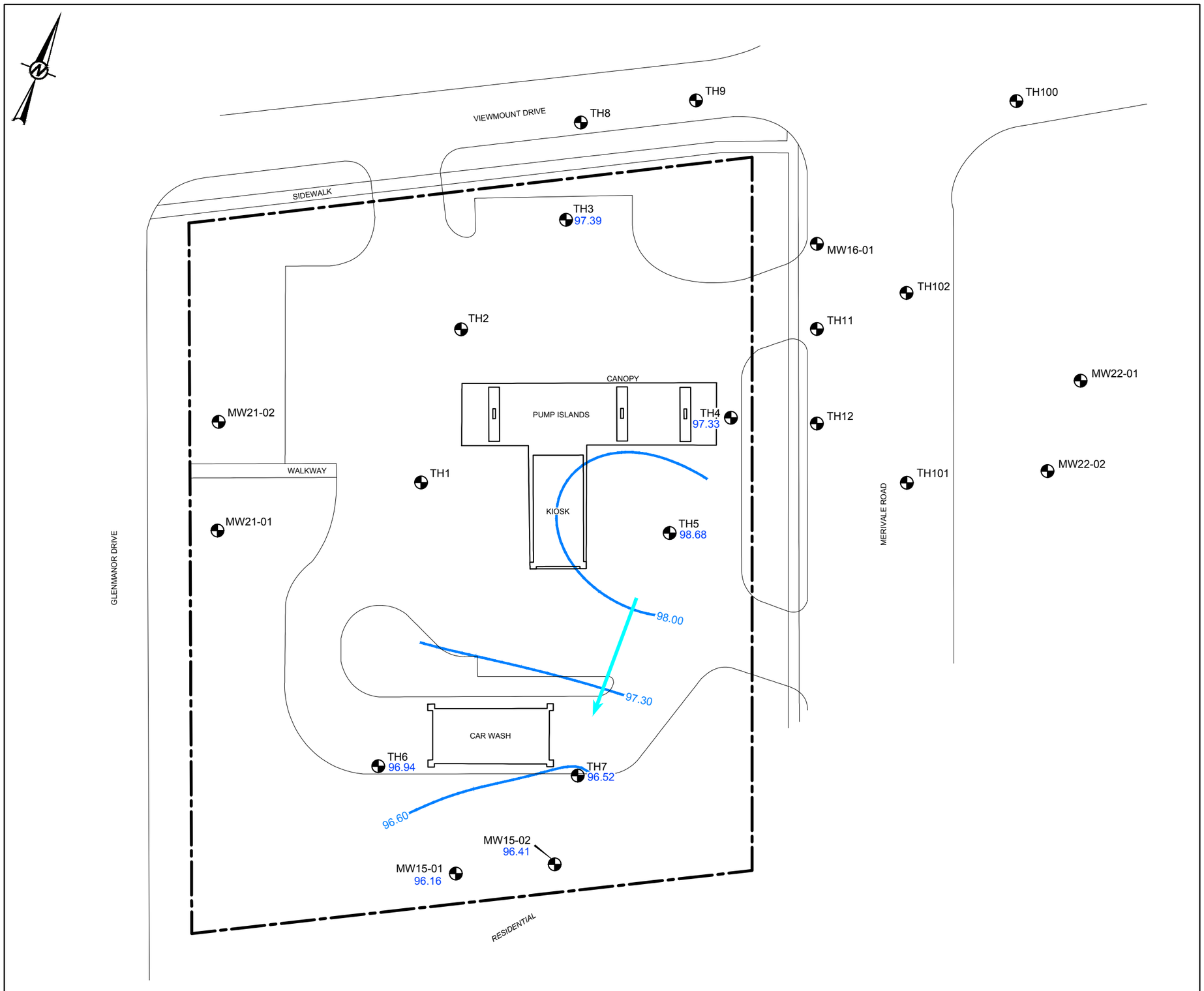

LEGEND

- PROPERTY BOUNDARY
- 98.00 — GROUNDWATER CONTOUR (m)
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL
- 97.39 — GROUNDWATER ELEVATION (m)
- DIRECTION OF GROUNDWATER FLOW

LIST OF APPLICABLE ABBREVIATIONS

m	METRE

NOTE

ELEVATIONS ARE RELATIVE TO A LOCAL BENCHMARK (CENTRE OF STORM SEWER CATCH BASIN LOCATED APPROXIMATELY 5 m WEST OF KIOSK), WITH AN ASSIGNED ELEVATION OF 100.00 m (EXP. 2013).

REFERENCE

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No.: 11010-SITE PLAN ONSITE-JUN14; SCALE: UNKNOWN; DATE: JUNE 2014.

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1:500 METRES

CLIENT
IMPERIAL OIL LIMITED

PROJECT
FORMER RETAIL FUEL OUTLET
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
GROUNDWATER ELEVATIONS
March 21 and 22, 2022

CONSULTANT
WSP GOLDER

YYYY-MM-DD	2022-06-30
DESIGNED	SMoloughney
PREPARED	KWray
REVIEWED	CVettotazzo
APPROVED	RMungal

PROJECT NO.	PHASE-TASK	REV.	FIGURE
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MW21-01										Date Sampled - December 01/21
Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	HA	Pb
1.50 - 2.40	<0.020	<0.020	<0.020	<0.040	<10	<10	<50	<50	<0.50	6.3
2.40 - 2.75	<0.020	<0.020	<0.020	<0.040	<10	<10	<50	<50	<0.50	5.8

MW21-02										Date Sampled - December 01/21
Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	HA	Pb
1.50 - 2.20	<0.020	<0.020	<0.020	<0.040	<10	<10	<50	<50	<0.50	<5.0
2.20 - 2.40	<0.020	<0.020	<0.020	<0.040	<10	<10	<50	<50	<0.50	5.5
2.20 - 2.40 (DUP)	<0.020	<0.020	<0.020	<0.040	<10	<10	<50	<50	<0.50	<5.0

MW22-01[d]										Date Sampled - March 26/22
Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	HA	Pb
0.40 - 0.70	<0.020	<0.020	<0.020	<0.040	<10	<10	<50	<50	-	-
1.50 - 1.80	<0.020	<0.020	<0.020	<0.040	<10	<10	<50	<50	-	-

MW22-02[d]										Date Sampled - March 26/22
Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	HA	Pb
0.40 - 0.70	<0.020	<0.020	<0.020	<0.040	<10	<10	<50	<50	-	-
1.10 - 1.40	<0.020	<0.020	<0.020	<0.040	<10	<10	<50	<50	-	-
1.10 - 1.40 (DUP)	<0.020	<0.020	<0.020	<0.040	<10	<10	<50	<50	-	-

ONTARIO STANDARDS

PARAMETERS	B	T	E	X	F1	F2	F3	F4	HA	Pb
CRITERIA[a]	0.32	68	9.5	26	55[c]	230	1,700	3,300	46	120
CRITERIA[b]	0.21	2.3	2	3.1	55[c]	98	300	2,800	2.8	120
RDL	0.020	0.020	0.020	0.040	10	10	50	50	0.50	5.0
UNITS	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g

(a) O.REG 153 (2011) TABLE 3 FULL DEPTH GENERIC SITE CONDITION STANDARDS FOR INDUSTRIAL/COMMERCIAL/COMMUNITY PROPERTY USE FOR COARSE TEXTURED SOIL IN A NON-POTABLE GROUNDWATER CONDITION.

(b) O.REG 153 (2011) TABLE 3 FULL DEPTH GENERIC SITE CONDITION STANDARDS FOR RESIDENTIAL/PARKLAND/INSTITUTIONAL PROPERTY USE FOR COARSE TEXTURED SOIL IN A NON-POTABLE GROUNDWATER CONDITION.

(c) F1 FRACTION DOES NOT INCLUDE BTEX; HOWEVER, THE PROPONENT HAS THE CHOICE AS TO WHETHER OR NOT TO SUBTRACT BTEX FROM THE ANALYTICAL RESULT.

(d) LOCATION COMPARED TO THE TABLE 3 RESIDENTIAL/PARKLAND/INSTITUTIONAL CRITERIA.

LEGEND

- PROPERTY BOUNDARY
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL (DECOMMISSIONED)
- SOIL VAPOUR PROBE LOCATION

LIST OF APPLICABLE ABBREVIATIONS

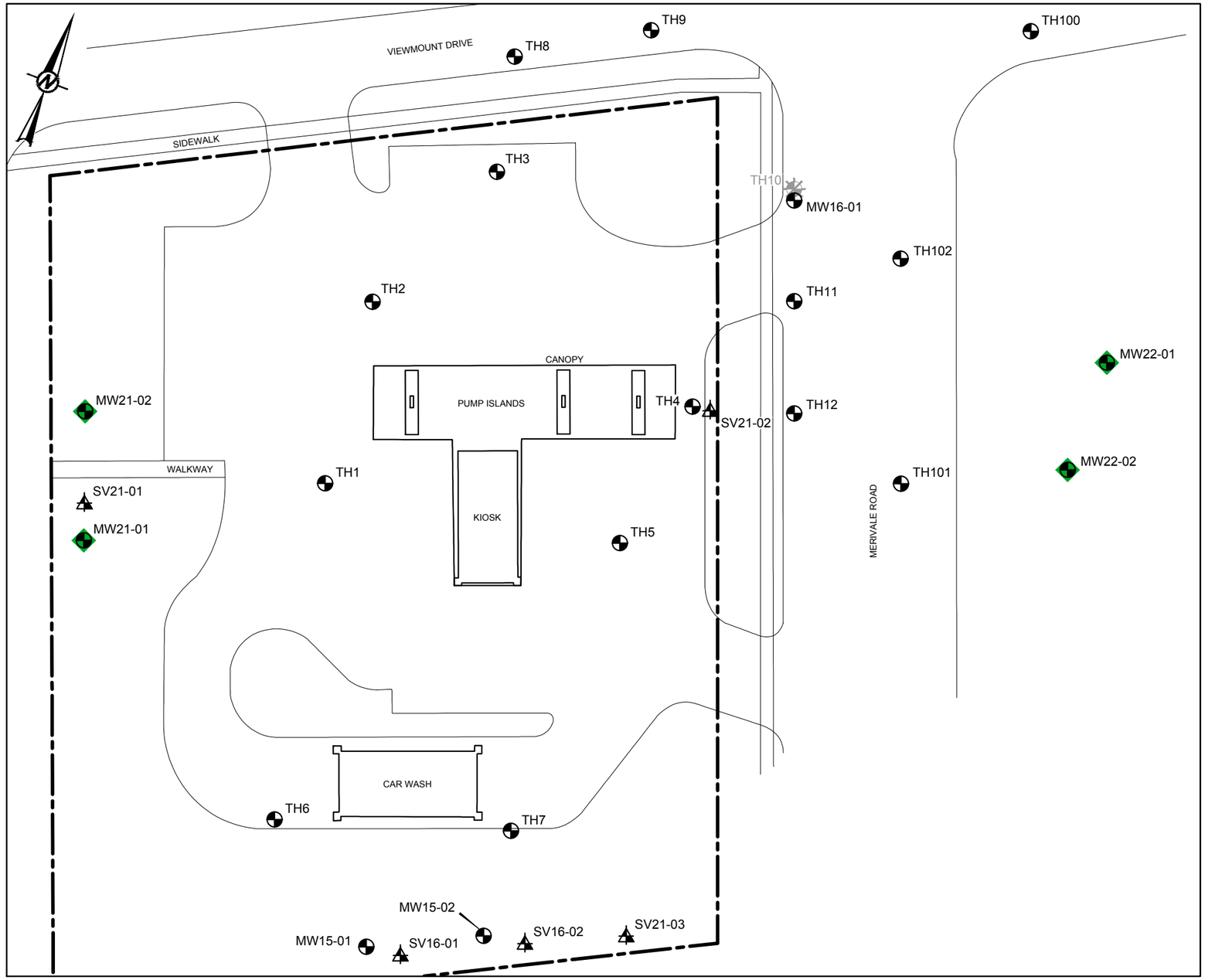
<	LESS THAN
µg/g	MICROGRAMS PER GRAM
-	NOT AVAILABLE OR NO DATA
B	BENZENE
T	TOLUENE
E	ETHYLBENZENE
X	XYLENES
F1	PETROLEUM HYDROCARBON FRACTION 1 (C_6-C_{10}) LESS BTEX
F2	PETROLEUM HYDROCARBON FRACTION 2 (C_{10}-C_{16})
F3	PETROLEUM HYDROCARBON FRACTION 3 (C_{16}-C_{34})
F4	PETROLEUM HYDROCARBON FRACTION 4 (C_{34}-C_{50})
HA	n-HEXANE
mbgs	METRES BELOW GROUND SURFACE
O.REG	ONTARIO REGULATION
Pb	LEAD
RDL	REPORTABLE DETECTION LIMIT

NOTES

1. LOCATIONS WHERE ALL SOIL SAMPLES MEET APPLICABLE GUIDELINES/STANDARDS FOR ALL PARAMETERS ANALYZED SHOWN AS A **GREEN DIAMOND (♦).**
2. LOCATIONS WHERE AT LEAST ONE SOIL SAMPLE EXCEEDS APPLICABLE GUIDELINES/STANDARDS FOR AT LEAST ONE OF THE PARAMETERS ANALYZED SHOWN AS A **RED CIRCLE (●).**
3. EXCEEDANCES OF APPLICABLE GUIDELINES/STANDARDS IN TEXT ARE SHOWN IN **RED.**

REFERENCE

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No.: 11010-SITE PLAN ONSITE-JUN14; SCALE: UNKNOWN; DATE: JUNE 2014.



CLIENT
IMPERIAL OIL LIMITED

CONSULTANT
WSP GOLDER

YYYY-MM-DD	2022-06-30
DESIGNED	SMoloughney
PREPARED	KWray
REVIEWED	CVettotazzo
APPROVED	RMungal

PROJECT
FORMER RETAIL FUEL OUTLET
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
SOIL ANALYTICAL RESULTS - BTEX AND PHC FRACTIONS F1 - F4, n-HEXANE AND LEAD

PROJECT NO.	PHASE-TASK	REV.	FIGURE
21506016	1155-2216	0	5

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

0 25 mm

Path: \\gpdcfer.gdsjgal\Calgary\CALIM\CAD\IMPERIAL_OIL\DOWNSTREAM\OTTAWA_ON_1660_MERIVALE_ROAD\99_PROJECTS\21506016\02_PRODUCTION\1155-2216\ONSITEDWG\ | File Name: 21506016-1155-HS-0005.dwg | Last Edited By: pricord Date: 2022-06-30 Time:2:17:40 PM | Printed By: KWray Date: 2022-06-30 Time:2:19:30 PM

TH1 — Screen Interval: 2.6 to 5.6 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-11	<0.20	<0.20	<0.20	<0.40	<25	<100	<100	<100	<5.0	<0.50
13-Jun-13	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	0.53
26-Aug-14	<0.20	0.75	<0.20	1.2	<25	<100	<200	<200	<5.0	<0.50
17-Nov-15	<0.20	0.27	0.28	<0.40	<25	<100	<200	<200	<5.0	<0.50
10-Aug-16	<0.20	<0.20	<0.20	<0.40	<25	<100	300	1,200[b]	<5.0	<0.50
05-Dec-16	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50
21-Jun-17	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50
16-Aug-18	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50
30-Jul-19	<0.20	<0.20	<0.20	<0.40	<25	<100	350	1,400[b]	<5.0	<0.50
29-Jul-20	<0.20	<0.20	<0.20	<0.40	<25	400	24,000	160,000[b]	-	1.5
13-Jul-21	LNAPL THICKNESS: <0.001 m									

TH2 — Screen Interval: 3.2 to 4.7 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-11	0.77	<0.20	1.3	0.48	<25	<100	<100	<100	<5.0	<0.50
13-Jun-13	0.62	<0.20	2.2	<0.40	<25	<100	<200	<200	<5.0	<0.50
27-Aug-14	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
17-Nov-15	<0.20	0.29	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
17-Nov-15 (DUP)	<0.20	0.28	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
09-Aug-16	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50
21-Jun-17	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50
15-Aug-18	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50
31-Jul-19	<0.20	<0.20	<0.20	<0.40	<25	<100	250	<200	-	<0.50
28-Jul-20	0.44	<0.20	<0.20	3.6	<25	<100	<200	<200	-	<0.50
13-Jul-21	<0.20	<0.20	<0.20	<0.40	31	<100	<200	<200	-	<0.50

TH3 — Screen Interval: 3.2 to 4.7 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-11	27	2.4	79	150	1,100	430	<100	130	20	3.8
31-Aug-11 (DUP)	23	2.1	69	130	1,100	380	<100	110	17	3.9
13-Jun-13	11	0.61	66	85	900	350	<200	<200	<5.0	3.1
26-Aug-14	14	0.28	19	5.2	520	180	<200	<200	<5.0	2.2
28-Oct-15	25	<0.20	15	0.89	450	<100	<200	<200	<5.0	2.0
10-Aug-16	42	<0.20	26	1.5	560	110	<200	<200	<5.0	0.98
21-Jun-17	19	0.29	77	20	630	140	<200	<200	-	<0.50
15-Aug-18	7.4	<0.20	7.2	3.3	310	<100	<200	<200	-	0.76
31-Jul-19	18	<0.20	26	2.1	380	120	<200	<200	-	2.2
29-Jul-20	9.8	<0.20	6.4	0.58	310	<100	<200	<200	-	3.7
13-Jul-21	23	0.28	17	0.83	330	170	<200	<200	-	0.83
22-Mar-22	18	<0.20	18	2.4	590	150	<200	<200	-	1.5

TH4 — Screen Interval: 3.4 to 4.9 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-11	610	610	3,400	19,000	26,000	17,000	360	170	540	2.6
13-Jun-13	200	35	1,200	4,300	6,200	19,000	580	430	<100[d]	5.8
26-Aug-14	500	37	1,400	2,600	4,700	1,400	<200	<200	58	3.0
26-Aug-14 (DUP)	540	40	1,600	2,700	400	1,400	<200	<200	62	1.9
17-Nov-15	180	18	560	930	1,900	940	240	230	<100[d]	3.1
10-Aug-16	210	11	550	1,500	1,800	370	<200	<200	31	1.1
10-Aug-16 (DUP)	190	9.7	490	1,400	1,600	400	210	<200	27	1.7
21-Jun-17	210	28	470	1,500	2,000	930	<200	<200	-	0.78
16-Aug-18	400	14	860	3,400	3,100	1,300	250	<200	-	30
16-Aug-18 (DUP)	420	14	890	3,500	2,800	1,200	260	210	-	32
31-Jul-19	36	1.9	41	270	1,500	1,400	280	<200	-	12
27-Jul-20	LNAPL THICKNESS: 0.002 m									
22-Mar-22	21	1.6	370	390	2,800	2,300	380	270	-	21

TH5 — Screen Interval: 3.5 to 5.0 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-11	750	140	3,000	13,000	85,000	20,000	690	620	1,400	5.5
13-Jun-13	530	44	1,600	3,800	9,900	160,000	12,000	6,800	<100[d]	8.3
13-Jun-13 (DUP)	550	44	1,600	3,800	9,200	110,000	7,000	4,300	<100[d]	8
27-Aug-14	450	46	1,600	3,100	11,000	2,800	<200	<200	210	4.1
17-Nov-15	360	26	930	1,300	3,300	2,900	320	240	<100[d]	3.7
10-Aug-16	420	43	1,500	3,700	13,000	11,000	1,100	810	240	0.81
21-Jun-17	210	25	690	1,800	4,400	3,600	420	350	-	1.8
21-Jun-17 (DUP)	190	23	640	1,600	4,400	3,200	490	450	-	2.2
16-Aug-18	510	37	1,400	2,600	6,700	3,300	300	<200	-	2.6
31-Jul-19	380	24	910	2,800	5,600	5,400	350	<200	-	8.4
31-Jul-19 (DUP)	380	26	940	2,900	5,700	4,100	290	<200	-	8.3
29-Jul-20	200	12	830	1,400	6,000	8,500	570	<200	-	26
29-Jul-20 (DUP)	200	12	790	1,300	5,900	8,500	470	<200	-	25
13-Jul-21	210	19	720	1,700	6,300	14,000	1,000	590	-	37
13-Jul-21 (DUP)	270	26	930	2,100	6,300	13,000	910	550	-	39
22-Mar-22	LNAPL THICKNESS: 0.002 m									

TH6 — Screen Interval: 3.6 to 5.1 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
20-Oct-11	<0.20	<0.20	<0.20	<0.40	<25	<100	<100	<100	<5.0	<0.50
20-Oct-11 (DUP)	<0.20	<0.20	<0.20	<0.40	<25	<100	<100	<100	<5.0	<0.50
13-Jun-13	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	0.6
27-Aug-14	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
28-Oct-15	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
28-Oct-15 (DUP)	<0.20	0.38	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
09-Aug-16	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50
22-Jun-17	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50
14-Aug-18	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50
29-Jul-19	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50
27-Jul-20	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50
13-Jul-21	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50
21-Mar-22	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50
21-Mar-22 (DUP)	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50

TH7 — Screen Interval: 4.4 to 5.8 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
14-Nov-11	31	5.4	160	340	430	<100	<100	<100	<30	<0.5
13-Jun-13	37	2.8	140	130	550	460	<200	<200	<5.0	3.2
27-Aug-14	150	18	610	730	1,900	540	<200	<200	22	2.1
28-Oct-15	93	8.4	270	300	1,000	280	<200	<200	<5.0	1.2
09-Aug-16	62	5.8	120	140	500	150	<200	<200	<5.0	<0.50
22-Jun-17	93	8.7	240	190	800	190	<200	<200	-	0.54
14-Aug-18	22	0.53	8.8	0.60	68	<100	<200	<200	-	<0.50
29-Jul-19	46	1.4	43	2.5	400	110	<200	<200	-	<0.50
27-Jul-20	27	1.3	35	3.1	270	<100	<200	<200	-	<0.50
13-Jul-21	21	0.60	4.5	0.70	150	<100	<200	<200	-	0.50
21-Mar-22	4.0	<0.20	<0.20	<0.40	35	<100	<200	<200	-	<0.50

TH8 — Screen Interval: 3.3 to 4.9 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
13-Jun-13	3.9	<0.20	4.1	0.61	48	<100	<200	<200	<0.5	1.1
27-Oct-15	4.4	<0.20	0.51	0.41	<25	<100	<200	<200	<5.0	0.82
10-Aug-16	3.0	<0.20	0.66	<0.40	70	<100	<200	<200	<5.0	0.77
15-Aug-18	0.99	<0.20	0.80	<0.40	<25	<100	<200	<200	-	<2.5
15-Aug-18 (DUP)	1.0	<0.20	0.78	<0.40	<25	<100	<200	<200	-	<2.5
30-Jul-19	3.7	<0.20	1.0	<0.40	220	<100	440	1,500[b]	-	1.2
28-Jul-20	4.5	<0.20	5.4	0.75	170	130	780	500	-	1.2
14-Oct-20	0.96	<0.20	1.2	<0.40	29	<100	<200	<200	-	0.61
14-Jul-21	3.8	<0.20	2.0	<0.40	110	<100	1,200	890	-	0.56
13-Apr-22	SHEEN									
13-Apr-22	3.4	0.31	3.4	0.47	130	110	590	380	-	1.8

TH9 — Screen Interval: 3.4 to 4.9 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
06-Oct-14	31	3	230	290	1,000	570	610	420	15	1.1
27-Oct-15	51	7.2	390	350	2,500	1,100	220	360	35	2.6
10-Aug-16	23	1.8	250	70	1,600	350	<200	<200	11	1.1
20-Jun-17	36	5.5	460	370	4,200	1,200	<200	<200	-	2.3
15-Aug-18	12	0.69	78	49	740	190	350	1,600[b]	-	<0.50
30-Jul-19	0.81	<0.20	2.5	0.47	50	<100	540	1,900[b]	-	<0.50
30-Jul-19 (DUP)	0.84	<0.20	2.6	0.51	63	<100	1,200	3,000[b]	-	<0.50
28-Jul-20	4.4	<0.20	7.8	<0.40	51	<100	700	520	-	<0.50
14-Oct-20	54	6.3	420	210	1,500	480	<200	<200	-	<0.50
14-Jul-21	<0.20	<0.20	0.29	<0.40	<25	<100	810	780	-	<0.50
13-Apr-22	Sheen									
13-Apr-22	0.21	<0.20	0.22	<0.40	<25	<100	<200	<200	-	<2.5

TH10 — Screen Interval: 3.3 to 4.9 mbgs

Date	B	T	E	X	F1	F2	F3	F4	H	Pb
11-Jun-13	73	58	52	200	1,400	560	<200	<200	35	1.2

TH11 — Screen Interval: 3.3 to 4.9 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
11-Jun-13	370	34	2,200	3,400	11,000	1,400	<200	<200	130	2.6
28-Oct-15	96	8.1	710	120	4,400	2,500	1,300	820	72	4.6
11-Aug-16	100	6.3	590	160	5,000	6,700	2,200	1,300	37	6.0
11-Aug-16 (DUP)	110	7.1	610	170	4,900	7,100	2,400	1,400	43	3.3
28-Jul-20	5.9	0.36	8.8	3.4	490	12,000	36,000	150,000[b]	-	<0.50
14-Oct-20	170	19	820	640	3,300	1,000	300	<200	-	<0.50
14-Jul-21	9.6	0.72	68	22	740	630	1,100	800	-	0.82
14-Apr-22	46	6.5	170	160	1,300	1,100	740	500	-	7.6

TH12 — Screen Interval: 3.3 to 4.9 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
11-Jun-13	380	35	2,300	3,500	11,000	3,100	<200	<200	<100[d]	6.8
11-Jun-13 (DUP)	360	34	2,300	3,500	11,000	2,800	<200	<200	<100[d]	6.9
28-Oct-15	95	14	620	400	4,500	1,600	540	320	140	4.5
11-Aug-16	130	17	1,100	630	6,800	1,800	900	510	120	2.1
20-Jun-17	160	11	1,200	170	7,900	2,800	750	460	-	3.8
20-Jun-17 (DUP)	150	11	1,200	160	7,300	2,600	700	430	-	4.5
14-Oct-20	37	4.7	240	69	4,100	1,900	270	<200	-	0.90
15-Jul-21	15	1.4	72	<2.0	3,400	1,500	350	<200	-	1.7

TH100 — Screen Interval: 3.0 to 4.9 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
06-Oct-14	<0.20	<0.20	0.31	0.91	<25	<100	<200	<200	<5.0	<0.50
27-Oct-15	<0.20	<0.20	0.94	1.1	<25	<100	<200	<200	<5.0	<0.50
27-Oct-15 (DUP)	<0.20	<0.20	0.24	<0.40	<25	<100	<200	<200	<5.0	<0.50
10-Aug-16	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
20-Jun-17	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50
15-Aug-18	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<2.5
31-Jul-19	<0.20	<0.20	1.3	<0.40	<25	<100	460	1,400[b]	-	<0.50
29-Jul-20	<0.20	<0.20	<0.20	<0.40	<25	<100	1,100	820	-	<0.50
14-Oct-20	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50
14-Oct-20 (DUP)	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50
14-Jul-21	0.25	<0.20	<0.20	<0.40	<25	<100	730	580	-	<0.50
13-Apr-22	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50
13-Apr-22 (DUP)	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<2.5

TH101 — Screen Interval: 3.0 to 4.9 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
06-Oct-14	85	12	580	500	4,100	830	<200	<200	44	2.9
06-Oct-14 (DUP)	84	12	580	510	4,100	910	<200	<200	54	4.2
28-Oct-15	110	16	740	590	3,400	830	<200	<200	64	4.6
11-Aug-16	49	8.6	580	390	2,200	590	<200	<200	23	0.63
20-Jun-17	76	14	870	410	4,800	1,100	<200	<200	-	0.84
15-Aug-18	110	9.2	1,200	130	5,900	1,700	<200	<200	-	3.8
31-Jul-19	73	7.5	870	130	5,100	1,500	<200	<200	-	3.2
28-Jul-20	86	7.1	1,000	69	5,700	1,400	<200	<200	-	6.6
28-Jul-20 (DUP)	76	6.5	900	61	4,900	1,500	<200	<200	-	6.4
14-Jul-21	61	8.9	1,300	1,700	5,300	1,900	280	<200	-	4.2
14-Jul-21 (DUP)	59	8.3	1,200	1,700	5,200	1,800	260	<200	-	6.2
13-Apr-22	1.8	0.45	84	2.5	940	350	<200	<200	-	1.0

TH102 — Screen Interval: 3.0 to 4.9 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
06-Oct-14	0.72	0.52	16	42	360	360	<200	<200	7.2	3.9
28-Oct-15	42	1.6	100	140	970	350	<200	<200	23	1.5
11-Aug-16	8.3	<0.20	33	21	510	180	<200	<200	18	1.4
20-Jun-17	19	3.1	190	120	1,800	500	<200	<200	-	<0.50
31-Jul-19	4.5	1.5	33	27	500	270	<200	<200	-	2.8
29-Jul-20	0.26	<0.20	0.71	0.55	66	<100	<200	<200	-	0.71
14-Jul-21	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50
13-Apr-22	4.1	0.48	10	2.3	450	<100	<200	<200	-	1.8

MW15-01 — Screen Interval: 3.0 to 6.0 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
17-Nov-15	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
09-Aug-16	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
22-Jun-17	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50
15-Aug-18	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50
29-Jul-19	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50
27-Jul-20	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50
13-Jul-21	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50
21-Mar-22	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	0.62

MW15-02 — Screen Interval: 2.7 to 4.9 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
17-Nov-15	44	5.9	180	170	2,300	750	<200	<200	35	2.2
09-Aug-16	78	4.7	73	25	800	450	<200	<200	5.5	<0.50
22-Jun-17	20	1.0	1.5	2.3	190	110	<200	<200	-	1.1
14-Aug-18	2.0	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50
29-Jul-19	1.7	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50
27-Jul-20	0.79	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50
13-Jul-21	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50
21-Mar-22	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50

MW16-01 — Screen Interval: 3.3 - 4.8 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-16	18	3.8	41	59	250	<100	<200	<200	-	0.53
21-Jun-17	46	3.7	170	79	820	260	<200	<200	-	1.2
16-Aug-18	15	0.39	30	0.81	88	<100	260	<200	-	0.53
30-Jul-19	110	0.57	41	0.79	470	140	<200	<200	-	0.71
28-Jul-20	38	0.63	20	1.3	260	<100	<200	<200	-	<0.50
14-Jul-21	18	0.51	18	3.3	110	<100	880	670	-	<0.50
14-Apr-22	59	7.9	75	230	530	220	330	<200	-	<2.5

MW21-01 — Screen Interval: 3.0 - 6.1 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
03-Dec-21	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50
03-Dec-21 (DUP)	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50
21-Mar-22	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50

MW21-02 — Screen Interval: 3.0 - 6.1 mbgs

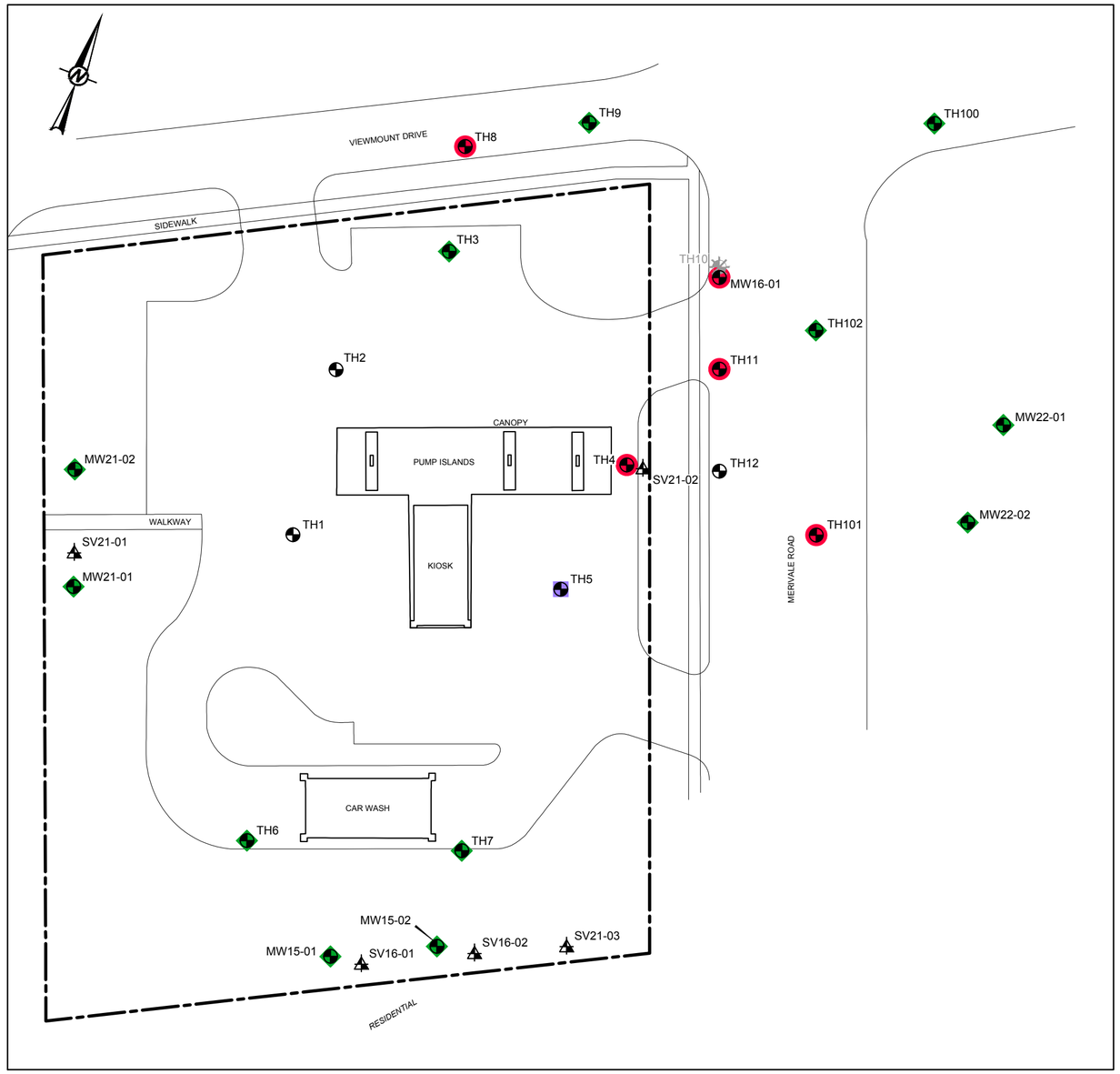
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
03-Dec-21	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50
22-Mar-22	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50

MW22-01 — Screen Interval: 2.8 - 4.8 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
30-Mar-22	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50

MW22-02 — Screen Interval: 2.8 - 4.8 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
30-Mar-22	<0.20	<0.20	<0.20	<0.40	<25	<100	230	<200	-	<0.50



ONTARIO STANDARDS

PARAMETERS	B	T	E	X	F1	F2	F3	F4	HA	Pb
CRITERIA[a]	44	18,000	2,300	4,200	750[b][c]	150	500	500	51	25
RDL	0.20	0.20	0.20	0.40	100	100	200	200	10	0.50
UNITS	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L

(a) O.REG 153 (2011) TABLE 3 FULL DEPTH GENERIC SITE CONDITION STANDARDS FOR ALL TYPES OF PROPERTY USE FOR GROUNDWATER IN COARSE TEXTURED SOIL IN A NON-POTABLE GROUND WATER CONDITION.

(b) BASELINE WAS NOT REACHED AT CARBON 50. VALUE PRESENTED CORRESPONDS TO THE GREATER OF THE F4 AND F4G VALUES.

(c) F1 FRACTION DOES NOT INCLUDE BTEX; HOWEVER, THE PROPONENT HAS THE CHOICE AS TO WHETHER OR NOT TO SUBTRACT BTEX FROM THE ANALYTICAL RESULT.

(d) RDL GREATER THAN CRITERIA.

LEGEND

- PROPERTY BOUNDARY
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL (DECOMMISSIONED)
- SOIL VAPOUR PROBE LOCATION

NOTES

1. LOCATIONS WHERE CURRENT GROUNDWATER SAMPLE MEETS APPLICABLE GUIDELINES/STANDARDS FOR ALL PARAMETERS ANALYZED SHOWN AS AN **GREEN DIAMOND (♦)**.
2. LOCATIONS WHERE CURRENT GROUNDWATER SAMPLE EXCEEDS APPLICABLE GUIDELINES/STANDARDS FOR AT LEAST ONE OF THE PARAMETERS ANALYZED SHOWN AS A **RED CIRCLE (●)**.
3. LOCATIONS WHERE LNAPL WAS ENCOUNTERED SHOWN AS A **PURPLE SQUARE (■)**.
4. EXCEEDANCES OF APPLICABLE GUIDELINES/STANDARDS IN TEXT ARE SHOWN IN **RED.**
5. LIGHT NON-AQUEOUS PHASE LIQUID (LNAPL) THICKNESSES IN TEXT SHOWN IN **PURPLE.**
6. LOCATION WHERE NO SAMPLES WERE TAKEN IN THE CURRENT SAMPLING EVENT SHOWN IN **BLACK**.
7. LNAPL REPORTED IN METRES (m).

LIST OF APPLICABLE ABBREVIATIONS

<	LESS THAN
µg/L	MICROGRAMS PER LITRE
-	NOT AVAILABLE OR NO DATA
B	BENZENE
T	TOLUENE
E	ETHYLBENZENE
X	XYLENES
F1	PETROLEUM HYDROCARBON FRACTION 1 (C_6-C_{10}) LESS BTEX
F2	PETROLEUM HYDROCARBON FRACTION 2 (C_{10}-C_{16})
F3	PETROLEUM HYDROCARBON FRACTION 3 (C_{16}-C_{34})
F4	PETROLEUM HYDROCARBON FRACTION 4 (C_{34}-C_{50})
F4G	PETROLEUM HYDROCARBON 4 GRAVIMETRIC
HA	n-HEXANE
LNAPL	LIGHT NON-AQUEOUS PHASE LIQUID
m	METRE
mbgs	METRES BELOW GROUND SURFACE
O.REG	ONTARIO REGULATION
Pb	DISSOLVED LEAD
RDL	REPORTABLE DETECTION LIMIT

REFERENCE

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No.: 11010-SITE PLAN ONSITE-JUN14; SCALE: UNKNOWN; DATE: JUNE 2014.

0 10 20
1:500 METRES

CLIENT
IMPERIAL OIL LIMITED

CONSULTANT
WSP GOLDER

YYYY-MM-DD	2022-06-30
DESIGNED	SMoloughney
PREPARED	KWray
REVIEWED	CVettotazzo
APPROVED	RMungal

PROJECT
FORMER RETAIL FUEL OUTLET
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
GROUNDWATER ANALYTICAL RESULTS - BTEX AND PHC FRACTIONS F1 - F2, n-HEXANE AND DISSOLVED LEAD

PROJECT NO.	PHASE-TASK	REV.	FIGURE
21506016	1155-2216	0	6

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI C
25 mm
0

Path: \\golder.gds\gal\calgary\CAL\MCAD\IMPERIAL_OIL\DOWNSTREAM\OTAWA_ON_1660_MERIVALE_ROAD\99_PROJECTS\21506016\02_PRODUCTION

SV16-01 — **Screen Interval: 1.35 - 1.50 mbgs**

Date	B	T	E	X	F1	F2	Ali >C_5-C_6	Ali >C_6-C_8	Ali >C_8-C_{10}	Ali >C_{10}-C_{12}	Ali >C_{12}-C_{16}	Aro >C_7-C_8	Aro >C_8-C_{10}	Aro >C_{10}-C_{12}	Aro >C_{12}-C_{16}
13-Dec-16	2.13	11.3	4.30	15.4	449	862	-	-	-	-	-	-	-	-	-
21-Jul-17	<0.32	3.93	4.56	21.7	424	6,090	-	-	-	-	-	-	-	-	-
21-Jul-17 (DUP)	<0.32	5.28	4.43	21.1	389	5,610	-	-	-	-	-	-	-	-	-
21-Nov-17	<0.32	1.28	1.41	5.2	145	501	-	-	-	-	-	-	-	-	-
03-Jul-18	<0.32	1.59	1.92	7.6	715	2,880	-	-	-	-	-	-	-	-	-
03-Jul-18 (DUP)	<0.32	1.71	2.35	9.4	832	3,400	-	-	-	-	-	-	-	-	-
30-Oct-18	<0.32	1.31	1.45	4.6	224	1,220	<5.0	<5.0	61.7	666	9.4	<5.0	<5.0	<5.0	<5.0
30-Oct-18 (DUP)	<0.32	1.33	1.27	4.1	188	1,040	<5.0	<5.0	52.6	551	13.9	<5.0	<5.0	<5.0	<5.0
21-Jun-19	<0.32	1.56	1.63	6.3	243	1,470	-	-	-	-	-	-	-	-	-
21-Jun-19 (DUP)	<0.32	0.52	<0.43	<0.30	165	360	-	-	-	-	-	-	-	-	-
12-Nov-19	<0.32	0.83	1.10	3.7	148	233	-	-	-	-	-	-	-	-	-
12-Nov-19 (DUP)	<0.32	0.65	<0.43	<1.3	110	166	-	-	-	-	-	-	-	-	-
28-Feb-20	<0.32	<0.38	0.47	1.8	102	227	-	-	-	-	-	-	-	-	-
28-Feb-20 (DUP)	<0.32	0.49	<0.43	1.7	134	197	-	-	-	-	-	-	-	-	-
31-Aug-20	<0.32	0.73	0.72	3.0	285	761	-	-	-	-	-	-	-	-	-
31-Aug-20 (DUP)	<0.32	0.65	0.80	3.1	217	760	-	-	-	-	-	-	-	-	-
27-Jan-21	<0.32	<0.38	0.5	1.9	138	197	-	-	-	-	-	-	-	-	-
22-Jul-21	<0.32	1.41	1.89	7.2	280	1,100	-	-	-	-	-	-	-	-	-
09-Dec-21	<0.32	<0.38	<0.43	<1.3	19.3	53.8	-	-	-	-	-	-	-	-	-
09-Dec-21 (DUP)	<0.32	<0.38	<0.43	<1.3	23.8	50.2	-	-	-	-	-	-	-	-	-

SV16-02 — **Screen Interval: 1.45 - 1.6 mbgs**

Date	B	T	E	X	F1	F2	Ali >C_5-C_6	Ali >C_6-C_8	Ali >C_8-C_{10}	Ali >C_{10}-C_{12}	Ali >C_{12}-C_{16}	Aro >C_7-C_8	Aro >C_8-C_{10}	Aro >C_{10}-C_{12}	Aro >C_{12}-C_{16}
13-Dec-16	1.38	8.57	2.75	9.6	439	563	-	-	-	-	-	-	-	-	-
13-Dec-16 (DUP)	1.45	8.70	2.76	10.1	448	559	-	-	-	-	-	-	-	-	-
21-Jul-17	<0.32	2.14	2.33	10.1	157	2,310	-	-	-	-	-	-	-	-	-
21-Nov-17	<0.32	0.68	0.67	2.5	98.3	281	-	-	-	-	-	-	-	-	-
21-Nov-17 (DUP)	<0.32	0.58	0.69	2.5	64.6	292	-	-	-	-	-	-	-	-	-
03-Jul-18	0.38	1.54	0.59	2.1	689	678	-	-	-	-	-	-	-	-	-
30-Oct-18	<0.32	<0.38	<0.43	<1.3	36.4	400	<5.0	<5.0	16.6	229	9.3	<5.0	<5.0	<5.0	<5.0
21-Jun-19	<0.32	0.39	<0.43	<1.3	70.6	331	-	-	-	-	-	-	-	-	-
12-Nov-19	<0.32	1.30	<0.43	<1.3	113	131	-	-	-	-	-	-	-	-	-
28-Feb-20	<0.32	<0.38	<0.43	<1.3	98.0	118	-	-	-	-	-	-	-	-	-
31-Aug-20	<0.32	0.42	<0.43	<1.3	95.9	353	-	-	-	-	-	-	-	-	-
27-Jan-21	<0.32	<0.38	<0.43	<1.3	32.1	89.6	-	-	-	-	-	-	-	-	-
27-Jan-21 (DUP)	0.33	1.44	<0.43	1.5	45.1	84.7	-	-	-	-	-	-	-	-	-
22-Jul-21	<0.32	0.64	<0.43	<1.3	93.1	435	-	-	-	-	-	-	-	-	-
22-Jul-21 (DUP)	<0.32	<0.38	<0.43	<1.3	70.2	445	-	-	-	-	-	-	-	-	-
09-Dec-21	<0.32	0.40	<0.43	<1.3	17.8	23.0	-	-	-	-	-	-	-	-	-

SV21-01 — **Probe Depth: 1.45 - 1.6 mbgs**

Date	B	T	E	X	F1	F2	Ali >C_5-C_6	Ali >C_6-C_8	Ali >C_8-C_{10}	Ali >C_{10}-C_{12}	Ali >C_{12}-C_{16}	Aro >C_7-C_8	Aro >C_8-C_{10}	Aro >C_{10}-C_{12}	Aro >C_{12}-C_{16}
10-Dec-21	0.44	0.39	<0.43	<1.3	70.4	29.3	-	-	-	-	-	-	-	-	-

SV21-02 — **Probe Depth: 1.43 - 1.58 mbgs**

Date	B	T	E	X	F1	F2	Ali >C_5-C_6	Ali >C_6-C_8	Ali >C_8-C_{10}	Ali >C_{10}-C_{12}	Ali >C_{12}-C_{16}	Aro >C_7-C_8	Aro >C_8-C_{10}	Aro >C_{10}-C_{12}	Aro >C_{12}-C_{16}
09-Dec-21	<0.32	1.16	<0.43	<1.3	49.0	39.6	-	-	-	-	-	-	-	-	-

SV21-03 — **Probe Depth: 1.35 - 1.50 mbgs**

Date	B	T	E	X	F1	F2	Ali >C_5-C_6	Ali >C_6-C_8	Ali >C_8-C_{10}	Ali >C_{10}-C_{12}	Ali >C_{12}-C_{16}	Aro >C_7-C_8	Aro >C_8-C_{10}	Aro >C_{10}-C_{12}	Aro >C_{12}-C_{16}
09-Dec-21	<0.32	<0.38	<0.43	<1.3	165	77.9	-	-	-	-	-	-	-	-	-

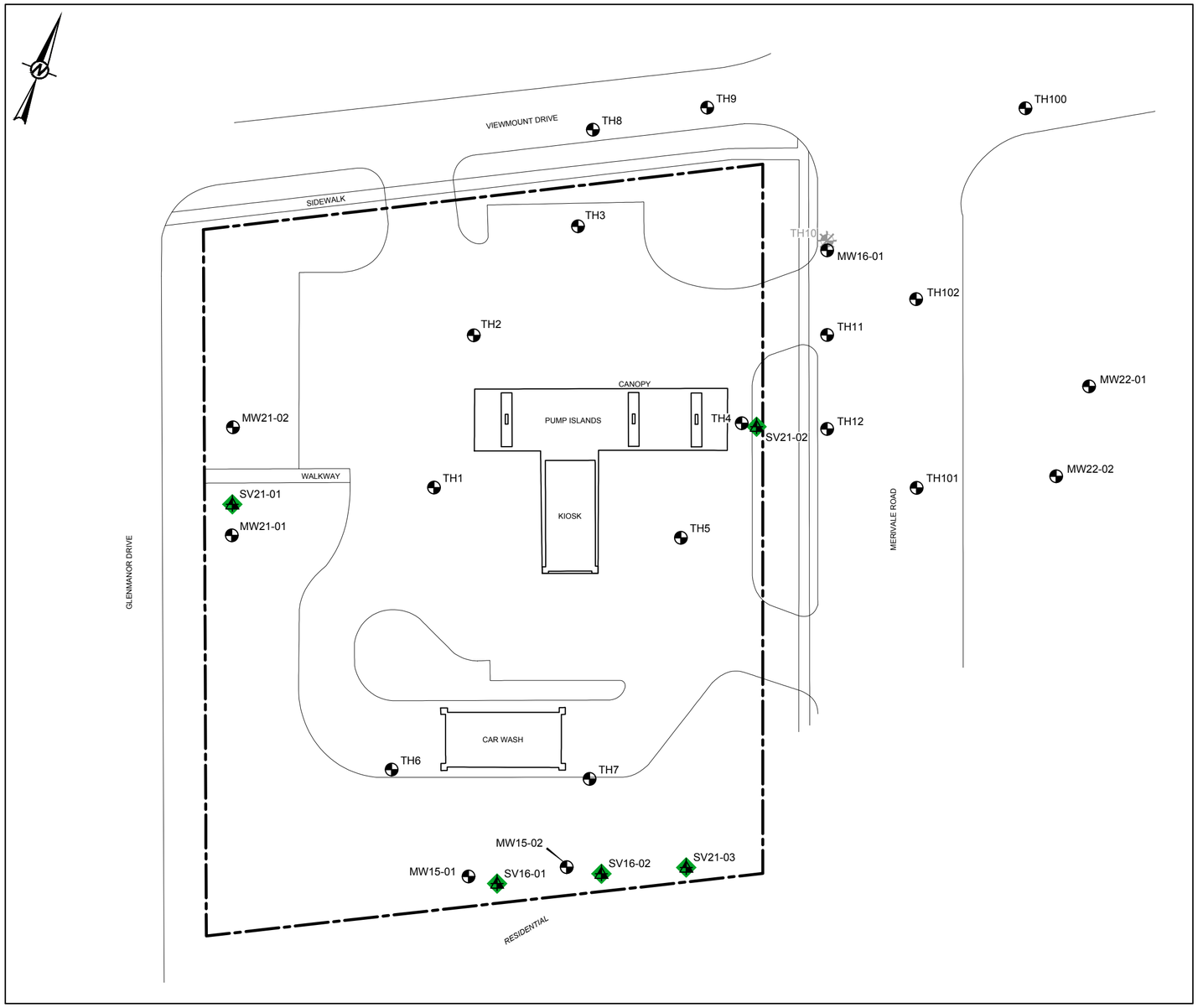
ONTARIO STANDARDS

PARAMETERS	B	T	E	X	F1	F2	Ali >C_5-C_6	Ali >C_6-C_8	Ali >C_8-C_{10}	Ali >C_{10}-C_{12}	Ali >C_{12}-C_{16}	Aro >C_7-C_8	Aro >C_8-C_{10}	Aro >C_{10}-C_{12}	Aro >C_{12}-C_{16}
Health-Based Indoor Air Criteria[a]	0.51	1,043	209	146	2,491	471	n/s	9,594	521	521	521	n/s	104	104	104
SVSL[b]	25	52,143	10,429	7,300	124,530	23,530	n/s	479,714	26,071	26,071	26,071	n/s	5,214	5,214	5,214
RDL	0.32	0.38	0.43	1.3	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
UNITS	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m3	µg/m³

(a) HEALTH-BASED INDOOR AIR CRITERIA - RESIDENTIAL, PROVIDED BY MOECC MODIFIED GENERIC RISK ASSESSMENT (TIER 2), SPREADSHEET MODEL (NOVEMBER 2016).

(b) SVSLs FOR A RESIDENTIAL BUILDING WITH BASEMENT (PROBE DEPTH 0 - 30 CENTIMETRES BELOW BASE OF THE BUILDING FOUNDATION) CALCULATED BY DIVIDING HEALTH-BASED INDOOR AIR CRITERIA BY AN ATTENUATION FACTOR OF 0.02.

(c) RDL GREATER THAN SVSL.



LEGEND

- PROPERTY BOUNDARY
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL (DECOMMISSIONED)
- SOIL VAPOUR PROBE LOCATION

NOTES

1. LOCATIONS WHERE CURRENT SOIL VAPOUR SAMPLE MEETS APPLICABLE GUIDELINES/STANDARDS FOR ALL PARAMETERS ANALYZED SHOWN AS AN **GREEN DIAMOND (♦)**.
2. LOCATIONS WHERE CURRENT SOIL VAPOUR SAMPLE EXCEEDS APPLICABLE GUIDELINES/STANDARDS FOR AT LEAST ONE OF THE PARAMETERS ANALYZED SHOWN AS A **RED CIRCLE (●)**.
3. EXCEEDANCES OF APPLICABLE GUIDELINES/STANDARDS IN TEXT ARE SHOWN IN **RED.**

LIST OF APPLICABLE ABBREVIATIONS

<	LESS THAN	B	BENZENE
µg/m³	MICROGRAMS PER METRE CUBE	T	TOLUENE
-	NOT AVAILABLE OR NO DATA	E	ETHYLBENZENE
Ali >C_5-C_6	ALIPHATICS >C_5-C_6	X	XYLENES
Ali >C_6-C_8	ALIPHATICS >C_6-C_8	F1	PETROLEUM HYDROCARBON FRACTION 1 (C_6-C_{10}) LESS BTEX
Ali >C_8-C_{10}	ALIPHATICS >C_8-C_{10}	F2	PETROLEUM HYDROCARBON FRACTION 2 (C/10-C/16)
Ali >C_{10}-C_{12}	ALIPHATICS >C_{10}-C_{12}	m	METRE
Ali >C_{12}-C_{16}	ALIPHATICS >C_{12}-C_{16}	mbgs	METRES BELOW GROUND SURFACE
Aro >C_7-C_8	AROMATIC >C_7-C_8	n/s	NO STANDARD
Aro >C_8-C_{10}	AROMATIC >C_8-C_{10}	RDL	REPORTABLE DETECTION LIMIT
Aro >C_{10}-C_{12}	AROMATIC >C_{10}-C_{12}	SVSL	SOIL VAPOUR SCREENING LEVEL
Aro >C_{12}-C_{16}	AROMATIC >C_{12}-C_{16}		

REFERENCE

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No.: 11010-SITE PLAN ONSITE-JUN14; SCALE: UNKNOWN; DATE: JUNE 2014.

0 10 20
1:500 METRES

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI C
25 mm
0

CLIENT
IMPERIAL OIL LIMITED

CONSULTANT
WSP GOLDER

YYYY-MM-DD	2022-06-30
DESIGNED	SMoloughney
PREPARED	KWray
REVIEWED	CVettotazzo
APPROVED	RMungal

PROJECT
FORMER RETAIL FUEL OUTLET
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
SOIL VAPOUR ANALYTICAL RESULTS - PETROLEUM HYDROCARBONS

PROJECT NO.	PHASE-TASK	REV.	FIGURE
21506016	1155-2216	0	7

Path: \\golder.gds\gal\Calgary\CAL\MCAD\IMPERIAL_OIL\DOWNSTREAM\OTTAWA_ON_1660_MERIVALE_ROAD\99_PROJECT\S21506016-02_PRODUCTION\1155-2216\ONSITE\DWG\ | File Name: 215060161155-2216ONSITEDWG.dwg | Last Edited By: pricord Date: 2022-06-30 Time/2:17:52 PM | Printed By: KWray Date: 2022-06-30 Time/2:19:58 PM

SV16-01																												Probe Depth: 1.35 - 1.50 mbgs
Date	**ACTN**	**BMA**	**CT**	**MCB**	**TCM**	**1,2-DBA**	**1,2-DCB**	**1,4-DCB**	**1,1-DCA**	**1,2-DCA**	**1,1-DCE**	**c-1,2-DCE**	**t-1,2-DCE**	**1,2-DCPA**	**c-1,3-DCPE**	**t-1,3-DCPE**	**1,4-DOX**	**HXCBDE**	**HA**	**MEK**	**MIBK**	**MTBE**	**DCM**	**NPT**	**ST**	**1,1,1,2-PCA**	**1,1,2,2-PCA**	**PCE**	**1,2,4-TCB**	**1,1,1-TCA**	**1,1,2-TCA**	**TCE**	**VC**
13-Dec-16	29.3	<0.39	0.72	<0.46	8.72	<0.77	<0.60	<0.60	<0.40	<0.40	<0.40	0.97	47.5	<0.46	<0.45	<0.45	<3.6	<5.3[c]	15.9	11.7	<4.1	<0.72	<2.8	na	<0.43	<0.69	<0.69	5.98	<3.7	<0.55	<0.55	<0.54	<0.26
21-Jul-17	76.5	<0.39	<0.63	<0.46	2.95	<0.77	<0.60	1.31	<0.40	<0.40	<0.40	<0.40	1.33	<0.46	<0.45	<0.45	<3.6	<5.3[c]	2.4	4.0	<4.1	<0.72	3.2	na	<0.43	<0.69	<0.69	7.03	<3.7	<0.55	<0.55	1.09	<0.26
21-Jul-17 (DUP)	78.5	<0.39	<0.63	<0.46	2.78	<0.77	<0.60	1.20	<0.40	<0.40	<0.40	<0.40	1.34	<0.46	<0.45	<0.45	<3.6	<5.3[c]	2.0	3.8	<4.1	<0.72	3.6	na	<0.43	<0.69	<0.69	7.21	<3.7	<0.55	<0.55	<0.54	<0.26
21-Nov-17	2.9	<0.39	<0.63	<0.46	1.68	<0.77	<0.60	<0.60	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<3.6	<5.3[c]	<1.1	<2.9	<4.1	<0.72	<2.8	na	<0.43	<0.69	<0.69	66.1	<3.7	<0.55	<0.55	<0.54	<0.26
3-Jul-18	89.5	<0.39	<0.63	<0.46	0.74	<0.77	<0.60	0.67	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<3.6	<5.3[c]	9.1	7.6	<4.1	<0.72	<2.8	na	<0.43	<0.69	<0.69	3.98	<3.7	<0.55	<0.55	<0.54	<0.26
03-Jul-18 (DUP)	103	<0.39	<0.63	<0.46	0.93	<0.77	<0.60	0.83	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<3.6	<5.3[c]	10.4	9.0	<4.1	<0.72	<2.8	na	<0.43	<0.69	<0.69	4.90	<3.7	<0.55	<0.55	<0.54	<0.26
30-Oct-18	7.5	<0.39	<0.63	<0.46	182	<0.77	<0.60	<0.60	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<3.6	<5.3[c]	<1.1	<2.9	<4.1	<0.72	<2.8	na	<0.43	<0.69	<0.69	3.07	<3.7	<0.55	<0.55	<0.54	<0.26
30-Oct-18 (DUP)	7.8	<0.39	<0.63	<0.46	159	<0.77	<0.60	<0.60	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<3.6	<5.3[c]	1.2	<2.9	<4.1	<0.72	<2.8	na	<0.43	<0.69	<0.69	2.66	<3.7	<0.55	<0.55	<0.54	<0.26
21-Jun-19	148	<0.39	<0.63	<0.46	76.7	<0.77	<0.60	<0.60	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<3.6	<4.1[c]	7.82	<0.72	<2.1	<0.20	<1.0	na	<0.43	<0.69	<0.69	9.95	<3.7	<0.55	<0.55	<0.54	<0.26
21-Jun-19 (DUP)	155	<0.39	<0.63	<0.46	87.6	<0.77	<0.60	<0.60	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<3.6	<4.1[c]	4.58	<0.72	<2.1	<0.20	<1.0	na	<0.43	<0.69	<0.69	7.89	<3.7	<0.55	<0.55	<0.54	<0.26
12-Nov-19	4.7	<0.39	<0.63	<0.46	52.9	<0.77	<0.60	<0.60	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<3.6	<5.3[c]	<0.70	<0.59	<0.82	<0.72	<2.1	na	<0.43	<0.69	<0.69	3.36	<3.7	<0.55	<0.55	<0.54	<0.26
28-Feb-20	13.4	<0.39	<0.63	<0.46	12.9	<0.77	<0.60	<0.60	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<3.6	<5.3[c]	<0.70	1.29	<0.82	<0.72	<2.1	<1.0	<0.43	<0.69	<0.69	1.80	<3.7	<0.55	<0.55	<0.54	<0.26
28-Feb-20 (DUP)	12.6	<0.39	<0.63	<0.46	12.7	<0.77	<0.60	<0.60	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<3.6	<5.3[c]	<0.70	1.19	<0.82	<0.72	<2.1	<1.0	<0.43	<0.69	<0.69	1.60	<3.7	<0.55	<0.55	<0.54	<0.26
31-Aug-20	34.3	<0.39	<0.63	<0.46	44.2	<0.77	<0.60	0.81	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<3.6	<5.3[c]	<0.70	3.07	<0.82	<0.72	<2.1	<1.0	<0.43	<0.69	<0.69	7.23	<3.7	<0.55	<0.55	<0.54	<0.26
31-Aug-20 (DUP)	34.5	<0.39	<0.63	<0.46	44.9	<0.77	<0.60	0.83	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<3.6	<5.3	<0.70	3.19	<0.82	<0.72	<2.1	<1.0	<0.43	<0.69	<0.69	7.38	<3.7	<0.55	<0.55	<0.54	<0.26
27-Jan-21	10.0	<0.39	<0.63	<0.46	13.3	<0.77	<0.60	<0.60	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<3.6	<5.3[c]	<0.70	1.83	<0.82	<0.72	<2.1	<1.0	<0.43	<0.69	<0.69	2.38	<3.7	<0.55	<0.55	<0.54	<0.26
22-Jul-21	240	<0.39	<0.63	<0.46	20.2	<0.77	<0.60	<0.60	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<3.6	<5.3[c]	0.94	33.0	<0.82	<0.72	<2.1	<1.0	<0.43	<0.69	<0.69	5.71	<3.7	<0.55	<0.55	<0.54	<0.26
9-Dec-21	4.3	<0.39	<0.63	<0.46	<0.49	<0.77	<0.60	<0.60	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<3.6	<5.3[c]	<0.70	<0.59	<0.82	<0.72	<2.1	<1.0	<0.43	<0.69	<0.69	<0.68	<3.7	<0.55	<0.55	11.4	<0.26
09-Dec-21 (DUP)	3.5	<0.39	<0.63	<0.46	<0.49	<0.77	<0.60	<0.60	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<3.6	<5.3[c]	<0.70	<0.59	<0.82	<0.72	<2.1	<1.0	<0.43	<0.69	<0.69	0.68	<3.7	<0.55	<0.55	12.3	<0.26

SV16-02																												Probe Depth: 1.45 - 1.6 mbgs
Date	**ACTN**	**BMA**	**CT**	**MCB**	**TCM**	**1,2-DBA**	**1,2-DCB**	**1,4-DCB**	**1,1-DCA**	**1,2-DCA**	**1,1-DCE**	**c-1,2-DCE**	**t-1,2-DCE**	**1,2-DCPA**	**c-1,3-DCPE**	**t-1,3-DCPE**	**1,4-DOX**	**HXCBDE**	**HA**	**MEK**	**MIBK**	**MTBE**	**DCM**	**NPT**	**ST**	**1,1,1,2-PCA**	**1,1,2,2-PCA**	**PCE**	**1,2,4-TCB**	**1,1,1-TCA**	**1,1,2-TCA**	**TCE**	**VC**
13-Dec-16	13.0	<0.39	<0.63	<0.46	10.8	<0.77	<0.60	<0.60	<0.40	<0.40	<0.40	<0.40	12.6	<0.46	<0.45	<0.45	<3.6	<5.3[c]	3.4	5.9	<4.1	<0.72	<2.8	na	<0.43	<0.69	<0.69	<0.68	<3.7	<0.55	<0.55	4.55	<0.26
13-Dec-16 (DUP)	14.0	<0.39	<0.63	<0.46	11.1	<0.77	<0.60	<0.60	<0.40	<0.40	<0.40	<0.40	13.1	<0.46	<0.45	<0.45	<3.6	<5.3[c]	3.7	6.3	<4.1	<0.72	<2.8	na	<0.43	<0.69	<0.69	<0.68	<3.7	<0.55	<0.55	4.94	<0.26
21-Jul-17	17.6	<0.39	<0.63	<0.46	2.56	<0.77	<0.60	<0.60	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<3.6	<5.3[c]	<1.1	<2.9	<4.1	<0.72	4.2	na	<0.43	<0.69	<0.69	1.38	<3.7	<0.55	<0.55	5.04	<0.26
21-Nov-17	<1.9	<0.39	<0.63	<0.46	1.38	<0.77	<0.60	<0.60	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<3.6	<5.3[c]	<1.1	<2.9	<4.1	<0.72	<2.8	na	<0.43	<0.69	<0.69	81.9	<3.7	<0.55	<0.55	4.27	<0.26
21-Nov-17 (DUP)	2.4	<0.39	<0.63	<0.46	1.38	<0.77	<0.60	<0.60	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<3.6	<5.3[c]	<1.1	<2.9	<4.1	<0.72	<2.8	na	<0.43	<0.69	<0.69	41.4	<3.7	<0.55	<0.55	4.42	<0.26
3-Jul-18	97.1	<0.39	<0.63	<0.46	0.51	<0.77	<0.60	<0.60	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<3.6	<5.3[c]	9.3	7.9	<4.1	<0.72	<2.8	na	0.54	<0.69	<0.69	<0.68	<3.7	<0.55	<0.55	0.95	<0.26
30-Oct-18	5.5	<0.39	<0.63	<0.46	<0.49	<0.77	<0.60	<0.60	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<3.6	<5.3[c]	<1.1	<2.9	<4.1	<0.72	<2.8	na	<0.43	<0.69	<0.69	<0.68	<3.7	<0.55	<0.55	2.12	<0.26
21-Jun-19	28.0	<0.39	<0.63	<0.46	1.17	<0.77	<0.60	<0.60	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<3.6	<5.3[c]	<0.70	1.18	<0.82	<0.72	<2.1	na	<0.43	<0.69	<0.69	0.75	<3.7	<0.55	<0.55	2.82	<0.26
12-Nov-19	6.1	<0.39	<0.63	<0.46	0.52	<0.77	<0.60	<0.60	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<3.6	<5.3[c]	0.84	0.66	<0.82	<0.72	<2.1	na	<0.43	<0.69	<0.69	<0.68	<3.7	<0.55	<0.55	**14.9**	<0.26
12-Nov-19 (DUP)	5.1	<0.39	<0.63	<0.46	0.58	<0.77	<0.60	<0.60	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<3.6	<5.3[c]	<0.70	<0.59	<0.82	<0.72	<2.1	na	<0.43	<0.69	<0.69	0.79	<3.7	<0.55	<0.55	**17.3**	<0.26
28-Feb-20	23.8	<0.39	<0.63	<0.46	<0.49	<0.77	<0.60	<0.60	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<3.6	<5.3[c]	<0.70	1.58	<0.82	<0.72	<2.1	<1.0	<0.43	<0.69	<0.69	<0.68	<3.7	<0.55	<0.55	4.33	<0.26
31-Aug-20	34.3	<0.39	<0.63	<0.46	0.73	<0.77	<0.60	<0.60	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<3.6	<5.3[c]	<0.70	1.66	<0.82	<0.72	<2.1	<1.0	<0.43	<0.69	<0.69	1.21	<3.7	<0.55	<0.55	**15.9**	<0.26
27-Jan-21	4.7	<0.39	<0.63	<0.46	<0.49	<0.77	<0.60	<0.60	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<3.6	<5.3[c]	<0.70	<0.59	<0.82	<0.72	<2.1	<1.0	<0.43	<0.69	<0.69	<0.68	<3.7	<0.55	<0.55	7.33	<0.26
27-Jan-21 (DUP)	20.1	<0.39	<0.63	<0.46	<0.49	<0.77	<0.60	<0.60	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	8.7	<5.3[c]	2.62	0.63	<0.82	<0.72	<2.1	<1.0	<0.43	<0.69	<0.69	<0.68	<3.7	<0.55	<0.55	6.92	<0.26
22-Jul-21	66.3	<0.39	<0.63	<0.46	0.50	<0.77	<0.60	<0.60	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<3.6	<5.3[c]	<0.70	6.77	<0.82	<0.72	<2.1	<1.0	<0.43	<0.69	<0.69	1.87	<3.7	<0.55	<0.55	**15.5**	<0.26
22-Jul-21 (DUP)	61.1	<0.39	<0.63	<0.46	0.61	<0.77	<0.60	<0.60	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<3.6	<5.3[c]	<0.70	3.63	<0.82	<0.72	<2.1	<1.0	<0.43	<0.69	<0.69	1.87	<3.7	<0.55	<0.55	**17.0**	<0.26
9-Dec-21	8.6	<0.39	<0.63	<0.46	3.69	<0.77	<0.60	<0.60	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<3.6	<5.3[c]	<0.70	1.21	<0.82	<0.72	<2.1	<1.0	<0.43	<0.69	<0.69	0.72	<3.7	<0.55	<0.55	<0.54	<0.26

SV21-01																												Probe Depth: 1.45 - 1.6 mbgs
Date	**ACTN**	**BMA**	**CT**	**MCB**	**TCM**	**1,2-DBA**	**1,2-DCB**	**1,4-DCB**	**1,1-DCA**	**1,2-DCA**	**1,1-DCE**	**c-1,2-DCE**	**t-1,2-DCE**	**1,2-DCPA**	**c-1,3-DCPE**	**t-1,3-DCPE**	**1,4-DOX**	**HXCBDE**	**HA**	**MEK**	**MIBK**	**MTBE**	**DCM**	**NPT**	**ST**	**1,1,1,2-PCA**	**1,1,2,2-PCA**	**PCE**	**1,2,4-TCB**	**1,1,1-TCA**	**1,1,2-TCA**	**TCE**	**VC**
10-Dec-21	11.4	<0.39	<0.63	<0.46	<0.49	<0.77	<0.60	<0.60	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<3.6	<5.3[c]	5.60	1.38	<0.82	<0.72	<2.1	<1.0	<0.43	<0.69	<0.69	6.54	<3.7	<0.55	<0.55	<0.54	<0.26

SV21-02																												Probe Depth: 1.43 - 1.58 mbgs
Date	**ACTN**	**BMA**	**CT**	**MCB**	**TCM**	**1,2-DBA**	**1,2-DCB**	**1,4-DCB**	**1,1-DCA**	**1,2-DCA**	**1,1-DCE**	**c-1,2-DCE**	**t-1,2-DCE**	**1,2-DCPA**	**c-1,3-DCPE**	**t-1,3-DCPE**	**1,4-DOX**	**HXCBDE**	**HA**	**MEK**	**MIBK**	**MTBE**	**DCM**	**NPT**	**ST**	**1,1,1,2-PCA**	**1,1,2,2-PCA**	**PCE**	**1,2,4-TCB**	**1,1,1-TCA**	**1,1,2-TCA**	**TCE**	**VC**
9-Dec-21	6.4	<0.39	<0.63	<0.46	22.8	<0.77	<0.60	<0.60	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<3.6	<5.3[c]	<0.70	<0.91	<0.82	<0.72	<2.1	<1.0	<0.43	<0.69	<0.69	2.76	<3.7	<0.55	<0.55	<0.54	<0.26

SV21-03																												Probe Depth: 1.35 - 1.50 mbgs
Date	**ACTN**	**BMA**	**CT**	**MCB**	**TCM**	**1,2-DBA**	**1,2-DCB**	**1,4-DCB**	**1,1-DCA**	**1,2-DCA**	**1,1-DCE**	**c-1,2-DCE**	**t-1,2-DCE**	**1,2-DCPA**	**c-1,3-DCPE**	**t-1,3-DCPE**	**1,4-DOX**	**HXCBDE**	**HA**	**MEK**	**MIBK**	**MTBE**	**DCM**	**NPT**	**ST**	**1,1,1,2-PCA**	**1,1,2,2-PCA**	**PCE**	**1,2,4-TCB**	**1,1,1-TCA**	**1,1,2-TCA**	**TCE**	**VC**
9-Dec-21	6.8	<0.39	<0.63	<0.46	<0.49	<0.77	<0.60	<0.60	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<3.6	<5.3[c]	1.84	<0.59	<0.82	<0.72	<2.1	<1.0	<0.43	<0.69	<0.69	4.01	<3.7	<0.55	<0.55	<0.54	<0.26

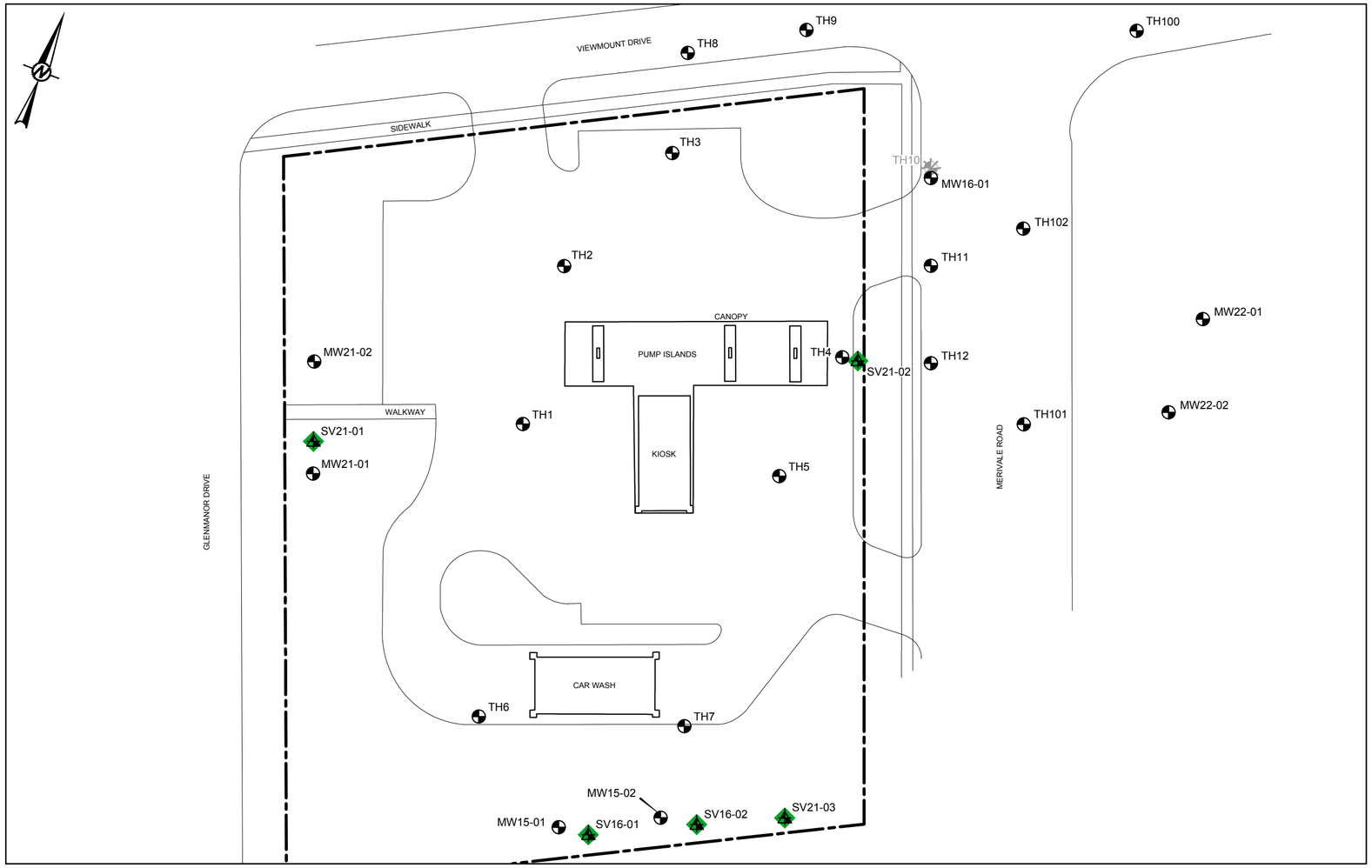
ONTARIO STANDARDS

PARAMETERS	**ACTN**	**BMA**	**CT**	**MCB**	**TCM**	**1,2-DBA**	**1,2-DCB**	**1,4-DCB**	**1,1-DCA**	**1,2-DCA**	**1,1-DCE**	**c-1,2-DCE**	**t-1,2-DCE**	**1,2-DCPA**	**c-1,3-DCPE**	**t-1,3-DCPE**	**1,4-DOX**	**HXCBDE**	**HA**	**MEK**	**MIBK**	**MTBE**	**DCM**	**NPT**	**ST**	**1,1,1,2-PCA**	**1,1,2,2-PCA**	**PCE**	**1,2,4-TCB**	**1,1,1-TCA**	**1,1,2-TCA**	**TCE**	**VC**
Health-Based Indoor Air Criteria[a]	2,503	1.04	0.42	209	20.86	0.17	125	0.28	34.41	0.04	14.60	31.29	12.51	0.83	0.28	0.28	751	0.05	521	1,003	602	4.28	48.36	38.60	54.23	0.15	0.02	4.28	1.67	209	0.07	0.27	0.13
SVSL[b]	125,143	52.14	20.86	10,429	1,043	8.34	6,257	13.90	1,721	2.14	730	1,564	626	41.71	14	14	37,543	2.53	26,071	50,137	30,082	214	2,418	1	2,711	7.51	0.96	214	83.43	10,429	3.48	13.56	6.32
RDL	1.9	0.39	0.63	0.46	0.49	0.77	0.60	0.60	0.40	0.40	0.40	0.40	0.40	0.46	0.45	0.45	3.6	5.3	1.1	2.9	4.1	0.72	2.8	0.77	0.43	0.69	0.69	0.68	3.7	0.55	0.55	0.54	0.26
UNITS	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	ug/m3	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³

(a) HEALTH-BASED INDOOR AIR CRITERIA - RESIDENTIAL, PROVIDED BY MOECC MODIFIED GENERIC RISK ASSESSMENT (TIER 2), SPREADSHEET MODEL (NOVEMBER 2016).

(b) SVSLs FOR A RESIDENTIAL BUILDING WITH BASEMENT (PROBE DEPTH 0 - 30 CENTIMETRES BELOW BASE OF THE BUILDING FOUNDATION) CALCULATED BY DIVIDING HEALTH-BASED INDOOR AIR CRITERIA BY AN ATTENUATION FACTOR OF 0.02.

(c) RDL GREATER THAN SVSL.



LEGEND

- PROPERTY BOUNDARY
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL (DECOMMISSIONED)
- SOIL VAPOUR PROBE LOCATION

LIST OF APPLICABLE ABBREVIATIONS

<	LESS THAN	DBCM	DIBROMOCHLOROMETHANE
µg/m³	MICROGRAMS PER METRE CUBE	DCM	DICHLOROMETHANE
-	NOT AVAILABLE OR NO DATA	HA	n-HEXANE
1,1,1,2-PCA	1,1,1,2-TETRACHLOROETHANE	HXCBDE	HEXACHLOROBUTADIENE
1,1,1-TCA	1,1,1-TRICHLOROETHANE	mbgs	METRES BELOW GROUND SURFACE
1,1,2,2-PCA	1,1,2,2-TETRACHLOROETHANE	MBK	METHYL BUTYL KETONE (2-HEXANONE)
1,1,2-TCA	1,1,2-TRICHLOROETHANE	MCB	CHLOROBENZENE
1,1-DCA	1,1-DICHLOROETHANE	MEK	METHYL ETHYL KETONE (2-BUTANONE)
1,1-DCE	1,1-DICHLOROETHENE	MTBE	METHYL TERTIARY BUTYL ETHER
1,2,4-TCB	1,2,4-TRICHLOROBENZENE	n/s	NO STANDARD
1,2-DBA	1,2-DIBROMOETHANE OR ETHYLENE DIBROMIDE	NPT	NAPHTHALENE
1,2-DCA	1,2-DICHLOROETHANE	PCE	TETRACHLOROETHENE
1,2-DCB	1,2-DICHLOROBENZENE	RDL	REPORTABLE DETECTION LIMIT
1,2-DCPA	1,2-DICHLOROPROPANE	ST	STYRENE
1,4-DCB	1,4-DICHLOROBENZENE	SVSL	SOIL VAPOUR SCREENING LEVELS
1,4-DOX	1,4-DIOXANE	t-1,2-DCE	TRANS-1,2-DICHLOROETHENE
ACTN	ACETONE	t-1,3-DCPE	TRANS-1,3-DICHLOROPROPENE
BMA	BROMOMETHANE	TCE	TRICHLOROETHENE
c-1,2-DCE	CIS-1,2-DICHLOROETHENE	TCM	CHLOROFORM
c-1,3-DCPE	CIS-1,3-DICHLOROPROPENE	VC	VINYL CHLORIDE
CT	CARBON TETRACHLORIDE		

NOTES

1. LOCATIONS WHERE CURRENT SOIL VAPOUR SAMPLE MEETS APPLICABLE GUIDELINES/STANDARDS FOR ALL PARAMETERS ANALYZED SHOWN AS AN **GREEN DIAMOND (♦)**.
2. LOCATIONS WHERE CURRENT SOIL VAPOUR SAMPLE EXCEEDS APPLICABLE GUIDELINES/STANDARDS FOR AT LEAST ONE OF THE PARAMETERS ANALYZED SHOWN AS A **RED CIRCLE (●)**.
3. EXCEEDANCES OF APPLICABLE GUIDELINES/STANDARDS IN TEXT ARE SHOWN IN **RED.**

REFERENCE

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No.: 11010-SITE PLAN ONSITE-JUN14; SCALE: UNKNOWN; DATE: JUNE 2014.

0 10 20
1:500 METRES

CLIENT
IMPERIAL OIL LIMITED

CONSULTANT
wsp GOLDER

YYYY-MM-DD	2022-06-30
DESIGNED	SMoloughney
PREPARED	KWray
REVIEWED	CVettotazzo
APPROVED	RMungal

PROJECT
FORMER RETAIL FUEL OUTLET
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
SOIL VAPOUR ANALYTICAL RESULTS - VOLATILE ORGANIC COMPOUNDS

PROJECT NO.	PHASE-TASK	REV.	FIGURE
21506016	1155-2216	0	8

Path: \\golder.gds\gal\Calgary\CAL\MCAD\IMPERIAL_OIL\DOWNSTREAM\OTTAWA_ON_1660_MERIVALE_ROAD\99_PROJECTS\21506016\02_PRODUCTION\1155-2216\ONSITE\DWG | File Name: 21506016-1155-HS-0008.dwg | Last Edited By: prcond Date: 2022-06-30 Time:2:17:58 PM | Printed By: KWray Date: 2022-06-30 Time:2:20:10 PM
IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI C
25mm
0

Table 1
Summary of Groundwater Field Monitoring Results
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Well Name	Screen Interval (mbgs)	Top of Casing Elevation[(a)] (m)	Ground Elevation[(a)] (m)	Monitoring Date	Depth to Groundwater (mbtoc)	Depth to Groundwater (mbgs)	Groundwater Elevation[(a)] (m)	LNAPL Thickness (mm)
TH1	2.6 - 5.6	99.99	100.08	14-Aug-18	3.71	3.80	96.28	n/d
				29-Jul-19	3.61	3.70	96.39	n/d
				27-Jul-20	3.57	3.66	96.42	n/d
				13-Jul-21	3.51	3.60	96.48	<1
				22-Mar-22	Obstructed at 0.40 mbtoc			
TH2	3.2 - 4.7	100.04	100.14	14-Aug-18	3.66	3.76	96.38	n/d
				29-Jul-19	3.56	3.65	96.49	n/d
				27-Jul-20	3.68	3.78	96.36	n/d
				13-Jul-21	3.66	3.76	96.38	n/d
				22-Mar-22	Obstructed at 0.46 mbtoc			
TH3	3.2 - 4.7	100.28	100.41	14-Aug-18	3.29	3.42	97.00	n/d
				29-Jul-19	3.17	3.30	97.11	n/d
				27-Jul-20	3.30	3.43	96.98	n/d
				13-Jul-21	3.11	3.24	97.17	n/d
				22-Mar-22	2.89	3.02	97.39	n/d
TH4	3.4 - 4.9	100.27	100.35	14-Aug-18	3.10	3.18	97.17	n/d
				29-Jul-19	3.10	3.18	97.17	n/d
				27-Jul-20	3.06	3.14	97.21	2
				13-Jul-21	3.07	3.15	97.21	<1
				22-Mar-22	2.94	3.02	97.33	n/d
TH5	3.5 - 5.0	100.12	100.23	14-Aug-18	2.87	2.98	97.25	n/d
				29-Jul-19	2.82	2.93	97.31	n/d
				27-Jul-20	2.74	2.85	97.38	n/d
				13-Jul-21	2.74	2.85	97.38	n/d
				22-Mar-22	2.94	3.05	98.68	2
TH6	3.6 - 5.1	99.99	99.54	14-Aug-18	3.61	3.16	96.38	n/d
				29-Jul-19	3.70	3.25	96.29	n/d
				27-Jul-20	3.69	3.24	96.30	n/d
				13-Jul-21	3.72	3.27	96.27	n/d
				21-Mar-22	3.05	2.60	96.94	n/d
TH7	4.4 - 5.8	100.50	99.66	14-Aug-18	4.67	3.83	95.83	n/d
				29-Jul-19	4.82	3.98	95.68	n/d
				27-Jul-20	4.86	4.02	95.65	n/d
				13-Jul-21	4.39	3.55	96.11	n/d
				21-Mar-22	3.98	3.14	96.52	n/d
TH8	3.3 - 4.9	100.03	100.16	30-Jul-19	2.98	3.11	97.06	n/d
				28-Jul-20	3.15	3.28	96.88	n/d
				14-Oct-20	3.67	3.80	96.37	n/d
				14-Jul-21	3.00	3.13	97.03	n/d
				13-Apr-22	2.48	2.61	97.55	Sheen

Notes:

[(a)] Elevations are relative to a local benchmark (centre of storm sewer catch basin approximately 5 m west of kiosk), with an assigned elevation of 100.00 m (exp. 2013).

LNAPL - light non-aqueous phase liquid

m - metres

mbgs - metres below ground surface

mbtoc - metres below top of casing

mm - millimetres

n/a - not applicable

n/d - not detected

n/m - not measured

< - less than

Table 1
Summary of Groundwater Field Monitoring Results
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Well Name	Screen Interval (mbgs)	Top of Casing Elevation[(a)] (m)	Ground Elevation[(a)] (m)	Monitoring Date	Depth to Groundwater (mbtoc)	Depth to Groundwater (mbgs)	Groundwater Elevation[(a)] (m)	LNAPL Thickness (mm)
TH9	3.4 - 4.9	100.46	100.59	30-Jul-19	2.74	2.87	97.72	n/d
				28-Jul-20	2.83	2.96	97.63	n/d
				14-Oct-20	2.86	2.99	97.60	n/d
				14-Jul-21	2.77	2.90	97.69	n/d
				13-Apr-22	2.55	2.68	97.92	Sheen
TH10	3.3 - 4.9	100.17	100.26	10-Jun-13	n/m	3.03	97.24	n/d
				6-Oct-14	n/m	n/a	n/a	n/m
				27-Oct-15	Destroyed			
				TH10 decommissioned on August 24, 2016				
TH11	3.3 - 4.9	99.90	100.04	31-Jul-19	2.81	2.95	97.09	n/d
				28-Jul-20	2.80	2.94	97.10	n/d
				14-Oct-20	3.12	3.26	96.78	n/d
				14-Jul-21	2.92	3.06	96.98	n/d
				13-Apr-22	2.59	2.73	97.32	n/d
TH12	3.3 - 4.9	99.60	99.74	31-Jul-19	n/m	n/a	n/a	n/m
				28-Jul-20	n/m	n/a	n/a	n/m
				14-Oct-20	2.73	2.87	96.87	n/d
				14-Jul-21	2.81	2.95	96.79	n/d
				13-Apr-22	Could not open			
TH100	3.0 - 4.9	101.40	101.52	30-Jul-19	3.44	3.56	97.96	n/d
				29-Jul-20	3.21	3.33	98.19	n/d
				14-Oct-20	3.41	3.52	98.00	n/d
				14-Jul-21	3.33	3.45	98.07	n/d
				13-Apr-22	2.98	3.09	98.43	n/d
TH101	3.0 - 4.9	99.94	100.06	15-Aug-18	2.91	3.03	97.03	n/d
				30-Jul-19	2.94	3.06	97.01	n/d
				28-Jul-20	3.02	3.14	96.92	n/d
				14-Jul-21	3.06	3.18	96.89	n/d
				13-Apr-22	2.52	2.64	97.42	n/d
TH102	3.0 - 4.9	100.59	100.69	15-Aug-18	n/m	n/a	n/a	n/m
				30-Jul-19	3.08	3.18	97.51	n/d
				29-Jul-20	3.10	3.20	97.49	n/d
				14-Jul-21	3.12	3.22	97.47	n/d
				13-Apr-22	2.93	3.02	97.67	n/d
MW15-01	3.0 - 6.0	97.84	97.99	14-Aug-18	3.16	3.31	94.68	n/d
				29-Jul-19	2.35	2.49	95.50	n/d
				27-Jul-20	2.29	2.44	95.55	n/d
				13-Jul-21	2.24	2.39	95.60	n/d
				21-Mar-22	1.68	1.83	96.16	n/d
MW15-02	2.7 - 4.9	98.01	98.08	14-Aug-18	2.38	2.44	95.64	n/d
				29-Jul-19	2.50	2.57	95.51	n/d
				27-Jul-20	2.54	2.61	95.47	n/d
				13-Jul-21	2.50	2.57	95.51	n/d
				21-Mar-22	1.61	1.67	96.41	n/d
MW16-01	3.3 - 4.8	100.19	100.30	15-Aug-18	2.82	2.93	97.37	n/d
				30-Jul-19	2.88	2.99	97.31	n/d
				28-Jul-20	2.82	2.93	97.37	n/d
				14-Jul-21	2.90	3.00	97.29	n/d
				13-Apr-22	2.80	2.90	97.39	n/d
MW21-01	3.0 - 6.1	n/m	n/m	03-Dec-21	3.13	n/a	n/a	n/d
				21-Mar-22	2.70	n/a	n/a	n/d
MW21-02	3.0 - 6.1	n/m	n/m	03-Dec-21	2.61	n/a	n/a	n/d
				22-Mar-22	1.61	n/a	n/a	n/d
MW22-01	2.8 - 4.8	n/m	n/m	30-Mar-22	2.81	n/a	n/a	n/d
MW22-02	2.8 - 4.8	n/m	n/m	30-Mar-22	2.71	n/a	n/a	n/d

Notes:

[(a)] Elevations are relative to a local benchmark (centre of storm sewer catch basin approximately 5 m west of kiosk), with an assigned elevation of 100.00 m (exp. 2013).

< - less than

LNAPL - light non-aqueous phase liquid

m - metres

mbgs - metres below ground surface

mbtoc - metres below top of casing

mm - millimetres

n/a - not applicable

n/d - not detected

n/m - not measured

Table 2
Summary of Soil Analytical Results - Petroleum Hydrocarbons, n-Hexane and Lead
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

				Sample Location	**MW21-01**		**MW21-02**			**MW22-01[d]**		**MW22-02[d]**			
				Sample ID	MW21-01-03	MW21-01-04	MW21-02-03	MW21-02-04	DUPA	MW22-01-01	MW22-01-02	MW22-02-01	MW22-02-02	DUP A	
				BVL Sample ID	RHG798	RHG799	RHG800	RHG801	RHG802	SFF364	SFF365	SFF366	SFF367	SFF368	
				BVL Job Number	C1Y2874	C1Y2874	C1Y2874	C1Y2874	C1Y2874	C281791	C281791	C281791	C281791	C281791	
				Sample Date	01-Dec-21	01-Dec-21	01-Dec-21	01-Dec-21	01-Dec-21	26-Mar-22	26-Mar-22	26-Mar-22	26-Mar-22	26-Mar-22	
				Sample Depth (mbgs)	1.50 - 2.20	2.20 - 2.40	1.50 - 2.20	2.20 - 2.40	2.20 - 2.40	0.40 - 0.70	1.50 - 1.80	0.40 - 0.70	1.10 - 1.40	1.10 - 1.40	
Parameters	**Units**	**RDL**	**Criteria[a]**	**Criteria[b]**											
Benzene	µg/g	0.020	0.32	0.21	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	
Toluene	µg/g	0.020	68	2.3	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	
Ethylbenzene	µg/g	0.020	9.5	2	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	
Xylenes	µg/g	0.040	26	3.1	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	
F1 (C_6-C_{10}) - BTEX	µg/g	10	55[c]	55[c]	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	
F2 (C_{10}-C_{16})	µg/g	10	230	98	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	
F3 (C_{16}-C_{34})	µg/g	50	1,700	300	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	
F4 (C_{34}-C_{50})	µg/g	50	3,300	2,800	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	
n-Hexane	µg/g	0.50	46	2.8	<0.50	<0.50	<0.50	<0.50	<0.50	-	-	-	-	-	
Lead	µg/g	5.0	120	120	6.3	5.8	5.5	<5.0	<5.0	-	-	-	-	-	

Notes:

[a] O.Reg 153 (2011) Table 3 Full Depth Generic Site Condition Standards for industrial/commercial/community property use for coarse textured soil in a non-potable groundwater condition

[b] O.Reg 153 (2011) Table 3 Full Depth Generic Site Condition Standards for residential/parkland/institutional property use for coarse textured soil in a non-potable groundwater condition

[c] F1 fraction does not include BTEX; however, the proponent has the choice as to whether or not to subtract BTEX from the analytical result.

[d] Location compared to the Table 3 residential/parkland/institutional criteria

Bold/Underlined - value exceeds criteria/standard

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3 and 4

mbgs - metres below ground surface

O.Reg. - Ontario Regulation

RDL - reportable detection limit

µg/g - micrograms per gram

- not available

> - greater than

< - less than

Table 3
Summary of Groundwater Analytical Results - Petroleum Hydrocarbons and Dissolved Lead
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

			Sample Location	**MW15-01**	**MW15-02**	**MW16-01**	**MW21-01**			**MW21-02**	
			Sample ID	MW15-01	MW15-02	MW16-01	MW21-01	DUP A	MW21-01	MW21-02	MW21-02
			BVL Sample ID	SEM995	SEM996	SJU500	RHJ392	RHJ394	SEM989	RHJ393	SEM990
			BVL Job Number	C278945	C278945	C2A2236	C1Y3398	C1Y3398	C278945	C1Y3398	C278945
			Sample Date	21-Mar-22	21-Mar-22	14-Apr-22	03-Dec-21	03-Dec-21	21-Mar-22	03-Dec-21	22-Mar-22
Parameters	**Units**	**RDL**	**Criteria[a]**								
Benzene	µg/L	0.20	44	<0.20	<0.20	**59**	<0.20	<0.20	<0.20	<0.20	<0.20
Toluene	µg/L	0.20	18,000	<0.20	<0.20	7.9	<0.20	<0.20	<0.20	<0.20	<0.20
Ethylbenzene	µg/L	0.20	2,300	<0.20	<0.20	75	<0.20	<0.20	<0.20	<0.20	<0.20
Xylenes	µg/L	0.40	4,200	<0.40	<0.40	230	<0.40	<0.40	<0.40	<0.40	<0.40
F1 (C_6-C_{10}) - BTEX	µg/L	25	750[b]	<25	<25	530	<25	<25	<25	<25	<25
F2 (C_{10}-C_{16})	µg/L	100	150	<100	<100	**220**	<100	<100	<100	<100	<100
F3 (C_{16}-C_{34})	µg/L	200	500	<200	<200	330	<200	<200	<200	<200	<200
F4 (C_{34}-C_{50})	µg/L	200	500	<200	<200	<200	<200	<200	<200	<200	<200
Lead	µg/L	0.50	25	0.62	<0.50	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50

Notes:

[a] O.Reg 153 (2011) O.Reg 153 (2011) Table 3 Full Depth Generic Site Condition Standards for all types of property use for groundwater in coarse textured soil in a non-potable ground water condition

[b] F1 fraction does not include BTEX; however, the proponent has the choice as to whether or not to subtract BTEX from the analytical result.

Bold/Underlined - value exceeds criteria/standard

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3 and 4

RDL - reportable detection limit

µg/L - micrograms per litre

< - less than

Table 3
Summary of Groundwater Analytical Results - Petroleum Hydrocarbons and Dissolved Lead
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

			Sample Location	**MW22-01**	**MW22-02**	**TH3**	**TH4**	**TH6**		**TH7**	**TH8**
			Sample ID	MW22-01	MW22-02	TH3	TH4	TH6	DUP A	TH7	TH8
			BVL Sample ID	SGC324	SGC325	SEM991	SEM992	SEM993	SEM997	SEM994	SJU499
			BVL Job Number	C285750	C285750	C278945	C278945	C278945	C278945	C278945	C2A2236
			Sample Date	30-Mar-22	30-Mar-22	22-Mar-22	22-Mar-22	21-Mar-22	21-Mar-22	21-Mar-22	13-Apr-22
Parameters	**Units**	**RDL**	**Criteria[a]**								
Benzene	µg/L	0.20	44	<0.20	<0.20	18	21	<0.20	<0.20	4.0	3.4
Toluene	µg/L	0.20	18,000	<0.20	<0.20	<0.20	1.6	<0.20	<0.20	<0.20	0.31
Ethylbenzene	µg/L	0.20	2,300	<0.20	<0.20	18	370	<0.20	<0.20	<0.20	3.4
Xylenes	µg/L	0.40	4,200	<0.40	<0.40	2.4	390	<0.40	<0.40	<0.40	0.47
F1 (C_6-C_{10}) - BTEX	µg/L	25	750[b]	<25	<25	590	**2,800**	<25	<25	35	130
F2 (C_{10}-C_{16})	µg/L	100	150	<100	<100	150	**2,300**	<100	<100	<100	110
F3 (C_{16}-C_{34})	µg/L	200	500	<200	230	<200	380	<200	<200	<200	**590**
F4 (C_{34}-C_{50})	µg/L	200	500	<200	<200	<200	270	<200	<200	<200	380
Lead	µg/L	0.50	25	<0.50	<0.50	1.5	21	<0.50	<0.50	<0.50	1.8

Notes:

[a] O.Reg 153 (2011) O.Reg 153 (2011) Table 3 Full Depth Generic Site Condition Standards for all types of property use for groundwater in coarse textured soil in a non-potable ground water condition

[b] F1 fraction does not include BTEX; however, the proponent has the choice as to whether or not to subtract BTEX from the analytical result.

Bold/Underlined - value exceeds criteria/standard

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3 and 4

RDL - reportable detection limit

µg/L - micrograms per litre

< - less than

Table 3
Summary of Groundwater Analytical Results - Petroleum Hydrocarbons and Dissolved Lead
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

			Sample Location	**TH9**	**TH11**	**TH100**		**TH101**	**TH102**
			Sample ID	TH9	TH11	TH100	DUP A	TH101	TH102
			BVL Sample ID	SJU504	SJU501	SJU498	SJU505	SJU502	SJU503
			BVL Job Number	C2A2236	C2A2236	C2A2236	C2A2236	C2A2236	C2A2236
			Sample Date	13-Apr-22	14-Apr-22	13-Apr-22	13-Apr-22	13-Apr-22	13-Apr-22
Parameters	**Units**	**RDL**	**Criteria[a]**						
Benzene	µg/L	0.20	44	0.21	**46**	<0.20	<0.20	1.8	4.1
Toluene	µg/L	0.20	18,000	<0.20	6.5	<0.20	<0.20	0.45	0.48
Ethylbenzene	µg/L	0.20	2,300	0.22	170	<0.20	<0.20	84	10
Xylenes	µg/L	0.40	4,200	<0.40	160	<0.40	<0.40	2.5	2.3
F1 (C_6-C_{10}) - BTEX	µg/L	25	750[b]	<25	**1,300**	<25	<25	**940**	450
F2 (C_{10}-C_{16})	µg/L	100	150	<100	**1,100**	<100	<100	**350**	<100
F3 (C_{16}-C_{34})	µg/L	200	500	<200	**740**	<200	<200	<200	<200
F4 (C_{34}-C_{50})	µg/L	200	500	<200	500	<200	<200	<200	<200
Lead	µg/L	0.50	25	<2.5	7.6	<0.50	<2.5	1.0	1.8

Notes:

[a] O.Reg 153 (2011) O.Reg 153 (2011) Table 3 Full Depth Generic Site Condition Standards for all types of property use for groundwater in coarse textured soil in a non-potable ground water condition

[b] F1 fraction does not include BTEX; however, the proponent has the choice as to whether or not to subtract BTEX from the analytical result.

Bold/Underlined - value exceeds criteria/standard

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3 and 4

RDL - reportable detection limit

µg/L - micrograms per litre

< - less than

Table 4
Field Screening and Leak Test Measurements
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Sampling Location	Sampling Date	Organic Vapour Concentration (ppbv)	Methane Concentration (%)	Carbon dioxide Concentration (%)	Oxygen Concentration (%)	Helium Concentration Inside Shroud (ppm or %)	Helium Concentration in Probe (ppm or %)	Helium Ratio of Below Grade/Shroud Concentration (%)	Pass Leak Test[(a)] (Y/N)
SV21-01	10-Dec-21	0	0.0	0.1	21.2	Leak testing could not be completed due to the probe valve being bypassed			
		5	0.0	3.4	18.2				
		0	0.0	4.1	17.6				
SV21-02	09-Dec-21	5	0.1	0.4	20.2	Leak testing could not be completed due to the probe valve being bypassed			
		7	0.1	2.0	19.4				
		6	0.1	2.5	19.2				
SV21-03	09-Dec-21	42	0	3.1	17.3	Leak testing could not be completed due to the probe valve being bypassed			
		25	0	3.2	17.3				
		35	0	3.1	17.6				
SV16-01	09-Dec-21	5	0.1	4.0	18.9	Leak testing could not be completed due to the probe valve being bypassed			
		21	0.1	0.2	19.4				
		9	0.1	4.0	17.6				
SV16-02	09-Dec-21	35	0.1	4.5	18.8	Leak testing could not be completed due to the probe valve being bypassed			
		16	0.1	4.6	18.5				
		16	0.1	4.5	18.2				

Notes:

[(a)] A leak test passes if the helium ratio of below grade to shroud concentration is less than 1%

ppbv - parts per billion by volume

ppmv - parts per million by volume

> - greater than

< - less than

% v/v - percent volume by volume

Table 5
Summary of Soil Vapour Analytical Results - Petroleum Hydrocarbons
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

				Sample Location	**SV16-01**		**SV16-02**	**SV21-01**	**SV21-02**	**SV21-03**
				Sample ID	SV16-01	DUP A	SV16-02	SV21-01	SV21-02	SV21-03
				BVL Sample ID	RIC797	RIC798	RIC799	RIC800	RIC795	RIC796
				BVL Job Number	C1Y6956	C1Y6956	C1Y6956	C1Y6956	C1Y6956	C1Y6956
				Sample Date	09-Dec-21	09-Dec-21	09-Dec-21	10-Dec-21	09-Dec-21	09-Dec-21
Parameters	**Units**	**RDL**	**Criteria[a]**	**Criteria[b]**						
Benzene	µg/m^3	0.32	0.51	25	<0.32	<0.32	<0.32	0.44	<0.32	<0.32
Toluene	µg/m^3	0.38	1,043	52,143	<0.38	<0.38	0.40	0.39	1.16	<0.38
Ethylbenzene	µg/m^3	0.43	209	10,429	<0.43	<0.43	<0.43	<0.43	<0.43	<0.43
Xylenes, Total	µg/m^3	1.3	146	7,300	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3
F1-BTEX, C_6-C_{10} (as Toluene)	µg/m^3	5.0	2,491	124,530	19.3	23.8	17.8	70.4	49.0	165
F2, C_{10}-C_{16} (as Decane)	µg/m^3	5.0	471	23,530	53.8	50.2	23.0	29.3	39.6	77.9

Notes:

[a] Health-Based Indoor Air Criteria - Residential, provided by MOECC Modified Generic Risk Assessment (Tier 2), Spreadsheet Model (November 2016).

[b] SVSLs for residential land use calculated by dividing Health-Based Indoor Air Criteria by an attenuation factor of 0.02.

Bold/Underlined - value exceeds SVSL criteria

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2 - petroleum hydrocarbon fractions 1, 2

RDL - reportable detection limit

SVSL - soil vapour screening level

µg/m^3 - micrograms per cubic metre

< - less than

Table 6
Summary of Soil Vapour Analytical Results - Volatile Organic Compounds
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

				Sample Location	**SV16-01**		**SV16-02**	**SV21-01**	**SV21-02**	**SV21-03**
				Sample ID	SV16-01	DUP A	SV16-02	SV21-01	SV21-02	SV21-03
				BVL Sample ID	RIC797	RIC798	RIC799	RIC800	RIC795	RIC796
				BVL Job Number	C1Y6956	C1Y6956	C1Y6956	C1Y6956	C1Y6956	C1Y6956
				Sample Date	09-Dec-21	09-Dec-21	09-Dec-21	10-Dec-21	09-Dec-21	09-Dec-21
Parameters	**Units**	**RDL**	**Criteria[a]**	**Criteria[b]**						
Benzyl chloride	µg/m^3	2.6	n/s	n/s	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6
Bromodichloromethane	µg/m^3	1.3	n/s	n/s	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3
Bromoform	µg/m^3	2.1	n/s	n/s	<2.1	<2.1	<2.1	<2.1	<2.1	<2.1
Bromomethane	µg/m^3	0.39	1.04	52.14	<0.39	<0.39	<0.39	<0.39	<0.39	<0.39
1,3-Butadiene	µg/m^3	1.1	n/s	n/s	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1
Carbon Disulfide	µg/m^3	1.6	n/s	n/s	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6
Carbon Tetrachloride	µg/m^3	0.63	0.42	20.86	<0.63	<0.63	<0.63	<0.63	<0.63	<0.63
Chlorobenzene	µg/m^3	0.46	209	10,429	<0.46	<0.46	<0.46	<0.46	<0.46	<0.46
Chloroethane	µg/m^3	0.79	n/s	n/s	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79
Chloroform	µg/m^3	0.49	20.86	1,043	<0.49	<0.49	3.69	<0.49	22.8	<0.49
Chloromethane	µg/m^3	0.62	n/s	n/s	<0.62	<0.62	0.96	<0.62	0.68	0.64
Cyclohexane	µg/m^3	0.69	n/s	n/s	<0.69	<0.69	<0.69	<0.69	<0.69	0.89
Dibromochloromethane	µg/m^3	1.7	n/s	n/s	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7
1,2-Dibromoethane (Ethylene Dibromide)	µg/m^3	0.77	0.17	8.34	<0.77	<0.77	<0.77	<0.77	<0.77	<0.77
1,2-Dichlorobenzene	µg/m^3	0.60	125	6,257	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60
1,3-Dichlorobenzene	µg/m^3	2.4	n/s	n/s	<2.4	<2.4	<2.4	<2.4	<2.4	<2.4
1,4-Dichlorobenzene	µg/m^3	0.60	0.28	13.90	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60
Dichlorodifluoromethane (FREON 12)	µg/m^3	0.99	n/s	n/s	11.0	11.6	3.15	5.53	2.31	3.52
1,1-Dichloroethane	µg/m^3	0.40	34.41	1,721	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
1,2-Dichloroethane	µg/m^3	0.40	0.04	2.14	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
1,1-Dichloroethylene	µg/m^3	0.40	14.60	730	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
cis-1,2-Dichloroethylene	µg/m^3	0.40	31.29	1,564	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
trans-1,2-Dichloroethylene	µg/m^3	0.40	12.51	626	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
1,2-Dichloropropane	µg/m^3	0.46	0.83	41.71	<0.46	<0.46	<0.46	<0.46	<0.46	<0.46
cis-1,3-Dichloropropene	µg/m^3	0.45	0.28	13.90	<0.45	<0.45	<0.45	<0.45	<0.45	<0.45
trans-1,3-Dichloropropene	µg/m^3	0.45	0.28	13.90	<0.45	<0.45	<0.45	<0.45	<0.45	<0.45
1,2-Dichlorotetrafluoroethane	µg/m^3	1.2	n/s	n/s	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2
1,4-Dioxane	µg/m^3	3.6	751	37,543	<3.6	<3.6	<3.6	<3.6	<3.6	<3.6
Ethanol (ethyl alcohol)	µg/m^3	1.9	n/s	n/s	2.5	<1.9	3.6	2.2	3.5	3.6
Ethyl Acetate	µg/m^3	3.6	n/s	n/s	<3.6	<3.6	<3.6	<3.6	<3.6	<3.6
4-ethyltoluene	µg/m^3	2.5	n/s	n/s	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
Heptane	µg/m^3	1.2	n/s	n/s	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2
Hexachlorobutadiene	µg/m^3	5.3	0.05	2.53	<5.3[c]	<5.3[c]	<5.3[c]	<5.3[c]	<5.3[c]	<5.3[c]
Hexane	µg/m^3	0.7	521	26,071	<0.70	<0.70	<0.70	5.60	<0.70	1.84

Notes:

[a] Health-Based Indoor Air Criteria - Residential, provided by MOECC Modified Generic Risk Assessment (Tier 2), Spreadsheet Model (November 2016).

[b] SVSLs for a residential building with basement (probe depth 0 - 30 centimetres below base of the building foundation) calculated by dividing Health-Based Indoor Air Criteria by an attenuation factor of 0.02.

[c] RDL greater than SVSL

Bold/Underlined - value exceeds SVSL criteria

BVL - Bureau Veritas Laboratories

MOECC - Ministry of the Environment and Climate Change

n/s - no standard

RDL - reportable detection limit

SVSL - soil vapour screening level

µg/m^3 - micrograms per cubic metre

< - less than

Table to be read in conjunction with Laboratory Certificate of Analysis

Table 6
Summary of Soil Vapour Analytical Results - Volatile Organic Compounds
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

				Sample Location	**SV16-01**		**SV16-02**	**SV21-01**	**SV21-02**	**SV21-03**
				Sample ID	SV16-01	DUP A	SV16-02	SV21-01	SV21-02	SV21-03
				BVL Sample ID	RIC797	RIC798	RIC799	RIC800	RIC795	RIC796
				BVL Job Number	C1Y6956	C1Y6956	C1Y6956	C1Y6956	C1Y6956	C1Y6956
				Sample Date	09-Dec-21	09-Dec-21	09-Dec-21	10-Dec-21	09-Dec-21	09-Dec-21
Parameters	**Units**	**RDL**	**Criteria[a]**	**Criteria[b]**						
Methyl Butyl Ketone (2-Hexanone)	µg/m^3	4.1	n/s	n/s	<4.1	<4.1	<4.1	<4.1	<4.1	<4.1
Methyl Ethyl Ketone (2-Butanone)	µg/m^3	2.9	1,003	50,137	<0.59	<0.59	1.21	1.38	<0.91	<0.59
Methyl Isobutyl Ketone	µg/m^3	4.1	602	30,082	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82
Methyl t-butyl ether (MTBE)	µg/m^3	0.72	4.28	214	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72
Methylene Chloride(Dichloromethane)	µg/m^3	2.8	48.36	2,418	<2.1	<2.1	<2.1	<2.1	<2.1	<2.1
Naphthalene	µg/m^3	1	0.77	38.60	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2-propanol (Isopropanol)	µg/m^3	2.5	n/s	n/s	<2.5	<2.5	<2.5	47.0	<2.5	<2.5
2-Propanone (Acetone)	µg/m^3	1.9	2,503	125,143	4.3	3.5	8.6	11.4	6.4	6.8
Propene (Propylene)	µg/m^3	0.86	n/s	n/s	<0.86	<0.86	<0.86	196	<7.1	<3.6
Styrene	µg/m^3	0.43	54.23	2,711	<0.43	<0.43	<0.43	<0.43	<0.43	<0.43
1,1,1,2-Tetrachloroethane	µg/m^3	0.69	0.15	7.51	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69
1,1,2,2-Tetrachloroethane	µg/m^3	0.69	0.02	0.96	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69
Tetrachloroethylene	µg/m^3	0.68	4.28	214	<0.68	0.68	0.72	6.54	2.76	4.01
Tetrahydrofuran	µg/m^3	1.2	n/s	n/s	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2
1,2,4-Trichlorobenzene	µg/m^3	3.7	1.67	83.43	<3.7	<3.7	<3.7	<3.7	<3.7	<3.7
1,1,1-Trichloroethane	µg/m^3	0.55	209	10,429	<0.55	<0.55	<0.55	<0.55	<0.55	<0.55
1,1,2-Trichloroethane	µg/m^3	0.55	0.07	3.48	<0.55	<0.55	<0.55	<0.55	<0.55	<0.55
Trichloroethylene	µg/m^3	0.54	0.27	13.56	11.4	12.3	<0.54	<0.54	<0.54	<0.54
Trichlorofluoromethane (FREON 11)	µg/m^3	1.1	n/s	n/s	<1.1	<1.1	1.1	<1.1	<1.1	<1.1
Trichlorotrifluoroethane (FREON 113)	µg/m^3	1.2	n/s	n/s	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2
1,2,4-Trimethylbenzene	µg/m^3	2.5	n/s	n/s	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
1,3,5-Trimethylbenzene	µg/m^3	2.5	n/s	n/s	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
2,2,4-Trimethylpentane	µg/m^3	0.93	n/s	n/s	<0.93	<0.93	<0.93	<0.93	<0.93	<0.93
Vinyl Acetate	µg/m^3	0.70	n/s	n/s	<0.70	<0.70	<0.70	<0.70	<0.70	<0.70
Vinyl Bromide	µg/m^3	0.87	n/s	n/s	<0.87	<0.87	<0.87	<0.87	<0.87	<0.87
Vinyl Chloride	µg/m^3	0.26	0.13	6.32	<0.26	<0.26	<0.26	<0.26	<0.26	<0.26

Notes:

[a] Health-Based Indoor Air Criteria - Residential, provided by MOECC Modified Generic Risk Assessment, Approved Model (November 1, 2016)

[b] SVSLs for a residential building with basement (probe depth 0 - 30 centimetres below base of the building foundation) calculated by dividing Health-Based Indoor Air Criteria by an attenuation factor of 0.02.

[c] RDL greater than SVSL

Bold/Underlined - value exceeds SVSL criteria

BVL - Bureau Veritas Laboratories

MOECC - Ministry of the Environment and Climate Change

n/s - no standard

RDL - reportable detection limit

SVSL - soil vapour screening level

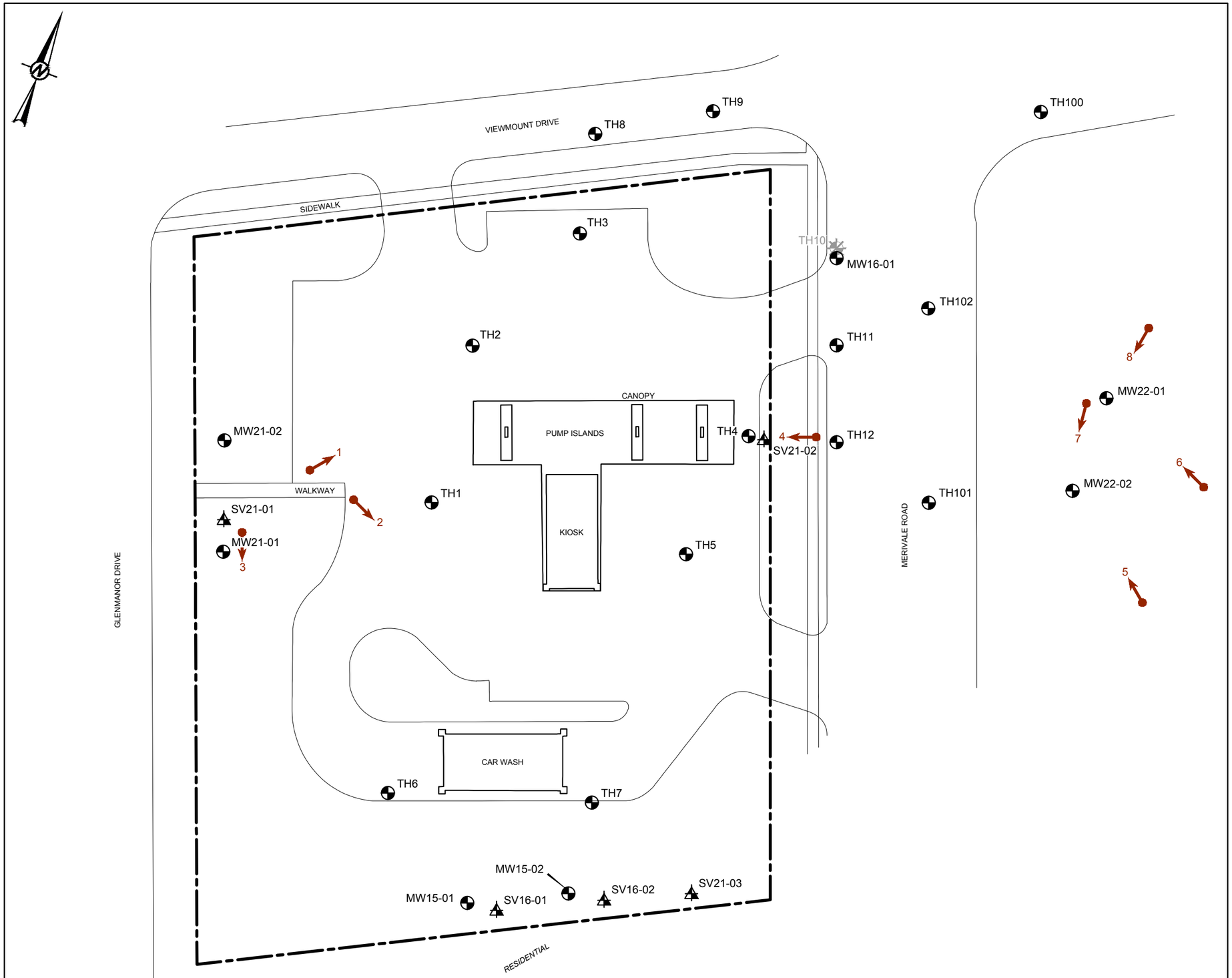
µg/m^3 - micrograms per cubic metre

< - less than

Table to be read in conjunction with Laboratory Certificate of Analysis

APPENDIX A

Photographs



LEGEND

- PROPERTY BOUNDARY
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL (DECOMMISSIONED)
- SOIL VAPOUR PROBE LOCATION
- PHOTOGRAPH LOCATION AND DIRECTION

REFERENCE

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No.: 11010-SITE PLAN ONSITE-JUN14; SCALE: UNKNOWN; DATE: JUNE 2014.

0 10 20
1:500 METRES

CLIENT
IMPERIAL OIL LIMITED

PROJECT
FORMER RETAIL FUEL OUTLET
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
PHOTOGRAPH LOCATIONS

CONSULTANT
WSP GOLDER

YYYY-MM-DD	2022-06-30
DESIGNED	SMoloughney
PREPARED	KWray
REVIEWED	CVettotazzo
APPROVED	RMungal

PROJECT NO.	PHASE-TASK	REV.	FIGURE
21506016	1155-2216	0	A.1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25 mm

Path: \\golder.gds\gal\Calgary\CAL\MCAD\IMPERIAL_OIL\DOWNSTREAM\OTTAWA_ON_1660_MERIVALE_ROAD\99_PROJECTS\21506016\02_PRODUCTION\1155-2216\ONSITE\DWG\ | File Name: 21506016-1155-HS-0009.dwg | Last Edited By: pricord Date: 2022-06-30 Time:2:17:42 PM | Printed By: KWray Date: 2022-06-30 Time:2:20:22 PM



Photo 1 – Photo taken from the west side of the Site, looking northeast (March 21, 2022).



Photo 2 – Photo taken from the west side of the Site, looking east (March 21, 2022).

CLIENT	**Imperial Oil Limited**
CONSULTANT	WSP GOLDER
DATE	June 2022
PREPARED	SM
REVIEWED	IS
PROJECT	**1660 Merivale Road, Ottawa, Ontario**
TITLE	**Photographic Document**
PROJECT NO.	**21506016-1155**



Photo 3 – Photo taken from the west side of the Site, looking southeast (March 21, 2022).



Photo 4 – Photo taken from the east boundary of the Site, looking southwest (March 21, 2022).

CLIENT
Imperial Oil Limited

CONSULTANT

wsp GOLDER

DATE	June 2022
PREPARED	SM
REVIEWED	IS

PROJECT
1660 Merivale Road, Ottawa, Ontario

TITLE
Photographic Document

PROJECT NO. **21506016-1155**



Photo 5 – Photo showing the hydro-vac excavating of MW22-02, looking northwest (March 26, 2022).



Photo 6 – Photo showing the drilling of MW22-01, looking northwest (March 26, 2022).



Photo 7 – Photo showing the drilling set up at MW22-02, looking south (March 26, 2022).



Photo 8 – Photo showing the completed monitoring wells (MW22-01 and MW22-02), looking south (March 26, 2022).

CLIENT
Imperial Oil Limited

CONSULTANT

WSP GOLDER

DATE	June 2022
PREPARED	SM
REVIEWED	IS

PROJECT
1660 Merivale Road, Ottawa, Ontario

TITLE
Photographic Document

PROJECT NO. **21506016-1155**

APPENDIX B

MECP Well Record

Ontario — Ministry of the Environment, Conservation and Parks

Well Record

...lation 903 Ontario Water Resources Act

Measurements recorded in: ☑ Metric ☐ Imperial

Well Tag No. (Place Sticker ...) A342631 Tag#:A342631

5-27953 Page ____ of ____

Well Owner's Information

First Name	Last Name/Organization	E-mail Address	☐ Well Constructed by Well Owner
	Imperial Oil Ltd		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
505 Quarry Park Blvd. SE.	Calgary	AB	T2C5N1	

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
1660 Merivale Rd			

County/District/Municipality	City/Town/Village	Province	Postal Code
	Ottawa	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	18	442803	5021342		

Overburden and Bedrock Materials/Abandonment Sealing Record (see instructions on the back of this form)

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
GRY	gravel backfill		loose	0	1.52
BRN	clay	silt	soft	1.52	2.13
GRY	shale		layered	2.13	6.1

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	.31	concrete/ Grout mixture	
.31	2.74	bentonite	
2.74	6.1	filter sand	

Method of Construction

☐ Cable Tool ☐ Diamond
☐ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☐ Driving
☑ Boring ☐ Digging
☑ Air percussion
☐ Other, specify ____

Well Use

☐ Public ☐ Commercial ☐ Not used
☐ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☑ Test Hole ☑ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ Other, specify ____

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
5.20	PVC	.390	0	3.1

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
6.03	PVC	#0	3.1	6.1

Status of Well

☐ Water Supply
☑ Replacement Well
☑ Test Hole
☐ Recharge Well
☑ Dewatering Well
☑ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, specify
☐ Other, specify

Water Details

Water found at Depth (m/ft) ☐ Gas	Kind of Water: ☐ Fresh ☐ Untested ☐ Other, specify
Water found at Depth (m/ft) ☐ Gas	Kind of Water: ☐ Fresh ☐ Untested ☐ Other, specify
Water found at Depth (m/ft) ☐ Gas	Kind of Water: ☐ Fresh ☐ Untested ☐ Other, specify

Hole Diameter

Depth (m/ft) From	Depth (m/ft) To	Diameter (cm/in)
0	3.1	11.43
3.1	6.1	8.89

Results of Well Yield Testing

After test of well yield, water was:
☐ Clear and sand free
☐ Other, specify ____

If pumping discontinued, give reason

Pump intake set at (m/ft)

Pumping rate (l/min / GPM)

Duration of pumping ____ hrs + ____ min

Final water level end of pumping (m/ft)

If flowing give rate (l/min/GPM)

Recommended pump depth (m/ft)

Recommended pump rate (l/min/GPM)

Well production (l/min/GPM)

Disinfected? ☐ Yes ☐ No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level				
1			1	
2			2	
3			3	
4			4	
5			5	
10			10	
15			15	
20			20	
25			25	
30			30	
40			40	
50			50	
60			60	

Map of Well Location

Please provide a map below following instructions on the back.

See Map MW1

Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Strata Drilling Group	7241

Business Address (Street Number/Name)	Municipality	Province	Postal Code	Business E-mail Address
129 Ringwood Dr.	Stouffville	ON	L4A8C1	wrecord@strataeng.com

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)	Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
9059407919	McCoy, James	7107		2021/12/16

Well owner's information package delivered ☐ Yes ☐ No

Date Package Delivered: Y Y Y Y M M D D

Date Work Completed: 2021/12/01

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Audit No. Z379360

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Ontario — Ministry of the Environment, Conservation and Parks

Well Record

Regulation 903 Ontario Water Resources Act

Measurements recorded in: ☑ Metric ☐ Imperial

Well Tag No. (Place Sticker and/or Print Below) A342634 Tag#:A342634

Page ____ of ____

Well Owner's Information

First Name	Last Name/Organization	E-mail Address	☐ Well Constructed by Well Owner
	Imperial Oil Ltd		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
505 Quarry Park Blvd. SE	Calgary	AB	T2C5N1	

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
1660 Merivale Rd			

County/District/Municipality	City/Town/Village	Province	Postal Code
	Ottawa	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	18	442817	5027367		

Overburden and Bedrock Materials/Abandonment Sealing Record (see instructions on the back of this form)

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
GRY	gravel backfill		loose	0	.31
BRN	clay	silt	soft	.31	2.13
GRY	shale		layered	2.13	6.1

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m^3/ft^3)
0	.31	concrete/grout mix	
.31	2.74	bentonite	
2.74	6.1	filter sand	

Method of Construction

☐ Cable Tool ☐ Diamond
☐ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☐ Driving
☐ Boring ☐ Digging
☑ Air percussion
☐ Other, specify ____

Well Use

☐ Public ☐ Commercial ☐ Not used
☐ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☑ Test Hole ☑ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ Other, specify ____

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
5.20	PVC	.390	0	3.1

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
6.03	PVC	10	3.1	6.1

Status of Well

☐ Water Supply
☑ Replacement Well
☐ Test Hole
☐ Recharge Well
☑ Dewatering Well
☑ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, specify
☐ Other, specify

Water Details

Water found at Depth (m/ft)	Gas	Kind of Water: Fresh	Untested	Other, specify
	☐	☐	☐	☐
	☐	☐	☐	☐
	☐	☐	☐	☐

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)
0	3.1	11.43
3.1	6.1	8.89

Results of Well Yield Testing

After test of well yield, water was: ☐ Clear and sand free ☐ Other, specify ____

If pumping discontinued, give reason:

Pump intake set at (m/ft)

Pumping rate (l/min / GPM)

Duration of pumping ____ hrs + ____ min

Final water level end of pumping (m/ft)

If flowing give rate (l/min/GPM)

Recommended pump depth (m/ft)

Recommended pump rate (l/min/GPM)

Well production (l/min/GPM)

Disinfected? ☐ Yes ☐ No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level				
1			1	
2			2	
3			3	
4			4	
5			5	
10			10	
15			15	
20			20	
25			25	
30			30	
40			40	
50			50	
60			60	

Map of Well Location

Please provide a map below following instructions on the back.

see Map MW2

Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Strata Drilling Group	7241

Business Address (Street Number/Name)	Municipality
129 Ringwood Dr.	Stouffville

Province	Postal Code	Business E-mail Address
ON	L4A8C1	wrecords@stratasoil.com

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
9059407919	McKay James

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
7107		2021/12/16

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☐ Yes ☐ No		2021/12/09

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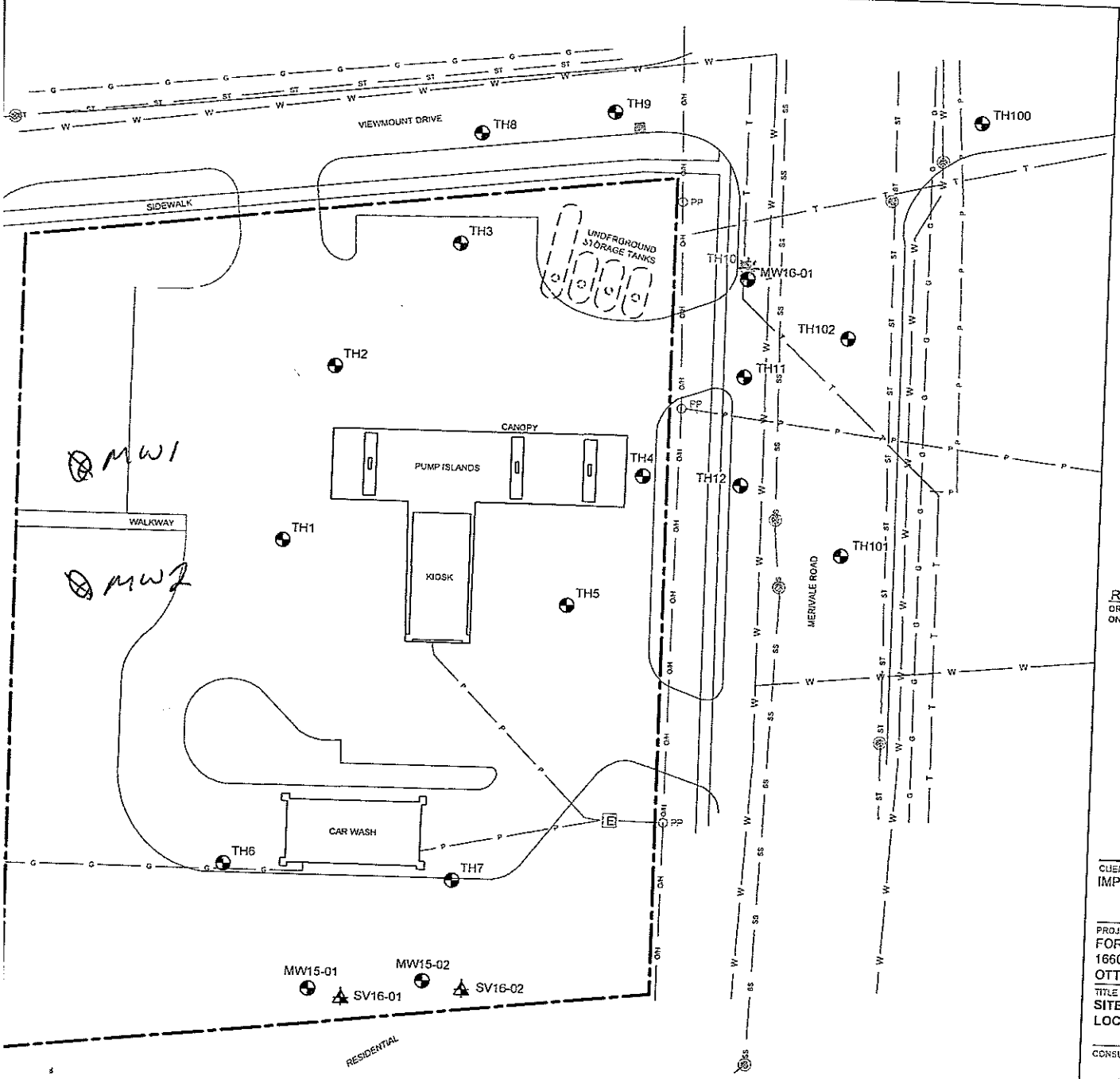

LEGEND

- PROPERTY BOUNDARY
- OH — OVERHEAD POWER LINE
- G — UNDERGROUND GAS LINE
- P — UNDERGROUND POWER LINE
- SS — UNDERGROUND SANITARY LINE
- ST — UNDERGROUND STORM SEWER LINE
- T — UNDERGROUND TELEPHONE LINE
- W — UNDERGROUND WATERLINE
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL (DECOMMISSIONED)
- SOIL VAPOUR PROBE LOCATION
- CATCH BASIN
- ELECTRICAL PEDESTAL
- MANHOLE
- PP — POWER POLE

REFERENCE

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No.: 11010-SITE PLAN ONSITE-JUN14; SCALE: UNKNOWN; DATE: JUNE 2014.

0 10 20
1:500 METRES

CLIENT
IMPERIAL OIL LIMITED

PROJECT
FORMER RETAIL FUEL OUTLET
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
SITE PLAN WITH MONITORING WELL AND SOIL VAPOUR LOCATIONS

CONSULTANT
GOLDER
MEMBER OF WSP

YYYY-MM-DD	2021-09-09
DESIGNED	PRicard
PREPARED	PRicard
REVIEWED	tSosney
APPROVED	RMungal

PROJECT NO.	PHASE-TASK	REV.	FIGURE
20447743	1155-2116	0	2

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET HAS BEEN MODIFIED FROM ANSI B

Ontario — Ministry of the Environment, Conservation and Parks

Well Record

Regulation 903 Ontario Water Resources Act

Measurements recorded in: ☐ Metric ☑ Imperial

Well Tag No. (Place Sticker and/or Print Below) A342620

5-28506

Page ____ of ____

Well Owner's Information

First Name	Last Name/Organization	E-mail Address	☐ Well Constructed by Well Owner
	Imperial Oil		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
505 Quarry Park Blvd SE	Calgary	AB	T2C5N1	

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
1755 Merivale rd			

County/District/Municipality	City/Town/Village	Province	Postal Code
	Ottawa	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	18	442903	5021374		

Overburden and Bedrock Materials/Abandonment Sealing Record (see instructions on the back of this form)

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
Grey	Gravel	Sand	loose	0	7
Grey	limestone		layered	7	16

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m^3/ft^3)
0	1	flushmount/Concrete	
1	8	Bentonite	
8	16	Sand	

Method of Construction

☐ Cable Tool ☐ Diamond
☐ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☐ Driving
☐ Boring ☐ Digging
☑ Air percussion
☐ Other, specify ____

Well Use

☐ Public ☐ Commercial ☐ Not used
☐ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☑ Test Hole ☐ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ Other, specify ____

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
2047	PVC	0.154	0	9

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
2375	PVC	10	9	16

Status of Well

☐ Water Supply
☐ Replacement Well
☐ Test Hole
☐ Recharge Well
☐ Dewatering Well
☑ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, specify
☐ Other, specify

Water Details

Water found at Depth (m/ft)	Gas	Kind of Water: ☐ Fresh ☐ Untested ☐ Other, specify
Water found at Depth (m/ft)	Gas	Kind of Water: ☐ Fresh ☐ Untested ☐ Other, specify
Water found at Depth (m/ft)	Gas	Kind of Water: ☐ Fresh ☐ Untested ☐ Other, specify

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)
0	8 ft	4.5
8	16	3.5

Results of Well Yield Testing

After test of well yield, water was:
☐ Clear and sand free
☐ Other, specify ____

If pumping discontinued, give reason:

Pump intake set at (m/ft)

Pumping rate (l/min / GPM)

Duration of pumping ____ hrs + ____ min

Final water level end of pumping (m/ft)

If flowing give rate (l/min/GPM)

Recommended pump depth (m/ft)

Recommended pump rate (l/min/GPM)

Well production (l/min/GPM)

Disinfected? ☐ Yes ☐ No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level				
1			1	
2			2	
3			3	
4			4	
5			5	
10			10	
15			15	
20			20	
25			25	
30			30	
40			40	
50			50	
60			60	

Map of Well Location

Please provide a map below following instructions on the back.

See Map

MW-1

Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Strata Drilling Group	7141

Business Address (Street Number/Name)	Municipality
129 Ringwood	Stouffville

Province	Postal Code	Business E-mail Address
ON	L4A8C1	Wrecords@strata-soil.com

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
9059407719	Beaty, Brian

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
3616		2022041 3

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☐ Yes ☐ No		2022 03 26

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Audit No. Z379468

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Well Record

Regulation 903 Ontario Water Resources Act

Measurements recorded in: ☐ Metric ☑ Imperial

Well Tag No. (Place Sticker and/or Print Below): A342619

Page ____ of ____

Well Owner's Information

First Name	Last Name/Organization	E-mail Address	☐ Well Constructed by Well Owner
	Imperial Oil		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
505 Quarry Park Blvd SE	Calgary	AB	T2C5N1	

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
1755 Merivale rd			

County/District/Municipality	City/Town/Village	Province	Postal Code
	Ottawa	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	18	442900	5021386		

Overburden and Bedrock Materials/Abandonment Sealing Record (see instructions on the back of this form)

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
Cmy	Gravel	Sand	loose	0	7
Cmy	limestone		layered	7	16

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m^3/ft^3)
0	1	flushmount/Concrete	
1	8	Bentonite	
8	16	Sand	

Method of Construction

☐ Cable Tool ☐ Diamond
☐ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☐ Driving
☐ Boring ☐ Digging
☒ Air percussion
☐ Other, specify ____

Well Use

☐ Public ☐ Commercial ☐ Not used
☐ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☒ Test Hole ☒ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ Other, specify ____

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
2.047	PVC	0.154	0	9

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
2.375	PVC	10	9	16

Status of Well

☐ Water Supply
☐ Replacement Well
☐ Test Hole
☐ Recharge Well
☐ Dewatering Well
☒ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, specify ____
☐ Other, specify ____

Water Details

Water found at Depth (m/ft)	Gas	Kind of Water: ☐ Fresh ☐ Untested ☐ Other, specify
	☐	
	☐	
	☐	

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)
0	8	4.5
8	16	3.5

Results of Well Yield Testing

After test of well yield, water was:
☐ Clear and sand free
☐ Other, specify ____

If pumping discontinued, give reason:

Pump intake set at (m/ft)

Pumping rate (l/min / GPM)

Duration of pumping ____ hrs + ____ min

Final water level end of pumping (m/ft)

If flowing give rate (l/min/GPM)

Recommended pump depth (m/ft)

Recommended pump rate (l/min/GPM)

Well production (l/min/GPM)

Disinfected? ☐ Yes ☐ No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level				
1			1	
2			2	
3			3	
4			4	
5			5	
10			10	
15			15	
20			20	
25			25	
30			30	
40			40	
50			50	
60			60	

Map of Well Location

Please provide a map below following instructions on the back.

See map

MW-2

Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Strata Drilling Group	7141

Business Address (Street Number/Name)	Municipality	Province	Postal Code	Business E-mail Address
129 Ringwood	Stouffville	ON	L4A8C1	Wrecords@Stratasoil.com

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)	Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
9059407919	Beattie, Brian	3616		2022/04/13

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☐ Yes ☐ No		2022/03/26

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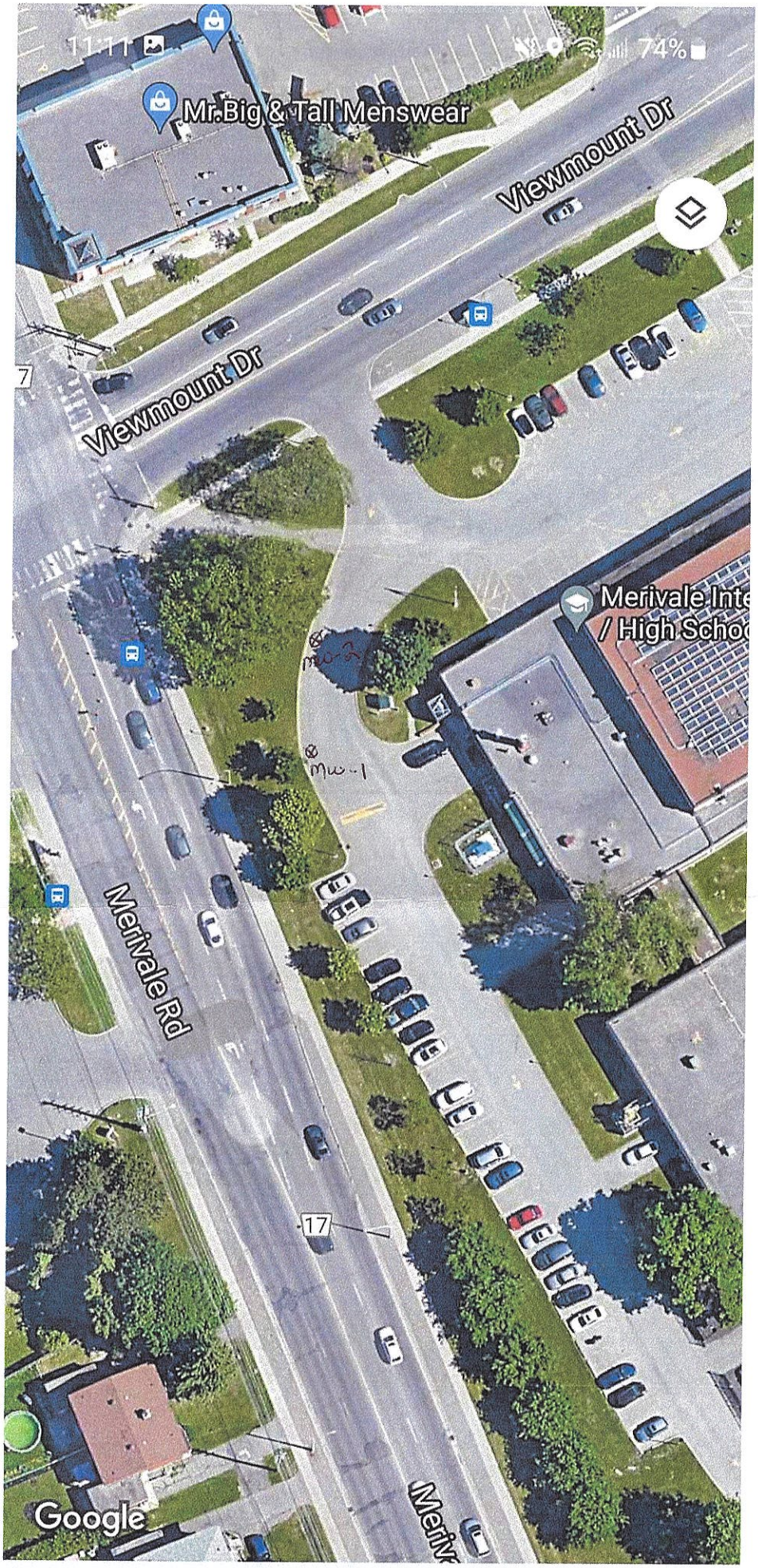
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Google
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APPENDIX C

Borehole and Monitoring Well Logs

LIST OF APPLICABLE ABBREVIATIONS

▽	GROUNDWATER LEVEL
%LEL	LOWER EXPLOSIVE LIMIT
µS/cm	MICROSIEMENS PER CENTIMETRE
1,2-DBA	1,2-DIBROMOETHANE
1,2-DCA	1,2-DICHLOROETHANE
ARS	AIR RETURN SAMPLE
As	ARSENIC
AS	AUGER SAMPLE
B-hws	BORON, HOT WATER SOLUBLE
Ba	BARIUM
Bsp	SATURATED PASTE BORON
B	BENZENE
T	TOLUENE
E	ETHYLBENZENE
X	XYLENES
Cr	CHROMIUM
CS	CORE SAMPLE
Cu	COPPER
DP	DIRECT PUSH
dS/m	DECISIEMENS PER METRE
EC	ELECTRICAL CONDUCTIVITY
EPH	EXTRACTABLE PETROLEUM HYDROCARBONS
ELEV.	ELEVATION
F1-F4	PETROLEUM HYDROCARBON FRACTION 1 TO FRACTION 4
FOC	FRACTION ORGANIC CARBON
GS	GRAB SAMPLE
HEPH	HEAVY EXTRACTABLE PETROLEUM HYDROCARBONS
LEPH	LIGHT EXTRACTABLE PETROLEUM HYDROCARBONS
m	METRE
mg/L	MILLIGRAMS PER LITRE
mald	METRES ABOVE LOCAL DATUM
mard	METRES ABOVE RELATIVE DATUM
masl	METRES ABOVE SEA LEVEL
mS/cm	MILLISIEMENS PER CENTIMETRE
MTBE	METHYL TERT-BUTYL ETHER
mTPH	MODIFIED TOTAL PETROLEUM HYDROCARBONS
n/a	NOT APPLICABLE
NA	NOT AVAILABLE
NBN	SEGREGATED ICE IS NON-VISIBLE, WELL BONDED, WITH NO EXCESS ICE.
OVM	ORGANIC VAPOUR MONITOR
PAH	POLYCYCLIC AROMATIC HYDROCARBONS
Pb	LEAD
PCB	POLYCHLORINATED BIPHENYL
pH	CaCl (2:1) WET pH
PHC	PETROLEUM HYDROCARBONS
PJ	PION JAR
ppmv	PARTS PER MILLION BY VOLUME
RC	ROCK CORE
SAL	SALINITY
SC	SOIL CORE
SPT	STANDARD PENETRATION TEST
Sr	STRONTIUM
SS	SPLIT SPOON
ST	STYRENE
USCS	UNIFIED SOIL CLASSIFICATION SYSTEM
VPH	VOLATILE PETROLEUM HYDROCARBONS
VOC	VOLATILE ORGANIC COMPOUNDS
w<PL	MATERIAL IS ESTIMATED TO BE DRIER THAN THE PLASTIC LIMIT
w~PL	MATERIAL IS ESTIMATED TO BE CLOSE TO THE PLASTIC LIMIT
w>PL	MATERIAL IS ESTIMATED TO BE WETTER THAN THE PLASTIC LIMIT
WS	WET SAMPLE
Zn	ZINC

\\golder.gds\GAL\Calgary\CALIM\CAD\IMPERIAL_OIL\z_Support_Files\gINT\Coverpage-Legend\dwg files\BH_MW_LOA_pLog.dwg Apr 01, 2021 - 12:00pm

RECORD OF BOREHOLE: MW21-01

CLIENT:	Imperial Oil Ltd.	DATE:	December 01, 2021	ELEVATION:	Data Not Available
PROJECT:	Former Retail Fuel Outlet				
PROJECT NO:	21506016-1155	INCLINATION:	90.0°	COORD SYS:	UTM Zone 18N
LOCATION:	1660 Merivale Road, Ottawa	CONTRACTOR:	Badger Daylighting/Strata Drilling	HORZ DATUM:	NAD83

DEPTH (m)	DRILL RIG	DRILL METHOD	MATERIAL PROFILE: DESCRIPTION	USCS	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLING ACTIVITY: TYPE	REC %	BLOWS	N-VALUE	ENVIRONMENTAL DATA: SOIL SAMPLE	Soil Vapour ppmv (10 / 100 / 1000)	ADDITIONAL LAB TESTING	GROUNDWATER OBSERVATIONS	CONSTRUCTION AND INSTALLATION DETAILS
															Pipe Stickup: 0.00 m
0	Hydrovac Truck	Hydrovac Excavation	FILL (SAND)	SP		0.00	GS								
1							GS								0.00 - 2.70 m bgs: Bentonite
2	Geoprobe 804DDT	Direct Push	SANDY CLAY	SW-SC		1.50	DP						MW21-01-03 BTEX, PHC F1-F4, HA, Pb		
			SAND, trace silt	SP		2.20							MW21-01-04 BTEX, PHC F1-F4, HA, Pb		
3		Air Rotary	Bedrock			2.40	AS								
4															2.70 - 6.00 m bgs: Silica Sand
5															
6			End of hole at 6.00 m.												
7															
8															
9															
10															

DEPTH SCALE: 1:51

HAMMER TYPE:

REV: 0

WSP GOLDER

LOGGED: LMariani DATE: Dec 01, 2021

CHECKED: CVettorazzo DATE: Jun 20, 2022

RECORD OF BOREHOLE: MW21-02

CLIENT:	Imperial Oil Ltd.	DATE:	December 01, 2021	ELEVATION:	Data Not Available
PROJECT:	Former Retail Fuel Outlet				
PROJECT NO:	21506016-1155	INCLINATION:	90.0°	COORD SYS:	UTM Zone 18N
LOCATION:	1660 Merivale Road, Ottawa	CONTRACTOR:	Badger Daylighting/Strata Drilling	HORZ DATUM:	NAD83

DEPTH (m)	DRILL RIG	DRILL METHOD	MATERIAL PROFILE: DESCRIPTION	USCS	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLING ACTIVITY: TYPE	REC %	BLOWS	N-VALUE	ENVIRONMENTAL DATA: SOIL SAMPLE	Soil Vapour ppmv (10, 100, 1000)	ADDITIONAL LAB TESTING	GROUNDWATER OBSERVATIONS	CONSTRUCTION AND INSTALLATION DETAILS
															Pipe Stickup: 0.00 m
0	Hydrovac Truck	Hydrovac Excavation	SANDY CLAY	SW-SC		0.00	GS								
1							GS								0.00 - 2.70 m bgs: Bentonite
2	Geoprobe 804DDT	Direct Push											MW21-02-03 BTEX, PHC F1-F4, HA, Pb		
			SAND, trace silt	SP		2.40							MW21-02-04 (DUP A) BTEX, PHC F1-F4, HA, Pb		
3		Air Rotary	Bedrock			2.75	AS								
4															2.70 - 6.00 m bgs: Silica Sand
5															
6			End of hole at 6.00 m.												
7															
8															
9															
10															

DEPTH SCALE: 1:51

HAMMER TYPE:

REV: 0

WSP GOLDER

LOGGED: LMariani DATE: Dec 01, 2021

CHECKED: CVettorazzo DATE: Jun 20, 2022

RECORD OF BOREHOLE: MW22-01

CLIENT:	Imperial Oil Ltd.	DATE:	March 26, 2022	ELEVATION:	Data Not Available
PROJECT:	Former Retail Fuel Outlet				
PROJECT NO:	21506016-1155	INCLINATION:	90.0°	COORD SYS:	UTM Zone 18N
LOCATION:	1660 Merivale Road, Ottawa	CONTRACTOR:	Badger Daylighting/Strata Drilling	HORZ DATUM:	NAD83

DEPTH (m)	DRILL RIG	DRILL METHOD	MATERIAL PROFILE: DESCRIPTION	USCS	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLING ACTIVITY: TYPE	REC %	BLOWS	N-VALUE	ENVIRONMENTAL DATA: SOIL SAMPLE	Soil Vapour ppmv (10 / 100 / 1000)	ADDITIONAL LAB TESTING	GROUNDWATER OBSERVATIONS	CONSTRUCTION AND INSTALLATION DETAILS
			ASPHALT			0.00									Pipe Stickup: 0.00 m
	Hydrovac Truck	Hydrovac Excavation - 305-mm Hole Dia.	FILL - (SP) SAND and GRAVEL, poorly graded; brown; moist.	SP		0.10	GS						MW22-01-01 BTEX, PHC F1-F4		
1			FILL - COBBLES, some sand, poorly graded; brown; moist.			0.90									0.00 - 2.50 m bgs: Bentonite
							GS						MW22-01-02 BTEX, PHC F1-F4		
2	Geoprobe 7822DT	Air Rotary - 102-mm Hole Dia.	BEDROCK; grey			2.00									
3															
4															2.50 - 4.80 m bgs: Silica Sand
			End of hole at 4.80 m.												
5															
6															
7															
8															
9															
10															

DEPTH SCALE: 1:51

HAMMER TYPE:

REV: 0

WSP GOLDER

LOGGED: TRyan DATE: Mar 26, 2022

CHECKED: CVettorazzo DATE: Jun 20, 2022

RECORD OF BOREHOLE: MW22-02

CLIENT:	Imperial Oil Ltd.	DATE:	March 26, 2022	ELEVATION:	Data Not Available
PROJECT:	Former Retail Fuel Outlet				
PROJECT NO:	21506016-1155	INCLINATION:	90.0°	COORD SYS:	UTM Zone 18N
LOCATION:	1660 Merivale Road, Ottawa	CONTRACTOR:	Badger Daylighting/Strata Drilling	HORZ DATUM:	NAD83

DEPTH (m)	DRILL RIG	DRILL METHOD	MATERIAL PROFILE: DESCRIPTION	USCS	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLING ACTIVITY: TYPE	REC %	BLOWS	N-VALUE	ENVIRONMENTAL DATA: SOIL SAMPLE	Soil Vapour ppmv (10 / 100 / 1000)	ADDITIONAL LAB TESTING	GROUNDWATER OBSERVATIONS	CONSTRUCTION AND INSTALLATION DETAILS
			ASPHALT			0.00									Pipe Stickup: 0.00 m
0	Hydrovac Truck	Hydrovac Excavation - 304-mm Hole Dia.	FILL - (SP) SAND and GRAVEL, poorly graded; brown; moist. - 0.35 to 0.70 m: roots - 0.75 to 1.30 m: soil sloughin			0.10	GS						MW22-02-01 BTEX, PHC F1-F4		
1			FILL - (SP) SAND, poorly graded; brown; moist.	SP		1.00	GS						MW22-02-02 (DUP A) BTEX, PHC F1-F4		0.00 - 2.50 m bgs: Bentonite
2	Geoprobe 7822DT	Air Rotary - 102-mm Hole Dia.	BEDROCK; grey			2.00									
3															2.50 - 4.80 m bgs: Silica Sand
4															
5			End of hole at 4.80 m.												
6															
7															
8															
9															
10															

DEPTH SCALE: 1:51

HAMMER TYPE: N/A

REV: 0

WSP GOLDER

LOGGED: TRyan DATE: Mar 26, 2022

CHECKED: CVettorazzo DATE: Jun 20, 2022

APPENDIX D

Laboratory Certificates of Analysis and Data Quality Reviews

Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2106
Your C.O.C. #: 712582-06-01

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2021/12/24
Report #: R6939225
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1Y2874
Received: 2021/12/06, 13:11

Sample Matrix: Soil
Samples Received: 5

Analyses	Quantity	Laboratory Method	Analytical Method
Dry, Grind & Sieve	5	CAM SOP-00405	EPA 3050B m
Petroleum Hydro. CCME F1 & BTEX in Soil (1)	5	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Soil (2)	5	CAM SOP-00316	CCME CWS m
Acid Extractable Metals Analysis by ICP	5	CAM SOP-00408	EPA 6010D m
Moisture	5	CAM SOP-00445	Carter 2nd ed 51.2 m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard. All samples were analyzed within hold time unless otherwise flagged.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) No lab extraction date is given for F1BTEX & VOC samples that are field preserved with methanol. Extraction date is the date sampled unless otherwise stated.
(2) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas Laboratories conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following “Alberta Environment’s Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003”. Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2106
Your C.O.C. #: 712582-06-01

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2021/12/24
Report #: R6939225
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1Y2874

Received: 2021/12/06, 13:11

Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Encryption Key



Gina Baybayan
Project Manager
24 Dec 2021 11:32:23

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Gina Baybayan, Project Manager
Email: Gina.Baybayan@bureauveritas.com
Phone# (905)817-5766

==========

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Bureau Veritas Job #: C1Y2874
Report Date: 2021/12/24

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2106

LEAD IN SOIL (SOIL)

Bureau Veritas ID		RHG798	RHG798	RHG799	RHG800	RHG801	RHG802		
Sampling Date		2021/12/01 12:38	2021/12/01 12:38	2021/12/01 12:39	2021/12/01 10:08	2021/12/01 10:00	2021/12/01 10:00		
COC Number		712582-06-01	712582-06-01	712582-06-01	712582-06-01	712582-06-01	712582-06-01		
	UNITS	**MW21-01-03**	**MW21-01-03 Lab-Dup**	**MW21-01-04**	**MW21-02-03**	**MW21-02-04**	**DUPA**	**RDL**	**QC Batch**
Acid Extractable Lead (Pb)	ug/g	6.3	6.6	5.8	5.5	<5.0	<5.0	5.0	7748015

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

O.REG 153 PHCS IN SOIL (SOIL)

Bureau Veritas ID		RHG798		RHG799		RHG800		RHG801		
Sampling Date		2021/12/01 12:38		2021/12/01 12:39		2021/12/01 10:08		2021/12/01 10:00		
COC Number		712582-06-01		712582-06-01		712582-06-01		712582-06-01		
	UNITS	**MW21-01-03**	**QC Batch**	**MW21-01-04**	**QC Batch**	**MW21-02-03**	**QC Batch**	**MW21-02-04**	**RDL**	**QC Batch**
Moisture	%	16	7714012	25	7714012	14	7714012	16	1.0	7714012
Benzene	ug/g	<0.020	7714438	<0.020	7715068	<0.020	7718290	<0.020	0.020	7714438
Toluene	ug/g	<0.020	7714438	<0.020	7715068	<0.020	7718290	<0.020	0.020	7714438
Ethylbenzene	ug/g	<0.020	7714438	<0.020	7715068	<0.020	7718290	<0.020	0.020	7714438
o-Xylene	ug/g	<0.020	7714438	<0.020	7715068	<0.020	7718290	<0.020	0.020	7714438
p+m-Xylene	ug/g	<0.040	7714438	<0.040	7715068	<0.040	7718290	<0.040	0.040	7714438
Total Xylenes	ug/g	<0.040	7714438	<0.040	7715068	<0.040	7718290	<0.040	0.040	7714438
Hexane	ug/g	<0.50	7714438	<0.50	7715068	<0.50	7718290	<0.50	0.50	7714438
F1 (C6-C10)	ug/g	<10	7714438	<10	7715068	<10	7718290	<10	10	7714438
F1 (C6-C10) - BTEX	ug/g	<10	7714438	<10	7715068	<10	7718290	<10	10	7714438
F2 (C10-C16 Hydrocarbons)	ug/g	<10	7714086	<10	7714086	<10	7714086	<10	10	7714086
F3 (C16-C34 Hydrocarbons)	ug/g	<50	7714086	<50	7714086	<50	7714086	<50	50	7714086
F4 (C34-C50 Hydrocarbons)	ug/g	<50	7714086	<50	7714086	<50	7714086	<50	50	7714086
Reached Baseline at C50	ug/g	Yes	7714086	Yes	7714086	Yes	7714086	Yes		7714086
Extraction Surrogate Recovery (%)										
D10-o-Xylene	%	103	7714438	113	7715068	96	7718290	110		7714438
o-Terphenyl	%	108	7714086	105	7714086	110	7714086	109		7714086
Instrument Surrogate Recovery (%)										
1,4-Difluorobenzene	%	105	7714438	106	7715068	106	7718290	104		7714438
4-Bromofluorobenzene	%	91	7714438	93	7715068	86	7718290	92		7714438
D4-1,2-Dichloroethane	%	108	7714438	105	7715068	93	7718290	105		7714438

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

O.REG 153 PHCS IN SOIL (SOIL)

Bureau Veritas ID		RHG802		
Sampling Date		2021/12/01 10:00		
COC Number		712582-06-01		
	UNITS	**DUPA**	**RDL**	**QC Batch**
Moisture	%	7.4	1.0	7714012
Benzene	ug/g	<0.020	0.020	7714438
Toluene	ug/g	<0.020	0.020	7714438
Ethylbenzene	ug/g	<0.020	0.020	7714438
o-Xylene	ug/g	<0.020	0.020	7714438
p+m-Xylene	ug/g	<0.040	0.040	7714438
Total Xylenes	ug/g	<0.040	0.040	7714438
Hexane	ug/g	<0.50	0.50	7714438
F1 (C6-C10)	ug/g	<10	10	7714438
F1 (C6-C10) - BTEX	ug/g	<10	10	7714438
F2 (C10-C16 Hydrocarbons)	ug/g	<10	10	7714086
F3 (C16-C34 Hydrocarbons)	ug/g	<50	50	7714086
F4 (C34-C50 Hydrocarbons)	ug/g	<50	50	7714086
Reached Baseline at C50	ug/g	Yes		7714086
Extraction Surrogate Recovery (%)				
D10-o-Xylene	%	106		7714438
o-Terphenyl	%	108		7714086
Instrument Surrogate Recovery (%)				
1,4-Difluorobenzene	%	105		7714438
4-Bromofluorobenzene	%	90		7714438
D4-1,2-Dichloroethane	%	108		7714438

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C1Y2874
Report Date: 2021/12/24

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2106

TEST SUMMARY

Bureau Veritas ID: RHG798
Sample ID: MW21-01-03
Matrix: Soil

Collected: 2021/12/01
Relinquished: 2021/12/03
Received: 2021/12/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	7714438	N/A	2021/12/07	Georgeta Rusu
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	7714086	2021/12/07	2021/12/14	Dennis Ngondu
Acid Extractable Metals Analysis by ICP	ICP	7748015	2021/12/22	2021/12/23	Suban Kanapathippllai
Moisture	BAL	7714012	N/A	2021/12/07	Simrat Bhathal

Bureau Veritas ID: RHG798 Dup
Sample ID: MW21-01-03
Matrix: Soil

Collected: 2021/12/01
Relinquished: 2021/12/03
Received: 2021/12/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acid Extractable Metals Analysis by ICP	ICP	7748015	2021/12/22	2021/12/23	Suban Kanapathippllai

Bureau Veritas ID: RHG799
Sample ID: MW21-01-04
Matrix: Soil

Collected: 2021/12/01
Relinquished: 2021/12/03
Received: 2021/12/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	7715068	N/A	2021/12/08	Georgeta Rusu
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	7714086	2021/12/07	2021/12/14	Dennis Ngondu
Acid Extractable Metals Analysis by ICP	ICP	7748015	2021/12/22	2021/12/23	Suban Kanapathippllai
Moisture	BAL	7714012	N/A	2021/12/07	Simrat Bhathal

Bureau Veritas ID: RHG800
Sample ID: MW21-02-03
Matrix: Soil

Collected: 2021/12/01
Relinquished: 2021/12/03
Received: 2021/12/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	7718290	N/A	2021/12/10	Georgeta Rusu
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	7714086	2021/12/07	2021/12/14	Dennis Ngondu
Acid Extractable Metals Analysis by ICP	ICP	7748015	2021/12/22	2021/12/23	Suban Kanapathippllai
Moisture	BAL	7714012	N/A	2021/12/07	Simrat Bhathal

Bureau Veritas ID: RHG801
Sample ID: MW21-02-04
Matrix: Soil

Collected: 2021/12/01
Relinquished: 2021/12/03
Received: 2021/12/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	7714438	N/A	2021/12/07	Georgeta Rusu
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	7714086	2021/12/07	2021/12/14	Dennis Ngondu
Acid Extractable Metals Analysis by ICP	ICP	7748015	2021/12/22	2021/12/23	Suban Kanapathippllai
Moisture	BAL	7714012	N/A	2021/12/07	Simrat Bhathal

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C1Y2874
Report Date: 2021/12/24

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2106

TEST SUMMARY

Bureau Veritas ID: RHG802
Sample ID: DUPA
Matrix: Soil

Collected: 2021/12/01
Relinquished: 2021/12/03
Received: 2021/12/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	7714438	N/A	2021/12/07	Georgeta Rusu
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	7714086	2021/12/07	2021/12/14	Dennis Ngondu
Acid Extractable Metals Analysis by ICP	ICP	7748015	2021/12/22	2021/12/23	Suban Kanapathippllai
Moisture	BAL	7714012	N/A	2021/12/07	Simrat Bhathal

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	1.7°C

Sample RHG799 [MW21-01-04] : F1/BTEX Analysis: Soil weight exceeds the protocol specification of approximately 5g in the field preserved vial. Additional methanol was added to the vial to ensure extraction efficiency.

Sample RHG800 [MW21-02-03] : F1/BTEX Analysis: Soil weight exceeds the protocol specification of approximately 5g in the field preserved vial. Additional methanol was added to the vial to ensure extraction efficiency.

Results relate only to the items tested.

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7714086	DN0	Method Blank	o-Terphenyl	2021/12/14		103	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2021/12/14	<10		ug/g	
			F3 (C16-C34 Hydrocarbons)	2021/12/14	<50		ug/g	
			F4 (C34-C50 Hydrocarbons)	2021/12/14	<50		ug/g	
7714438	GRU	Method Blank	1,4-Difluorobenzene	2021/12/07		106	%	60 - 140
			4-Bromofluorobenzene	2021/12/07		94	%	60 - 140
			D10-o-Xylene	2021/12/07		107	%	60 - 140
			D4-1,2-Dichloroethane	2021/12/07		107	%	60 - 140
			Benzene	2021/12/07	<0.020		ug/g	
			Toluene	2021/12/07	<0.020		ug/g	
			Ethylbenzene	2021/12/07	<0.020		ug/g	
			o-Xylene	2021/12/07	<0.020		ug/g	
			p+m-Xylene	2021/12/07	<0.040		ug/g	
			Total Xylenes	2021/12/07	<0.040		ug/g	
			Hexane	2021/12/07	<0.50		ug/g	
			F1 (C6-C10)	2021/12/07	<10		ug/g	
			F1 (C6-C10) - BTEX	2021/12/07	<10		ug/g	
7715068	GRU	Method Blank	1,4-Difluorobenzene	2021/12/08		104	%	60 - 140
			4-Bromofluorobenzene	2021/12/08		95	%	60 - 140
			D10-o-Xylene	2021/12/08		110	%	60 - 140
			D4-1,2-Dichloroethane	2021/12/08		107	%	60 - 140
			Benzene	2021/12/08	<0.020		ug/g	
			Toluene	2021/12/08	<0.020		ug/g	
			Ethylbenzene	2021/12/08	<0.020		ug/g	
			o-Xylene	2021/12/08	<0.020		ug/g	
			p+m-Xylene	2021/12/08	<0.040		ug/g	
			Total Xylenes	2021/12/08	<0.040		ug/g	
			Hexane	2021/12/08	<0.50		ug/g	
			F1 (C6-C10)	2021/12/08	<10		ug/g	
			F1 (C6-C10) - BTEX	2021/12/08	<10		ug/g	
7718290	GRU	Method Blank	1,4-Difluorobenzene	2021/12/10		102	%	60 - 140
			4-Bromofluorobenzene	2021/12/10		98	%	60 - 140
			D10-o-Xylene	2021/12/10		93	%	60 - 140
			D4-1,2-Dichloroethane	2021/12/10		91	%	60 - 140
			Benzene	2021/12/10	<0.020		ug/g	
			Toluene	2021/12/10	<0.020		ug/g	
			Ethylbenzene	2021/12/10	<0.020		ug/g	
			o-Xylene	2021/12/10	<0.020		ug/g	
			p+m-Xylene	2021/12/10	<0.040		ug/g	
			Total Xylenes	2021/12/10	<0.040		ug/g	
			Hexane	2021/12/10	<0.50		ug/g	
			F1 (C6-C10)	2021/12/10	<10		ug/g	
			F1 (C6-C10) - BTEX	2021/12/10	<10		ug/g	
7748015	SUK	Method Blank	Acid Extractable Lead (Pb)	2021/12/23	<5.0		ug/g	
7748015	SUK	RPD [RHG798-01]	Acid Extractable Lead (Pb)	2021/12/23	4.6		%	30
7748015	SUK	Matrix Spike [RHG798-01]	Acid Extractable Lead (Pb)	2021/12/23		NC	%	75 - 125
7714086	DN0	LCS	o-Terphenyl	2021/12/14		102	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2021/12/14		104	%	80 - 120
			F3 (C16-C34 Hydrocarbons)	2021/12/14		104	%	80 - 120
			F4 (C34-C50 Hydrocarbons)	2021/12/14		106	%	80 - 120

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7714438	GRU	LCS	1,4-Difluorobenzene	2021/12/07		98	%	60 - 140
			4-Bromofluorobenzene	2021/12/07		103	%	60 - 140
			D10-o-Xylene	2021/12/07		105	%	60 - 140
			D4-1,2-Dichloroethane	2021/12/07		98	%	60 - 140
			Benzene	2021/12/07		103	%	50 - 140
			Toluene	2021/12/07		102	%	50 - 140
			Ethylbenzene	2021/12/07		117	%	50 - 140
			o-Xylene	2021/12/07		114	%	50 - 140
			p+m-Xylene	2021/12/07		114	%	50 - 140
			Hexane	2021/12/07		105	%	60 - 130
			F1 (C6-C10)	2021/12/07		97	%	80 - 120
7715068	GRU	LCS	1,4-Difluorobenzene	2021/12/08		99	%	60 - 140
			4-Bromofluorobenzene	2021/12/08		107	%	60 - 140
			D10-o-Xylene	2021/12/08		112	%	60 - 140
			D4-1,2-Dichloroethane	2021/12/08		99	%	60 - 140
			Benzene	2021/12/08		111	%	50 - 140
			Toluene	2021/12/08		110	%	50 - 140
			Ethylbenzene	2021/12/08		121	%	50 - 140
			o-Xylene	2021/12/08		117	%	50 - 140
			p+m-Xylene	2021/12/08		118	%	50 - 140
			Hexane	2021/12/08		116	%	60 - 130
			F1 (C6-C10)	2021/12/08		99	%	80 - 120
7718290	GRU	LCS	1,4-Difluorobenzene	2021/12/10		99	%	60 - 140
			4-Bromofluorobenzene	2021/12/10		114	%	60 - 140
			D10-o-Xylene	2021/12/10		98	%	60 - 140
			D4-1,2-Dichloroethane	2021/12/10		84	%	60 - 140
			Benzene	2021/12/10		95	%	50 - 140
			Toluene	2021/12/10		98	%	50 - 140
			Ethylbenzene	2021/12/10		114	%	50 - 140
			o-Xylene	2021/12/10		103	%	50 - 140
			p+m-Xylene	2021/12/10		120	%	50 - 140
			Hexane	2021/12/10		110	%	60 - 130
			F1 (C6-C10)	2021/12/10		89	%	80 - 120
7748015	SUK	LCS	Acid Extractable Lead (Pb)	2021/12/23		97	%	80 - 120

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C1Y2874
Report Date: 2021/12/24

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2106

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



Brad Newman, B.Sc., C.Chem., Scientific Service Specialist

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Maxxam

6740 Campobello Road
Mississauga, Ontario L5N 2L8
www.maxxam.ca

Phone: (905) 817-5700
Fax: (905) 817-5777
Toll Free: 800-563-6266

EXXONMOBIL/IMPERIAL OIL - MAXXAM
CHAIN-OF-CUSTODY RECORD
ANALYSIS REQUESTED

C of C # 712582-06-01

712582

INVOICE INFORMATION	REPORT INFORMATION
Company Name: Imperial Oil Ltd - Golder Associates Ltd	Company Name: Golder Associates Ltd
Contact Name: IOL Accounts Payable	Contact Name: ~~Lissette Bonilla~~ Ian Sosney
Address: 102, 2535-3rd Avenue SE Calgary AB T2A 7W5	Address: 110 Hanover Dr, Building A Suite 203 St. Catherines ON L2W 1A4
Email: IOLAccounts_Payable@golder.com	Email: ~~Lissette_Bonilla@golder.com~~; IOL_1390@golder
Phone: (403) 299-5600	Phone: ~~(905) 688-8217~~ (647) 522-4678
Sampler Name (Print): Leandra Manson, Tom Ryan	Consultant Project #: ~~1791626-1240-1907A~~ 20447743 - 1155 - 2108

	FIELD SAMPLE ID	MATRIX: GROUND WATER	MATRIX: SURFACE WATER	MATRIX: SOIL	MATRIX: OTHER	# CONTAINERS	SAMPLING: DATE (YYYY/MM/DD)	SAMPLING: TIME (24 HR)	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	F1/BTEX	F2-F4	Lead	Hexane	Limited sample.
1	MW21-01-03			X		2	2021/12/01	12 38			X	X	X	X	X
2	MW21-01-04			X		2	2021/12/01	12 39			X	X	X	X	X
3	MW21-02-03			X		2	2021/12/01	10 08			X	X	X	X	X
4	MW21-02-04			X		2	2021/12/01	10 00			X	X	X	X	X
5	DUP A			X		2	2021/12/01	10 00			X	X	X	X	X
6															
7															
8															
9															
10															

IOL SITE LOCATION: ~~1270 Johnston Road, Ottawa, ON~~ 1660 Merivale rd, Ottawa, ON

IOL PROJECT # (if applicable): N/A

MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM: ~~1791626-1240-7777~~ 20447743 - 1155 - 7777

REGULATORY CRITERIA / DETECTION LIMITS:
☑ REG 153 Table Table 3 ☐ 2004 ☑ 2011 ☐ RSC
(Please indicate which Reg. version and if RSC required)
☐ ODWS ☐ PWQO
☐ Other

SPECIAL INSTRUCTIONS:
A261436
SAP 8800 1627

JARS USED AND NOT SUBMITTED Enter N/A for Water: 8

TURNAROUND TIME
Standard (5 days) ☑
Rush (3 days) ☐
(2 days) ☐
(1 day) ☐
(same day) ☐
Date Required

	YES	NO	COOLER ID:			
SEAL PRESENT	✓					
SEAL INTACT	✓		TEMP °C	3	1	1
COOLING MEDIA PRESENT	✓			1	2	3

	YES	NO	COOLER ID:			
SEAL PRESENT						
SEAL INTACT			TEMP °C			
COOLING MEDIA PRESENT				1	2	3

	YES	NO	COOLER ID:			
SEAL PRESENT						
SEAL INTACT			TEMP °C			
COOLING MEDIA PRESENT				1	2	3

LAB USE ONLY
MAXXAM JOB # C1Y2874
SAMPLES
LABELED BY: ATM
VERIFIED BY: NP4

* RELINQUISHED BY:		DATE:	TIME (24 HR)	RECEIVED BY:		DATE:	TIME (24 HR)
1.	Tom Ryan	2021/12/03	08:45	1. Jaspreet Kaur	Kaur	2021/12/06	13:11
2.				2.			
3.				3.			

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXXAM'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.MAXXAM.CA/TERMS.

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: December 1, 2021

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Bureau Veritas Mississauga

Consultant Project Number: 20447743-1155

Sample Submission Number: C1Y2874

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within
Extraction Surrogate Recovery	X			acceptance criteria.
Method Blank Concentration	X			
Matrix Duplicate RPD	X			
Matrix Spike Recovery	X			
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	All field QC samples are within
Trip Blank Concentration			X	alert limits.
Field Duplicate RPD	X			

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	Yes
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): Amanda Newberry

Date: January 4, 2022

Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107A
Your C.O.C. #: 789749-02-01

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2021/12/15
Report #: R6921823
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1Y3398
Received: 2021/12/08, 09:10

Sample Matrix: Ground Water
Samples Received: 3

Analyses	Quantity	Laboratory Method	Analytical Method
Petroleum Hydro. CCME F1 & BTEX in Water	3	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1)	3	CAM SOP-00316	CCME PHC-CWS m
Dissolved Metals by ICPMS	3	CAM SOP-00447	EPA 6020B m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard. All samples were analyzed within hold time unless otherwise flagged.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas Laboratories conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following “Alberta Environment’s Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003”. Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107A
Your C.O.C. #: 789749-02-01

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2021/12/15
Report #: R6921823
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1Y3398
Received: 2021/12/08, 09:10

Encryption Key



Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Gina Baybayan, Project Manager
Email: Gina.Baybayan@bureauveritas.com
Phone# (905)817-5766

==========

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C1Y3398
Report Date: 2021/12/15

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107A

LEAD (DISSOLVED) IN WATER

Bureau Veritas ID		RHJ392	RHJ392	RHJ393	RHJ394		
Sampling Date		2021/12/03 12:00	2021/12/03 12:00	2021/12/03 12:30	2021/12/03 12:00		
COC Number		789749-02-01	789749-02-01	789749-02-01	789749-02-01		
	UNITS	**MW21-01**	**MW21-01 Lab-Dup**	**MW21-02**	**DUP A**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	7717530

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C1Y3398
Report Date: 2021/12/15

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107A

O.REG 153 PHCS IN WATER (GROUND WATER)

Bureau Veritas ID		RHJ392			RHJ392			RHJ393	RHJ394		
Sampling Date		2021/12/03 12:00			2021/12/03 12:00			2021/12/03 12:30	2021/12/03 12:00		
COC Number		789749-02-01			789749-02-01			789749-02-01	789749-02-01		
	UNITS	**MW21-01**	**RDL**	**QC Batch**	**MW21-01 Lab-Dup**	**RDL**	**QC Batch**	**MW21-02**	**DUP A**	**RDL**	**QC Batch**
Benzene	ug/L	<0.20	0.20	7716552	<0.20	0.20	7716552	<0.20	<0.20	0.20	7716552
Toluene	ug/L	<0.20	0.20	7716552	<0.20	0.20	7716552	<0.20	<0.20	0.20	7716552
Ethylbenzene	ug/L	<0.20	0.20	7716552	<0.20	0.20	7716552	<0.20	<0.20	0.20	7716552
o-Xylene	ug/L	<0.20	0.20	7716552	<0.20	0.20	7716552	<0.20	<0.20	0.20	7716552
p+m-Xylene	ug/L	<0.40	0.40	7716552	<0.40	0.40	7716552	<0.40	<0.40	0.40	7716552
Total Xylenes	ug/L	<0.40	0.40	7716552	<0.40	0.40	7716552	<0.40	<0.40	0.40	7716552
F1 (C6-C10)	ug/L	<25	25	7716552	<25	25	7716552	<25	<25	25	7716552
F1 (C6-C10) - BTEX	ug/L	<25	25	7716552	<25	25	7716552	<25	<25	25	7716552
F2 (C10-C16 Hydrocarbons)	ug/L	<100	100	7720316				<100	<100	100	7720316
F3 (C16-C34 Hydrocarbons)	ug/L	<200	200	7720316				<200	<200	200	7720316
F4 (C34-C50 Hydrocarbons)	ug/L	<200	200	7720316				<200	<200	200	7720316
Reached Baseline at C50	ug/L	Yes		7720316				Yes	Yes		7720316
Extraction Surrogate Recovery (%)											
D10-o-Xylene	%	101		7716552	99		7716552	104	103		7716552
o-Terphenyl	%	105		7720316				102	102		7720316
Instrument Surrogate Recovery (%)											
1,4-Difluorobenzene	%	108		7716552	107		7716552	109	108		7716552
4-Bromofluorobenzene	%	95		7716552	93		7716552	91	83		7716552
D4-1,2-Dichloroethane	%	110		7716552	108		7716552	107	111		7716552

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C1Y3398
Report Date: 2021/12/15

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107A

TEST SUMMARY

Bureau Veritas ID: RHJ392
Sample ID: MW21-01
Matrix: Ground Water
Collected: 2021/12/03
Relinquished: 2021/12/07
Received: 2021/12/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7716552	N/A	2021/12/09	Georgeta Rusu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7720316	2021/12/12	2021/12/12	Dennis Ngondu
Dissolved Metals by ICPMS	ICP/MS	7717530	N/A	2021/12/13	Nan Raykha

Bureau Veritas ID: RHJ392 Dup
Sample ID: MW21-01
Matrix: Ground Water
Collected: 2021/12/03
Relinquished: 2021/12/07
Received: 2021/12/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7716552	N/A	2021/12/09	Georgeta Rusu
Dissolved Metals by ICPMS	ICP/MS	7717530	N/A	2021/12/13	Nan Raykha

Bureau Veritas ID: RHJ393
Sample ID: MW21-02
Matrix: Ground Water
Collected: 2021/12/03
Relinquished: 2021/12/07
Received: 2021/12/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7716552	N/A	2021/12/10	Georgeta Rusu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7720316	2021/12/12	2021/12/12	Dennis Ngondu
Dissolved Metals by ICPMS	ICP/MS	7717530	N/A	2021/12/13	Nan Raykha

Bureau Veritas ID: RHJ394
Sample ID: DUP A
Matrix: Ground Water
Collected: 2021/12/03
Relinquished: 2021/12/07
Received: 2021/12/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7716552	N/A	2021/12/10	Georgeta Rusu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7720316	2021/12/12	2021/12/12	Dennis Ngondu
Dissolved Metals by ICPMS	ICP/MS	7717530	N/A	2021/12/13	Nan Raykha

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	2.3°C

Results relate only to the items tested.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7716552	GRU	Method Blank	1,4-Difluorobenzene	2021/12/09		104	%	70 - 130
			4-Bromofluorobenzene	2021/12/09		85	%	70 - 130
			D10-o-Xylene	2021/12/09		103	%	70 - 130
			D4-1,2-Dichloroethane	2021/12/09		105	%	70 - 130
			Benzene	2021/12/09	<0.20		ug/L	
			Toluene	2021/12/09	<0.20		ug/L	
			Ethylbenzene	2021/12/09	<0.20		ug/L	
			o-Xylene	2021/12/09	<0.20		ug/L	
			p+m-Xylene	2021/12/09	<0.40		ug/L	
			Total Xylenes	2021/12/09	<0.40		ug/L	
			F1 (C6-C10)	2021/12/09	<25		ug/L	
			F1 (C6-C10) - BTEX	2021/12/09	<25		ug/L	
7717530	N_R	Method Blank	Dissolved Lead (Pb)	2021/12/13	<0.50		ug/L	
7720316	DN0	Method Blank	o-Terphenyl	2021/12/12		103	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2021/12/12	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2021/12/12	<200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2021/12/12	<200		ug/L	
7720316	DN0	RPD	F2 (C10-C16 Hydrocarbons)	2021/12/12	2.3		%	30
			F3 (C16-C34 Hydrocarbons)	2021/12/12	2.0		%	30
			F4 (C34-C50 Hydrocarbons)	2021/12/12	2.2		%	30
7716552	GRU	RPD [RHJ392-03]	Benzene	2021/12/09	NC		%	30
			Toluene	2021/12/09	NC		%	30
			Ethylbenzene	2021/12/09	NC		%	30
			o-Xylene	2021/12/09	NC		%	30
			p+m-Xylene	2021/12/09	NC		%	30
			Total Xylenes	2021/12/09	NC		%	30
			F1 (C6-C10)	2021/12/09	NC		%	30
			F1 (C6-C10) - BTEX	2021/12/09	NC		%	30
7717530	N_R	RPD [RHJ392-02]	Dissolved Lead (Pb)	2021/12/13	NC		%	20
7716552	GRU	Matrix Spike [RHJ392-03]	1,4-Difluorobenzene	2021/12/10		98	%	70 - 130
			4-Bromofluorobenzene	2021/12/10		102	%	70 - 130
			D10-o-Xylene	2021/12/10		101	%	70 - 130
			D4-1,2-Dichloroethane	2021/12/10		98	%	70 - 130
			Benzene	2021/12/10		116	%	50 - 140
			Toluene	2021/12/10		111	%	50 - 140
			Ethylbenzene	2021/12/10		122	%	50 - 140
			o-Xylene	2021/12/10		115	%	50 - 140
			p+m-Xylene	2021/12/10		118	%	50 - 140
			F1 (C6-C10)	2021/12/10		94	%	60 - 140
7717530	N_R	Matrix Spike [RHJ392-02]	Dissolved Lead (Pb)	2021/12/13		93	%	80 - 120
7716552	GRU	LCS	1,4-Difluorobenzene	2021/12/10		97	%	70 - 130
			4-Bromofluorobenzene	2021/12/10		103	%	70 - 130
			D10-o-Xylene	2021/12/10		103	%	70 - 130
			D4-1,2-Dichloroethane	2021/12/10		99	%	70 - 130
			Benzene	2021/12/10		115	%	50 - 140
			Toluene	2021/12/10		109	%	50 - 140
			Ethylbenzene	2021/12/10		121	%	50 - 140
			o-Xylene	2021/12/10		116	%	50 - 140
			p+m-Xylene	2021/12/10		119	%	50 - 140
			F1 (C6-C10)	2021/12/10		95	%	60 - 140

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7717530	N_R	LCS	Dissolved Lead (Pb)	2021/12/13		95	%	80 - 120
7720316	DN0	LCS	o-Terphenyl	2021/12/12		107	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2021/12/12		102	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2021/12/12		114	%	60 - 130
			F4 (C34-C50 Hydrocarbons)	2021/12/12		114	%	60 - 130

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C1Y3398
Report Date: 2021/12/15

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107A

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



Brad Newman, B.Sc., C.Chem., Scientific Service Specialist

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

6740 Campobello Road
Mississauga, Ontario L5N 2L8
www.bvlabs.com

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Fax: (905) 817-5777
Toll Free: 800-563-6266

EXXONMOBIL/IMPERIAL OIL - BV LABS
CHAIN-OF-CUSTODY RECORD
ANALYSIS REQUESTED

Page 1 of 1
C of C # 789749-02-01
789749

INVOICE INFORMATION	REPORT INFORMATION
Company Name: Imperial Oil Ltd - Golder Associates Ltd	Company Name: Golder Associates Ltd
Contact Name: Imperial Accounts Payable	Contact Name: ~~Rachel Laurin~~ Ian Sosney
Address: 102, 2535-3rd Avenue SE Calgary AB T2A 7W5	Address: 110 Hanover Dr. #203 St. Catharines ON ~~7250, rue du Mile End 3e Étage Montreal QC H3R 2A4~~
Email: CanadaAccountsPayableInvoices@golder.co	Email: ~~rachel_laurin@golder.com~~ IOL_1390@golder.co ian_sosney@golder.com
Phone: (403) 299-5600	Phone: 647 522 4698
Sampler Name (Print): Leandra Mariani & Tom Ryan	Consultant Project #: ~~20144014-1626-2666~~ 20447743-1155-2107A

	FIELD SAMPLE ID	MATRIX: GROUND WATER	MATRIX: SURFACE WATER	MATRIX: SOIL	MATRIX: OTHER	# CONTAINERS	SAMPLING: DATE (YYYY/MM/DD)	SAMPLING: TIME (24 HR)	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	[illegible]	[illegible]	BTEX/F1	PHCs F2-F4	dissolved lead	limited sample
1	MW21-01	X				5	2021/12/03	12:00	X				X	X	X	X
2	MW21-02	X				5	↓	12:30	X				X	X	X	X
3	DUP A	X				5	↓	12:00	X				X	X	X	X
4																
5																
6																
7																
8																
9																
10																

IOL SITE LOCATION: ~~Palmer Drive, Ottawa~~ 1660 Merivale Dr. Ottawa ON

IOL PROJECT # (if applicable): N/A

BV LABS TASK ORDER # OR SERVICE ORDER # + LINE ITEM: ~~20144014-1626-2777-N/A~~ 20447743-1155-2777

REGULATORY CRITERIA / DETECTION LIMITS:
[X] REG 153 Table 3 [ ] 2004 [X] 2011 [ ] RSC
(Please indicate which Reg. version and if RSC required)
[ ] ODWS [ ] PWQO [ ] Reg 406 Table
[ ] Other

SPECIAL INSTRUCTIONS: IES A2601436
samples may contain headspace and/or silt.

JARS USED AND NOT SUBMITTED Enter N/A for Water: NA

TURNAROUND TIME
Standard (5 days) [X]
Rush (3 days) [ ]
(2 days) [ ]
(1 day) [ ]
(same day) [ ]
Date Required

	YES	NO	COOLER ID: 1				YES	NO	COOLER ID:				YES	NO	COOLER ID:			
SEAL PRESENT	✓		TEMP °C	1	2	4	SEAL PRESENT			TEMP °C	1	2	3	SEAL PRESENT			TEMP °C	1	2	3
SEAL INTACT	✓						SEAL INTACT							SEAL INTACT						
COOLING MEDIA PRESENT							COOLING MEDIA PRESENT							COOLING MEDIA PRESENT						

* RELINQUISHED BY:		DATE:	TIME (24 HR)	RECEIVED BY:		DATE:	TIME (24 HR)
1. [signature]	Leandra Mariani	2021/12/07	15:41	1. [signature]	[illegible]	[illegible]	09:10
2.				2.			
3.				3.			

LAB USE ONLY
BV LABS JOB #: C1Y3398
SAMPLES
LABELED BY: KTN
VERIFIED BY: DSG

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BV LABS' STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVLABS.COM/TERMS-AND-CONDITIONS.

COC – 1012 (2018) IOL – ON White: BV Labs Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: December 3, 2021

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Bureau Veritas Mississauga

Consultant Project Number: 20447743-1155

Sample Submission Number: C1Y3398

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within
Extraction Surrogate Recovery	X			acceptance criteria.
Method Blank Concentration	X			
Matrix Duplicate RPD	X			
Matrix Spike Recovery	X			
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	All field QC samples are within
Trip Blank Concentration			X	alert limits.
Field Duplicate RPD	X			

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): Amanda Newberry

Date: December 15, 2021

Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107A
Your C.O.C. #: 789749-03-01

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2021/12/17
Report #: R6925810
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1Y3401
Received: 2021/12/08, 09:10

Sample Matrix: Water
Samples Received: 2

Analyses	Quantity	Laboratory Method	Analytical Method
Petroleum Hydro. CCME F1 & BTEX in Water	2	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1)	1	CAM SOP-00316	CCME PHC-CWS m
Dissolved Metals by ICPMS	1	CAM SOP-00447	EPA 6020B m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard. All samples were analyzed within hold time unless otherwise flagged.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas Laboratories conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following “Alberta Environment’s Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003”. Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107A
Your C.O.C. #: 789749-03-01

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2021/12/17
Report #: R6925810
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1Y3401
Received: 2021/12/08, 09:10

Encryption Key



Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Gina Baybayan, Project Manager
Email: Gina.Baybayan@bureauveritas.com
Phone# (905)817-5766

==========

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Bureau Veritas Job #: C1Y3401
Report Date: 2021/12/17

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107A

LEAD (DISSOLVED) IN WATER

Bureau Veritas ID		RHJ399		
Sampling Date		2021/12/03 13:00		
COC Number		789749-03-01		
	UNITS	**F. BLANK**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	<0.50	0.50	7717530

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

O.REG 153 PHCS IN WATER (WATER)

Bureau Veritas ID		RHJ399			RHJ400		
Sampling Date		2021/12/03 13:00			2021/12/03 13:05		
COC Number		789749-03-01			789749-03-01		
	UNITS	**F. BLANK**	**RDL**	**QC Batch**	**TRIP BLANK**	**RDL**	**QC Batch**
Benzene	ug/L	<0.20	0.20	7717210	<0.20	0.20	7717210
Toluene	ug/L	<0.20	0.20	7717210	<0.20	0.20	7717210
Ethylbenzene	ug/L	<0.20	0.20	7717210	<0.20	0.20	7717210
o-Xylene	ug/L	<0.20	0.20	7717210	<0.20	0.20	7717210
p+m-Xylene	ug/L	<0.40	0.40	7717210	<0.40	0.40	7717210
Total Xylenes	ug/L	<0.40	0.40	7717210	<0.40	0.40	7717210
F1 (C6-C10)	ug/L	<25	25	7717210	<25	25	7717210
F1 (C6-C10) - BTEX	ug/L	<25	25	7717210	<25	25	7717210
F2 (C10-C16 Hydrocarbons)	ug/L	<100	100	7719466			
F3 (C16-C34 Hydrocarbons)	ug/L	<200	200	7719466			
F4 (C34-C50 Hydrocarbons)	ug/L	<200	200	7719466			
Reached Baseline at C50	ug/L	Yes		7719466			
Extraction Surrogate Recovery (%)							
D10-o-Xylene	%	105		7717210	101		7717210
o-Terphenyl	%	110		7719466			
Instrument Surrogate Recovery (%)							
1,4-Difluorobenzene	%	106		7717210	104		7717210
4-Bromofluorobenzene	%	83		7717210	82		7717210
D4-1,2-Dichloroethane	%	90		7717210	90		7717210

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Bureau Veritas Job #: C1Y3401
Report Date: 2021/12/17

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107A

TEST SUMMARY

Bureau Veritas ID: RHJ399
Sample ID: F. BLANK
Matrix: Water

Collected: 2021/12/03
Relinquished: 2021/12/07
Received: 2021/12/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7717210	N/A	2021/12/10	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7719466	2021/12/11	2021/12/13	Dennis Ngondu
Dissolved Metals by ICPMS	ICP/MS	7717530	N/A	2021/12/13	Nan Raykha

Bureau Veritas ID: RHJ400
Sample ID: TRIP BLANK
Matrix: Water

Collected: 2021/12/03
Relinquished: 2021/12/07
Received: 2021/12/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7717210	N/A	2021/12/10	Lincoln Ramdahin

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	2.3°C

Note. Field Blank received frozen. Two of three vials found broken as well as cap of F2-F4 bottle (volume left was about 2/3).

Results relate only to the items tested.

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C1Y3401
Report Date: 2021/12/17

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107A

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7717210	LRA	Method Blank	1,4-Difluorobenzene	2021/12/09		107	%	70 - 130
			4-Bromofluorobenzene	2021/12/09		86	%	70 - 130
			D10-o-Xylene	2021/12/09		105	%	70 - 130
			D4-1,2-Dichloroethane	2021/12/09		90	%	70 - 130
			Benzene	2021/12/09	<0.20		ug/L	
			Toluene	2021/12/09	<0.20		ug/L	
			Ethylbenzene	2021/12/09	<0.20		ug/L	
			o-Xylene	2021/12/09	<0.20		ug/L	
			p+m-Xylene	2021/12/09	<0.40		ug/L	
			Total Xylenes	2021/12/09	<0.40		ug/L	
			F1 (C6-C10)	2021/12/09	<25		ug/L	
			F1 (C6-C10) - BTEX	2021/12/09	<25		ug/L	
7717530	N_R	Method Blank	Dissolved Lead (Pb)	2021/12/13	<0.50		ug/L	
7719466	DN0	Method Blank	o-Terphenyl	2021/12/12		110	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2021/12/12	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2021/12/12	<200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2021/12/12	<200		ug/L	
7717210	LRA	LCS	1,4-Difluorobenzene	2021/12/10		99	%	70 - 130
			4-Bromofluorobenzene	2021/12/10		101	%	70 - 130
			D10-o-Xylene	2021/12/10		107	%	70 - 130
			D4-1,2-Dichloroethane	2021/12/10		82	%	70 - 130
			Benzene	2021/12/10		96	%	50 - 140
			Toluene	2021/12/10		97	%	50 - 140
			Ethylbenzene	2021/12/10		106	%	50 - 140
			o-Xylene	2021/12/10		103	%	50 - 140
			p+m-Xylene	2021/12/10		103	%	50 - 140
			F1 (C6-C10)	2021/12/10		93	%	60 - 140
7717530	N_R	LCS	Dissolved Lead (Pb)	2021/12/13		95	%	80 - 120
7719466	DN0	LCS	o-Terphenyl	2021/12/12		115	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2021/12/12		117	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2021/12/12		119	%	60 - 130
			F4 (C34-C50 Hydrocarbons)	2021/12/12		125	%	60 - 130

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C1Y3401
Report Date: 2021/12/17

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107A

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



Brad Newman, B.Sc., C.Chem., Scientific Service Specialist

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Fax: (905) 817-5777
Toll Free: 800-563-6266

EXXONMOBIL/IMPERIAL OIL - BV LABS
CHAIN-OF-CUSTODY RECORD
ANALYSIS REQUESTED

Page 1 of 1
C of C # 789749-03-01
789749

INVOICE INFORMATION	REPORT INFORMATION
Company Name: Imperial Oil Ltd - Golder Associates Ltd	Company Name: Golder Associates Ltd
Contact Name: Imperial Accounts Payable	Contact Name: ~~Rachel Lavis~~ Ian Sosney
Address: 102, 2535-3rd Avenue SE Calgary AB T2A 7W5	Address: 110 Hanover Dr. #203 ~~7250 Rue Dr Mike Ericault~~ St. Catharines ON ~~Montreal QC H2R 3P4~~
Email: CanadaAccountsPayableInvoices@golder.co	Email: Ian_Sosney@golder.com IOL_1360@golder.co
Phone: (403) 299-5600	Phone: 647 522 4698
Sampler Name (Print): Leandra Mariani & Tom Ryan	Consultant Project #: ~~20117161-2000-8000~~ 20447743-1155-2107A

	FIELD SAMPLE ID	MATRIX: GROUND WATER	MATRIX: SURFACE WATER	MATRIX: SOIL	MATRIX: OTHER	# CONTAINERS	SAMPLING: DATE (YYYY/MM/DD)	SAMPLING: TIME (24 HR)	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	~~Drinking Water~~ BTEX / F1	~~Other Matrix~~ PHC F2-F4	dissolved lead
1	F. blank.				X	5	2021/12/03	13:00			X	X	X
2	Trip blank				X	2	2021/12/03	13:05			X		
3													
4													
5													
6													
7													
8													
9													
10													

IOL SITE LOCATION: ~~Golman Drive, Ottawa~~ 11060 Merivale Dr. Ottawa ON

IOL PROJECT # (if applicable): N/A

BV LABS TASK ORDER # OR SERVICE ORDER # + LINE ITEM: ~~20117161-2000-8000~~ 20447743-1155-7777

REGULATORY CRITERIA / DETECTION LIMITS:
X REG 153 Table 3 ☐ 2004 X 2011 ☐ RSC
(Please indicate which Reg. version and if RSC required)
☐ ODWS ☐ PWQO ☐ Reg 406 Table ____
☐ Other ____

SPECIAL INSTRUCTIONS:
IES A2601436
samples may contain headspace

JARS USED AND NOT SUBMITTED Enter N/A for Water: NA

TURNAROUND TIME

Standard	(5 days)	X
Rush	(3 days)	☐
	(2 days)	☐
	(1 day)	☐
	(same day)	☐

Date Required:

	YES	NO	COOLER ID: 1			COOLER ID:				COOLER ID:			
SEAL PRESENT	✓					SEAL PRESENT				SEAL PRESENT			
SEAL INTACT	✓		TEMP °C	1	2	SEAL INTACT		TEMP °C	1	SEAL INTACT		TEMP °C	1
COOLING MEDIA PRESENT	✓			3	4	COOLING MEDIA PRESENT			2 3	COOLING MEDIA PRESENT			2 3

* RELINQUISHED BY:	DATE:	TIME (24 HR)	RECEIVED BY:	DATE:	TIME (24 HR)
1. Mariani	Leandra Mariani 2021/12/07	15:51	1. MAMC	2021/12/08	0910
2.			2.		
3.			3.		

LAB USE ONLY
BV LABS JOB #: C1Y3401
SAMPLES
LABELED BY: KTN
VERIFIED BY: DSG

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BV LABS' STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVLABS.COM/TERMS-AND-CONDITIONS.

COC – 1012 (2016) IOL – ON White: BV Labs Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: December 3, 2021

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Bureau Veritas Mississauga

Consultant Project Number: 20447743-1155

Sample Submission Number: C1Y3401

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within
Extraction Surrogate Recovery	X			acceptance criteria.
Method Blank Concentration	X			
Matrix Duplicate RPD			X	
Matrix Spike Recovery			X	
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration	X			All field QC samples are within
Trip Blank Concentration	X			alert limits.
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): Amanda Newberry

Date: January 4, 2022

Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107A
Your C.O.C. #: 82791

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2021/12/23
Report #: R6937732
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1Y6956
Received: 2021/12/13, 09:00

Sample Matrix: Air
Samples Received: 6

Analyses	Quantity	Laboratory Method	Analytical Method
BTEX and CCME Compounds in Air(TO-15mod)	6	BRL SOP-00304	EPA TO-15 m
Canister Pressure (TO-15)	6	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (ug/m3)	6	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (TO-15) (1)	6	BRL SOP-00304	EPA TO-15 m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard. All samples were analyzed within hold time unless otherwise flagged.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Air sampling canisters have been cleaned in accordance with U.S. EPA Method TO15. At the end of the cleaning, evacuation, and pressurization cycles, one canister was selected and was pressurized with Zero Air. This canister was then analyzed via TO15 on a GC/MS. The canister must have been found to contain <0.2 ppbv concentration of all target analytes in order for the batch to have been considered clean. Each canister also underwent a leak check prior to shipment.

Please Note: SUMMA® canister samples will be retained by Bureau Veritas Laboratories for a period of 5 calendar days or as contractually agreed from the date of this report, after which time they will be cleaned for reuse. If you require a longer sample storage period, please contact your service representative.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107A
Your C.O.C. #: 82791

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2021/12/23
Report #: R6937732
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1Y6956
Received: 2021/12/13, 09:00

Encryption Key

Gina Baybayan
Project Manager
23 Dec 2021 16:06:50

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Gina Baybayan, Project Manager
Email: Gina.Baybayan@bureauveritas.com
Phone# (905)817-5766

==========

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C1Y6956
Report Date: 2021/12/23

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107A

RESULTS OF ANALYSES OF AIR

Bureau Veritas ID		RIC795	RIC796	RIC797	RIC798	RIC799		RIC800	
Sampling Date		2021/12/09 15:16	2021/12/09 12:56	2021/12/09 14:56	2021/12/09 14:56	2021/12/09 14:01		2021/12/10 11:15	
COC Number		82791	82791	82791	82791	82791		82791	
	UNITS	**SV21-02**	**SV21-03**	**SV16-01**	**DUP A**	**SV16-02**	**QC Batch**	**SV21-01**	**QC Batch**
Pressure on Receipt	psig	(-3.3)	(-2.5)	(-3.4)	(-4.3)	(-3.7)	7737778	(-3.4)	7737798

QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

VOLATILE ORGANICS BY GC/MS (AIR)

Bureau Veritas ID		RIC795		RIC796	RIC796		RIC797	RIC798		
Sampling Date		2021/12/09 15:16		2021/12/09 12:56	2021/12/09 12:56		2021/12/09 14:56	2021/12/09 14:56		
COC Number		82791		82791	82791		82791	82791		
	UNITS	**SV21-02**	**RDL**	**SV21-03**	**SV21-03 Lab-Dup**	**RDL**	**SV16-01**	**DUP A**	**RDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ppbv	0.47	0.20	0.71	0.72	0.20	2.23	2.34	0.20	7737780
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	0.17	<0.17	<0.17	0.17	<0.17	<0.17	0.17	7737780
Chloromethane	ppbv	0.33	0.30	0.31	<0.30	0.30	<0.30	<0.30	0.30	7737780
Vinyl Chloride	ppbv	<0.10	0.10	<0.10	<0.10	0.10	<0.10	<0.10	0.10	7737780
Chloroethane	ppbv	<0.30	0.30	<0.30	<0.30	0.30	<0.30	<0.30	0.30	7737780
1,3-Butadiene	ppbv	<0.50	0.50	<0.50	<0.50	0.50	<0.50	<0.50	0.50	7737780
Trichlorofluoromethane (FREON 11)	ppbv	<0.20	0.20	<0.20	<0.20	0.20	<0.20	<0.20	0.20	7737780
Ethanol (ethyl alcohol)	ppbv	1.9	1.0	1.9	1.9	1.0	1.3	<1.0	1.0	7737780
Trichlorotrifluoroethane	ppbv	<0.15	0.15	<0.15	<0.15	0.15	<0.15	<0.15	0.15	7737780
2-propanol	ppbv	<1.0	1.0	<1.0	<1.0	1.0	<1.0	<1.0	1.0	7737780
2-Propanone	ppbv	2.69	0.60	2.88	3.05	0.60	1.79	1.47	0.60	7737780
Methyl Ethyl Ketone (2-Butanone)	ppbv	<0.31	0.31	<0.20	<0.20	0.20	<0.20	<0.20	0.20	7737780
Methyl Isobutyl Ketone	ppbv	<0.20	0.20	<0.20	<0.20	0.20	<0.20	<0.20	0.20	7737780
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	1.0	<1.0	<1.0	1.0	<1.0	<1.0	1.0	7737780
Methyl t-butyl ether (MTBE)	ppbv	<0.20	0.20	<0.20	<0.20	0.20	<0.20	<0.20	0.20	7737780
Ethyl Acetate	ppbv	<1.0	1.0	<1.0	<1.0	1.0	<1.0	<1.0	1.0	7737780
1,1-Dichloroethylene	ppbv	<0.10	0.10	<0.10	<0.10	0.10	<0.10	<0.10	0.10	7737780
cis-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.10	<0.10	0.10	<0.10	<0.10	0.10	7737780
trans-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.10	<0.10	0.10	<0.10	<0.10	0.10	7737780
Methylene Chloride(Dichloromethane)	ppbv	<0.60	0.60	<0.60	<0.60	0.60	<0.60	<0.60	0.60	7737780
Chloroform	ppbv	4.67	0.10	<0.10	<0.10	0.10	<0.10	<0.10	0.10	7737780
Carbon Tetrachloride	ppbv	<0.10	0.10	<0.10	<0.10	0.10	<0.10	<0.10	0.10	7737780
1,1-Dichloroethane	ppbv	<0.10	0.10	<0.10	<0.10	0.10	<0.10	<0.10	0.10	7737780
1,2-Dichloroethane	ppbv	<0.10	0.10	<0.10	<0.10	0.10	<0.10	<0.10	0.10	7737780
Ethylene Dibromide	ppbv	<0.10	0.10	<0.10	<0.10	0.10	<0.10	<0.10	0.10	7737780
1,1,1-Trichloroethane	ppbv	<0.10	0.10	<0.10	<0.10	0.10	<0.10	<0.10	0.10	7737780
1,1,2-Trichloroethane	ppbv	<0.10	0.10	<0.10	<0.10	0.10	<0.10	<0.10	0.10	7737780
1,1,2,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.10	<0.10	0.10	<0.10	<0.10	0.10	7737780
cis-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.10	<0.10	0.10	<0.10	<0.10	0.10	7737780
trans-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.10	<0.10	0.10	<0.10	<0.10	0.10	7737780
1,2-Dichloropropane	ppbv	<0.10	0.10	<0.10	<0.10	0.10	<0.10	<0.10	0.10	7737780
Bromomethane	ppbv	<0.10	0.10	<0.10	<0.10	0.10	<0.10	<0.10	0.10	7737780
Bromoform	ppbv	<0.20	0.20	<0.20	<0.20	0.20	<0.20	<0.20	0.20	7737780

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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VOLATILE ORGANICS BY GC/MS (AIR)

Bureau Veritas ID		RIC795		RIC796	RIC796		RIC797	RIC798		
Sampling Date		2021/12/09 15:16		2021/12/09 12:56	2021/12/09 12:56		2021/12/09 14:56	2021/12/09 14:56		
COC Number		82791		82791	82791		82791	82791		
	UNITS	**SV21-02**	**RDL**	**SV21-03**	**SV21-03 Lab-Dup**	**RDL**	**SV16-01**	**DUP A**	**RDL**	**QC Batch**
Bromodichloromethane	ppbv	<0.20	0.20	<0.20	<0.20	0.20	<0.20	<0.20	0.20	7737780
Dibromochloromethane	ppbv	<0.20	0.20	<0.20	<0.20	0.20	<0.20	<0.20	0.20	7737780
Trichloroethylene	ppbv	<0.10	0.10	<0.10	<0.10	0.10	2.12	2.29	0.10	7737780
Tetrachloroethylene	ppbv	0.41	0.10	0.59	0.60	0.10	<0.10	0.10	0.10	7737780
Benzene	ppbv	<0.10	0.10	<0.10	<0.10	0.10	<0.10	<0.10	0.10	7737780
Toluene	ppbv	0.31	0.10	<0.10	<0.10	0.10	<0.10	<0.10	0.10	7737780
Ethylbenzene	ppbv	<0.10	0.10	<0.10	<0.10	0.10	<0.10	<0.10	0.10	7737780
p+m-Xylene	ppbv	<0.20	0.20	<0.20	<0.20	0.20	<0.20	<0.20	0.20	7737780
o-Xylene	ppbv	<0.10	0.10	<0.10	<0.10	0.10	<0.10	<0.10	0.10	7737780
Styrene	ppbv	<0.10	0.10	<0.10	<0.10	0.10	<0.10	<0.10	0.10	7737780
4-ethyltoluene	ppbv	<0.50	0.50	<0.50	<0.50	0.50	<0.50	<0.50	0.50	7737780
1,3,5-Trimethylbenzene	ppbv	<0.50	0.50	<0.50	<0.50	0.50	<0.50	<0.50	0.50	7737780
1,2,4-Trimethylbenzene	ppbv	<0.50	0.50	<0.50	<0.50	0.50	<0.50	<0.50	0.50	7737780
Chlorobenzene	ppbv	<0.10	0.10	<0.10	<0.10	0.10	<0.10	<0.10	0.10	7737780
Benzyl chloride	ppbv	<0.50	0.50	<0.50	<0.50	0.50	<0.50	<0.50	0.50	7737780
1,3-Dichlorobenzene	ppbv	<0.40	0.40	<0.40	<0.40	0.40	<0.40	<0.40	0.40	7737780
1,4-Dichlorobenzene	ppbv	<0.10	0.10	<0.10	<0.10	0.10	<0.10	<0.10	0.10	7737780
1,2-Dichlorobenzene	ppbv	<0.10	0.10	<0.10	<0.10	0.10	<0.10	<0.10	0.10	7737780
1,2,4-Trichlorobenzene	ppbv	<0.50	0.50	<0.50	<0.50	0.50	<0.50	<0.50	0.50	7737780
Hexachlorobutadiene	ppbv	<0.50	0.50	<0.50	<0.50	0.50	<0.50	<0.50	0.50	7737780
Hexane	ppbv	<0.20	0.20	0.52	0.53	0.20	<0.20	<0.20	0.20	7737780
Heptane	ppbv	<0.30	0.30	<0.30	<0.30	0.30	<0.30	<0.30	0.30	7737780
Cyclohexane	ppbv	<0.20	0.20	0.26	0.21	0.20	<0.20	<0.20	0.20	7737780
Tetrahydrofuran	ppbv	<0.40	0.40	<0.40	<0.40	0.40	<0.40	<0.40	0.40	7737780
1,4-Dioxane	ppbv	<1.0	1.0	<1.0	<1.0	1.0	<1.0	<1.0	1.0	7737780
Naphthalene	ppbv	<0.20	0.20	<0.20	<0.20	0.20	<0.20	<0.20	0.20	7737780
Total Xylenes	ppbv	<0.30	0.30	<0.30	<0.30	0.30	<0.30	<0.30	0.30	7737780
1,1,1,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.10	<0.10	0.10	<0.10	<0.10	0.10	7737780
Vinyl Bromide	ppbv	<0.20	0.20	<0.20	<0.20	0.20	<0.20	<0.20	0.20	7737780
Propene	ppbv	<4.1	4.1	<2.1	<2.1	2.1	<0.50	<0.50	0.50	7737780
2,2,4-Trimethylpentane	ppbv	<0.20	0.20	<0.20	<0.20	0.20	<0.20	<0.20	0.20	7737780
Carbon Disulfide	ppbv	<0.50	0.50	<0.50	<0.50	0.50	<0.50	<0.50	0.50	7737780
Vinyl Acetate	ppbv	<0.20	0.20	<0.20	<0.20	0.20	<0.20	<0.20	0.20	7737780

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C1Y6956
Report Date: 2021/12/23

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107A

VOLATILE ORGANICS BY GC/MS (AIR)

Bureau Veritas ID		RIC795		RIC796	RIC796		RIC797	RIC798		
Sampling Date		2021/12/09 15:16		2021/12/09 12:56	2021/12/09 12:56		2021/12/09 14:56	2021/12/09 14:56		
COC Number		82791		82791	82791		82791	82791		
	UNITS	**SV21-02**	**RDL**	**SV21-03**	**SV21-03 Lab-Dup**	**RDL**	**SV16-01**	**DUP A**	**RDL**	**QC Batch**
Instrument Surrogate Recovery (%)										
Bromochloromethane	%	96		98	98		96	94		7737780
D5-Chlorobenzene	%	90		92	92		89	88		7737780
Difluorobenzene	%	95		97	97		95	94		7737780

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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VOLATILE ORGANICS BY GC/MS (AIR)

Bureau Veritas ID		RIC799		RIC800		
Sampling Date		2021/12/09 14:01		2021/12/10 11:15		
COC Number		82791		82791		
	UNITS	**SV16-02**	**QC Batch**	**SV21-01**	**RDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ppbv	0.64	7737780	1.12	0.20	7737800
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	7737780	<0.17	0.17	7737800
Chloromethane	ppbv	0.46	7737780	<0.30	0.30	7737800
Vinyl Chloride	ppbv	<0.10	7737780	<0.10	0.10	7737800
Chloroethane	ppbv	<0.30	7737780	<0.30	0.30	7737800
1,3-Butadiene	ppbv	<0.50	7737780	<0.50	0.50	7737800
Trichlorofluoromethane (FREON 11)	ppbv	0.20	7737780	<0.20	0.20	7737800
Ethanol (ethyl alcohol)	ppbv	1.9	7737780	1.2	1.0	7737800
Trichlorotrifluoroethane	ppbv	<0.15	7737780	<0.15	0.15	7737800
2-propanol	ppbv	<1.0	7737780	19.1	1.0	7737800
2-Propanone	ppbv	3.63	7737780	4.79	0.60	7737800
Methyl Ethyl Ketone (2-Butanone)	ppbv	0.41	7737780	0.47	0.20	7737800
Methyl Isobutyl Ketone	ppbv	<0.20	7737780	<0.20	0.20	7737800
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	7737780	<1.0	1.0	7737800
Methyl t-butyl ether (MTBE)	ppbv	<0.20	7737780	<0.20	0.20	7737800
Ethyl Acetate	ppbv	<1.0	7737780	<1.0	1.0	7737800
1,1-Dichloroethylene	ppbv	<0.10	7737780	<0.10	0.10	7737800
cis-1,2-Dichloroethylene	ppbv	<0.10	7737780	<0.10	0.10	7737800
trans-1,2-Dichloroethylene	ppbv	<0.10	7737780	<0.10	0.10	7737800
Methylene Chloride(Dichloromethane)	ppbv	<0.60	7737780	<0.60	0.60	7737800
Chloroform	ppbv	0.76	7737780	<0.10	0.10	7737800
Carbon Tetrachloride	ppbv	<0.10	7737780	<0.10	0.10	7737800
1,1-Dichloroethane	ppbv	<0.10	7737780	<0.10	0.10	7737800
1,2-Dichloroethane	ppbv	<0.10	7737780	<0.10	0.10	7737800
Ethylene Dibromide	ppbv	<0.10	7737780	<0.10	0.10	7737800
1,1,1-Trichloroethane	ppbv	<0.10	7737780	<0.10	0.10	7737800
1,1,2-Trichloroethane	ppbv	<0.10	7737780	<0.10	0.10	7737800
1,1,2,2-Tetrachloroethane	ppbv	<0.10	7737780	<0.10	0.10	7737800
cis-1,3-Dichloropropene	ppbv	<0.10	7737780	<0.10	0.10	7737800
trans-1,3-Dichloropropene	ppbv	<0.10	7737780	<0.10	0.10	7737800
1,2-Dichloropropane	ppbv	<0.10	7737780	<0.10	0.10	7737800
Bromomethane	ppbv	<0.10	7737780	<0.10	0.10	7737800
Bromoform	ppbv	<0.20	7737780	<0.20	0.20	7737800
Bromodichloromethane	ppbv	<0.20	7737780	<0.20	0.20	7737800

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QC Batch = Quality Control Batch

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VOLATILE ORGANICS BY GC/MS (AIR)

Bureau Veritas ID		RIC799		RIC800		
Sampling Date		2021/12/09 14:01		2021/12/10 11:15		
COC Number		82791		82791		
	UNITS	**SV16-02**	**QC Batch**	**SV21-01**	**RDL**	**QC Batch**
Dibromochloromethane	ppbv	<0.20	7737780	<0.20	0.20	7737800
Trichloroethylene	ppbv	<0.10	7737780	<0.10	0.10	7737800
Tetrachloroethylene	ppbv	0.11	7737780	0.96	0.10	7737800
Benzene	ppbv	<0.10	7737780	0.14	0.10	7737800
Toluene	ppbv	0.11	7737780	0.10	0.10	7737800
Ethylbenzene	ppbv	<0.10	7737780	<0.10	0.10	7737800
p+m-Xylene	ppbv	<0.20	7737780	<0.20	0.20	7737800
o-Xylene	ppbv	<0.10	7737780	<0.10	0.10	7737800
Styrene	ppbv	<0.10	7737780	<0.10	0.10	7737800
4-ethyltoluene	ppbv	<0.50	7737780	<0.50	0.50	7737800
1,3,5-Trimethylbenzene	ppbv	<0.50	7737780	<0.50	0.50	7737800
1,2,4-Trimethylbenzene	ppbv	<0.50	7737780	<0.50	0.50	7737800
Chlorobenzene	ppbv	<0.10	7737780	<0.10	0.10	7737800
Benzyl chloride	ppbv	<0.50	7737780	<0.50	0.50	7737800
1,3-Dichlorobenzene	ppbv	<0.40	7737780	<0.40	0.40	7737800
1,4-Dichlorobenzene	ppbv	<0.10	7737780	<0.10	0.10	7737800
1,2-Dichlorobenzene	ppbv	<0.10	7737780	<0.10	0.10	7737800
1,2,4-Trichlorobenzene	ppbv	<0.50	7737780	<0.50	0.50	7737800
Hexachlorobutadiene	ppbv	<0.50	7737780	<0.50	0.50	7737800
Hexane	ppbv	<0.20	7737780	1.59	0.20	7737800
Heptane	ppbv	<0.30	7737780	<0.30	0.30	7737800
Cyclohexane	ppbv	<0.20	7737780	<0.20	0.20	7737800
Tetrahydrofuran	ppbv	<0.40	7737780	<0.40	0.40	7737800
1,4-Dioxane	ppbv	<1.0	7737780	<1.0	1.0	7737800
Naphthalene	ppbv	<0.20	7737780	<0.20	0.20	7737800
Total Xylenes	ppbv	<0.30	7737780	<0.30	0.30	7737800
1,1,1,2-Tetrachloroethane	ppbv	<0.10	7737780	<0.10	0.10	7737800
Vinyl Bromide	ppbv	<0.20	7737780	<0.20	0.20	7737800
Propene	ppbv	<0.50	7737780	114	0.50	7737800
2,2,4-Trimethylpentane	ppbv	<0.20	7737780	<0.20	0.20	7737800
Carbon Disulfide	ppbv	<0.50	7737780	<0.50	0.50	7737800
Vinyl Acetate	ppbv	<0.20	7737780	<0.20	0.20	7737800

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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VOLATILE ORGANICS BY GC/MS (AIR)

Bureau Veritas ID		RIC799		RIC800		
Sampling Date		2021/12/09 14:01		2021/12/10 11:15		
COC Number		82791		82791		
	UNITS	**SV16-02**	**QC Batch**	**SV21-01**	**RDL**	**QC Batch**
Instrument Surrogate Recovery (%)						
Bromochloromethane	%	95	7737780	94		7737800
D5-Chlorobenzene	%	87	7737780	90		7737800
Difluorobenzene	%	94	7737780	95		7737800

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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CALCULATED VOLATILE ORGANICS (AIR)

Bureau Veritas ID		RIC795		RIC796	RIC796		RIC797	RIC798		
Sampling Date		2021/12/09 15:16		2021/12/09 12:56	2021/12/09 12:56		2021/12/09 14:56	2021/12/09 14:56		
COC Number		82791		82791	82791		82791	82791		
	UNITS	**SV21-02**	**RDL**	**SV21-03**	**SV21-03 Lab-Dup**	**RDL**	**SV16-01**	**DUP A**	**RDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ug/m3	2.31	0.99	3.52	3.55	0.99	11.0	11.6	0.99	7721417
1,2-Dichlorotetrafluoroethane	ug/m3	<1.2	1.2	<1.2	<1.2	1.2	<1.2	<1.2	1.2	7721417
Chloromethane	ug/m3	0.68	0.62	0.64	<0.62	0.62	<0.62	<0.62	0.62	7721417
Vinyl Chloride	ug/m3	<0.26	0.26	<0.26	<0.26	0.26	<0.26	<0.26	0.26	7721417
Chloroethane	ug/m3	<0.79	0.79	<0.79	<0.79	0.79	<0.79	<0.79	0.79	7721417
1,3-Butadiene	ug/m3	<1.1	1.1	<1.1	<1.1	1.1	<1.1	<1.1	1.1	7721417
Trichlorofluoromethane (FREON 11)	ug/m3	<1.1	1.1	<1.1	<1.1	1.1	<1.1	<1.1	1.1	7721417
Ethanol (ethyl alcohol)	ug/m3	3.5	1.9	3.6	3.7	1.9	2.5	<1.9	1.9	7721417
Trichlorotrifluoroethane	ug/m3	<1.2	1.2	<1.2	<1.2	1.2	<1.2	<1.2	1.2	7721417
2-propanol	ug/m3	<2.5	2.5	<2.5	<2.5	2.5	<2.5	<2.5	2.5	7721417
2-Propanone	ug/m3	6.4	1.4	6.8	7.3	1.4	4.3	3.5	1.4	7721417
Methyl Ethyl Ketone (2-Butanone)	ug/m3	<0.91	0.91	<0.59	<0.59	0.59	<0.59	<0.59	0.59	7721417
Methyl Isobutyl Ketone	ug/m3	<0.82	0.82	<0.82	<0.82	0.82	<0.82	<0.82	0.82	7721417
Methyl Butyl Ketone (2-Hexanone)	ug/m3	<4.1	4.1	<4.1	<4.1	4.1	<4.1	<4.1	4.1	7721417
Methyl t-butyl ether (MTBE)	ug/m3	<0.72	0.72	<0.72	<0.72	0.72	<0.72	<0.72	0.72	7721417
Ethyl Acetate	ug/m3	<3.6	3.6	<3.6	<3.6	3.6	<3.6	<3.6	3.6	7721417
1,1-Dichloroethylene	ug/m3	<0.40	0.40	<0.40	<0.40	0.40	<0.40	<0.40	0.40	7721417
cis-1,2-Dichloroethylene	ug/m3	<0.40	0.40	<0.40	<0.40	0.40	<0.40	<0.40	0.40	7721417
trans-1,2-Dichloroethylene	ug/m3	<0.40	0.40	<0.40	<0.40	0.40	<0.40	<0.40	0.40	7721417
Methylene Chloride(Dichloromethane)	ug/m3	<2.1	2.1	<2.1	<2.1	2.1	<2.1	<2.1	2.1	7721417
Chloroform	ug/m3	22.8	0.49	<0.49	<0.49	0.49	<0.49	<0.49	0.49	7721417
Carbon Tetrachloride	ug/m3	<0.63	0.63	<0.63	<0.63	0.63	<0.63	<0.63	0.63	7721417
1,1-Dichloroethane	ug/m3	<0.40	0.40	<0.40	<0.40	0.40	<0.40	<0.40	0.40	7721417
1,2-Dichloroethane	ug/m3	<0.40	0.40	<0.40	<0.40	0.40	<0.40	<0.40	0.40	7721417
Ethylene Dibromide	ug/m3	<0.77	0.77	<0.77	<0.77	0.77	<0.77	<0.77	0.77	7721417
1,1,1-Trichloroethane	ug/m3	<0.55	0.55	<0.55	<0.55	0.55	<0.55	<0.55	0.55	7721417
1,1,2-Trichloroethane	ug/m3	<0.55	0.55	<0.55	<0.55	0.55	<0.55	<0.55	0.55	7721417
1,1,2,2-Tetrachloroethane	ug/m3	<0.69	0.69	<0.69	<0.69	0.69	<0.69	<0.69	0.69	7721417
cis-1,3-Dichloropropene	ug/m3	<0.45	0.45	<0.45	<0.45	0.45	<0.45	<0.45	0.45	7721417
trans-1,3-Dichloropropene	ug/m3	<0.45	0.45	<0.45	<0.45	0.45	<0.45	<0.45	0.45	7721417
1,2-Dichloropropane	ug/m3	<0.46	0.46	<0.46	<0.46	0.46	<0.46	<0.46	0.46	7721417
Bromomethane	ug/m3	<0.39	0.39	<0.39	<0.39	0.39	<0.39	<0.39	0.39	7721417
Bromoform	ug/m3	<2.1	2.1	<2.1	<2.1	2.1	<2.1	<2.1	2.1	7721417

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Lab-Dup = Laboratory Initiated Duplicate

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CALCULATED VOLATILE ORGANICS (AIR)

Bureau Veritas ID		RIC795		RIC796	RIC796		RIC797	RIC798		
Sampling Date		2021/12/09 15:16		2021/12/09 12:56	2021/12/09 12:56		2021/12/09 14:56	2021/12/09 14:56		
COC Number		82791		82791	82791		82791	82791		
	UNITS	**SV21-02**	**RDL**	**SV21-03**	**SV21-03 Lab-Dup**	**RDL**	**SV16-01**	**DUP A**	**RDL**	**QC Batch**
Bromodichloromethane	ug/m3	<1.3	1.3	<1.3	<1.3	1.3	<1.3	<1.3	1.3	7721417
Dibromochloromethane	ug/m3	<1.7	1.7	<1.7	<1.7	1.7	<1.7	<1.7	1.7	7721417
Trichloroethylene	ug/m3	<0.54	0.54	<0.54	<0.54	0.54	11.4	12.3	0.54	7721417
Tetrachloroethylene	ug/m3	2.76	0.68	4.01	4.08	0.68	<0.68	0.68	0.68	7721417
Benzene	ug/m3	<0.32	0.32	<0.32	<0.32	0.32	<0.32	<0.32	0.32	7721417
Toluene	ug/m3	1.16	0.38	<0.38	<0.38	0.38	<0.38	<0.38	0.38	7721417
Ethylbenzene	ug/m3	<0.43	0.43	<0.43	<0.43	0.43	<0.43	<0.43	0.43	7721417
p+m-Xylene	ug/m3	<0.87	0.87	<0.87	<0.87	0.87	<0.87	<0.87	0.87	7721417
o-Xylene	ug/m3	<0.43	0.43	<0.43	<0.43	0.43	<0.43	<0.43	0.43	7721417
Styrene	ug/m3	<0.43	0.43	<0.43	<0.43	0.43	<0.43	<0.43	0.43	7721417
4-ethyltoluene	ug/m3	<2.5	2.5	<2.5	<2.5	2.5	<2.5	<2.5	2.5	7721417
1,3,5-Trimethylbenzene	ug/m3	<2.5	2.5	<2.5	<2.5	2.5	<2.5	<2.5	2.5	7721417
1,2,4-Trimethylbenzene	ug/m3	<2.5	2.5	<2.5	<2.5	2.5	<2.5	<2.5	2.5	7721417
Chlorobenzene	ug/m3	<0.46	0.46	<0.46	<0.46	0.46	<0.46	<0.46	0.46	7721417
Benzyl chloride	ug/m3	<2.6	2.6	<2.6	<2.6	2.6	<2.6	<2.6	2.6	7721417
1,3-Dichlorobenzene	ug/m3	<2.4	2.4	<2.4	<2.4	2.4	<2.4	<2.4	2.4	7721417
1,4-Dichlorobenzene	ug/m3	<0.60	0.60	<0.60	<0.60	0.60	<0.60	<0.60	0.60	7721417
1,2-Dichlorobenzene	ug/m3	<0.60	0.60	<0.60	<0.60	0.60	<0.60	<0.60	0.60	7721417
1,2,4-Trichlorobenzene	ug/m3	<3.7	3.7	<3.7	<3.7	3.7	<3.7	<3.7	3.7	7721417
Hexachlorobutadiene	ug/m3	<5.3	5.3	<5.3	<5.3	5.3	<5.3	<5.3	5.3	7721417
Hexane	ug/m3	<0.70	0.70	1.84	1.85	0.70	<0.70	<0.70	0.70	7721417
Heptane	ug/m3	<1.2	1.2	<1.2	<1.2	1.2	<1.2	<1.2	1.2	7721417
Cyclohexane	ug/m3	<0.69	0.69	0.89	0.73	0.69	<0.69	<0.69	0.69	7721417
Tetrahydrofuran	ug/m3	<1.2	1.2	<1.2	<1.2	1.2	<1.2	<1.2	1.2	7721417
1,4-Dioxane	ug/m3	<3.6	3.6	<3.6	<3.6	3.6	<3.6	<3.6	3.6	7721417
Naphthalene	ug/m3	<1.0	1.0	<1.0	<1.0	1.0	<1.0	<1.0	1.0	7721417
Total Xylenes	ug/m3	<1.3	1.3	<1.3	<1.3	1.3	<1.3	<1.3	1.3	7721417
1,1,1,2-Tetrachloroethane	ug/m3	<0.69	0.69	<0.69	<0.69	0.69	<0.69	<0.69	0.69	7721417
Vinyl Bromide	ug/m3	<0.87	0.87	<0.87	<0.87	0.87	<0.87	<0.87	0.87	7721417
Propene	ug/m3	<7.1	7.1	<3.6	<3.6	3.6	<0.86	<0.86	0.86	7721417
2,2,4-Trimethylpentane	ug/m3	<0.93	0.93	<0.93	<0.93	0.93	<0.93	<0.93	0.93	7721417
Carbon Disulfide	ug/m3	<1.6	1.6	<1.6	<1.6	1.6	<1.6	<1.6	1.6	7721417
Vinyl Acetate	ug/m3	<0.70	0.70	<0.70	<0.70	0.70	<0.70	<0.70	0.70	7721417

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

CALCULATED VOLATILE ORGANICS (AIR)

Bureau Veritas ID		RIC799	RIC800		
Sampling Date		2021/12/09 14:01	2021/12/10 11:15		
COC Number		82791	82791		
	UNITS	**SV16-02**	**SV21-01**	**RDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ug/m3	3.15	5.53	0.99	7721417
1,2-Dichlorotetrafluoroethane	ug/m3	<1.2	<1.2	1.2	7721417
Chloromethane	ug/m3	0.96	<0.62	0.62	7721417
Vinyl Chloride	ug/m3	<0.26	<0.26	0.26	7721417
Chloroethane	ug/m3	<0.79	<0.79	0.79	7721417
1,3-Butadiene	ug/m3	<1.1	<1.1	1.1	7721417
Trichlorofluoromethane (FREON 11)	ug/m3	1.1	<1.1	1.1	7721417
Ethanol (ethyl alcohol)	ug/m3	3.6	2.2	1.9	7721417
Trichlorotrifluoroethane	ug/m3	<1.2	<1.2	1.2	7721417
2-propanol	ug/m3	<2.5	47.0	2.5	7721417
2-Propanone	ug/m3	8.6	11.4	1.4	7721417
Methyl Ethyl Ketone (2-Butanone)	ug/m3	1.21	1.38	0.59	7721417
Methyl Isobutyl Ketone	ug/m3	<0.82	<0.82	0.82	7721417
Methyl Butyl Ketone (2-Hexanone)	ug/m3	<4.1	<4.1	4.1	7721417
Methyl t-butyl ether (MTBE)	ug/m3	<0.72	<0.72	0.72	7721417
Ethyl Acetate	ug/m3	<3.6	<3.6	3.6	7721417
1,1-Dichloroethylene	ug/m3	<0.40	<0.40	0.40	7721417
cis-1,2-Dichloroethylene	ug/m3	<0.40	<0.40	0.40	7721417
trans-1,2-Dichloroethylene	ug/m3	<0.40	<0.40	0.40	7721417
Methylene Chloride(Dichloromethane)	ug/m3	<2.1	<2.1	2.1	7721417
Chloroform	ug/m3	3.69	<0.49	0.49	7721417
Carbon Tetrachloride	ug/m3	<0.63	<0.63	0.63	7721417
1,1-Dichloroethane	ug/m3	<0.40	<0.40	0.40	7721417
1,2-Dichloroethane	ug/m3	<0.40	<0.40	0.40	7721417
Ethylene Dibromide	ug/m3	<0.77	<0.77	0.77	7721417
1,1,1-Trichloroethane	ug/m3	<0.55	<0.55	0.55	7721417
1,1,2-Trichloroethane	ug/m3	<0.55	<0.55	0.55	7721417
1,1,2,2-Tetrachloroethane	ug/m3	<0.69	<0.69	0.69	7721417
cis-1,3-Dichloropropene	ug/m3	<0.45	<0.45	0.45	7721417
trans-1,3-Dichloropropene	ug/m3	<0.45	<0.45	0.45	7721417
1,2-Dichloropropane	ug/m3	<0.46	<0.46	0.46	7721417
Bromomethane	ug/m3	<0.39	<0.39	0.39	7721417
Bromoform	ug/m3	<2.1	<2.1	2.1	7721417
Bromodichloromethane	ug/m3	<1.3	<1.3	1.3	7721417

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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CALCULATED VOLATILE ORGANICS (AIR)

Bureau Veritas ID		RIC799	RIC800		
Sampling Date		2021/12/09 14:01	2021/12/10 11:15		
COC Number		82791	82791		
	UNITS	**SV16-02**	**SV21-01**	**RDL**	**QC Batch**
Dibromochloromethane	ug/m3	<1.7	<1.7	1.7	7721417
Trichloroethylene	ug/m3	<0.54	<0.54	0.54	7721417
Tetrachloroethylene	ug/m3	0.72	6.54	0.68	7721417
Benzene	ug/m3	<0.32	0.44	0.32	7721417
Toluene	ug/m3	0.40	0.39	0.38	7721417
Ethylbenzene	ug/m3	<0.43	<0.43	0.43	7721417
p+m-Xylene	ug/m3	<0.87	<0.87	0.87	7721417
o-Xylene	ug/m3	<0.43	<0.43	0.43	7721417
Styrene	ug/m3	<0.43	<0.43	0.43	7721417
4-ethyltoluene	ug/m3	<2.5	<2.5	2.5	7721417
1,3,5-Trimethylbenzene	ug/m3	<2.5	<2.5	2.5	7721417
1,2,4-Trimethylbenzene	ug/m3	<2.5	<2.5	2.5	7721417
Chlorobenzene	ug/m3	<0.46	<0.46	0.46	7721417
Benzyl chloride	ug/m3	<2.6	<2.6	2.6	7721417
1,3-Dichlorobenzene	ug/m3	<2.4	<2.4	2.4	7721417
1,4-Dichlorobenzene	ug/m3	<0.60	<0.60	0.60	7721417
1,2-Dichlorobenzene	ug/m3	<0.60	<0.60	0.60	7721417
1,2,4-Trichlorobenzene	ug/m3	<3.7	<3.7	3.7	7721417
Hexachlorobutadiene	ug/m3	<5.3	<5.3	5.3	7721417
Hexane	ug/m3	<0.70	5.60	0.70	7721417
Heptane	ug/m3	<1.2	<1.2	1.2	7721417
Cyclohexane	ug/m3	<0.69	<0.69	0.69	7721417
Tetrahydrofuran	ug/m3	<1.2	<1.2	1.2	7721417
1,4-Dioxane	ug/m3	<3.6	<3.6	3.6	7721417
Naphthalene	ug/m3	<1.0	<1.0	1.0	7721417
Total Xylenes	ug/m3	<1.3	<1.3	1.3	7721417
1,1,1,2-Tetrachloroethane	ug/m3	<0.69	<0.69	0.69	7721417
Vinyl Bromide	ug/m3	<0.87	<0.87	0.87	7721417
Propene	ug/m3	<0.86	196	0.86	7721417
2,2,4-Trimethylpentane	ug/m3	<0.93	<0.93	0.93	7721417
Carbon Disulfide	ug/m3	<1.6	<1.6	1.6	7721417
Vinyl Acetate	ug/m3	<0.70	<0.70	0.70	7721417

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Bureau Veritas Job #: C1Y6956
Report Date: 2021/12/23

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107A

VOLATILE ORGANIC HYDROCARBONS BY GC/MS (AIR)

Bureau Veritas ID		RIC795	RIC796	RIC796	RIC797	RIC798	RIC799		
Sampling Date		2021/12/09 15:16	2021/12/09 12:56	2021/12/09 12:56	2021/12/09 14:56	2021/12/09 14:56	2021/12/09 14:01		
COC Number		82791	82791	82791	82791	82791	82791		
	UNITS	**SV21-02**	**SV21-03**	**SV21-03 Lab-Dup**	**SV16-01**	**DUP A**	**SV16-02**	**RDL**	**QC Batch**
F1-BTEX, C6-C10 (as Toluene)	ug/m3	49.0	165	172	19.3	23.8	17.8	5.0	7737784
F2, C10-C16 (as Decane)	ug/m3	39.6	77.9	80.4	53.8	50.2	23.0	5.0	7737784

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

Bureau Veritas ID		RIC800		
Sampling Date		2021/12/10 11:15		
COC Number		82791		
	UNITS	**SV21-01**	**RDL**	**QC Batch**
F1-BTEX, C6-C10 (as Toluene)	ug/m3	70.4	5.0	7743870
F2, C10-C16 (as Decane)	ug/m3	29.3	5.0	7743870

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

TEST SUMMARY

Bureau Veritas ID: RIC795
Sample ID: SV21-02
Matrix: Air

Collected: 2021/12/09
Relinquished: 2021/12/10
Received: 2021/12/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	7737784	N/A	2021/12/16	Dany Marqass
Canister Pressure (TO-15)	PRES	7737778	N/A	2021/12/16	Dany Marqass
Volatile Organics in Air (ug/m3)	GC/MS	7721417	N/A	2021/12/20	Automated Statchk
Volatile Organics in Air (TO-15)	GC/MS	7737780	N/A	2021/12/16	Dany Marqass

Bureau Veritas ID: RIC796
Sample ID: SV21-03
Matrix: Air

Collected: 2021/12/09
Relinquished: 2021/12/10
Received: 2021/12/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	7737784	N/A	2021/12/16	Dany Marqass
Canister Pressure (TO-15)	PRES	7737778	N/A	2021/12/16	Dany Marqass
Volatile Organics in Air (ug/m3)	GC/MS	7721417	N/A	2021/12/20	Automated Statchk
Volatile Organics in Air (TO-15)	GC/MS	7737780	N/A	2021/12/16	Dany Marqass

Bureau Veritas ID: RIC796 Dup
Sample ID: SV21-03
Matrix: Air

Collected: 2021/12/09
Relinquished: 2021/12/10
Received: 2021/12/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	7737784	N/A	2021/12/16	Dany Marqass
Volatile Organics in Air (ug/m3)	GC/MS	7721417	N/A	2021/12/23	Automated Statchk
Volatile Organics in Air (TO-15)	GC/MS	7737780	N/A	2021/12/16	Dany Marqass

Bureau Veritas ID: RIC797
Sample ID: SV16-01
Matrix: Air

Collected: 2021/12/09
Relinquished: 2021/12/10
Received: 2021/12/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	7737784	N/A	2021/12/16	Dany Marqass
Canister Pressure (TO-15)	PRES	7737778	N/A	2021/12/16	Dany Marqass
Volatile Organics in Air (ug/m3)	GC/MS	7721417	N/A	2021/12/20	Automated Statchk
Volatile Organics in Air (TO-15)	GC/MS	7737780	N/A	2021/12/16	Dany Marqass

Bureau Veritas ID: RIC798
Sample ID: DUP A
Matrix: Air

Collected: 2021/12/09
Relinquished: 2021/12/10
Received: 2021/12/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	7737784	N/A	2021/12/16	Dany Marqass
Canister Pressure (TO-15)	PRES	7737778	N/A	2021/12/16	Dany Marqass
Volatile Organics in Air (ug/m3)	GC/MS	7721417	N/A	2021/12/20	Automated Statchk
Volatile Organics in Air (TO-15)	GC/MS	7737780	N/A	2021/12/16	Dany Marqass

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C1Y6956
Report Date: 2021/12/23

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107A

TEST SUMMARY

Bureau Veritas ID: RIC799
Sample ID: SV16-02
Matrix: Air

Collected: 2021/12/09
Relinquished: 2021/12/10
Received: 2021/12/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	7737784	N/A	2021/12/16	Dany Marqass
Canister Pressure (TO-15)	PRES	7737778	N/A	2021/12/16	Dany Marqass
Volatile Organics in Air (ug/m3)	GC/MS	7721417	N/A	2021/12/20	Automated Statchk
Volatile Organics in Air (TO-15)	GC/MS	7737780	N/A	2021/12/16	Dany Marqass

Bureau Veritas ID: RIC800
Sample ID: SV21-01
Matrix: Air

Collected: 2021/12/10
Relinquished: 2021/12/10
Received: 2021/12/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	7743870	N/A	2021/12/17	Dany Marqass
Canister Pressure (TO-15)	PRES	7737798	N/A	2021/12/17	Dany Marqass
Volatile Organics in Air (ug/m3)	GC/MS	7721417	N/A	2021/12/20	Automated Statchk
Volatile Organics in Air (TO-15)	GC/MS	7737800	N/A	2021/12/17	Dany Marqass

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GENERAL COMMENTS

Sample RIC795 [SV21-02] : Increased DL for Propene due to Propane interference.

Increased DL for 2-Butanone due to an interference.

Sample RIC796 [SV21-03] : Increased DL for Propene due to Propane interference.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7737780	DM2	Method Blank	Bromochloromethane	2021/12/16		99	%	60 - 140
			D5-Chlorobenzene	2021/12/16		92	%	60 - 140
			Difluorobenzene	2021/12/16		99	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2021/12/16	<0.20		ppbv	
			1,2-Dichlorotetrafluoroethane	2021/12/16	<0.17		ppbv	
			Chloromethane	2021/12/16	<0.30		ppbv	
			Vinyl Chloride	2021/12/16	<0.10		ppbv	
			Chloroethane	2021/12/16	<0.30		ppbv	
			1,3-Butadiene	2021/12/16	<0.50		ppbv	
			Trichlorofluoromethane (FREON 11)	2021/12/16	<0.20		ppbv	
			Ethanol (ethyl alcohol)	2021/12/16	<1.0		ppbv	
			Trichlorotrifluoroethane	2021/12/16	<0.15		ppbv	
			2-propanol	2021/12/16	<1.0		ppbv	
			2-Propanone	2021/12/16	<0.60		ppbv	
			Methyl Ethyl Ketone (2-Butanone)	2021/12/16	<0.20		ppbv	
			Methyl Isobutyl Ketone	2021/12/16	<0.20		ppbv	
			Methyl Butyl Ketone (2-Hexanone)	2021/12/16	<1.0		ppbv	
			Methyl t-butyl ether (MTBE)	2021/12/16	<0.20		ppbv	
			Ethyl Acetate	2021/12/16	<1.0		ppbv	
			1,1-Dichloroethylene	2021/12/16	<0.10		ppbv	
			cis-1,2-Dichloroethylene	2021/12/16	<0.10		ppbv	
			trans-1,2-Dichloroethylene	2021/12/16	<0.10		ppbv	
			Methylene Chloride(Dichloromethane)	2021/12/16	<0.60		ppbv	
			Chloroform	2021/12/16	<0.10		ppbv	
			Carbon Tetrachloride	2021/12/16	<0.10		ppbv	
			1,1-Dichloroethane	2021/12/16	<0.10		ppbv	
			1,2-Dichloroethane	2021/12/16	<0.10		ppbv	
			Ethylene Dibromide	2021/12/16	<0.10		ppbv	
			1,1,1-Trichloroethane	2021/12/16	<0.10		ppbv	
			1,1,2-Trichloroethane	2021/12/16	<0.10		ppbv	
			1,1,2,2-Tetrachloroethane	2021/12/16	<0.10		ppbv	
			cis-1,3-Dichloropropene	2021/12/16	<0.10		ppbv	
			trans-1,3-Dichloropropene	2021/12/16	<0.10		ppbv	
			1,2-Dichloropropane	2021/12/16	<0.10		ppbv	
			Bromomethane	2021/12/16	<0.10		ppbv	
			Bromoform	2021/12/16	<0.20		ppbv	
			Bromodichloromethane	2021/12/16	<0.20		ppbv	
			Dibromochloromethane	2021/12/16	<0.20		ppbv	
			Trichloroethylene	2021/12/16	<0.10		ppbv	
			Tetrachloroethylene	2021/12/16	<0.10		ppbv	
			Benzene	2021/12/16	<0.10		ppbv	
			Toluene	2021/12/16	<0.10		ppbv	
			Ethylbenzene	2021/12/16	<0.10		ppbv	
			p+m-Xylene	2021/12/16	<0.20		ppbv	
			o-Xylene	2021/12/16	<0.10		ppbv	
			Styrene	2021/12/16	<0.10		ppbv	
			4-ethyltoluene	2021/12/16	<0.50		ppbv	
			1,3,5-Trimethylbenzene	2021/12/16	<0.50		ppbv	
			1,2,4-Trimethylbenzene	2021/12/16	<0.50		ppbv	
			Chlorobenzene	2021/12/16	<0.10		ppbv	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Benzyl chloride	2021/12/16	<0.50		ppbv	
			1,3-Dichlorobenzene	2021/12/16	<0.40		ppbv	
			1,4-Dichlorobenzene	2021/12/16	<0.10		ppbv	
			1,2-Dichlorobenzene	2021/12/16	<0.10		ppbv	
			1,2,4-Trichlorobenzene	2021/12/16	<0.50		ppbv	
			Hexachlorobutadiene	2021/12/16	<0.50		ppbv	
			Hexane	2021/12/16	<0.20		ppbv	
			Heptane	2021/12/16	<0.30		ppbv	
			Cyclohexane	2021/12/16	<0.20		ppbv	
			Tetrahydrofuran	2021/12/16	<0.40		ppbv	
			1,4-Dioxane	2021/12/16	<1.0		ppbv	
			Naphthalene	2021/12/16	<0.20		ppbv	
			Total Xylenes	2021/12/16	<0.30		ppbv	
			1,1,1,2-Tetrachloroethane	2021/12/16	<0.10		ppbv	
			Vinyl Bromide	2021/12/16	<0.20		ppbv	
			Propene	2021/12/16	<0.50		ppbv	
			2,2,4-Trimethylpentane	2021/12/16	<0.20		ppbv	
			Carbon Disulfide	2021/12/16	<0.50		ppbv	
			Vinyl Acetate	2021/12/16	<0.20		ppbv	
7737784	DM2	Method Blank	F1-BTEX, C6-C10 (as Toluene)	2021/12/16	<5.0		ug/m3	
			F2, C10-C16 (as Decane)	2021/12/16	<5.0		ug/m3	
7737800	DM2	Method Blank	Bromochloromethane	2021/12/17		99	%	60 - 140
			D5-Chlorobenzene	2021/12/17		91	%	60 - 140
			Difluorobenzene	2021/12/17		99	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2021/12/17	<0.20		ppbv	
			1,2-Dichlorotetrafluoroethane	2021/12/17	<0.17		ppbv	
			Chloromethane	2021/12/17	<0.30		ppbv	
			Vinyl Chloride	2021/12/17	<0.10		ppbv	
			Chloroethane	2021/12/17	<0.30		ppbv	
			1,3-Butadiene	2021/12/17	<0.50		ppbv	
			Trichlorofluoromethane (FREON 11)	2021/12/17	<0.20		ppbv	
			Ethanol (ethyl alcohol)	2021/12/17	<1.0		ppbv	
			Trichlorotrifluoroethane	2021/12/17	<0.15		ppbv	
			2-propanol	2021/12/17	<1.0		ppbv	
			2-Propanone	2021/12/17	<0.60		ppbv	
			Methyl Ethyl Ketone (2-Butanone)	2021/12/17	<0.20		ppbv	
			Methyl Isobutyl Ketone	2021/12/17	<0.20		ppbv	
			Methyl Butyl Ketone (2-Hexanone)	2021/12/17	<1.0		ppbv	
			Methyl t-butyl ether (MTBE)	2021/12/17	<0.20		ppbv	
			Ethyl Acetate	2021/12/17	<1.0		ppbv	
			1,1-Dichloroethylene	2021/12/17	<0.10		ppbv	
			cis-1,2-Dichloroethylene	2021/12/17	<0.10		ppbv	
			trans-1,2-Dichloroethylene	2021/12/17	<0.10		ppbv	
			Methylene Chloride(Dichloromethane)	2021/12/17	<0.60		ppbv	
			Chloroform	2021/12/17	<0.10		ppbv	
			Carbon Tetrachloride	2021/12/17	<0.10		ppbv	
			1,1-Dichloroethane	2021/12/17	<0.10		ppbv	
			1,2-Dichloroethane	2021/12/17	<0.10		ppbv	
			Ethylene Dibromide	2021/12/17	<0.10		ppbv	
			1,1,1-Trichloroethane	2021/12/17	<0.10		ppbv	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,1,2-Trichloroethane	2021/12/17	<0.10		ppbv	
			1,1,2,2-Tetrachloroethane	2021/12/17	<0.10		ppbv	
			cis-1,3-Dichloropropene	2021/12/17	<0.10		ppbv	
			trans-1,3-Dichloropropene	2021/12/17	<0.10		ppbv	
			1,2-Dichloropropane	2021/12/17	<0.10		ppbv	
			Bromomethane	2021/12/17	<0.10		ppbv	
			Bromoform	2021/12/17	<0.20		ppbv	
			Bromodichloromethane	2021/12/17	<0.20		ppbv	
			Dibromochloromethane	2021/12/17	<0.20		ppbv	
			Trichloroethylene	2021/12/17	<0.10		ppbv	
			Tetrachloroethylene	2021/12/17	<0.10		ppbv	
			Benzene	2021/12/17	<0.10		ppbv	
			Toluene	2021/12/17	<0.10		ppbv	
			Ethylbenzene	2021/12/17	<0.10		ppbv	
			p+m-Xylene	2021/12/17	<0.20		ppbv	
			o-Xylene	2021/12/17	<0.10		ppbv	
			Styrene	2021/12/17	<0.10		ppbv	
			4-ethyltoluene	2021/12/17	<0.50		ppbv	
			1,3,5-Trimethylbenzene	2021/12/17	<0.50		ppbv	
			1,2,4-Trimethylbenzene	2021/12/17	<0.50		ppbv	
			Chlorobenzene	2021/12/17	<0.10		ppbv	
			Benzyl chloride	2021/12/17	<0.50		ppbv	
			1,3-Dichlorobenzene	2021/12/17	<0.40		ppbv	
			1,4-Dichlorobenzene	2021/12/17	<0.10		ppbv	
			1,2-Dichlorobenzene	2021/12/17	<0.10		ppbv	
			1,2,4-Trichlorobenzene	2021/12/17	<0.50		ppbv	
			Hexachlorobutadiene	2021/12/17	<0.50		ppbv	
			Hexane	2021/12/17	<0.20		ppbv	
			Heptane	2021/12/17	<0.30		ppbv	
			Cyclohexane	2021/12/17	<0.20		ppbv	
			Tetrahydrofuran	2021/12/17	<0.40		ppbv	
			1,4-Dioxane	2021/12/17	<1.0		ppbv	
			Naphthalene	2021/12/17	<0.20		ppbv	
			Total Xylenes	2021/12/17	<0.30		ppbv	
			1,1,1,2-Tetrachloroethane	2021/12/17	<0.10		ppbv	
			Vinyl Bromide	2021/12/17	<0.20		ppbv	
			Propene	2021/12/17	<0.50		ppbv	
			2,2,4-Trimethylpentane	2021/12/17	<0.20		ppbv	
			Carbon Disulfide	2021/12/17	<0.50		ppbv	
			Vinyl Acetate	2021/12/17	<0.20		ppbv	
7743870	DM2	Method Blank	F1-BTEX, C6-C10 (as Toluene)	2021/12/17	<5.0		ug/m3	
			F2, C10-C16 (as Decane)	2021/12/17	<5.0		ug/m3	
7721417	ASC	RPD [RIC796-01]	Dichlorodifluoromethane (FREON 12)	2021/12/23	0.95		%	25
			1,2-Dichlorotetrafluoroethane	2021/12/23	NC		%	25
			Chloromethane	2021/12/23	2.5		%	25
			Vinyl Chloride	2021/12/23	NC		%	25
			Chloroethane	2021/12/23	NC		%	25
			1,3-Butadiene	2021/12/23	NC		%	25
			Trichlorofluoromethane (FREON 11)	2021/12/23	NC		%	25
			Ethanol (ethyl alcohol)	2021/12/23	0.79		%	25

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Trichlorotrifluoroethane	2021/12/23	NC		%	25
			2-propanol	2021/12/23	NC		%	25
			2-Propanone	2021/12/23	5.8		%	25
			Methyl Ethyl Ketone (2-Butanone)	2021/12/23	NC		%	25
			Methyl Isobutyl Ketone	2021/12/23	NC		%	25
			Methyl Butyl Ketone (2-Hexanone)	2021/12/23	NC		%	25
			Methyl t-butyl ether (MTBE)	2021/12/23	NC		%	25
			Ethyl Acetate	2021/12/23	NC		%	25
			1,1-Dichloroethylene	2021/12/23	NC		%	25
			cis-1,2-Dichloroethylene	2021/12/23	NC		%	25
			trans-1,2-Dichloroethylene	2021/12/23	NC		%	25
			Methylene Chloride(Dichloromethane)	2021/12/23	NC		%	25
			Chloroform	2021/12/23	NC		%	25
			Carbon Tetrachloride	2021/12/23	NC		%	25
			1,1-Dichloroethane	2021/12/23	NC		%	25
			1,2-Dichloroethane	2021/12/23	NC		%	25
			Ethylene Dibromide	2021/12/23	NC		%	25
			1,1,1-Trichloroethane	2021/12/23	NC		%	25
			1,1,2-Trichloroethane	2021/12/23	NC		%	25
			1,1,2,2-Tetrachloroethane	2021/12/23	NC		%	25
			cis-1,3-Dichloropropene	2021/12/23	NC		%	25
			trans-1,3-Dichloropropene	2021/12/23	NC		%	25
			1,2-Dichloropropane	2021/12/23	NC		%	25
			Bromomethane	2021/12/23	NC		%	25
			Bromoform	2021/12/23	NC		%	25
			Bromodichloromethane	2021/12/23	NC		%	25
			Dibromochloromethane	2021/12/23	NC		%	25
			Trichloroethylene	2021/12/23	NC		%	25
			Tetrachloroethylene	2021/12/23	1.7		%	25
			Benzene	2021/12/23	NC		%	25
			Toluene	2021/12/23	NC		%	25
			Ethylbenzene	2021/12/23	NC		%	25
			p+m-Xylene	2021/12/23	NC		%	25
			o-Xylene	2021/12/23	NC		%	25
			Styrene	2021/12/23	NC		%	25
			4-ethyltoluene	2021/12/23	NC		%	25
			1,3,5-Trimethylbenzene	2021/12/23	NC		%	25
			1,2,4-Trimethylbenzene	2021/12/23	NC		%	25
			Chlorobenzene	2021/12/23	NC		%	25
			Benzyl chloride	2021/12/23	NC		%	25
			1,3-Dichlorobenzene	2021/12/23	NC		%	25
			1,4-Dichlorobenzene	2021/12/23	NC		%	25
			1,2-Dichlorobenzene	2021/12/23	NC		%	25
			1,2,4-Trichlorobenzene	2021/12/23	NC		%	25
			Hexachlorobutadiene	2021/12/23	NC		%	25
			Hexane	2021/12/23	0.56		%	25
			Heptane	2021/12/23	NC		%	25
			Cyclohexane	2021/12/23	19		%	25
			Tetrahydrofuran	2021/12/23	NC		%	25
			1,4-Dioxane	2021/12/23	NC		%	25

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Naphthalene	2021/12/23	NC		%	25
			Total Xylenes	2021/12/23	NC		%	25
			1,1,1,2-Tetrachloroethane	2021/12/23	NC		%	25
			Vinyl Bromide	2021/12/23	NC		%	25
			Propene	2021/12/23	NC		%	25
			2,2,4-Trimethylpentane	2021/12/23	NC		%	25
			Carbon Disulfide	2021/12/23	NC		%	25
			Vinyl Acetate	2021/12/23	NC		%	25
7737780	DM2	RPD [RIC796-01]	Dichlorodifluoromethane (FREON 12)	2021/12/16	0.95		%	25
			1,2-Dichlorotetrafluoroethane	2021/12/16	NC		%	25
			Chloromethane	2021/12/16	2.5		%	25
			Vinyl Chloride	2021/12/16	NC		%	25
			Chloroethane	2021/12/16	NC		%	25
			1,3-Butadiene	2021/12/16	NC		%	25
			Trichlorofluoromethane (FREON 11)	2021/12/16	NC		%	25
			Ethanol (ethyl alcohol)	2021/12/16	0.79		%	25
			Trichlorotrifluoroethane	2021/12/16	NC		%	25
			2-propanol	2021/12/16	NC		%	25
			2-Propanone	2021/12/16	5.8		%	25
			Methyl Ethyl Ketone (2-Butanone)	2021/12/16	NC		%	25
			Methyl Isobutyl Ketone	2021/12/16	NC		%	25
			Methyl Butyl Ketone (2-Hexanone)	2021/12/16	NC		%	25
			Methyl t-butyl ether (MTBE)	2021/12/16	NC		%	25
			Ethyl Acetate	2021/12/16	NC		%	25
			1,1-Dichloroethylene	2021/12/16	NC		%	25
			cis-1,2-Dichloroethylene	2021/12/16	NC		%	25
			trans-1,2-Dichloroethylene	2021/12/16	NC		%	25
			Methylene Chloride(Dichloromethane)	2021/12/16	NC		%	25
			Chloroform	2021/12/16	NC		%	25
			Carbon Tetrachloride	2021/12/16	NC		%	25
			1,1-Dichloroethane	2021/12/16	NC		%	25
			1,2-Dichloroethane	2021/12/16	NC		%	25
			Ethylene Dibromide	2021/12/16	NC		%	25
			1,1,1-Trichloroethane	2021/12/16	NC		%	25
			1,1,2-Trichloroethane	2021/12/16	NC		%	25
			1,1,2,2-Tetrachloroethane	2021/12/16	NC		%	25
			cis-1,3-Dichloropropene	2021/12/16	NC		%	25
			trans-1,3-Dichloropropene	2021/12/16	NC		%	25
			1,2-Dichloropropane	2021/12/16	NC		%	25
			Bromomethane	2021/12/16	NC		%	25
			Bromoform	2021/12/16	NC		%	25
			Bromodichloromethane	2021/12/16	NC		%	25
			Dibromochloromethane	2021/12/16	NC		%	25
			Trichloroethylene	2021/12/16	NC		%	25
			Tetrachloroethylene	2021/12/16	1.7		%	25
			Benzene	2021/12/16	NC		%	25
			Toluene	2021/12/16	NC		%	25
			Ethylbenzene	2021/12/16	NC		%	25
			p+m-Xylene	2021/12/16	NC		%	25
			o-Xylene	2021/12/16	NC		%	25

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Styrene	2021/12/16	NC		%	25
			4-ethyltoluene	2021/12/16	NC		%	25
			1,3,5-Trimethylbenzene	2021/12/16	NC		%	25
			1,2,4-Trimethylbenzene	2021/12/16	NC		%	25
			Chlorobenzene	2021/12/16	NC		%	25
			Benzyl chloride	2021/12/16	NC		%	25
			1,3-Dichlorobenzene	2021/12/16	NC		%	25
			1,4-Dichlorobenzene	2021/12/16	NC		%	25
			1,2-Dichlorobenzene	2021/12/16	NC		%	25
			1,2,4-Trichlorobenzene	2021/12/16	NC		%	25
			Hexachlorobutadiene	2021/12/16	NC		%	25
			Hexane	2021/12/16	0.56		%	25
			Heptane	2021/12/16	NC		%	25
			Cyclohexane	2021/12/16	19		%	25
			Tetrahydrofuran	2021/12/16	NC		%	25
			1,4-Dioxane	2021/12/16	NC		%	25
			Naphthalene	2021/12/16	NC		%	25
			Total Xylenes	2021/12/16	NC		%	25
			1,1,1,2-Tetrachloroethane	2021/12/16	NC		%	25
			Vinyl Bromide	2021/12/16	NC		%	25
			Propene	2021/12/16	NC		%	25
			2,2,4-Trimethylpentane	2021/12/16	NC		%	25
			Carbon Disulfide	2021/12/16	NC		%	25
			Vinyl Acetate	2021/12/16	NC		%	25
7737784	DM2	RPD [RIC796-01]	F1-BTEX, C6-C10 (as Toluene)	2021/12/16	3.9		%	25
			F2, C10-C16 (as Decane)	2021/12/16	3.1		%	25
7737780	DM2	LCS	Bromochloromethane	2021/12/16		97	%	60 - 140
			D5-Chlorobenzene	2021/12/16		99	%	60 - 140
			Difluorobenzene	2021/12/16		98	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2021/12/16		98	%	70 - 130
			1,2-Dichlorotetrafluoroethane	2021/12/16		98	%	70 - 130
			Chloromethane	2021/12/16		85	%	70 - 130
			Vinyl Chloride	2021/12/16		93	%	70 - 130
			Chloroethane	2021/12/16		92	%	70 - 130
			1,3-Butadiene	2021/12/16		94	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2021/12/16		102	%	70 - 130
			Ethanol (ethyl alcohol)	2021/12/16		107	%	70 - 130
			Trichlorotrifluoroethane	2021/12/16		101	%	70 - 130
			2-propanol	2021/12/16		70	%	70 - 130
			2-Propanone	2021/12/16		97	%	70 - 130
			Methyl Ethyl Ketone (2-Butanone)	2021/12/16		101	%	70 - 130
			Methyl Isobutyl Ketone	2021/12/16		104	%	70 - 130
			Methyl Butyl Ketone (2-Hexanone)	2021/12/16		108	%	70 - 130
			Methyl t-butyl ether (MTBE)	2021/12/16		109	%	70 - 130
			Ethyl Acetate	2021/12/16		99	%	70 - 130
			1,1-Dichloroethylene	2021/12/16		97	%	70 - 130
			cis-1,2-Dichloroethylene	2021/12/16		95	%	70 - 130
			trans-1,2-Dichloroethylene	2021/12/16		103	%	70 - 130
			Methylene Chloride(Dichloromethane)	2021/12/16		94	%	70 - 130
			Chloroform	2021/12/16		99	%	70 - 130

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Carbon Tetrachloride	2021/12/16		113	%	70 - 130
			1,1-Dichloroethane	2021/12/16		97	%	70 - 130
			1,2-Dichloroethane	2021/12/16		100	%	70 - 130
			Ethylene Dibromide	2021/12/16		104	%	70 - 130
			1,1,1-Trichloroethane	2021/12/16		109	%	70 - 130
			1,1,2-Trichloroethane	2021/12/16		100	%	70 - 130
			1,1,2,2-Tetrachloroethane	2021/12/16		89	%	70 - 130
			cis-1,3-Dichloropropene	2021/12/16		105	%	70 - 130
			trans-1,3-Dichloropropene	2021/12/16		116	%	70 - 130
			1,2-Dichloropropane	2021/12/16		99	%	70 - 130
			Bromomethane	2021/12/16		100	%	70 - 130
			Bromoform	2021/12/16		105	%	70 - 130
			Bromodichloromethane	2021/12/16		107	%	70 - 130
			Dibromochloromethane	2021/12/16		114	%	70 - 130
			Trichloroethylene	2021/12/16		107	%	70 - 130
			Tetrachloroethylene	2021/12/16		107	%	70 - 130
			Benzene	2021/12/16		98	%	70 - 130
			Toluene	2021/12/16		103	%	70 - 130
			Ethylbenzene	2021/12/16		100	%	70 - 130
			p+m-Xylene	2021/12/16		100	%	70 - 130
			o-Xylene	2021/12/16		92	%	70 - 130
			Styrene	2021/12/16		98	%	70 - 130
			4-ethyltoluene	2021/12/16		113	%	70 - 130
			1,3,5-Trimethylbenzene	2021/12/16		109	%	70 - 130
			1,2,4-Trimethylbenzene	2021/12/16		116	%	70 - 130
			Chlorobenzene	2021/12/16		99	%	70 - 130
			Benzyl chloride	2021/12/16		122	%	70 - 130
			1,3-Dichlorobenzene	2021/12/16		104	%	70 - 130
			1,4-Dichlorobenzene	2021/12/16		105	%	70 - 130
			1,2-Dichlorobenzene	2021/12/16		100	%	70 - 130
			1,2,4-Trichlorobenzene	2021/12/16		108	%	70 - 130
			Hexachlorobutadiene	2021/12/16		99	%	70 - 130
			Hexane	2021/12/16		100	%	70 - 130
			Heptane	2021/12/16		102	%	70 - 130
			Cyclohexane	2021/12/16		101	%	70 - 130
			Tetrahydrofuran	2021/12/16		98	%	70 - 130
			1,4-Dioxane	2021/12/16		107	%	70 - 130
			Naphthalene	2021/12/16		106	%	70 - 130
			Total Xylenes	2021/12/16		97	%	70 - 130
			1,1,1,2-Tetrachloroethane	2021/12/16		103	%	70 - 130
			Vinyl Bromide	2021/12/16		109	%	70 - 130
			Propene	2021/12/16		91	%	70 - 130
			2,2,4-Trimethylpentane	2021/12/16		103	%	70 - 130
			Carbon Disulfide	2021/12/16		100	%	70 - 130
			Vinyl Acetate	2021/12/16		109	%	70 - 130
7737800	DM2	LCS	Bromochloromethane	2021/12/17		93	%	60 - 140
			D5-Chlorobenzene	2021/12/17		95	%	60 - 140
			Difluorobenzene	2021/12/17		95	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2021/12/17		102	%	70 - 130
			1,2-Dichlorotetrafluoroethane	2021/12/17		100	%	70 - 130

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Chloromethane	2021/12/17		88	%	70 - 130
			Vinyl Chloride	2021/12/17		96	%	70 - 130
			Chloroethane	2021/12/17		96	%	70 - 130
			1,3-Butadiene	2021/12/17		99	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2021/12/17		105	%	70 - 130
			Ethanol (ethyl alcohol)	2021/12/17		116	%	70 - 130
			Trichlorotrifluoroethane	2021/12/17		105	%	70 - 130
			2-propanol	2021/12/17		74	%	70 - 130
			2-Propanone	2021/12/17		101	%	70 - 130
			Methyl Ethyl Ketone (2-Butanone)	2021/12/17		105	%	70 - 130
			Methyl Isobutyl Ketone	2021/12/17		107	%	70 - 130
			Methyl Butyl Ketone (2-Hexanone)	2021/12/17		112	%	70 - 130
			Methyl t-butyl ether (MTBE)	2021/12/17		113	%	70 - 130
			Ethyl Acetate	2021/12/17		104	%	70 - 130
			1,1-Dichloroethylene	2021/12/17		100	%	70 - 130
			cis-1,2-Dichloroethylene	2021/12/17		98	%	70 - 130
			trans-1,2-Dichloroethylene	2021/12/17		107	%	70 - 130
			Methylene Chloride(Dichloromethane)	2021/12/17		97	%	70 - 130
			Chloroform	2021/12/17		102	%	70 - 130
			Carbon Tetrachloride	2021/12/17		115	%	70 - 130
			1,1-Dichloroethane	2021/12/17		100	%	70 - 130
			1,2-Dichloroethane	2021/12/17		103	%	70 - 130
			Ethylene Dibromide	2021/12/17		107	%	70 - 130
			1,1,1-Trichloroethane	2021/12/17		111	%	70 - 130
			1,1,2-Trichloroethane	2021/12/17		102	%	70 - 130
			1,1,2,2-Tetrachloroethane	2021/12/17		93	%	70 - 130
			cis-1,3-Dichloropropene	2021/12/17		107	%	70 - 130
			trans-1,3-Dichloropropene	2021/12/17		119	%	70 - 130
			1,2-Dichloropropane	2021/12/17		101	%	70 - 130
			Bromomethane	2021/12/17		102	%	70 - 130
			Bromoform	2021/12/17		109	%	70 - 130
			Bromodichloromethane	2021/12/17		109	%	70 - 130
			Dibromochloromethane	2021/12/17		117	%	70 - 130
			Trichloroethylene	2021/12/17		109	%	70 - 130
			Tetrachloroethylene	2021/12/17		110	%	70 - 130
			Benzene	2021/12/17		100	%	70 - 130
			Toluene	2021/12/17		106	%	70 - 130
			Ethylbenzene	2021/12/17		104	%	70 - 130
			p+m-Xylene	2021/12/17		104	%	70 - 130
			o-Xylene	2021/12/17		95	%	70 - 130
			Styrene	2021/12/17		102	%	70 - 130
			4-ethyltoluene	2021/12/17		117	%	70 - 130
			1,3,5-Trimethylbenzene	2021/12/17		113	%	70 - 130
			1,2,4-Trimethylbenzene	2021/12/17		121	%	70 - 130
			Chlorobenzene	2021/12/17		103	%	70 - 130
			Benzyl chloride	2021/12/17		126	%	70 - 130
			1,3-Dichlorobenzene	2021/12/17		109	%	70 - 130
			1,4-Dichlorobenzene	2021/12/17		110	%	70 - 130
			1,2-Dichlorobenzene	2021/12/17		104	%	70 - 130
			1,2,4-Trichlorobenzene	2021/12/17		116	%	70 - 130

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Hexachlorobutadiene	2021/12/17		105	%	70 - 130
			Hexane	2021/12/17		104	%	70 - 130
			Heptane	2021/12/17		104	%	70 - 130
			Cyclohexane	2021/12/17		104	%	70 - 130
			Tetrahydrofuran	2021/12/17		102	%	70 - 130
			1,4-Dioxane	2021/12/17		110	%	70 - 130
			Naphthalene	2021/12/17		116	%	70 - 130
			Total Xylenes	2021/12/17		101	%	70 - 130
			1,1,1,2-Tetrachloroethane	2021/12/17		106	%	70 - 130
			Vinyl Bromide	2021/12/17		113	%	70 - 130
			Propene	2021/12/17		94	%	70 - 130
			2,2,4-Trimethylpentane	2021/12/17		105	%	70 - 130
			Carbon Disulfide	2021/12/17		102	%	70 - 130
			Vinyl Acetate	2021/12/17		114	%	70 - 130

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Melanie Mabini, Team Leader

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

6740 Campobello Road
Mississauga, ON L5N 2L8
www.bvlabs.com

Phone: (905) 817-5700
Fax: (905) 817-5779
Toll Free: 1-800-563-6266

EXXONMOBIL/IMPERIAL OIL - BUREAU VERITAS
AIR CHAIN OF CUSTODY RECORD

C of C # 82791

INVOICE INFORMATION	REPORT INFORMATION
Company Name: ☒ Imperial Oil ☐ ExxonMobil	Company Name: Golder Associates Ltd
Contact Name: IOL Accounts Payable	Contact Name: Ian Sonney
Address: 102, 2535-3rd Avenue SE Calgary, AB T2A 7W5	Address: 110 Hoover Dr Building A Suite 203 St Catharines, ON L2W1A4
Email: IOL-Accounts_Payable@Golder.com	Email: Ian-Sonney@Golder.com
Ph: (403) 299-5600	Ph: (647) 522-4678
Sampler Name (Print): Leandra Marani + Tom Ryan	Consultant Project #: 20447743-1155-2107A

	FIELD SAMPLE ID	Canister Serial #	Flow Regulator Serial #	Sample Collection DATE (YYYY/MM/DD)	Sample Collection TIME (24 HR)	Media Type (See Legend)	FLOW RATE (mL/min)	LENGTH OF SAMPLING (minutes)	End Vacuum (inches of Hg)	BTEX	Aromatic/Aliphatic Hydrocarbon Fractionations	F1 (C6-C10) - F2 (C10-C16)	VOC (TO15)
1	SV21-02	1527	FX0271	2021/12/09	15:16	S	200mL/min	7	-9	X		X	X
2	SV21-03	10871	FX1898	2021/12/09	12:56	S	175mL/min	8	-9	X		X	X
3	SV16-01	1298	FX1127	2021/12/09	14:56	S	175mL/min	8	-9	X		X	X
4	DUP A	6571	FX0344	2021/12/09	14:56	S	175mL/min	8	-8.5	X		X	X
5	SV16-02	10953	FX1449	2021/12/09	14:01	S	175mL/min	8	-9	X		X	X
6	SV21-01	1928	FX1240	2021/12/10	11:15	S	175mL/min	8	-9	X		X	X
7													
8													
9													
10													
11													

C1Y6956-1

Inspected By: BSU
Entered By

IOL SITE LOCATION: 1660 Merivale rd Ottawa, ON

IOL PROJECT # (if applicable): ~~20447743-1155-7777~~

BUREAU VERITAS TASK ORDER # OR SERVICE ORDER # + LINE ITEM: 20447743-1155-7777

REGULATORY CRITERIA / DETECTION LIMITS: (PLEASE SPECIFY): ~~O/Reg 153~~ ~~T6576~~ ~~2011~~ NA

SPECIAL INSTRUCTIONS: IES A2601436
SAP 8800 1627

LEGEND
S - Summa Can
T - Tube
TB - Tedlar Bag
O - Other(Specify)
*TEMP N/A for SUMMA CAN

TURNAROUND TIME
Standard (10 days) ☒
Rush (9 days) ☐
(6 days) ☐
(3 days) ☐
Date Required

	YES	NO	COOLER ID #	TEMP °C 1	2	3
SEAL PRESENT	X					
SEAL INTACT	X					
COOLING MEDIA PRESENT		X				

	YES	NO	COOLER ID #	TEMP °C 1	2	3
SEAL PRESENT						
SEAL INTACT						
COOLING MEDIA PRESENT						

	YES	NO	COOLER ID #	TEMP °C 1	2	3
SEAL PRESENT						
SEAL INTACT						
COOLING MEDIA PRESENT						

RELINQUISHED BY:		DATE:	TIME (24 HR)	RECEIVED BY:		DATE:	TIME (24 HR)
1.	Tom Ryan	2021/12/10	13:25	1.	Ramisha Rizwan	2021/12/13	09:00
2.				2.			
3.				3.			

LAB USE ONLY
BUREAU VERITAS JOB # C1Y6956

SAMPLES
LABELED BY: BSU
VERIFIED BY: AKP

IOL COC-AIR-(08/19)
White: Bureau Veritas Yellow: Client
Unless otherwise agreed to in writing, work submitted on this Chain of Custody is subject to Bureau Veritas Laboratories' standard Terms and Conditions. Signing of this Chain of Custody document is acknowledgment and acceptance of our terms available at http://www.bvlabs.com/terms-and-conditions

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: December 9 and 10, 2021

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Bureau Veritas Mississauga

Consultant Project Number: 20447743-1155

Sample Submission Number: C1Y6956

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within
Extraction Surrogate Recovery			X	acceptance criteria.
Method Blank Concentration	X			
Matrix Duplicate RPD	X			
Matrix Spike Recovery			X	
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	All field QC samples are within
Trip Blank Concentration			X	alert limits.
Field Duplicate RPD	X			

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	n/a

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): Amanda Newberry

Date: January 4, 2022

Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107A
Your C.O.C. #: 82761

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2021/12/24
Report #: R6939034
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1Y9274
Received: 2021/12/13, 11:25

Sample Matrix: Air
Samples Received: 2

Analyses	Quantity	Laboratory Method	Analytical Method
BTEX and CCME Compounds in Air(TO-15mod)	2	BRL SOP-00304	EPA TO-15 m
Canister Pressure (TO-15)	2	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (ug/m3)	2	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (TO-15) (1)	2	BRL SOP-00304	EPA TO-15 m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard. All samples were analyzed within hold time unless otherwise flagged.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Air sampling canisters have been cleaned in accordance with U.S. EPA Method TO15. At the end of the cleaning, evacuation, and pressurization cycles, one canister was selected and was pressurized with Zero Air. This canister was then analyzed via TO15 on a GC/MS. The canister must have been found to contain <0.2 ppbv concentration of all target analytes in order for the batch to have been considered clean. Each canister also underwent a leak check prior to shipment.

Please Note: SUMMA® canister samples will be retained by Bureau Veritas Laboratories for a period of 5 calendar days or as contractually agreed from the date of this report, after which time they will be cleaned for reuse. If you require a longer sample storage period, please contact your service representative.

Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107A
Your C.O.C. #: 82761

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2021/12/24
Report #: R6939034
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1Y9274
Received: 2021/12/13, 11:25

Encryption Key



Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Gina Baybayan, Project Manager
Email: Gina.Baybayan@bureauveritas.com
Phone# (905)817-5766

==========

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C1Y9274
Report Date: 2021/12/24

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107A

RESULTS OF ANALYSES OF AIR

Bureau Veritas ID		RIQ245	RIQ246	
Sampling Date		2021/12/09 13:53	2021/12/10 11:25	
COC Number		82761	82761	
	UNITS	**F.BLANK**	**TRIP BLANK**	**QC Batch**
Pressure on Receipt	psig	(-1.9)	(-14.6)	7737778
QC Batch = Quality Control Batch				

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

VOLATILE ORGANICS BY GC/MS (AIR)

Bureau Veritas ID		RIQ245	RIQ246		
Sampling Date		2021/12/09 13:53	2021/12/10 11:25		
COC Number		82761	82761		
	UNITS	**F.BLANK**	**TRIP BLANK**	**RDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ppbv	0.48	<0.20	0.20	7737780
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	<0.17	0.17	7737780
Chloromethane	ppbv	0.63	<0.30	0.30	7737780
Vinyl Chloride	ppbv	<0.10	<0.10	0.10	7737780
Chloroethane	ppbv	<0.30	<0.30	0.30	7737780
1,3-Butadiene	ppbv	<0.50	<0.50	0.50	7737780
Trichlorofluoromethane (FREON 11)	ppbv	0.21	<0.20	0.20	7737780
Ethanol (ethyl alcohol)	ppbv	2.6	<1.0	1.0	7737780
Trichlorotrifluoroethane	ppbv	<0.15	<0.15	0.15	7737780
2-propanol	ppbv	<1.0	<1.0	1.0	7737780
2-Propanone	ppbv	0.70	<0.60	0.60	7737780
Methyl Ethyl Ketone (2-Butanone)	ppbv	<0.20	<0.20	0.20	7737780
Methyl Isobutyl Ketone	ppbv	<0.20	<0.20	0.20	7737780
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	<1.0	1.0	7737780
Methyl t-butyl ether (MTBE)	ppbv	<0.20	<0.20	0.20	7737780
Ethyl Acetate	ppbv	<1.0	<1.0	1.0	7737780
1,1-Dichloroethylene	ppbv	<0.10	<0.10	0.10	7737780
cis-1,2-Dichloroethylene	ppbv	<0.10	<0.10	0.10	7737780
trans-1,2-Dichloroethylene	ppbv	<0.10	<0.10	0.10	7737780
Methylene Chloride(Dichloromethane)	ppbv	<0.60	<0.60	0.60	7737780
Chloroform	ppbv	<0.10	<0.10	0.10	7737780
Carbon Tetrachloride	ppbv	<0.10	<0.10	0.10	7737780
1,1-Dichloroethane	ppbv	<0.10	<0.10	0.10	7737780
1,2-Dichloroethane	ppbv	<0.10	<0.10	0.10	7737780
Ethylene Dibromide	ppbv	<0.10	<0.10	0.10	7737780
1,1,1-Trichloroethane	ppbv	<0.10	<0.10	0.10	7737780
1,1,2-Trichloroethane	ppbv	<0.10	<0.10	0.10	7737780
1,1,2,2-Tetrachloroethane	ppbv	<0.10	<0.10	0.10	7737780
cis-1,3-Dichloropropene	ppbv	<0.10	<0.10	0.10	7737780
trans-1,3-Dichloropropene	ppbv	<0.10	<0.10	0.10	7737780
1,2-Dichloropropane	ppbv	<0.10	<0.10	0.10	7737780
Bromomethane	ppbv	<0.10	<0.10	0.10	7737780
Bromoform	ppbv	<0.20	<0.20	0.20	7737780
Bromodichloromethane	ppbv	<0.20	<0.20	0.20	7737780

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

VOLATILE ORGANICS BY GC/MS (AIR)

Bureau Veritas ID		RIQ245	RIQ246		
Sampling Date		2021/12/09 13:53	2021/12/10 11:25		
COC Number		82761	82761		
	UNITS	**F.BLANK**	**TRIP BLANK**	**RDL**	**QC Batch**
Dibromochloromethane	ppbv	<0.20	<0.20	0.20	7737780
Trichloroethylene	ppbv	<0.10	<0.10	0.10	7737780
Tetrachloroethylene	ppbv	<0.10	<0.10	0.10	7737780
Benzene	ppbv	0.14	<0.10	0.10	7737780
Toluene	ppbv	<0.10	<0.10	0.10	7737780
Ethylbenzene	ppbv	<0.10	<0.10	0.10	7737780
p+m-Xylene	ppbv	<0.20	<0.20	0.20	7737780
o-Xylene	ppbv	<0.10	<0.10	0.10	7737780
Styrene	ppbv	<0.10	<0.10	0.10	7737780
4-ethyltoluene	ppbv	<0.50	<0.50	0.50	7737780
1,3,5-Trimethylbenzene	ppbv	<0.50	<0.50	0.50	7737780
1,2,4-Trimethylbenzene	ppbv	<0.50	<0.50	0.50	7737780
Chlorobenzene	ppbv	<0.10	<0.10	0.10	7737780
Benzyl chloride	ppbv	<0.50	<0.50	0.50	7737780
1,3-Dichlorobenzene	ppbv	<0.40	<0.40	0.40	7737780
1,4-Dichlorobenzene	ppbv	<0.10	<0.10	0.10	7737780
1,2-Dichlorobenzene	ppbv	<0.10	<0.10	0.10	7737780
1,2,4-Trichlorobenzene	ppbv	<0.50	<0.50	0.50	7737780
Hexachlorobutadiene	ppbv	<0.50	<0.50	0.50	7737780
Hexane	ppbv	<0.20	<0.20	0.20	7737780
Heptane	ppbv	<0.30	<0.30	0.30	7737780
Cyclohexane	ppbv	<0.20	<0.20	0.20	7737780
Tetrahydrofuran	ppbv	<0.40	<0.40	0.40	7737780
1,4-Dioxane	ppbv	<1.0	<1.0	1.0	7737780
Naphthalene	ppbv	<0.20	<0.20	0.20	7737780
Total Xylenes	ppbv	<0.30	<0.30	0.30	7737780
1,1,1,2-Tetrachloroethane	ppbv	<0.10	<0.10	0.10	7737780
Vinyl Bromide	ppbv	<0.20	<0.20	0.20	7737780
Propene	ppbv	<0.50	<0.50	0.50	7737780
2,2,4-Trimethylpentane	ppbv	<0.20	<0.20	0.20	7737780
Carbon Disulfide	ppbv	<0.50	<0.50	0.50	7737780
Vinyl Acetate	ppbv	<0.20	<0.20	0.20	7737780

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Bureau Veritas Job #: C1Y9274
Report Date: 2021/12/24

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107A

VOLATILE ORGANICS BY GC/MS (AIR)

Bureau Veritas ID		RIQ245	RIQ246		
Sampling Date		2021/12/09 13:53	2021/12/10 11:25		
COC Number		82761	82761		
	UNITS	**F.BLANK**	**TRIP BLANK**	**RDL**	**QC Batch**
Instrument Surrogate Recovery (%)					
Bromochloromethane	%	97	97		7737780
D5-Chlorobenzene	%	89	88		7737780
Difluorobenzene	%	96	96		7737780

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

CALCULATED VOLATILE ORGANICS (AIR)

Bureau Veritas ID		RIQ245	RIQ246		
Sampling Date		2021/12/09 13:53	2021/12/10 11:25		
COC Number		82761	82761		
	UNITS	**F.BLANK**	**TRIP BLANK**	**RDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ug/m3	2.38	<0.99	0.99	7725705
1,2-Dichlorotetrafluoroethane	ug/m3	<1.2	<1.2	1.2	7725705
Chloromethane	ug/m3	1.30	<0.62	0.62	7725705
Vinyl Chloride	ug/m3	<0.26	<0.26	0.26	7725705
Chloroethane	ug/m3	<0.79	<0.79	0.79	7725705
1,3-Butadiene	ug/m3	<1.1	<1.1	1.1	7725705
Trichlorofluoromethane (FREON 11)	ug/m3	1.2	<1.1	1.1	7725705
Ethanol (ethyl alcohol)	ug/m3	4.9	<1.9	1.9	7725705
Trichlorotrifluoroethane	ug/m3	<1.2	<1.2	1.2	7725705
2-propanol	ug/m3	<2.5	<2.5	2.5	7725705
2-Propanone	ug/m3	1.7	<1.4	1.4	7725705
Methyl Ethyl Ketone (2-Butanone)	ug/m3	<0.59	<0.59	0.59	7725705
Methyl Isobutyl Ketone	ug/m3	<0.82	<0.82	0.82	7725705
Methyl Butyl Ketone (2-Hexanone)	ug/m3	<4.1	<4.1	4.1	7725705
Methyl t-butyl ether (MTBE)	ug/m3	<0.72	<0.72	0.72	7725705
Ethyl Acetate	ug/m3	<3.6	<3.6	3.6	7725705
1,1-Dichloroethylene	ug/m3	<0.40	<0.40	0.40	7725705
cis-1,2-Dichloroethylene	ug/m3	<0.40	<0.40	0.40	7725705
trans-1,2-Dichloroethylene	ug/m3	<0.40	<0.40	0.40	7725705
Methylene Chloride(Dichloromethane)	ug/m3	<2.1	<2.1	2.1	7725705
Chloroform	ug/m3	<0.49	<0.49	0.49	7725705
Carbon Tetrachloride	ug/m3	<0.63	<0.63	0.63	7725705
1,1-Dichloroethane	ug/m3	<0.40	<0.40	0.40	7725705
1,2-Dichloroethane	ug/m3	<0.40	<0.40	0.40	7725705
Ethylene Dibromide	ug/m3	<0.77	<0.77	0.77	7725705
1,1,1-Trichloroethane	ug/m3	<0.55	<0.55	0.55	7725705
1,1,2-Trichloroethane	ug/m3	<0.55	<0.55	0.55	7725705
1,1,2,2-Tetrachloroethane	ug/m3	<0.69	<0.69	0.69	7725705
cis-1,3-Dichloropropene	ug/m3	<0.45	<0.45	0.45	7725705
trans-1,3-Dichloropropene	ug/m3	<0.45	<0.45	0.45	7725705
1,2-Dichloropropane	ug/m3	<0.46	<0.46	0.46	7725705
Bromomethane	ug/m3	<0.39	<0.39	0.39	7725705
Bromoform	ug/m3	<2.1	<2.1	2.1	7725705
Bromodichloromethane	ug/m3	<1.3	<1.3	1.3	7725705

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

CALCULATED VOLATILE ORGANICS (AIR)

Bureau Veritas ID		RIQ245	RIQ246		
Sampling Date		2021/12/09 13:53	2021/12/10 11:25		
COC Number		82761	82761		
	UNITS	**F.BLANK**	**TRIP BLANK**	**RDL**	**QC Batch**
Dibromochloromethane	ug/m3	<1.7	<1.7	1.7	7725705
Trichloroethylene	ug/m3	<0.54	<0.54	0.54	7725705
Tetrachloroethylene	ug/m3	<0.68	<0.68	0.68	7725705
Benzene	ug/m3	0.46	<0.32	0.32	7725705
Toluene	ug/m3	<0.38	<0.38	0.38	7725705
Ethylbenzene	ug/m3	<0.43	<0.43	0.43	7725705
p+m-Xylene	ug/m3	<0.87	<0.87	0.87	7725705
o-Xylene	ug/m3	<0.43	<0.43	0.43	7725705
Styrene	ug/m3	<0.43	<0.43	0.43	7725705
4-ethyltoluene	ug/m3	<2.5	<2.5	2.5	7725705
1,3,5-Trimethylbenzene	ug/m3	<2.5	<2.5	2.5	7725705
1,2,4-Trimethylbenzene	ug/m3	<2.5	<2.5	2.5	7725705
Chlorobenzene	ug/m3	<0.46	<0.46	0.46	7725705
Benzyl chloride	ug/m3	<2.6	<2.6	2.6	7725705
1,3-Dichlorobenzene	ug/m3	<2.4	<2.4	2.4	7725705
1,4-Dichlorobenzene	ug/m3	<0.60	<0.60	0.60	7725705
1,2-Dichlorobenzene	ug/m3	<0.60	<0.60	0.60	7725705
1,2,4-Trichlorobenzene	ug/m3	<3.7	<3.7	3.7	7725705
Hexachlorobutadiene	ug/m3	<5.3	<5.3	5.3	7725705
Hexane	ug/m3	<0.70	<0.70	0.70	7725705
Heptane	ug/m3	<1.2	<1.2	1.2	7725705
Cyclohexane	ug/m3	<0.69	<0.69	0.69	7725705
Tetrahydrofuran	ug/m3	<1.2	<1.2	1.2	7725705
1,4-Dioxane	ug/m3	<3.6	<3.6	3.6	7725705
Naphthalene	ug/m3	<1.0	<1.0	1.0	7725705
Total Xylenes	ug/m3	<1.3	<1.3	1.3	7725705
1,1,1,2-Tetrachloroethane	ug/m3	<0.69	<0.69	0.69	7725705
Vinyl Bromide	ug/m3	<0.87	<0.87	0.87	7725705
Propene	ug/m3	<0.86	<0.86	0.86	7725705
2,2,4-Trimethylpentane	ug/m3	<0.93	<0.93	0.93	7725705
Carbon Disulfide	ug/m3	<1.6	<1.6	1.6	7725705
Vinyl Acetate	ug/m3	<0.70	<0.70	0.70	7725705

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C1Y9274
Report Date: 2021/12/24

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107A

VOLATILE ORGANIC HYDROCARBONS BY GC/MS (AIR)

Bureau Veritas ID		RIQ245	RIQ246		
Sampling Date		2021/12/09 13:53	2021/12/10 11:25		
COC Number		82761	82761		
	UNITS	**F.BLANK**	**TRIP BLANK**	**RDL**	**QC Batch**
F1-BTEX, C6-C10 (as Toluene)	ug/m3	<5.0	<5.0	5.0	7737784
F2, C10-C16 (as Decane)	ug/m3	<5.0	<5.0	5.0	7737784

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C1Y9274
Report Date: 2021/12/24

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107A

TEST SUMMARY

Bureau Veritas ID: RIQ245
Sample ID: F.BLANK
Matrix: Air

Collected: 2021/12/09
Relinquished: 2021/12/10
Received: 2021/12/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	7737784	N/A	2021/12/16	Dany Marqass
Canister Pressure (TO-15)	PRES	7737778	N/A	2021/12/16	Dany Marqass
Volatile Organics in Air (ug/m3)	GC/MS	7725705	N/A	2021/12/20	Automated Statchk
Volatile Organics in Air (TO-15)	GC/MS	7737780	N/A	2021/12/16	Dany Marqass

Bureau Veritas ID: RIQ246
Sample ID: TRIP BLANK
Matrix: Air

Collected: 2021/12/10
Relinquished: 2021/12/10
Received: 2021/12/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	7737784	N/A	2021/12/16	Dany Marqass
Canister Pressure (TO-15)	PRES	7737778	N/A	2021/12/16	Dany Marqass
Volatile Organics in Air (ug/m3)	GC/MS	7725705	N/A	2021/12/20	Automated Statchk
Volatile Organics in Air (TO-15)	GC/MS	7737780	N/A	2021/12/16	Dany Marqass

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GENERAL COMMENTS

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7737780	DM2	Method Blank	Bromochloromethane	2021/12/16		99	%	60 - 140
			D5-Chlorobenzene	2021/12/16		92	%	60 - 140
			Difluorobenzene	2021/12/16		99	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2021/12/16	<0.20		ppbv	
			1,2-Dichlorotetrafluoroethane	2021/12/16	<0.17		ppbv	
			Chloromethane	2021/12/16	<0.30		ppbv	
			Vinyl Chloride	2021/12/16	<0.10		ppbv	
			Chloroethane	2021/12/16	<0.30		ppbv	
			1,3-Butadiene	2021/12/16	<0.50		ppbv	
			Trichlorofluoromethane (FREON 11)	2021/12/16	<0.20		ppbv	
			Ethanol (ethyl alcohol)	2021/12/16	<1.0		ppbv	
			Trichlorotrifluoroethane	2021/12/16	<0.15		ppbv	
			2-propanol	2021/12/16	<1.0		ppbv	
			2-Propanone	2021/12/16	<0.60		ppbv	
			Methyl Ethyl Ketone (2-Butanone)	2021/12/16	<0.20		ppbv	
			Methyl Isobutyl Ketone	2021/12/16	<0.20		ppbv	
			Methyl Butyl Ketone (2-Hexanone)	2021/12/16	<1.0		ppbv	
			Methyl t-butyl ether (MTBE)	2021/12/16	<0.20		ppbv	
			Ethyl Acetate	2021/12/16	<1.0		ppbv	
			1,1-Dichloroethylene	2021/12/16	<0.10		ppbv	
			cis-1,2-Dichloroethylene	2021/12/16	<0.10		ppbv	
			trans-1,2-Dichloroethylene	2021/12/16	<0.10		ppbv	
			Methylene Chloride(Dichloromethane)	2021/12/16	<0.60		ppbv	
			Chloroform	2021/12/16	<0.10		ppbv	
			Carbon Tetrachloride	2021/12/16	<0.10		ppbv	
			1,1-Dichloroethane	2021/12/16	<0.10		ppbv	
			1,2-Dichloroethane	2021/12/16	<0.10		ppbv	
			Ethylene Dibromide	2021/12/16	<0.10		ppbv	
			1,1,1-Trichloroethane	2021/12/16	<0.10		ppbv	
			1,1,2-Trichloroethane	2021/12/16	<0.10		ppbv	
			1,1,2,2-Tetrachloroethane	2021/12/16	<0.10		ppbv	
			cis-1,3-Dichloropropene	2021/12/16	<0.10		ppbv	
			trans-1,3-Dichloropropene	2021/12/16	<0.10		ppbv	
			1,2-Dichloropropane	2021/12/16	<0.10		ppbv	
			Bromomethane	2021/12/16	<0.10		ppbv	
			Bromoform	2021/12/16	<0.20		ppbv	
			Bromodichloromethane	2021/12/16	<0.20		ppbv	
			Dibromochloromethane	2021/12/16	<0.20		ppbv	
			Trichloroethylene	2021/12/16	<0.10		ppbv	
			Tetrachloroethylene	2021/12/16	<0.10		ppbv	
			Benzene	2021/12/16	<0.10		ppbv	
			Toluene	2021/12/16	<0.10		ppbv	
			Ethylbenzene	2021/12/16	<0.10		ppbv	
			p+m-Xylene	2021/12/16	<0.20		ppbv	
			o-Xylene	2021/12/16	<0.10		ppbv	
			Styrene	2021/12/16	<0.10		ppbv	
			4-ethyltoluene	2021/12/16	<0.50		ppbv	
			1,3,5-Trimethylbenzene	2021/12/16	<0.50		ppbv	
			1,2,4-Trimethylbenzene	2021/12/16	<0.50		ppbv	
			Chlorobenzene	2021/12/16	<0.10		ppbv	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Benzyl chloride	2021/12/16	<0.50		ppbv	
			1,3-Dichlorobenzene	2021/12/16	<0.40		ppbv	
			1,4-Dichlorobenzene	2021/12/16	<0.10		ppbv	
			1,2-Dichlorobenzene	2021/12/16	<0.10		ppbv	
			1,2,4-Trichlorobenzene	2021/12/16	<0.50		ppbv	
			Hexachlorobutadiene	2021/12/16	<0.50		ppbv	
			Hexane	2021/12/16	<0.20		ppbv	
			Heptane	2021/12/16	<0.30		ppbv	
			Cyclohexane	2021/12/16	<0.20		ppbv	
			Tetrahydrofuran	2021/12/16	<0.40		ppbv	
			1,4-Dioxane	2021/12/16	<1.0		ppbv	
			Naphthalene	2021/12/16	<0.20		ppbv	
			Total Xylenes	2021/12/16	<0.30		ppbv	
			1,1,1,2-Tetrachloroethane	2021/12/16	<0.10		ppbv	
			Vinyl Bromide	2021/12/16	<0.20		ppbv	
			Propene	2021/12/16	<0.50		ppbv	
			2,2,4-Trimethylpentane	2021/12/16	<0.20		ppbv	
			Carbon Disulfide	2021/12/16	<0.50		ppbv	
			Vinyl Acetate	2021/12/16	<0.20		ppbv	
7737784	DM2	Method Blank	F1-BTEX, C6-C10 (as Toluene)	2021/12/16	<5.0		ug/m3	
			F2, C10-C16 (as Decane)	2021/12/16	<5.0		ug/m3	
7737780	DM2	LCS	Bromochloromethane	2021/12/16		97	%	60 - 140
			D5-Chlorobenzene	2021/12/16		99	%	60 - 140
			Difluorobenzene	2021/12/16		98	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2021/12/16		98	%	70 - 130
			1,2-Dichlorotetrafluoroethane	2021/12/16		98	%	70 - 130
			Chloromethane	2021/12/16		85	%	70 - 130
			Vinyl Chloride	2021/12/16		93	%	70 - 130
			Chloroethane	2021/12/16		92	%	70 - 130
			1,3-Butadiene	2021/12/16		94	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2021/12/16		102	%	70 - 130
			Ethanol (ethyl alcohol)	2021/12/16		107	%	70 - 130
			Trichlorotrifluoroethane	2021/12/16		101	%	70 - 130
			2-propanol	2021/12/16		70	%	70 - 130
			2-Propanone	2021/12/16		97	%	70 - 130
			Methyl Ethyl Ketone (2-Butanone)	2021/12/16		101	%	70 - 130
			Methyl Isobutyl Ketone	2021/12/16		104	%	70 - 130
			Methyl Butyl Ketone (2-Hexanone)	2021/12/16		108	%	70 - 130
			Methyl t-butyl ether (MTBE)	2021/12/16		109	%	70 - 130
			Ethyl Acetate	2021/12/16		99	%	70 - 130
			1,1-Dichloroethylene	2021/12/16		97	%	70 - 130
			cis-1,2-Dichloroethylene	2021/12/16		95	%	70 - 130
			trans-1,2-Dichloroethylene	2021/12/16		103	%	70 - 130
			Methylene Chloride(Dichloromethane)	2021/12/16		94	%	70 - 130
			Chloroform	2021/12/16		99	%	70 - 130
			Carbon Tetrachloride	2021/12/16		113	%	70 - 130
			1,1-Dichloroethane	2021/12/16		97	%	70 - 130
			1,2-Dichloroethane	2021/12/16		100	%	70 - 130
			Ethylene Dibromide	2021/12/16		104	%	70 - 130
			1,1,1-Trichloroethane	2021/12/16		109	%	70 - 130

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,1,2-Trichloroethane	2021/12/16		100	%	70 - 130
			1,1,2,2-Tetrachloroethane	2021/12/16		89	%	70 - 130
			cis-1,3-Dichloropropene	2021/12/16		105	%	70 - 130
			trans-1,3-Dichloropropene	2021/12/16		116	%	70 - 130
			1,2-Dichloropropane	2021/12/16		99	%	70 - 130
			Bromomethane	2021/12/16		100	%	70 - 130
			Bromoform	2021/12/16		105	%	70 - 130
			Bromodichloromethane	2021/12/16		107	%	70 - 130
			Dibromochloromethane	2021/12/16		114	%	70 - 130
			Trichloroethylene	2021/12/16		107	%	70 - 130
			Tetrachloroethylene	2021/12/16		107	%	70 - 130
			Benzene	2021/12/16		98	%	70 - 130
			Toluene	2021/12/16		103	%	70 - 130
			Ethylbenzene	2021/12/16		100	%	70 - 130
			p+m-Xylene	2021/12/16		100	%	70 - 130
			o-Xylene	2021/12/16		92	%	70 - 130
			Styrene	2021/12/16		98	%	70 - 130
			4-ethyltoluene	2021/12/16		113	%	70 - 130
			1,3,5-Trimethylbenzene	2021/12/16		109	%	70 - 130
			1,2,4-Trimethylbenzene	2021/12/16		116	%	70 - 130
			Chlorobenzene	2021/12/16		99	%	70 - 130
			Benzyl chloride	2021/12/16		122	%	70 - 130
			1,3-Dichlorobenzene	2021/12/16		104	%	70 - 130
			1,4-Dichlorobenzene	2021/12/16		105	%	70 - 130
			1,2-Dichlorobenzene	2021/12/16		100	%	70 - 130
			1,2,4-Trichlorobenzene	2021/12/16		108	%	70 - 130
			Hexachlorobutadiene	2021/12/16		99	%	70 - 130
			Hexane	2021/12/16		100	%	70 - 130
			Heptane	2021/12/16		102	%	70 - 130
			Cyclohexane	2021/12/16		101	%	70 - 130
			Tetrahydrofuran	2021/12/16		98	%	70 - 130
			1,4-Dioxane	2021/12/16		107	%	70 - 130
			Naphthalene	2021/12/16		106	%	70 - 130
			Total Xylenes	2021/12/16		97	%	70 - 130
			1,1,1,2-Tetrachloroethane	2021/12/16		103	%	70 - 130
			Vinyl Bromide	2021/12/16		109	%	70 - 130
			Propene	2021/12/16		91	%	70 - 130
			2,2,4-Trimethylpentane	2021/12/16		103	%	70 - 130
			Carbon Disulfide	2021/12/16		100	%	70 - 130
			Vinyl Acetate	2021/12/16		109	%	70 - 130

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

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Bureau Veritas Job #: C1Y9274
Report Date: 2021/12/24

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107A

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Melanie Mabini, Team Leader

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

6740 Campobello Road
Mississauga, ON L5N 2L8
www.bvlabs.com

Phone: (905) 817-5700
Fax: (905) 817-5779
Toll Free: 1-800-563-6266

EXXONMOBIL/IMPERIAL OIL - BUREAU VERITAS AIR CHAIN OF CUSTODY RECORD

Page 1 of 1

C of C # 82761

INVOICE INFORMATION

Company Name: ☒ Imperial Oil ☐ ExxonMobil
Contact Name: IOL Accounts Payable
Address: 102, 2535-3rd Ave SE
Calgary, AB T2A 7W5
Email: IOLAccounts_Payable@exxon.com
Ph: (403) 299-5600
Sampler Name (Print): Leonara Marjani, Thomas Ryan.

REPORT INFORMATION

Company Name: Golder Associates Ltd.
Contact Name: Ian Sossey
Address: 110 Hoover Dr Building A Suite 203
St Catherines, ON. L2W 1A4
Email: Ian_Sossey@Golder.com
Ph: (647) 522-4698
Consultant Project #: 20447743 · 1155 · 2107A

ANALYSIS REQUESTED

C1Y9274-01

Inspected By: MDK
Entered By: MDK

	FIELD SAMPLE ID	Canister Serial #	Flow Regulator Serial #	Sample Collection DATE (YYYY/MM/DD)	Sample Collection TIME (24 HR)	Media Type (See Legend)	FLOW RATE (mL/min)	LENGTH OF SAMPLING (minutes)	End Vacuum (inches of Hg)	BTEX	Aromatic/Aliphatic Hydrocarbon Fractionations	F1 (C6-C10) - F2 (C10-C16)	VOC (TO15)
1	F. Blank	1205	FX1615	2021/12/09	13:53	S	200mL/m	7	-7	X		X	X
2	Trip Blank	1256	NA	2021/12/10	11:25	S	NA	NA	NA	X		X	X
3													
4													
5													
6													
7													
8													
9													
10													
11													

IOL SITE LOCATION: 1660 Merivale Rd Ottawa ON

IOL PROJECT # (if applicable): NA

BUREAU VERITAS TASK ORDER # OR SERVICE ORDER # + LINE ITEM: 20447743 - 1155 - 7777

REGULATORY CRITERIA / DETECTION LIMITS: (PLEASE SPECIFY): NA

SPECIAL INSTRUCTIONS: IES A2601436
SAP 88501627

LEGEND
S - Summa Can
T - Tube
TB - Tedlar Bag
O - Other(Specify)
*TEMP N/A for SUMMA CAN

TURNAROUND TIME
Standard (10 days) ☒
Rush (9 days) ☐
(6 days) ☐
(3 days) ☐
Date Required

	YES	NO	COOLER ID #	TEMP °C 1	2	3
SEAL PRESENT	X					
SEAL INTACT	X					
COOLING MEDIA PRESENT		X				

	YES	NO	COOLER ID #	TEMP °C 1	2	3
SEAL PRESENT	✓					
SEAL INTACT	✓					
COOLING MEDIA PRESENT		✓				

	YES	NO	COOLER ID #	TEMP °C 1	2	3
SEAL PRESENT						
SEAL INTACT						
COOLING MEDIA PRESENT						

LAB USE ONLY
BUREAU VERITAS JOB # C1Y9274

RELINQUISHED BY:		DATE:	TIME (24 HR)	RECEIVED BY:	DATE:	TIME (24 HR)
1.	Tom Ryan	2021/12/10	13:25	1.		1125
2.				2.		
3.				3.		

SAMPLES
LABELED BY: MDK
VERIFIED BY: LOR

IOL COC-AIR-(08/19) White: Bureau Veritas Yellow: Client

Unless otherwise agreed to in writing, work submitted on this Chain of Custody is subject to Bureau Veritas Laboratories' standard Terms and Conditions. Signing of this Chain of Custody document is acknowledgment and acceptance of our terms available at http://www.bvlabs.com/terms-and-conditions

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: December 10, 2021

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Bureau Veritas Mississauga

Consultant Project Number: 20447743-1155

Sample Submission Number: C1Y9274

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within
Extraction Surrogate Recovery			X	acceptance criteria.
Method Blank Concentration	X			
Matrix Duplicate RPD			X	
Matrix Spike Recovery			X	
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration	X			All field QC samples are within
Trip Blank Concentration	X			alert limits.
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	n/a

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): Amanda Newberry

Date: January 4, 2022

Task Order#: 21506016-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 21506016-1155-2207A
Your C.O.C. #: 498894

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2022/04/22
Report #: R7095527
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C2A2163
Received: 2022/04/19, 09:31

Sample Matrix: Water
Samples Received: 2

Analyses	Quantity	Laboratory Method	Analytical Method
Petroleum Hydro. CCME F1 & BTEX in Water	2	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1)	2	CAM SOP-00316	CCME PHC-CWS m
Dissolved Metals by ICPMS	2	CAM SOP-00447	EPA 6020B m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard. All samples were analyzed within hold time unless otherwise flagged.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following “Alberta Environment’s Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003”. Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Task Order#: 21506016-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 21506016-1155-2207A
Your C.O.C. #: 498894

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2022/04/22
Report #: R7095527
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C2A2163
Received: 2022/04/19, 09:31

Encryption Key



Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Gina Baybayan, Project Manager
Email: Gina.Baybayan@bureauveritas.com
Phone# (905)817-5766

==========

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Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C2A2163
Report Date: 2022/04/22

Golder Associates Ltd
Task Order#: 21506016-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 21506016-1155-2207A

LEAD (DISSOLVED) IN WATER

Bureau Veritas ID			SJU131	SJU132		
Sampling Date			2022/04/13 22:10	2022/04/13 22:15		
COC Number			498894	498894		
	UNITS	**Criteria**	**Trip Blank**	**F. Blank**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	**25**	<0.50	<0.50	0.50	7948542

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition
Non-Potable Ground Water - All Types of Property Uses - Medium and Fine Textured Soil

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

O.REG 153 PHCS IN WATER (WATER)

Bureau Veritas ID			SJU131	SJU132		
Sampling Date			2022/04/13 22:10	2022/04/13 22:15		
COC Number			498894	498894		
	UNITS	**Criteria**	**Trip Blank**	**F. Blank**	**RDL**	**QC Batch**
Benzene	ug/L	**430**	<0.20	<0.20	0.20	7950512
Toluene	ug/L	**18000**	<0.20	<0.20	0.20	7950512
Ethylbenzene	ug/L	**2300**	<0.20	<0.20	0.20	7950512
o-Xylene	ug/L	-	<0.20	<0.20	0.20	7950512
p+m-Xylene	ug/L	-	<0.40	<0.40	0.40	7950512
Total Xylenes	ug/L	**4200**	<0.40	<0.40	0.40	7950512
F1 (C6-C10)	ug/L	**750**	<25	<25	25	7950512
F1 (C6-C10) - BTEX	ug/L	**750**	<25	<25	25	7950512
F2 (C10-C16 Hydrocarbons)	ug/L	**150**	<100	<100	100	7952363
F3 (C16-C34 Hydrocarbons)	ug/L	**500**	<200	<200	200	7952363
F4 (C34-C50 Hydrocarbons)	ug/L	**500**	<200	<200	200	7952363
Reached Baseline at C50	ug/L	-	Yes	Yes		7952363
Extraction Surrogate Recovery (%)						
D10-o-Xylene	%	-	104	103		7950512
o-Terphenyl	%	-	99	100		7952363
Instrument Surrogate Recovery (%)						
1,4-Difluorobenzene	%	-	104	104		7950512
4-Bromofluorobenzene	%	-	96	93		7950512
D4-1,2-Dichloroethane	%	-	108	109		7950512

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition
Non-Potable Ground Water - All Types of Property Uses - Medium and Fine Textured Soil

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Bureau Veritas Job #: C2A2163
Report Date: 2022/04/22

Golder Associates Ltd
Task Order#: 21506016-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 21506016-1155-2207A

TEST SUMMARY

Bureau Veritas ID: SJU131
Sample ID: Trip Blank
Matrix: Water

Collected: 2022/04/13
Relinquished: 2022/04/18
Received: 2022/04/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7950512	N/A	2022/04/20	Georgeta Rusu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7952363	2022/04/21	2022/04/22	Dennis Ngondu
Dissolved Metals by ICPMS	ICP/MS	7948542	N/A	2022/04/20	Prempal Bhatti

Bureau Veritas ID: SJU132
Sample ID: F. Blank
Matrix: Water

Collected: 2022/04/13
Relinquished: 2022/04/18
Received: 2022/04/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7950512	N/A	2022/04/21	Georgeta Rusu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7952363	2022/04/21	2022/04/22	Dennis Ngondu
Dissolved Metals by ICPMS	ICP/MS	7948542	N/A	2022/04/20	Prempal Bhatti

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	3.3°C

Results relate only to the items tested.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7948542	PBA	Method Blank	Dissolved Lead (Pb)	2022/04/20	<0.50		ug/L	
7950512	GRU	Method Blank	1,4-Difluorobenzene	2022/04/20		105	%	70 - 130
			4-Bromofluorobenzene	2022/04/20		97	%	70 - 130
			D10-o-Xylene	2022/04/20		104	%	70 - 130
			D4-1,2-Dichloroethane	2022/04/20		111	%	70 - 130
			Benzene	2022/04/20	<0.20		ug/L	
			Toluene	2022/04/20	<0.20		ug/L	
			Ethylbenzene	2022/04/20	<0.20		ug/L	
			o-Xylene	2022/04/20	<0.20		ug/L	
			p+m-Xylene	2022/04/20	<0.40		ug/L	
			Total Xylenes	2022/04/20	<0.40		ug/L	
			F1 (C6-C10)	2022/04/20	<25		ug/L	
			F1 (C6-C10) - BTEX	2022/04/20	<25		ug/L	
7952363	DN0	Method Blank	o-Terphenyl	2022/04/22		101	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2022/04/22	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2022/04/22	<200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2022/04/22	<200		ug/L	
7948542	PBA	LCS	Dissolved Lead (Pb)	2022/04/20		96	%	80 - 120
7950512	GRU	LCS	1,4-Difluorobenzene	2022/04/20		99	%	70 - 130
			4-Bromofluorobenzene	2022/04/20		103	%	70 - 130
			D10-o-Xylene	2022/04/20		108	%	70 - 130
			D4-1,2-Dichloroethane	2022/04/20		101	%	70 - 130
			Benzene	2022/04/20		109	%	50 - 140
			Toluene	2022/04/20		101	%	50 - 140
			Ethylbenzene	2022/04/20		118	%	50 - 140
			o-Xylene	2022/04/20		112	%	50 - 140
			p+m-Xylene	2022/04/20		111	%	50 - 140
			F1 (C6-C10)	2022/04/20		88	%	60 - 140
7952363	DN0	LCS	o-Terphenyl	2022/04/22		100	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2022/04/22		108	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2022/04/22		119	%	60 - 130
			F4 (C34-C50 Hydrocarbons)	2022/04/22		117	%	60 - 130

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

Bureau Veritas Job #: C2A2163
Report Date: 2022/04/22

Golder Associates Ltd
Task Order#: 21506016-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 21506016-1155-2207A

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Cristina Carriere

Cristina Carriere, Senior Scientific Specialist

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

eCOC: T498894

Project Information:	C2A2163
Job Received:	2022/04/19 09:31
Results Required By:	2022/04/26
Expected Arrival:	2022/04/19
Submitted By:	Thomas Ryan
Submitted To:	Mississauga, ON (Env. Lab)

Invoice Information

Attn: Imperial Accounts Payable
Imperial Oil Ltd - Golder Associates Ltd
102, 2535-3rd Avenue SE
Calgary , AB , T2A 7W5
Email to:
canadaaccountspayableinvoices@golder.com

Report Information

Attn: Ian Sosney
Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines , ON , L2W 1A4
Email to:
ian_sosney@golder.com
iol_1390@golder.com
iol_equis@golder.com

Project Information

Quote #:	B73682
PO/AFE#:	IES A2601436
Project #:	21506016-1155-2207A
Site Location:	1660 Merivale Road, Ottawa, ON
Site #:	NA
Task Order:	21506016-1155-7777
Line Item:	NA

Analytical Summary

A: 2022/04/26

Client Sample ID	Clnt Ref	Sampling Date/Time	Matrix	#Cont	Lead (Dissolved) in Water	O.Reg 153 PHCs in Water
Trip Blank	1	2022/04/13 22:10	GROUND WATER	7	A	A
F. Blank	2	2022/04/13 22:15	GROUND WATER	7	A	A

Deadlines are estimates only and are subject to change. Please refer to your Job Confirmation report for final due dates.

Criteria : Reg153/04 T3-GW-F/M

Submission Information

# of Samples: 2

Details: Upload to SAP 88001627
Metals bottles field filtered and preserved

Custody Tracking Form

eCOC Number
T498894

Please use this form for custody tracking when submitting the work instructions via eCOC (electronic Chain of Custody). Please ensure your form **has a barcode or a Bureau Veritas Laboratories eCOC confirmation number** in the top right hand side. This number links your electronic submission to your samples. This form should be **placed in the cooler with your samples**.

Relinquished By				Received By			
Tom Ryan		Date	April 18, 2022			Date	2022-04-19
		Time (24 HR)	07:13			Time (24 HR)	09:31
		Date				Date	
		Time (24 HR)				Time (24 HR)	
		Date				Date	
		Time (24 HR)				Time (24 HR)	

Unless otherwise agreed to, submissions and use of services are governed by Bureau Veritas' standard terms and conditions which can be found at www.bvlabs.com.

Triage Information

Sampled By (Print)	# of Coolers/Pkgs				
Tom Ryan	1	Rush ☐	Immediate Test ☐	Food Residue ☐	
		Micro ☐		Food Chemistry ☐	

***** Laboratory Use Only *****

Received At	Mississauga
Labeled By	mum
Verified By	T-L

Lab Comments: C2A2163

Custody Seal		Cooling Media	Temperature °C		
Present (Y/N)	Intact (Y/N)	Present (Y/N)	1	2	3
Y	Y	Y	2	3	5

COR FCD-00340 / 3
PAGE 1 of 1

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: April 13, 2022

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Bureau Veritas Mississauga

Consultant Project Number: 21506016-1155

Sample Submission Number: C2A2163

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within
Extraction Surrogate Recovery	X			acceptance criteria.
Method Blank Concentration	X			
Matrix Duplicate RPD			X	
Matrix Spike Recovery			X	
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration	X			All field QC samples are within
Trip Blank Concentration	X			alert limits.
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): Amanda Newberry

Date: April 26, 2022

Task Order#: 21506016-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 21506016-1155-2207A
Your C.O.C. #: 498893

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2022/04/25
Report #: R7098539
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C2A2236
Received: 2022/04/19, 09:31

Sample Matrix: Water
Samples Received: 8

Analyses	Quantity	Laboratory Method	Analytical Method
Petroleum Hydro. CCME F1 & BTEX in Water	8	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1)	8	CAM SOP-00316	CCME PHC-CWS m
Dissolved Metals by ICPMS	8	CAM SOP-00447	EPA 6020B m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard. All samples were analyzed within hold time unless otherwise flagged.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following “Alberta Environment’s Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003”. Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Task Order#: 21506016-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 21506016-1155-2207A
Your C.O.C. #: 498893

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2022/04/25
Report #: R7098539
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C2A2236
Received: 2022/04/19, 09:31

Encryption Key



Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Gina Baybayan, Project Manager
Email: Gina.Baybayan@bureauveritas.com
Phone# (905)817-5766

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Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.

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Bureau Veritas Job #: C2A2236
Report Date: 2022/04/25

Golder Associates Ltd
Task Order#: 21506016-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 21506016-1155-2207A

LEAD (DISSOLVED) IN WATER

Bureau Veritas ID			SJU498	SJU499			SJU500			SJU501		
Sampling Date			2022/04/13 21:45	2022/04/13 20:43			2022/04/14 00:28			2022/04/14 00:35		
COC Number			498893	498893			498893			498893		
	UNITS	**Criteria**	**TH100**	**TH8**	**RDL**	**QC Batch**	**MW16-01**	**RDL**	**QC Batch**	**TH11**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	**25**	<0.50	1.8	0.50	7949658	<2.5	2.5	7948542	7.6	0.50	7949658

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition
Non-Potable Ground Water - All Types of Property Uses - Medium and Fine Textured Soil

Bureau Veritas ID			SJU501	SJU502	SJU503			SJU504	SJU505		
Sampling Date			2022/04/14 00:35	2022/04/13 23:15	2022/04/13 23:20			2022/04/13 20:32	2022/04/13 21:45		
COC Number			498893	498893	498893			498893	498893		
	UNITS	**Criteria**	**TH11 Lab-Dup**	**TH101**	**TH102**	**RDL**	**QC Batch**	**TH9**	**DUP A**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	**25**	7.6	1.0	1.8	0.50	7949658	<2.5	<2.5	2.5	7948542

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition
Non-Potable Ground Water - All Types of Property Uses - Medium and Fine Textured Soil

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O.REG 153 PHCS IN WATER (WATER)

Bureau Veritas ID			SJU498			SJU498			SJU499		
Sampling Date			2022/04/13 21:45			2022/04/13 21:45			2022/04/13 20:43		
COC Number			498893			498893			498893		
	UNITS	**Criteria**	**TH100**	**RDL**	**QC Batch**	**TH100 Lab-Dup**	**RDL**	**QC Batch**	**TH8**	**RDL**	**QC Batch**
Benzene	ug/L	**430**	<0.20	0.20	7951604	<0.20	0.20	7951604	3.4	0.20	7951604
Toluene	ug/L	**18000**	<0.20	0.20	7951604	<0.20	0.20	7951604	0.31	0.20	7951604
Ethylbenzene	ug/L	**2300**	<0.20	0.20	7951604	<0.20	0.20	7951604	3.4	0.20	7951604
o-Xylene	ug/L	-	<0.20	0.20	7951604	<0.20	0.20	7951604	<0.20	0.20	7951604
p+m-Xylene	ug/L	-	<0.40	0.40	7951604	<0.40	0.40	7951604	0.47	0.40	7951604
Total Xylenes	ug/L	**4200**	<0.40	0.40	7951604	<0.40	0.40	7951604	0.47	0.40	7951604
F1 (C6-C10)	ug/L	**750**	<25	25	7951604	<25	25	7951604	140	25	7951604
F1 (C6-C10) - BTEX	ug/L	**750**	<25	25	7951604	<25	25	7951604	130	25	7951604
F2 (C10-C16 Hydrocarbons)	ug/L	**150**	<100	100	7953212				110	100	7953212
F3 (C16-C34 Hydrocarbons)	ug/L	**500**	<200	200	7953212				**590**	200	7953212
F4 (C34-C50 Hydrocarbons)	ug/L	**500**	<200	200	7953212				380	200	7953212
Reached Baseline at C50	ug/L	-	Yes		7953212				Yes		7953212
Extraction Surrogate Recovery (%)											
D10-o-Xylene	%	-	84		7951604	85		7951604	87		7951604
o-Terphenyl	%	-	95		7953212				98		7953212
Instrument Surrogate Recovery (%)											
1,4-Difluorobenzene	%	-	100		7951604	101		7951604	102		7951604
4-Bromofluorobenzene	%	-	104		7951604	101		7951604	106		7951604
D4-1,2-Dichloroethane	%	-	102		7951604	99		7951604	106		7951604

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition
Non-Potable Ground Water - All Types of Property Uses - Medium and Fine Textured Soil

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

O.REG 153 PHCS IN WATER (WATER)

Bureau Veritas ID			SJU499			SJU500		SJU501		SJU502		
Sampling Date			2022/04/13 20:43			2022/04/14 00:28		2022/04/14 00:35		2022/04/13 23:15		
COC Number			498893			498893		498893		498893		
	UNITS	**Criteria**	**TH8 Lab-Dup**	**RDL**	**QC Batch**	**MW16-01**	**RDL**	**TH11**	**RDL**	**TH101**	**RDL**	**QC Batch**
Benzene	ug/L	**430**				59	0.20	46	0.40	1.8	0.20	7951604
Toluene	ug/L	**18000**				7.9	0.20	6.5	0.40	0.45	0.20	7951604
Ethylbenzene	ug/L	**2300**				75	0.20	170	0.40	84	0.20	7951604
o-Xylene	ug/L	-				16	0.20	11	0.40	1.1	0.20	7951604
p+m-Xylene	ug/L	-				210	0.40	150	0.80	1.4	0.40	7951604
Total Xylenes	ug/L	**4200**				230	0.40	160	0.80	2.5	0.40	7951604
F1 (C6-C10)	ug/L	**750**				**900**	25	**1700**	50	**1000**	25	7951604
F1 (C6-C10) - BTEX	ug/L	**750**				530	25	**1300**	50	**940**	25	7951604
F2 (C10-C16 Hydrocarbons)	ug/L	**150**	<100	100	7953212	**220**	100	**1100**	100	**350**	100	7953212
F3 (C16-C34 Hydrocarbons)	ug/L	**500**	380	200	7953212	330	200	**740**	200	<200	200	7953212
F4 (C34-C50 Hydrocarbons)	ug/L	**500**	210	200	7953212	<200	200	500	200	<200	200	7953212
Reached Baseline at C50	ug/L	-	Yes		7953212	Yes		Yes		Yes		7953212
Extraction Surrogate Recovery (%)												
D10-o-Xylene	%	-				85		117		84		7951604
o-Terphenyl	%	-	98		7953212	93		99		102		7953212
Instrument Surrogate Recovery (%)												
1,4-Difluorobenzene	%	-				103		101		99		7951604
4-Bromofluorobenzene	%	-				108		107		105		7951604
D4-1,2-Dichloroethane	%	-				107		109		109		7951604

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition
Non-Potable Ground Water - All Types of Property Uses - Medium and Fine Textured Soil

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

O.REG 153 PHCS IN WATER (WATER)

Bureau Veritas ID			SJU503	SJU504	SJU505		
Sampling Date			2022/04/13 23:20	2022/04/13 20:32	2022/04/13 21:45		
COC Number			498893	498893	498893		
	UNITS	**Criteria**	**TH102**	**TH9**	**DUP A**	**RDL**	**QC Batch**
Benzene	ug/L	**430**	4.1	0.21	<0.20	0.20	7951604
Toluene	ug/L	**18000**	0.48	<0.20	<0.20	0.20	7951604
Ethylbenzene	ug/L	**2300**	10	0.22	<0.20	0.20	7951604
o-Xylene	ug/L	-	0.69	<0.20	<0.20	0.20	7951604
p+m-Xylene	ug/L	-	1.6	<0.40	<0.40	0.40	7951604
Total Xylenes	ug/L	**4200**	2.3	<0.40	<0.40	0.40	7951604
F1 (C6-C10)	ug/L	**750**	460	<25	<25	25	7951604
F1 (C6-C10) - BTEX	ug/L	**750**	450	<25	<25	25	7951604
F2 (C10-C16 Hydrocarbons)	ug/L	**150**	<100	<100	<100	100	7953212
F3 (C16-C34 Hydrocarbons)	ug/L	**500**	<200	<200	<200	200	7953212
F4 (C34-C50 Hydrocarbons)	ug/L	**500**	<200	<200	<200	200	7953212
Reached Baseline at C50	ug/L	-	Yes	Yes	Yes		7953212
Extraction Surrogate Recovery (%)							
D10-o-Xylene	%	-	86	87	84		7951604
o-Terphenyl	%	-	101	98	95		7953212
Instrument Surrogate Recovery (%)							
1,4-Difluorobenzene	%	-	101	104	100		7951604
4-Bromofluorobenzene	%	-	103	103	106		7951604
D4-1,2-Dichloroethane	%	-	105	106	105		7951604

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition
Non-Potable Ground Water - All Types of Property Uses - Medium and Fine Textured Soil

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C2A2236
Report Date: 2022/04/25

Golder Associates Ltd
Task Order#: 21506016-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 21506016-1155-2207A

TEST SUMMARY

Bureau Veritas ID: SJU498
Sample ID: TH100
Matrix: Water

Collected: 2022/04/13
Relinquished: 2022/04/18
Received: 2022/04/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7951604	N/A	2022/04/21	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7953212	2022/04/21	2022/04/22	Dennis Ngondu
Dissolved Metals by ICPMS	ICP/MS	7949658	N/A	2022/04/21	Arefa Dabhad

Bureau Veritas ID: SJU498 Dup
Sample ID: TH100
Matrix: Water

Collected: 2022/04/13
Relinquished: 2022/04/18
Received: 2022/04/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7951604	N/A	2022/04/21	Abdikarim Ali

Bureau Veritas ID: SJU499
Sample ID: TH8
Matrix: Water

Collected: 2022/04/13
Relinquished: 2022/04/18
Received: 2022/04/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7951604	N/A	2022/04/21	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7953212	2022/04/21	2022/04/22	Dennis Ngondu
Dissolved Metals by ICPMS	ICP/MS	7949658	N/A	2022/04/21	Arefa Dabhad

Bureau Veritas ID: SJU499 Dup
Sample ID: TH8
Matrix: Water

Collected: 2022/04/13
Relinquished: 2022/04/18
Received: 2022/04/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7953212	2022/04/21	2022/04/22	Dennis Ngondu

Bureau Veritas ID: SJU500
Sample ID: MW16-01
Matrix: Water

Collected: 2022/04/14
Relinquished: 2022/04/18
Received: 2022/04/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7951604	N/A	2022/04/21	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7953212	2022/04/21	2022/04/22	Dennis Ngondu
Dissolved Metals by ICPMS	ICP/MS	7948542	N/A	2022/04/22	Prempal Bhatti

Bureau Veritas ID: SJU501
Sample ID: TH11
Matrix: Water

Collected: 2022/04/14
Relinquished: 2022/04/18
Received: 2022/04/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7951604	N/A	2022/04/21	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7953212	2022/04/21	2022/04/22	Dennis Ngondu
Dissolved Metals by ICPMS	ICP/MS	7949658	N/A	2022/04/21	Arefa Dabhad

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Bureau Veritas Job #: C2A2236
Report Date: 2022/04/25

Golder Associates Ltd
Task Order#: 21506016-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 21506016-1155-2207A

TEST SUMMARY

Bureau Veritas ID: SJU501 Dup
Sample ID: TH11
Matrix: Water
Collected: 2022/04/14
Relinquished: 2022/04/18
Received: 2022/04/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Metals by ICPMS	ICP/MS	7949658	N/A	2022/04/21	Arefa Dabhad

Bureau Veritas ID: SJU502
Sample ID: TH101
Matrix: Water
Collected: 2022/04/13
Relinquished: 2022/04/18
Received: 2022/04/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7951604	N/A	2022/04/21	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7953212	2022/04/21	2022/04/22	Dennis Ngondu
Dissolved Metals by ICPMS	ICP/MS	7949658	N/A	2022/04/21	Arefa Dabhad

Bureau Veritas ID: SJU503
Sample ID: TH102
Matrix: Water
Collected: 2022/04/13
Relinquished: 2022/04/18
Received: 2022/04/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7951604	N/A	2022/04/21	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7953212	2022/04/21	2022/04/22	Dennis Ngondu
Dissolved Metals by ICPMS	ICP/MS	7949658	N/A	2022/04/21	Arefa Dabhad

Bureau Veritas ID: SJU504
Sample ID: TH9
Matrix: Water
Collected: 2022/04/13
Relinquished: 2022/04/18
Received: 2022/04/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7951604	N/A	2022/04/21	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7953212	2022/04/21	2022/04/22	Dennis Ngondu
Dissolved Metals by ICPMS	ICP/MS	7948542	N/A	2022/04/22	Prempal Bhatti

Bureau Veritas ID: SJU505
Sample ID: DUP A
Matrix: Water
Collected: 2022/04/13
Relinquished: 2022/04/18
Received: 2022/04/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7951604	N/A	2022/04/21	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7953212	2022/04/21	2022/04/22	Dennis Ngondu
Dissolved Metals by ICPMS	ICP/MS	7948542	N/A	2022/04/22	Prempal Bhatti

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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	0.7°C

Sample SJU500 [MW16-01] : Metals Analysis: Due to the sample matrix, the sample required dilution. Detection limits were adjusted accordingly.

Sample SJU501 [TH11] : F1 BTEX analysis : Due to high concentration of target analytes, sample required dilution. Reporting limits were adjusted accordingly.

Sample SJU504 [TH9] : Metals Analysis: Due to the sample matrix, the sample required dilution. Detection limits were adjusted accordingly.

Sample SJU505 [DUP A] : Metals Analysis: Due to the sample matrix, the sample required dilution. Detection limits were adjusted accordingly.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7948542	PBA	Method Blank	Dissolved Lead (Pb)	2022/04/20	<0.50		ug/L	
7949658	ADA	Method Blank	Dissolved Lead (Pb)	2022/04/21	<0.50		ug/L	
7951604	AAI	Method Blank	1,4-Difluorobenzene	2022/04/21		100	%	70 - 130
			4-Bromofluorobenzene	2022/04/21		103	%	70 - 130
			D10-o-Xylene	2022/04/21		87	%	70 - 130
			D4-1,2-Dichloroethane	2022/04/21		100	%	70 - 130
			Benzene	2022/04/21	<0.20		ug/L	
			Toluene	2022/04/21	<0.20		ug/L	
			Ethylbenzene	2022/04/21	<0.20		ug/L	
			o-Xylene	2022/04/21	<0.20		ug/L	
			p+m-Xylene	2022/04/21	<0.40		ug/L	
			Total Xylenes	2022/04/21	<0.40		ug/L	
			F1 (C6-C10)	2022/04/21	<25		ug/L	
			F1 (C6-C10) - BTEX	2022/04/21	<25		ug/L	
7953212	DN0	Method Blank	o-Terphenyl	2022/04/22		87	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2022/04/22	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2022/04/22	<200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2022/04/22	<200		ug/L	
7951604	AAI	RPD [SJU498-04]	Benzene	2022/04/21	NC		%	30
			Toluene	2022/04/21	NC		%	30
			Ethylbenzene	2022/04/21	NC		%	30
			o-Xylene	2022/04/21	NC		%	30
			p+m-Xylene	2022/04/21	NC		%	30
			Total Xylenes	2022/04/21	NC		%	30
			F1 (C6-C10)	2022/04/21	NC		%	30
			F1 (C6-C10) - BTEX	2022/04/21	NC		%	30
7953212	DN0	RPD [SJU499-01]	F2 (C10-C16 Hydrocarbons)	2022/04/22	4.9		%	30
			F3 (C16-C34 Hydrocarbons)	2022/04/22	NC		%	30
			F4 (C34-C50 Hydrocarbons)	2022/04/22	NC		%	30
7949658	ADA	RPD [SJU501-03]	Dissolved Lead (Pb)	2022/04/21	0.11		%	20
7949658	ADA	Matrix Spike [SJU501-03]	Dissolved Lead (Pb)	2022/04/21		90	%	80 - 120
7951604	AAI	Matrix Spike [SJU498-04]	1,4-Difluorobenzene	2022/04/21		99	%	70 - 130
			4-Bromofluorobenzene	2022/04/21		106	%	70 - 130
			D10-o-Xylene	2022/04/21		88	%	70 - 130
			D4-1,2-Dichloroethane	2022/04/21		109	%	70 - 130
			Benzene	2022/04/21		93	%	50 - 140
			Toluene	2022/04/21		89	%	50 - 140
			Ethylbenzene	2022/04/21		100	%	50 - 140
			o-Xylene	2022/04/21		98	%	50 - 140
			p+m-Xylene	2022/04/21		94	%	50 - 140
			F1 (C6-C10)	2022/04/21		81	%	60 - 140
7953212	DN0	Matrix Spike [SJU498-01]	o-Terphenyl	2022/04/22		107	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2022/04/22		119	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2022/04/22		115	%	60 - 130
			F4 (C34-C50 Hydrocarbons)	2022/04/22		120	%	60 - 130
7948542	PBA	LCS	Dissolved Lead (Pb)	2022/04/20		96	%	80 - 120
7949658	ADA	LCS	Dissolved Lead (Pb)	2022/04/21		97	%	80 - 120
7951604	AAI	LCS	1,4-Difluorobenzene	2022/04/21		103	%	70 - 130
			4-Bromofluorobenzene	2022/04/21		104	%	70 - 130
			D10-o-Xylene	2022/04/21		94	%	70 - 130

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			D4-1,2-Dichloroethane	2022/04/21		100	%	70 - 130
			Benzene	2022/04/21		96	%	50 - 140
			Toluene	2022/04/21		93	%	50 - 140
			Ethylbenzene	2022/04/21		102	%	50 - 140
			o-Xylene	2022/04/21		103	%	50 - 140
			p+m-Xylene	2022/04/21		100	%	50 - 140
			F1 (C6-C10)	2022/04/21		82	%	60 - 140
7953212	DN0	LCS	o-Terphenyl	2022/04/22		95	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2022/04/22		101	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2022/04/22		99	%	60 - 130
			F4 (C34-C50 Hydrocarbons)	2022/04/22		102	%	60 - 130

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C2A2236
Report Date: 2022/04/25

Golder Associates Ltd
Task Order#: 21506016-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 21506016-1155-2207A

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



Brad Newman, B.Sc., C.Chem., Scientific Service Specialist

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

eCOC: T498893

Project Information:	C2A2236
Job Received:	2022/04/19 09:31
Results Required By:	2022/04/26
Expected Arrival:	2022/04/19
Submitted By:	Thomas Ryan
Submitted To:	Mississauga, ON (Env. Lab)

Invoice Information

Attn: Imperial Accounts Payable
Imperial Oil Ltd - Golder Associates Ltd
102, 2535-3rd Avenue SE
Calgary , AB , T2A 7W5
Email to:
canadaaccountspayableinvoices@golder.com

Report Information

Attn: Ian Sosney
Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines , ON , L2W 1A4
Email to:
ian_sosney@golder.com
iol_1390@golder.com
iol_equis@golder.com

Project Information

Quote #:	B73682
PO/AFE#:	IES A2601436
Project #:	21506016-1155-2207A
Site Location:	1660 Merivale Road, Ottawa, ON
Site #:	NA
Task Order:	21506016-1155-7777
Line Item:	NA

Analytical Summary

A: 2022/04/26

Client Sample ID	Clnt Ref	Sampling Date/Time	Matrix	#Cont	Lead (Dissolved) in Water	O.Reg 153 PHCs in Water
TH100	1	2022/04/13 21:45	GROUND WATER	7	A	A
TH8	2	2022/04/13 20:43	GROUND WATER	7	A	A
MW16-01	3	2022/04/14 00:28	GROUND WATER	7	A	A
TH11	4	2022/04/14 00:35	GROUND WATER	7	A	A
TH101	5	2022/04/13 23:15	GROUND WATER	7	A	A
TH102	6	2022/04/13 23:20	GROUND WATER	7	A	A
TH9	7	2022/04/13 20:32	GROUND WATER	7	A	A
DUP A	8	2022/04/13 21:45	GROUND WATER	7	A	A

Deadlines are estimates only and are subject to change. Please refer to your Job Confirmation report for final due dates.

Criteria : Reg153/04 T3-GW-F/M

Submission Information

# of Samples:	8
Details:	Upload to SAP 88001627 Metals bottles field filtered and preserved

eCOC: T498893

Project Information:	C2A2236
Job Received:	2022/04/19 09:31
Results Required By:	2022/04/26
Expected Arrival:	2022/04/19
Submitted By:	Thomas Ryan
Submitted To:	Mississauga, ON (Env. Lab)

Custody Tracking Form

eCOC Number
T498893

Please use this form for custody tracking when submitting the work instructions via eCOC (electronic Chain of Custody). Please ensure your form **has a barcode or a Bureau Veritas eCOC confirmation number** in the top right hand side. This number links your electronic submission to your samples. This form should be **placed in the cooler with your samples.**

Relinquished By				Received By			
Tom Ryan		Date	April 18, 2022			Date	2022/04/19
		Time (24 HR)	06:55			Time (24 HR)	0931
		Date				Date	
		Time (24 HR)				Time (24 HR)	
		Date				Date	
		Time (24 HR)				Time (24 HR)	

Unless otherwise agreed to, submissions and use of services are governed by Bureau Veritas' standard terms and conditions which can be found at www.bvna.com.

Triage Information

Sampled By (Print)	# of Coolers/Pkgs				
Tom Ryan	1	Rush ☐	Micro ☐	Immediate Test ☐	Food Residue ☐ Food Chemistry ☐

***** Laboratory Use Only *****

Received At	Mississauga
Labeled By	mum
Verified By	VBV

Lab Comments: C2A2236

Custody Seal		Cooling Media	Temperature °C		
Present (Y/N)	Intact (Y/N)	Present (Y/N)	1	2	3
Y	Y	Y	1	0	1

COR FCD-00340 / 3
PAGE 1 of 1

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: April 13 and 14, 2022

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Bureau Veritas Mississauga

Consultant Project Number: 21506016-1155

Sample Submission Number: C2A2236

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within
Extraction Surrogate Recovery	X			acceptance criteria.
Method Blank Concentration	X			
Matrix Duplicate RPD	X			
Matrix Spike Recovery	X			
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	All field QC samples are within
Trip Blank Concentration			X	alert limits.
Field Duplicate RPD	X			

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	Yes
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): Amanda Newberry

Date: April 26, 2022

Task Order#: 21506016-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 21506016-1155-2207A
Your C.O.C. #: 488944

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2022/03/30
Report #: R7065551
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C278945
Received: 2022/03/25, 08:05

Sample Matrix: Water
Samples Received: 9

Analyses	Quantity	Laboratory Method	Analytical Method
Petroleum Hydro. CCME F1 & BTEX in Water	9	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1)	9	CAM SOP-00316	CCME PHC-CWS m
Dissolved Metals by ICPMS	9	CAM SOP-00447	EPA 6020B m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard. All samples were analyzed within hold time unless otherwise flagged.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following “Alberta Environment’s Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003”. Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Task Order#: 21506016-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 21506016-1155-2207A
Your C.O.C. #: 488944

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2022/03/30
Report #: R7065551
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C278945
Received: 2022/03/25, 08:05

Encryption Key



Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Gina Baybayan, Project Manager
Email: Gina.Baybayan@bureauveritas.com
Phone# (905)817-5766
==========
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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C278945
Report Date: 2022/03/30

Golder Associates Ltd
Task Order#: 21506016-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 21506016-1155-2207A

LEAD (DISSOLVED) IN WATER

Bureau Veritas ID			SEM989	SEM990	SEM991	SEM992	SEM993	SEM994		
Sampling Date			2022/03/21 11:28	2022/03/22 13:48	2022/03/22 12:32	2022/03/22 11:51	2022/03/21 12:25	2022/03/21 13:09		
COC Number			488944	488944	488944	488944	488944	488944		
	UNITS	**Criteria**	**MW21-01**	**MW21-02**	**TH3**	**TH4**	**TH6**	**TH7**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	**25**	<0.50	<0.50	1.5	21	<0.50	<0.50	0.50	7906083

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition
Non-Potable Ground Water - All Types of Property Uses - Medium and Fine Textured Soil

Bureau Veritas ID			SEM995	SEM996	SEM997		
Sampling Date			2022/03/21 14:00	2022/03/21 14:26	2022/03/21 12:25		
COC Number			488944	488944	488944		
	UNITS	**Criteria**	**MW15-01**	**MW15-02**	**DUP A**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	**25**	0.62	<0.50	<0.50	0.50	7906083

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition
Non-Potable Ground Water - All Types of Property Uses - Medium and Fine Textured Soil

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

O.REG 153 PHCS IN WATER (WATER)

Bureau Veritas ID			SEM989	SEM990	SEM991	SEM992	SEM993		
Sampling Date			2022/03/21 11:28	2022/03/22 13:48	2022/03/22 12:32	2022/03/22 11:51	2022/03/21 12:25		
COC Number			488944	488944	488944	488944	488944		
	UNITS	**Criteria**	**MW21-01**	**MW21-02**	**TH3**	**TH4**	**TH6**	**RDL**	**QC Batch**
Benzene	ug/L	**430**	<0.20	<0.20	18	21	<0.20	0.20	7906342
Toluene	ug/L	**18000**	<0.20	<0.20	<0.20	1.6	<0.20	0.20	7906342
Ethylbenzene	ug/L	**2300**	<0.20	<0.20	18	370	<0.20	0.20	7906342
o-Xylene	ug/L	-	<0.20	<0.20	0.22	2.8	<0.20	0.20	7906342
p+m-Xylene	ug/L	-	<0.40	<0.40	2.2	390	<0.40	0.40	7906342
Total Xylenes	ug/L	**4200**	<0.40	<0.40	2.4	390	<0.40	0.40	7906342
F1 (C6-C10)	ug/L	**750**	<25	<25	630	**3600**	<25	25	7906342
F1 (C6-C10) - BTEX	ug/L	**750**	<25	<25	590	**2800**	<25	25	7906342
F2 (C10-C16 Hydrocarbons)	ug/L	**150**	<100	<100	150	**2300**	<100	100	7910230
F3 (C16-C34 Hydrocarbons)	ug/L	**500**	<200	<200	<200	380	<200	200	7910230
F4 (C34-C50 Hydrocarbons)	ug/L	**500**	<200	<200	<200	270	<200	200	7910230
Reached Baseline at C50	ug/L	-	Yes	Yes	Yes	Yes	Yes		7910230
Extraction Surrogate Recovery (%)									
D10-o-Xylene	%	-	81	82	87	95	81		7906342
o-Terphenyl	%	-	97	97	97	99	96		7910230
Instrument Surrogate Recovery (%)									
1,4-Difluorobenzene	%	-	101	102	100	100	101		7906342
4-Bromofluorobenzene	%	-	80	90	101	117	85		7906342
D4-1,2-Dichloroethane	%	-	104	100	100	102	101		7906342

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition
Non-Potable Ground Water - All Types of Property Uses - Medium and Fine Textured Soil

O.REG 153 PHCS IN WATER (WATER)

Bureau Veritas ID			SEM993			SEM994	SEM995	SEM996	SEM997		
Sampling Date			2022/03/21 12:25			2022/03/21 13:09	2022/03/21 14:00	2022/03/21 14:26	2022/03/21 12:25		
COC Number			488944			488944	488944	488944	488944		
	UNITS	**Criteria**	**TH6 Lab-Dup**	**RDL**	**QC Batch**	**TH7**	**MW15-01**	**MW15-02**	**DUP A**	**RDL**	**QC Batch**
Benzene	ug/L	**430**				4.0	<0.20	<0.20	<0.20	0.20	7906342
Toluene	ug/L	**18000**				<0.20	<0.20	<0.20	<0.20	0.20	7906342
Ethylbenzene	ug/L	**2300**				<0.20	<0.20	<0.20	<0.20	0.20	7906342
o-Xylene	ug/L	-				<0.20	<0.20	<0.20	<0.20	0.20	7906342
p+m-Xylene	ug/L	-				<0.40	<0.40	<0.40	<0.40	0.40	7906342
Total Xylenes	ug/L	**4200**				<0.40	<0.40	<0.40	<0.40	0.40	7906342
F1 (C6-C10)	ug/L	**750**				39	<25	<25	<25	25	7906342
F1 (C6-C10) - BTEX	ug/L	**750**				35	<25	<25	<25	25	7906342
F2 (C10-C16 Hydrocarbons)	ug/L	**150**	<100	100	7910230	<100	<100	<100	<100	100	7910230
F3 (C16-C34 Hydrocarbons)	ug/L	**500**	<200	200	7910230	<200	<200	<200	<200	200	7910230
F4 (C34-C50 Hydrocarbons)	ug/L	**500**	<200	200	7910230	<200	<200	<200	<200	200	7910230
Reached Baseline at C50	ug/L	-	Yes		7910230	Yes	Yes	Yes	Yes		7910230
Extraction Surrogate Recovery (%)											
D10-o-Xylene	%	-				82	82	81	81		7906342
o-Terphenyl	%	-	104		7910230	96	96	97	96		7910230
Instrument Surrogate Recovery (%)											
1,4-Difluorobenzene	%	-				101	103	103	101		7906342
4-Bromofluorobenzene	%	-				93	81	88	90		7906342
D4-1,2-Dichloroethane	%	-				102	101	99	101		7906342

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition
Non-Potable Ground Water - All Types of Property Uses - Medium and Fine Textured Soil

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C278945
Report Date: 2022/03/30

Golder Associates Ltd
Task Order#: 21506016-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 21506016-1155-2207A

TEST SUMMARY

Bureau Veritas ID: SEM989
Sample ID: MW21-01
Matrix: Water

Collected: 2022/03/21
Relinquished: 2022/03/24
Received: 2022/03/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7906342	N/A	2022/03/28	Domnica Andronescu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7910230	2022/03/29	2022/03/30	Suleeqa Nurr
Dissolved Metals by ICPMS	ICP/MS	7906083	N/A	2022/03/28	Arefa Dabhad

Bureau Veritas ID: SEM990
Sample ID: MW21-02
Matrix: Water

Collected: 2022/03/22
Relinquished: 2022/03/24
Received: 2022/03/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7906342	N/A	2022/03/28	Domnica Andronescu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7910230	2022/03/29	2022/03/30	Suleeqa Nurr
Dissolved Metals by ICPMS	ICP/MS	7906083	N/A	2022/03/28	Arefa Dabhad

Bureau Veritas ID: SEM991
Sample ID: TH3
Matrix: Water

Collected: 2022/03/22
Relinquished: 2022/03/24
Received: 2022/03/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7906342	N/A	2022/03/28	Domnica Andronescu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7910230	2022/03/29	2022/03/30	Suleeqa Nurr
Dissolved Metals by ICPMS	ICP/MS	7906083	N/A	2022/03/28	Arefa Dabhad

Bureau Veritas ID: SEM992
Sample ID: TH4
Matrix: Water

Collected: 2022/03/22
Relinquished: 2022/03/24
Received: 2022/03/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7906342	N/A	2022/03/28	Domnica Andronescu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7910230	2022/03/29	2022/03/30	Suleeqa Nurr
Dissolved Metals by ICPMS	ICP/MS	7906083	N/A	2022/03/28	Arefa Dabhad

Bureau Veritas ID: SEM993
Sample ID: TH6
Matrix: Water

Collected: 2022/03/21
Relinquished: 2022/03/24
Received: 2022/03/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7906342	N/A	2022/03/28	Domnica Andronescu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7910230	2022/03/29	2022/03/30	Suleeqa Nurr
Dissolved Metals by ICPMS	ICP/MS	7906083	N/A	2022/03/28	Arefa Dabhad

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C278945
Report Date: 2022/03/30

Golder Associates Ltd
Task Order#: 21506016-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 21506016-1155-2207A

TEST SUMMARY

Bureau Veritas ID: SEM993 Dup
Sample ID: TH6
Matrix: Water
Collected: 2022/03/21
Relinquished: 2022/03/24
Received: 2022/03/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7910230	2022/03/29	2022/03/30	Suleeqa Nurr

Bureau Veritas ID: SEM994
Sample ID: TH7
Matrix: Water
Collected: 2022/03/21
Relinquished: 2022/03/24
Received: 2022/03/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7906342	N/A	2022/03/29	Domnica Andronescu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7910230	2022/03/29	2022/03/30	Suleeqa Nurr
Dissolved Metals by ICPMS	ICP/MS	7906083	N/A	2022/03/28	Arefa Dabhad

Bureau Veritas ID: SEM995
Sample ID: MW15-01
Matrix: Water
Collected: 2022/03/21
Relinquished: 2022/03/24
Received: 2022/03/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7906342	N/A	2022/03/28	Domnica Andronescu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7910230	2022/03/29	2022/03/30	Suleeqa Nurr
Dissolved Metals by ICPMS	ICP/MS	7906083	N/A	2022/03/28	Arefa Dabhad

Bureau Veritas ID: SEM996
Sample ID: MW15-02
Matrix: Water
Collected: 2022/03/21
Relinquished: 2022/03/24
Received: 2022/03/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7906342	N/A	2022/03/28	Domnica Andronescu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7910230	2022/03/29	2022/03/30	Suleeqa Nurr
Dissolved Metals by ICPMS	ICP/MS	7906083	N/A	2022/03/28	Arefa Dabhad

Bureau Veritas ID: SEM997
Sample ID: DUP A
Matrix: Water
Collected: 2022/03/21
Relinquished: 2022/03/24
Received: 2022/03/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7906342	N/A	2022/03/28	Domnica Andronescu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7910230	2022/03/29	2022/03/30	Suleeqa Nurr
Dissolved Metals by ICPMS	ICP/MS	7906083	N/A	2022/03/28	Arefa Dabhad

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C278945
Report Date: 2022/03/30

Golder Associates Ltd
Task Order#: 21506016-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 21506016-1155-2207A

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	2.3°C
Package 2	4.3°C

Results relate only to the items tested.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C278945
Report Date: 2022/03/30

Golder Associates Ltd
Task Order#: 21506016-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 21506016-1155-2207A

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7906083	ADA	Method Blank	Dissolved Lead (Pb)	2022/03/28	<0.50		ug/L	
7906342	DAN	Method Blank	1,4-Difluorobenzene	2022/03/28		101	%	70 - 130
			4-Bromofluorobenzene	2022/03/28		74	%	70 - 130
			D10-o-Xylene	2022/03/28		80	%	70 - 130
			D4-1,2-Dichloroethane	2022/03/28		99	%	70 - 130
			Benzene	2022/03/28	<0.20		ug/L	
			Toluene	2022/03/28	<0.20		ug/L	
			Ethylbenzene	2022/03/28	<0.20		ug/L	
			o-Xylene	2022/03/28	<0.20		ug/L	
			p+m-Xylene	2022/03/28	<0.40		ug/L	
			Total Xylenes	2022/03/28	<0.40		ug/L	
			F1 (C6-C10)	2022/03/28	<25		ug/L	
			F1 (C6-C10) - BTEX	2022/03/28	<25		ug/L	
7910230	SN1	Method Blank	o-Terphenyl	2022/03/30		101	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2022/03/30	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2022/03/30	<200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2022/03/30	<200		ug/L	
7910230	SN1	RPD [SEM993-01]	F2 (C10-C16 Hydrocarbons)	2022/03/30	NC		%	30
			F3 (C16-C34 Hydrocarbons)	2022/03/30	NC		%	30
			F4 (C34-C50 Hydrocarbons)	2022/03/30	NC		%	30
7910230	SN1	Matrix Spike [SEM996-01]	o-Terphenyl	2022/03/30		99	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2022/03/30		103	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2022/03/30		102	%	60 - 130
			F4 (C34-C50 Hydrocarbons)	2022/03/30		100	%	60 - 130
7906083	ADA	LCS	Dissolved Lead (Pb)	2022/03/28		96	%	80 - 120
7906342	DAN	LCS	1,4-Difluorobenzene	2022/03/28		100	%	70 - 130
			4-Bromofluorobenzene	2022/03/28		104	%	70 - 130
			D10-o-Xylene	2022/03/28		93	%	70 - 130
			D4-1,2-Dichloroethane	2022/03/28		92	%	70 - 130
			Benzene	2022/03/28		94	%	50 - 140
			Toluene	2022/03/28		98	%	50 - 140
			Ethylbenzene	2022/03/28		106	%	50 - 140
			o-Xylene	2022/03/28		106	%	50 - 140
			p+m-Xylene	2022/03/28		111	%	50 - 140
			F1 (C6-C10)	2022/03/28		85	%	60 - 140
7910230	SN1	LCS	o-Terphenyl	2022/03/30		103	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2022/03/30		106	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2022/03/30		106	%	60 - 130
			F4 (C34-C50 Hydrocarbons)	2022/03/30		103	%	60 - 130

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

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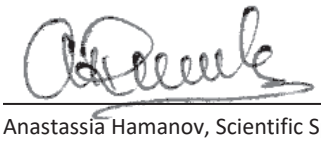
Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C278945
Report Date: 2022/03/30

Golder Associates Ltd
Task Order#: 21506016-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 21506016-1155-2207A

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



Anastassia Hamanov, Scientific Specialist

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

eCOC: T488944

Project Information:	C278945
Job Received:	2022/03/25 08:05
Results Required By:	2022/04/01
Expected Arrival:	2022/03/25
Submitted By:	Leandra Mariani
Submitted To:	Mississauga, ON (Env. Lab)

Invoice Information

Attn: Imperial Accounts Payable
Imperial Oil Ltd - Golder Associates Ltd
102, 2535-3rd Avenue SE
Calgary , AB , T2A 7W5
Email to:
canadaaccountspayableinvoices@golder.com

Report Information

Attn: Ian Sosney
Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines , ON , L2W 1A4
Email to:
ian_sosney@golder.com
iol_1390@golder.com
iol_equis@golder.com

Project Information

Quote #:	B73682
PO/AFE#:	IES A2601436
Project #:	21506016-1155-2207A
Site Location:	1660 Merivale Road, Ottawa, ON
Site #:	NA
Task Order:	21506016-1155-7777
Line Item:	NA

Analytical Summary

A: 2022/04/01

Client Sample ID	Clnt Ref	Sampling Date/Time	Matrix	#Cont	Lead (Dissolved) in Water	O.Reg 153 PHCs in Water
MW21-01	1	2022/03/21 11:28	GROUND WATER	7	A	A
MW21-02	2	2022/03/22 13:48	GROUND WATER	7	A	A
TH3	3	2022/03/22 12:32	GROUND WATER	7	A	A
TH4	4	2022/03/22 11:51	GROUND WATER	7	A	A
TH6	5	2022/03/21 12:25	GROUND WATER	7	A	A
TH7	6	2022/03/21 13:09	GROUND WATER	7	A	A
MW15-01	7	2022/03/21 14:00	GROUND WATER	7	A	A
MW15-02	8	2022/03/21 14:26	GROUND WATER	7	A	A
DUP A	9	2022/03/21 12:25	GROUND WATER	7	A	A

Deadlines are estimates only and are subject to change. Please refer to your Job Confirmation report for final due dates.

Criteria : Reg153/04 T3-GW-F/M

eCOC: T488944

Project Information:	C278945
Job Received:	2022/03/25 08:05
Results Required By:	2022/04/01
Expected Arrival:	2022/03/25
Submitted By:	Leandra Mariani
Submitted To:	Mississauga, ON (Env. Lab)

Submission Information

# of Samples: 9

Details: Upload to SAP 88001627

eCOC Change Log

Modified By	Date Modified	Changes	Comments
Leandra Mariani	24 Mar 22 16:31:19	Reporting and Invoicing	

Custody Tracking Form

T488944

Please use this form for custody tracking when submitting the work instructions via eCOC (electronic Chain of Custody). Please ensure your form has a barcode or a Bureau Veritas eCOC confirmation number in the top right hand side. This number links your electronic submission to your samples. This form should be placed in the cooler with your samples.

First Sample: MW21-01
Last Sample: DUP A
Sample Count: 9

Relinquished By				Received By			
Print	Sign			Print	Sign		
Leandra Mariani	Mariani	Date	2022/03/24	Mistan	Mistan	Date	2022/03/25
		Time (24 HR)	16:36			Time (24 HR)	08:05
Print	Sign	Date	YYYY/MM/DD	Print	Sign	Date	YYYY/MM/DD
		Time (24 HR)	HH:MM			Time (24 HR)	HH:MM
Print	Sign	Date	YYYY/MM/DD	Print	Sign	Date	YYYY/MM/DD
		Time (24 HR)	HH:MM			Time (24 HR)	HH:MM

Unless otherwise agreed to, submissions and use of services are governed by Bureau Veritas' standard terms and conditions which can be found at www.bvna.com.

Triage Information

Sampled By (Print): Thomas Ryan

# of Coolers/Pkgs: 1/2

Rush ☐ Immediate Test ☐ Food Residue ☐

Micro ☐ Food Chemistry ☐

*** LABORATORY USE ONLY ***

Received At: Mississauga

Labeled By: ATM

Verified By: KTN

Lab Comments: C278345

Custody Seal		Cooling Media	Temperature °C		
Present (Y/N)	Intact (Y/N)	Present (Y/N)	1	2	3
✓	✓	✓	2	3	2
✓	✓	✓	4	5	4
Drinking Water Metals Preservation Check Done (Circle)				YES	NO

COR FCD-00383/3

Page 1 of 1

Custody Tracking Form

T488944

Please use this form for custody tracking when submitting the work instructions via eCOC (electronic Chain of Custody). Please ensure your form has a barcode or a Bureau Veritas eCOC confirmation number in the top right hand side. This number links your electronic submission to your samples. This form should be placed in the cooler with your samples.

First Sample: MW21-01
Last Sample: DUP A
Sample Count: 9

Relinquished By				Received By			
Print	Sign			Print	Sign		
Leandra Mariani	Mariani	Date	2022/03/24	Muskan	Muskan	Date	2022/03/25
		Time (24 HR)	16:37			Time (24 HR)	08:05
Print	Sign	Date	YYYY/MM/DD	Print	Sign	Date	YYYY/MM/DD
		Time (24 HR)	HH:MM			Time (24 HR)	HH:MM
Print	Sign	Date	YYYY/MM/DD	Print	Sign	Date	YYYY/MM/DD
		Time (24 HR)	HH:MM			Time (24 HR)	HH:MM

Unless otherwise agreed to, submissions and use of services are governed by Bureau Veritas' standard terms and conditions which can be found at www.bvna.com.

Triage Information

Sampled By (Print): Thomas Ryan

# of Coolers/Pkgs: 2/2

Rush ☐ Immediate Test ☐ Food Residue ☐

Micro ☐ Food Chemistry ☐

*** LABORATORY USE ONLY ***

Received At: Mississauga

Labeled By: ATM

Verified By:

Lab Comments: C278345

Custody Seal		Cooling Media	Temperature °C		
Present (Y/N)	Intact (Y/N)	Present (Y/N)	1	2	3
✓	✓	✓	2	3	2
✓	✓	✓	4	5	4

Drinking Water Metals Preservation Check Done (Circle) **YES** **NO**

COR FCD-00383/3

Page 1 of 1

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: March 21, 2022

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Bureau Veritas Mississauga

Consultant Project Number: 21506016-1155

Sample Submission Number: C278945

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within
Extraction Surrogate Recovery	X			acceptance criteria.
Method Blank Concentration	X			
Matrix Duplicate RPD	X			
Matrix Spike Recovery	X			
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	All field QC samples are within
Trip Blank Concentration			X	alert limits.
Field Duplicate RPD	X			

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): Amanda Newberry

Date: April 4, 2022

Task Order#: 21506016-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 21506016-1155-2207A
Your C.O.C. #: 488946

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2022/03/30
Report #: R7065535
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C278953
Received: 2022/03/25, 08:05

Sample Matrix: Water
Samples Received: 2

Analyses	Quantity	Laboratory Method	Analytical Method
Petroleum Hydro. CCME F1 & BTEX in Water	2	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1)	2	CAM SOP-00316	CCME PHC-CWS m
Dissolved Metals by ICPMS	2	CAM SOP-00447	EPA 6020B m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard. All samples were analyzed within hold time unless otherwise flagged.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following “Alberta Environment’s Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003”. Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Task Order#: 21506016-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 21506016-1155-2207A
Your C.O.C. #: 488946

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2022/03/30
Report #: R7065535
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C278953
Received: 2022/03/25, 08:05

Encryption Key



Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Gina Baybayan, Project Manager
Email: Gina.Baybayan@bureauveritas.com
Phone# (905)817-5766

==========

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C278953
Report Date: 2022/03/30

Golder Associates Ltd
Task Order#: 21506016-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 21506016-1155-2207A

LEAD (DISSOLVED) IN WATER

Bureau Veritas ID			SEN029	SEN030		
Sampling Date			2022/03/22 15:15	2022/03/22 15:10		
COC Number			488946	488946		
	UNITS	**Criteria**	**F. Blank**	**T. Blank**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	**25**	<0.50	<0.50	0.50	7906083

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition
Non-Potable Ground Water - All Types of Property Uses - Medium and Fine Textured Soil

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

O.REG 153 PHCS IN WATER (WATER)

Bureau Veritas ID			SEN029	SEN030		
Sampling Date			2022/03/22 15:15	2022/03/22 15:10		
COC Number			488946	488946		
	UNITS	**Criteria**	**F. Blank**	**T. Blank**	**RDL**	**QC Batch**
Benzene	ug/L	**430**	<0.20	<0.20	0.20	7910376
Toluene	ug/L	**18000**	<0.20	<0.20	0.20	7910376
Ethylbenzene	ug/L	**2300**	<0.20	<0.20	0.20	7910376
o-Xylene	ug/L	-	<0.20	<0.20	0.20	7910376
p+m-Xylene	ug/L	-	<0.40	<0.40	0.40	7910376
Total Xylenes	ug/L	**4200**	<0.40	<0.40	0.40	7910376
F1 (C6-C10)	ug/L	**750**	<25	<25	25	7910376
F1 (C6-C10) - BTEX	ug/L	**750**	<25	<25	25	7910376
F2 (C10-C16 Hydrocarbons)	ug/L	**150**	<100	<100	100	7910230
F3 (C16-C34 Hydrocarbons)	ug/L	**500**	<200	<200	200	7910230
F4 (C34-C50 Hydrocarbons)	ug/L	**500**	<200	<200	200	7910230
Reached Baseline at C50	ug/L	-	Yes	Yes		7910230
Extraction Surrogate Recovery (%)						
D10-o-Xylene	%	-	93	91		7910376
o-Terphenyl	%	-	98	95		7910230
Instrument Surrogate Recovery (%)						
1,4-Difluorobenzene	%	-	107	107		7910376
4-Bromofluorobenzene	%	-	87	77		7910376
D4-1,2-Dichloroethane	%	-	106	104		7910376

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition
Non-Potable Ground Water - All Types of Property Uses - Medium and Fine Textured Soil

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C278953
Report Date: 2022/03/30

Golder Associates Ltd
Task Order#: 21506016-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 21506016-1155-2207A

TEST SUMMARY

Bureau Veritas ID: SEN029
Sample ID: F. Blank
Matrix: Water

Collected: 2022/03/22
Relinquished: 2022/03/24
Received: 2022/03/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7910376	N/A	2022/03/29	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7910230	2022/03/29	2022/03/30	Suleeqa Nurr
Dissolved Metals by ICPMS	ICP/MS	7906083	N/A	2022/03/28	Arefa Dabhad

Bureau Veritas ID: SEN030
Sample ID: T. Blank
Matrix: Water

Collected: 2022/03/22
Relinquished: 2022/03/24
Received: 2022/03/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7910376	N/A	2022/03/29	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7910230	2022/03/29	2022/03/30	Suleeqa Nurr
Dissolved Metals by ICPMS	ICP/MS	7906083	N/A	2022/03/28	Arefa Dabhad

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	2.3°C
Package 2	4.3°C

Results relate only to the items tested.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C278953
Report Date: 2022/03/30

Golder Associates Ltd
Task Order#: 21506016-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 21506016-1155-2207A

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7906083	ADA	Method Blank	Dissolved Lead (Pb)	2022/03/28	<0.50		ug/L	
7910230	SN1	Method Blank	o-Terphenyl	2022/03/30		101	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2022/03/30	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2022/03/30	<200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2022/03/30	<200		ug/L	
7910376	AAI	Method Blank	1,4-Difluorobenzene	2022/03/29		107	%	70 - 130
			4-Bromofluorobenzene	2022/03/29		84	%	70 - 130
			D10-o-Xylene	2022/03/29		92	%	70 - 130
			D4-1,2-Dichloroethane	2022/03/29		102	%	70 - 130
			Benzene	2022/03/29	<0.20		ug/L	
			Toluene	2022/03/29	<0.20		ug/L	
			Ethylbenzene	2022/03/29	<0.20		ug/L	
			o-Xylene	2022/03/29	<0.20		ug/L	
			p+m-Xylene	2022/03/29	<0.40		ug/L	
			Total Xylenes	2022/03/29	<0.40		ug/L	
			F1 (C6-C10)	2022/03/29	<25		ug/L	
			F1 (C6-C10) - BTEX	2022/03/29	<25		ug/L	
7906083	ADA	LCS	Dissolved Lead (Pb)	2022/03/28		96	%	80 - 120
7910230	SN1	LCS	o-Terphenyl	2022/03/30		103	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2022/03/30		106	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2022/03/30		106	%	60 - 130
			F4 (C34-C50 Hydrocarbons)	2022/03/30		103	%	60 - 130
7910376	AAI	LCS	1,4-Difluorobenzene	2022/03/29		97	%	70 - 130
			4-Bromofluorobenzene	2022/03/29		107	%	70 - 130
			D10-o-Xylene	2022/03/29		102	%	70 - 130
			D4-1,2-Dichloroethane	2022/03/29		92	%	70 - 130
			Benzene	2022/03/29		90	%	50 - 140
			Toluene	2022/03/29		90	%	50 - 140
			Ethylbenzene	2022/03/29		100	%	50 - 140
			o-Xylene	2022/03/29		99	%	50 - 140
			p+m-Xylene	2022/03/29		99	%	50 - 140
			F1 (C6-C10)	2022/03/29		85	%	60 - 140

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

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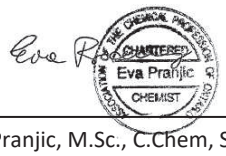
Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C278953
Report Date: 2022/03/30

Golder Associates Ltd
Task Order#: 21506016-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 21506016-1155-2207A

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



Ewa Pranjic, M.Sc., C.Chem, Scientific Specialist

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

eCOC: T488946

Project Information:	C278953
Job Received:	2022/03/25 08:05
Results Required By:	2022/04/01
Expected Arrival:	2022/03/25
Submitted By:	Leandra Mariani
Submitted To:	Mississauga, ON (Env. Lab)

Invoice Information

Attn: Imperial Accounts Payable
Imperial Oil Ltd - Golder Associates Ltd
102, 2535-3rd Avenue SE
Calgary , AB , T2A 7W5
Email to:
canadaaccountspayableinvoices@golder.com

Report Information

Attn: Ian Sosney
Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines , ON , L2W 1A4
Email to:
ian_sosney@golder.com
iol_1390@golder.com
iol_equis@golder.com

Project Information

Quote #:	B73682
PO/AFE#:	IES A2601436
Project #:	21506016-1155-2207A
Site Location:	1660 Merivale Road, Ottawa, ON
Site #:	NA
Task Order:	21506016-1155-7777
Line Item:	NA

Analytical Summary

A: 2022/04/01

Client Sample ID	Clnt Ref	Sampling Date/Time	Matrix	#Cont	Lead (Dissolved) in Water	O.Reg 153 PHCs in Water
F. Blank	1	2022/03/22 15:15	WATER	7	A	A
T. Blank	2	2022/03/22 15:10	WATER	4	A	A

Deadlines are estimates only and are subject to change. Please refer to your Job Confirmation report for final due dates.

Criteria : Reg153/04 T3-GW-F/M

Submission Information

# of Samples:	2
Details:	Upload to SAP 88001627

Custody Tracking Form

T488946

Please use this form for custody tracking when submitting the work instructions via eCOC (electronic Chain of Custody). Please ensure your form has a barcode or a Bureau Veritas eCOC confirmation number in the top right hand side. This number links your electronic submission to your samples. This form should be placed in the cooler with your samples.

First Sample: F. Blank
Last Sample: T. Blank
Sample Count: 2

Relinquished By				Received By			
Print	Sign	Date	YYYY/MM/DD	Print	Sign	Date	YYYY/MM/DD
Leandra Mariani	Mariani	Time (24 HR)	HH:MM	Muskan	Muskan	Time (24 HR)	HH:MM
		Date				Date	
		Time (24 HR)				Time (24 HR)	
		Date				Date	
		Time (24 HR)				Time (24 HR)	

2022/03/24 16:35
2022/03/25 08:05

Unless otherwise agreed to, submissions and use of services are governed by Bureau Veritas' standard terms and conditions which can be found at www.bvna.com.

Triage Information

Sampled By (Print): Thomas Ryan.

# of Coolers/Pkgs: 1/1

Rush ☐ Immediate Test ☐ Food Residue ☐
Micro ☐ Food Chemistry ☐

*** LABORATORY USE ONLY ***

Received At: Mississauga's
Labeled By: ATM
Verified By: KTN

Lab Comments: C278953

Custody Seal		Cooling Media	Temperature °C		
Present (Y/N)	Intact (Y/N)	Present (Y/N)	1	2	3
✓	✓	✓	2	3	2
✓	✓	✓	4	5	4

Drinking Water Metals Preservation Check Done (Circle) **YES** **NO**

COR FCD-00383/3

Page 1 of 1

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: March 22, 2022

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Bureau Veritas Mississauga

Consultant Project Number: 21506016-1155

Sample Submission Number: C278953

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within
Extraction Surrogate Recovery	X			acceptance criteria.
Method Blank Concentration	X			
Matrix Duplicate RPD			X	
Matrix Spike Recovery			X	
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration	X			All field QC samples are within
Trip Blank Concentration	X			alert limits.
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): Amanda Newberry

Date: April 4, 2022

Task Order#: 21506016-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 21506016-1155
Your C.O.C. #: 489747

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2022/03/30
Report #: R7065578
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C281791
Received: 2022/03/29, 10:03

Sample Matrix: Soil
Samples Received: 5

Analyses	Quantity	Laboratory Method	Analytical Method
Petroleum Hydro. CCME F1 & BTEX in Soil (1)	5	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Soil (2)	5	CAM SOP-00316	CCME CWS m
Moisture	5	CAM SOP-00445	Carter 2nd ed 51.2 m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard. All samples were analyzed within hold time unless otherwise flagged.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) No lab extraction date is given for F1BTEX & VOC samples that are field preserved with methanol. Extraction date is the date sampled unless otherwise stated.
(2) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following “Alberta Environment’s Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003”. Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Task Order#: 21506016-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 21506016-1155
Your C.O.C. #: 489747

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2022/03/30
Report #: R7065578
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C281791
Received: 2022/03/29, 10:03

Encryption Key



Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Gina Baybayan, Project Manager
Email: Gina.Baybayan@bureauveritas.com
Phone# (905)817-5766
==========
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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

O.REG 153 PHCS IN SOIL (SOIL)

Bureau Veritas ID		SFF364	SFF365	SFF366	SFF367	SFF368		
Sampling Date		2022/03/26 11:00	2022/03/26 11:10	2022/03/26 12:00	2022/03/26 12:10	2022/03/26 12:10		
COC Number		489747	489747	489747	489747	489747		
	UNITS	**MW22-01-01**	**MW22-01-02**	**MW22-02-01**	**MW22-02-02**	**DUP A**	**RDL**	**QC Batch**
Moisture	%	27	20	14	19	16	1.0	7909586
Benzene	ug/g	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	7910095
Toluene	ug/g	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	7910095
Ethylbenzene	ug/g	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	7910095
o-Xylene	ug/g	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	7910095
p+m-Xylene	ug/g	<0.040	<0.040	<0.040	<0.040	<0.040	0.040	7910095
Total Xylenes	ug/g	<0.040	<0.040	<0.040	<0.040	<0.040	0.040	7910095
F1 (C6-C10)	ug/g	<10	<10	<10	<10	<10	10	7910095
F1 (C6-C10) - BTEX	ug/g	<10	<10	<10	<10	<10	10	7910095
F2 (C10-C16 Hydrocarbons)	ug/g	<10	<10	<10	<10	<10	10	7909982
F3 (C16-C34 Hydrocarbons)	ug/g	<50	<50	<50	<50	<50	50	7909982
F4 (C34-C50 Hydrocarbons)	ug/g	<50	<50	<50	<50	<50	50	7909982
Reached Baseline at C50	ug/g	Yes	Yes	Yes	Yes	Yes		7909982
Extraction Surrogate Recovery (%)								
D10-o-Xylene	%	86	99	85	93	91		7910095
o-Terphenyl	%	93	90	92	89	91		7909982
Instrument Surrogate Recovery (%)								
1,4-Difluorobenzene	%	114	111	107	111	114		7910095
4-Bromofluorobenzene	%	82	82	83	81	77		7910095
D4-1,2-Dichloroethane	%	114	110	106	108	106		7910095

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

O.REG 153 PHCS IN SOIL (SOIL)

Bureau Veritas ID		SFF368		
Sampling Date		2022/03/26 12:10		
COC Number		489747		
	UNITS	**DUP A Lab-Dup**	**RDL**	**QC Batch**
Moisture	%	17	1.0	7909586

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

Bureau Veritas Job #: C281791
Report Date: 2022/03/30

Golder Associates Ltd
Task Order#: 21506016-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 21506016-1155

TEST SUMMARY

Bureau Veritas ID: SFF364
Sample ID: MW22-01-01
Matrix: Soil

Collected: 2022/03/26
Relinquished: 2022/03/28
Received: 2022/03/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	7910095	N/A	2022/03/29	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	7909982	2022/03/29	2022/03/30	Suleeqa Nurr
Moisture	BAL	7909586	N/A	2022/03/29	Simrat Bhathal

Bureau Veritas ID: SFF365
Sample ID: MW22-01-02
Matrix: Soil

Collected: 2022/03/26
Relinquished: 2022/03/28
Received: 2022/03/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	7910095	N/A	2022/03/29	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	7909982	2022/03/29	2022/03/30	Suleeqa Nurr
Moisture	BAL	7909586	N/A	2022/03/29	Simrat Bhathal

Bureau Veritas ID: SFF366
Sample ID: MW22-02-01
Matrix: Soil

Collected: 2022/03/26
Relinquished: 2022/03/28
Received: 2022/03/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	7910095	N/A	2022/03/29	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	7909982	2022/03/29	2022/03/30	Suleeqa Nurr
Moisture	BAL	7909586	N/A	2022/03/29	Simrat Bhathal

Bureau Veritas ID: SFF367
Sample ID: MW22-02-02
Matrix: Soil

Collected: 2022/03/26
Relinquished: 2022/03/28
Received: 2022/03/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	7910095	N/A	2022/03/29	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	7909982	2022/03/29	2022/03/30	Suleeqa Nurr
Moisture	BAL	7909586	N/A	2022/03/29	Simrat Bhathal

Bureau Veritas ID: SFF368
Sample ID: DUP A
Matrix: Soil

Collected: 2022/03/26
Relinquished: 2022/03/28
Received: 2022/03/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	7910095	N/A	2022/03/29	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	7909982	2022/03/29	2022/03/30	Suleeqa Nurr
Moisture	BAL	7909586	N/A	2022/03/29	Simrat Bhathal

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C281791
Report Date: 2022/03/30

Golder Associates Ltd
Task Order#: 21506016-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 21506016-1155

TEST SUMMARY

Bureau Veritas ID: SFF368 Dup
Sample ID: DUP A
Matrix: Soil

Collected: 2022/03/26
Relinquished: 2022/03/28
Received: 2022/03/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	7909586	N/A	2022/03/29	Simrat Bhathal

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	4.3°C

Sample SFF364 [MW22-01-01] : F1 BTEX analysis : Soil weight exceeds the protocol specification of approximately 5g in the field preserved vial. Additional methanol was added to the vial to ensure extraction efficiency

Sample SFF366 [MW22-02-01] : F1 BTEX analysis : Soil weight exceeds the protocol specification of approximately 5g in the field preserved vial. Additional methanol was added to the vial to ensure extraction efficiency

Sample SFF367 [MW22-02-02] : F1 BTEX analysis : Soil weight exceeds the protocol specification of approximately 5g in the field preserved vial. Additional methanol was added to the vial to ensure extraction efficiency

Sample SFF368 [DUP A] : F1 BTEX analysis : Soil weight exceeds the protocol specification of approximately 5g in the field preserved vial. Additional methanol was added to the vial to ensure extraction efficiency

Results relate only to the items tested.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7909982	SN1	Method Blank	o-Terphenyl	2022/03/29		98	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2022/03/29	<10		ug/g	
			F3 (C16-C34 Hydrocarbons)	2022/03/29	<50		ug/g	
			F4 (C34-C50 Hydrocarbons)	2022/03/29	<50		ug/g	
7910095	AAI	Method Blank	1,4-Difluorobenzene	2022/03/29		110	%	60 - 140
			4-Bromofluorobenzene	2022/03/29		87	%	60 - 140
			D10-o-Xylene	2022/03/29		86	%	60 - 140
			D4-1,2-Dichloroethane	2022/03/29		106	%	60 - 140
			Benzene	2022/03/29	<0.020		ug/g	
			Toluene	2022/03/29	<0.020		ug/g	
			Ethylbenzene	2022/03/29	<0.020		ug/g	
			o-Xylene	2022/03/29	<0.020		ug/g	
			p+m-Xylene	2022/03/29	<0.040		ug/g	
			Total Xylenes	2022/03/29	<0.040		ug/g	
			F1 (C6-C10)	2022/03/29	<10		ug/g	
			F1 (C6-C10) - BTEX	2022/03/29	<10		ug/g	
7909586	HHY	RPD [SFF368-01]	Moisture	2022/03/29	3.7		%	20
7909982	SN1	LCS	o-Terphenyl	2022/03/29		102	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2022/03/29		100	%	80 - 120
			F3 (C16-C34 Hydrocarbons)	2022/03/29		106	%	80 - 120
			F4 (C34-C50 Hydrocarbons)	2022/03/29		103	%	80 - 120
7910095	AAI	LCS	1,4-Difluorobenzene	2022/03/29		99	%	60 - 140
			4-Bromofluorobenzene	2022/03/29		100	%	60 - 140
			D10-o-Xylene	2022/03/29		87	%	60 - 140
			D4-1,2-Dichloroethane	2022/03/29		94	%	60 - 140
			Benzene	2022/03/29		86	%	50 - 140
			Toluene	2022/03/29		90	%	50 - 140
			Ethylbenzene	2022/03/29		97	%	50 - 140
			o-Xylene	2022/03/29		96	%	50 - 140
			p+m-Xylene	2022/03/29		94	%	50 - 140
			F1 (C6-C10)	2022/03/29		81	%	80 - 120

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

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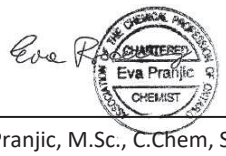
Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C281791
Report Date: 2022/03/30

Golder Associates Ltd
Task Order#: 21506016-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 21506016-1155

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



Ewa Pranjic, M.Sc., C.Chem, Scientific Specialist

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

eCOC: T489747

Project Information:	C281791
Job Received:	2022/03/29 10:03
Results Required By:	2022/03/30
Expected Arrival:	2022/03/29
Submitted By:	Leandra Mariani
Submitted To:	Mississauga, ON (Env. Lab)

Invoice Information

Attn: Imperial Accounts Payable
Imperial Oil Ltd - Golder Associates Ltd
102, 2535-3rd Avenue SE
Calgary , AB , T2A 7W5
Email to:
canadaaccountspayableinvoices@golder.com

Report Information

Attn: Ian Sosney
Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines , ON , L2W 1A4
Email to:
ian_sosney@golder.com
iol_1390@golder.com
iol_equis@golder.com

Project Information

Quote #:	B73682
PO/AFE#:	IES A2601436
Project #:	21506016-1155-2206
Site Location:	1660 Merivale Road, Ottawa, ON
Site #:	NA
Task Order:	21506016-1155-7777
Line Item:	NA

Analytical Summary

A: 2022/03/30

Client Sample ID	Clnt Ref	Sampling Date/Time	Matrix	#Cont	O.Reg 153 PHCs in Soil
MW22-01-01	1	2022/03/26 11:00	SOIL	3	A
MW22-01-02	2	2022/03/26 11:10	SOIL	3	A
MW22-02-01	3	2022/03/26 12:00	SOIL	3	A
MW22-02-02	4	2022/03/26 12:10	SOIL	3	A
DUP A	5	2022/03/26 12:10	SOIL	3	A

Deadlines are estimates only and are subject to change. Please refer to your Job Confirmation report for final due dates.
Criteria : Reg153/04 T3-GW-F/M

Submission Information

# of Samples:	5
Details:	Upload to SAP 88001627 Head space will be present in larger sample containers

Custody Tracking Form

T489747-R

Please use this form for custody tracking when submitting the work instructions via eCOC (electronic Chain of Custody). Please ensure your form has a barcode or a Bureau Veritas eCOC confirmation number in the top right hand side. This number links your electronic submission to your samples. This form should be placed in the cooler with your samples.

First Sample: MW22-01-01
Last Sample: DUP A
Sample Count: 5

Relinquished By				Received By			
Leandra Marani		Date	~~Mar~~ 2022/03/28			Date	2022/03/29
		Time (24 HR)	08:05			Time (24 HR)	1003
		Date				Date	
		Time (24 HR)				Time (24 HR)	
		Date				Date	
		Time (24 HR)				Time (24 HR)	

Unless otherwise agreed to, submissions and use of services are governed by Bureau Veritas' standard terms and conditions which can be found at www.bvna.com.

Triage Information

Sampled By (Print): Thomas Ryan

# of Coolers/Pkgs: 1

Rush ☐ Immediate Test ☐ Food Residue ☐

Micro ☐ Food Chemistry ☐

*** LABORATORY USE ONLY ***

Received At: Mississauga

Lab Comments: C281791

Labeled By: T-L

Verified By: URE

Custody Seal		Cooling Media	Temperature °C		
Present (Y/N)	Intact (Y/N)	Present (Y/N)	1	2	3
Y	Y	Y	6	3	4
Drinking Water Metals Preservation Check Done (Circle)				YES	NO

COR FCD-00383/3

Page 1 of 1

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: mar 26 ,2022

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Bureau Veritas Mississauga

Consultant Project Number: 21506016-1155

Sample Submission Number: C281791

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within
Extraction Surrogate Recovery	X			acceptance criteria.
Method Blank Concentration	X			
Matrix Duplicate RPD	X			
Matrix Spike Recovery			X	
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	All field QC samples are within
Trip Blank Concentration			X	alert limits.
Field Duplicate RPD	X			

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	Yes
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): Amanda Newberry

Date: April 4, 2022

Task Order#: 21506016-1155-7777
Site#: N/A
Site Location: 1660 Merivale Road, Ottawa, ON
Project #: 21506016-1155
Your C.O.C. #: 491882

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2022/04/04
Report #: R7072677
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C285750
Received: 2022/04/01, 09:14

Sample Matrix: Ground Water
Samples Received: 2

Analyses	Quantity	Laboratory Method	Analytical Method
Petroleum Hydro. CCME F1 & BTEX in Water	2	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1)	2	CAM SOP-00316	CCME PHC-CWS m
Dissolved Metals by ICPMS	2	CAM SOP-00447	EPA 6020B m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard. All samples were analyzed within hold time unless otherwise flagged.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following “Alberta Environment’s Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003”. Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Task Order#: 21506016-1155-7777
Site#: N/A
Site Location: 1660 Merivale Road, Ottawa, ON
Project #: 21506016-1155
Your C.O.C. #: 491882

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2022/04/04
Report #: R7072677
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C285750
Received: 2022/04/01, 09:14

Encryption Key



Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Gina Baybayan, Project Manager
Email: Gina.Baybayan@bureauveritas.com
Phone# (905)817-5766

==========

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Bureau Veritas Job #: C285750
Report Date: 2022/04/04

Golder Associates Ltd
Task Order#: 21506016-1155-7777
Site#: N/A
Site Location: 1660 Merivale Road, Ottawa, ON
Project #: 21506016-1155

ELEMENTS BY ATOMIC SPECTROSCOPY (GROUND WATER)

Bureau Veritas ID		SGC324	SGC325	SGC325		
Sampling Date		2022/03/30 19:57	2022/03/30 20:40	2022/03/30 20:40		
COC Number		491882	491882	491882		
	UNITS	**MW22-01**	**MW22-02**	**MW22-02 Lab-Dup**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	<0.50	<0.50	<0.50	0.50	7919070

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C285750
Report Date: 2022/04/04

Golder Associates Ltd
Task Order#: 21506016-1155-7777
Site#: N/A
Site Location: 1660 Merivale Road, Ottawa, ON
Project #: 21506016-1155

PETROLEUM HYDROCARBONS (CCME)

Bureau Veritas ID		SGC324			SGC324			SGC325		
Sampling Date		2022/03/30 19:57			2022/03/30 19:57			2022/03/30 20:40		
COC Number		491882			491882			491882		
	UNITS	**MW22-01**	**RDL**	**QC Batch**	**MW22-01 Lab-Dup**	**RDL**	**QC Batch**	**MW22-02**	**RDL**	**QC Batch**
Benzene	ug/L	<0.20	0.20	7917299	<0.20	0.20	7917299	<0.20	0.20	7917299
Toluene	ug/L	<0.20	0.20	7917299	<0.20	0.20	7917299	<0.20	0.20	7917299
Ethylbenzene	ug/L	<0.20	0.20	7917299	<0.20	0.20	7917299	<0.20	0.20	7917299
o-Xylene	ug/L	<0.20	0.20	7917299	<0.20	0.20	7917299	<0.20	0.20	7917299
p+m-Xylene	ug/L	<0.40	0.40	7917299	<0.40	0.40	7917299	<0.40	0.40	7917299
Total Xylenes	ug/L	<0.40	0.40	7917299	<0.40	0.40	7917299	<0.40	0.40	7917299
F1 (C6-C10)	ug/L	<25	25	7917299	<25	25	7917299	<25	25	7917299
F1 (C6-C10) - BTEX	ug/L	<25	25	7917299	<25	25	7917299	<25	25	7917299
F2 (C10-C16 Hydrocarbons)	ug/L	<100	100	7917159				<100	100	7917159
F3 (C16-C34 Hydrocarbons)	ug/L	<200	200	7917159				230	200	7917159
F4 (C34-C50 Hydrocarbons)	ug/L	<200	200	7917159				<200	200	7917159
Reached Baseline at C50	ug/L	Yes		7917159				Yes		7917159
Extraction Surrogate Recovery (%)										
D10-o-Xylene	%	105		7917299	104		7917299	100		7917299
o-Terphenyl	%	96		7917159				96		7917159
Instrument Surrogate Recovery (%)										
1,4-Difluorobenzene	%	104		7917299	104		7917299	104		7917299
4-Bromofluorobenzene	%	97		7917299	97		7917299	97		7917299
D4-1,2-Dichloroethane	%	106		7917299	108		7917299	107		7917299

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C285750
Report Date: 2022/04/04

Golder Associates Ltd
Task Order#: 21506016-1155-7777
Site#: N/A
Site Location: 1660 Merivale Road, Ottawa, ON
Project #: 21506016-1155

TEST SUMMARY

Bureau Veritas ID: SGC324
Sample ID: MW22-01
Matrix: Ground Water
Collected: 2022/03/30
Relinquished: 2022/03/31
Received: 2022/04/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7917299	N/A	2022/04/01	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7917159	2022/04/01	2022/04/02	Suleeqa Nurr
Dissolved Metals by ICPMS	ICP/MS	7919070	N/A	2022/04/04	Azita Fazaeli

Bureau Veritas ID: SGC324 Dup
Sample ID: MW22-01
Matrix: Ground Water
Collected: 2022/03/30
Relinquished: 2022/03/31
Received: 2022/04/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7917299	N/A	2022/04/01	Lincoln Ramdahin

Bureau Veritas ID: SGC325
Sample ID: MW22-02
Matrix: Ground Water
Collected: 2022/03/30
Relinquished: 2022/03/31
Received: 2022/04/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7917299	N/A	2022/04/01	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7917159	2022/04/01	2022/04/02	Suleeqa Nurr
Dissolved Metals by ICPMS	ICP/MS	7919070	N/A	2022/04/04	Azita Fazaeli

Bureau Veritas ID: SGC325 Dup
Sample ID: MW22-02
Matrix: Ground Water
Collected: 2022/03/30
Relinquished: 2022/03/31
Received: 2022/04/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Metals by ICPMS	ICP/MS	7919070	N/A	2022/04/04	Azita Fazaeli

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	1.3°C

Results relate only to the items tested.

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7917159	SN1	Method Blank	o-Terphenyl	2022/04/02		92	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2022/04/02	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2022/04/02	<200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2022/04/02	<200		ug/L	
7917299	LRA	Method Blank	1,4-Difluorobenzene	2022/04/01		104	%	70 - 130
			4-Bromofluorobenzene	2022/04/01		96	%	70 - 130
			D10-o-Xylene	2022/04/01		101	%	70 - 130
			D4-1,2-Dichloroethane	2022/04/01		105	%	70 - 130
			Benzene	2022/04/01	<0.20		ug/L	
			Toluene	2022/04/01	<0.20		ug/L	
			Ethylbenzene	2022/04/01	<0.20		ug/L	
			o-Xylene	2022/04/01	<0.20		ug/L	
			p+m-Xylene	2022/04/01	<0.40		ug/L	
			Total Xylenes	2022/04/01	<0.40		ug/L	
			F1 (C6-C10)	2022/04/01	<25		ug/L	
			F1 (C6-C10) - BTEX	2022/04/01	<25		ug/L	
7919070	AFZ	Method Blank	Dissolved Lead (Pb)	2022/04/04	<0.50		ug/L	
7917299	LRA	RPD [SGC324-02]	Benzene	2022/04/01	NC		%	30
			Toluene	2022/04/01	NC		%	30
			Ethylbenzene	2022/04/01	NC		%	30
			o-Xylene	2022/04/01	NC		%	30
			p+m-Xylene	2022/04/01	NC		%	30
			Total Xylenes	2022/04/01	NC		%	30
			F1 (C6-C10)	2022/04/01	NC		%	30
			F1 (C6-C10) - BTEX	2022/04/01	NC		%	30
7919070	AFZ	RPD [SGC325-03]	Dissolved Lead (Pb)	2022/04/04	NC		%	20
7917299	LRA	Matrix Spike [SGC324-02]	1,4-Difluorobenzene	2022/04/01		97	%	70 - 130
			4-Bromofluorobenzene	2022/04/01		104	%	70 - 130
			D10-o-Xylene	2022/04/01		108	%	70 - 130
			D4-1,2-Dichloroethane	2022/04/01		107	%	70 - 130
			Benzene	2022/04/01		109	%	50 - 140
			Toluene	2022/04/01		101	%	50 - 140
			Ethylbenzene	2022/04/01		116	%	50 - 140
			o-Xylene	2022/04/01		114	%	50 - 140
			p+m-Xylene	2022/04/01		107	%	50 - 140
			F1 (C6-C10)	2022/04/01		96	%	60 - 140
7919070	AFZ	Matrix Spike [SGC325-03]	Dissolved Lead (Pb)	2022/04/04		93	%	80 - 120
7917159	SN1	LCS	o-Terphenyl	2022/04/02		103	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2022/04/02		108	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2022/04/02		107	%	60 - 130
			F4 (C34-C50 Hydrocarbons)	2022/04/02		102	%	60 - 130
7917299	LRA	LCS	1,4-Difluorobenzene	2022/04/01		100	%	70 - 130
			4-Bromofluorobenzene	2022/04/01		101	%	70 - 130
			D10-o-Xylene	2022/04/01		107	%	70 - 130
			D4-1,2-Dichloroethane	2022/04/01		97	%	70 - 130
			Benzene	2022/04/01		102	%	50 - 140
			Toluene	2022/04/01		96	%	50 - 140
			Ethylbenzene	2022/04/01		114	%	50 - 140
			o-Xylene	2022/04/01		107	%	50 - 140
			p+m-Xylene	2022/04/01		108	%	50 - 140

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			F1 (C6-C10)	2022/04/01		88	%	60 - 140
7919070	AFZ	LCS	Dissolved Lead (Pb)	2022/04/04		94	%	80 - 120

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C285750
Report Date: 2022/04/04

Golder Associates Ltd
Task Order#: 21506016-1155-7777
Site#: N/A
Site Location: 1660 Merivale Road, Ottawa, ON
Project #: 21506016-1155

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Cristina Carriere

Cristina Carriere, Senior Scientific Specialist

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

eCOC: T491882

Project Information:	C285750
Job Received:	2022/04/01 09:14
Results Required By:	2022/04/04
Expected Arrival:	2022/04/01
Submitted By:	Thomas Ryan
Submitted To:	Mississauga, ON (Env. Lab)

Invoice Information

Attn: Imperial Accounts Payable
Imperial Oil Ltd - Golder Associates Ltd
102, 2535-3rd Avenue SE
Calgary , AB , T2A 7W5
Email to:
canadaaccountspayableinvoices@golder.com

Report Information

Attn: Ian Sosney
Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines , ON , L2W 1A4
Email to:
ian_sosney@golder.com
iol_1390@golder.com
iol_equis@golder.com

Project Information

Quote #:	B73682
PO/AFE#:	IES A2601436
Project #:	21506016-1155-2207A
Site Location:	1660 Merivale Road, Ottawa, ON
Site #:	NA
Task Order:	21506016-1155-7777
Line Item:	NA

Analytical Summary

A: 2022/04/04

Client Sample ID	Clnt Ref	Sampling Date/Time	Matrix	#Cont	Lead (Dissolved) in Water	O.Reg 153 PHCs in Water
MW22-01	1	2022/03/30 19:57	GROUND WATER	7	A	A
MW22-02	2	2022/03/30 20:40	GROUND WATER	7	A	A

Deadlines are estimates only and are subject to change. Please refer to your Job Confirmation report for final due dates.
Criteria : Reg153/04 T3-GW-F/M

Submission Information

# of Samples:	2
Details:	Upload to SAP 88001627

eCOC Change Log

Modified By	Date Modified	Changes	Comments
Gina Baybayan	01 Apr 22 11:18:20	Reporting and Invoicing	

BUREAU VERITAS

RUSH!

Custody Tracking Form

eCOC Number
T491882-R

Please use this form for custody tracking when submitting the work instructions via eCOC (electronic Chain of Custody). Please ensure your form **has a barcode or a Bureau Veritas eCOC confirmation number** in the top right hand side. This number links your electronic submission to your samples. This form should be **placed in the cooler with your samples.**

Relinquished By				Received By			
Tom Ryan		Date	2022/03/31			Date	2022/04/01
		Time (24 HR)	13:47			Time (24 HR)	0914
		Date				Date	
		Time (24 HR)				Time (24 HR)	
		Date				Date	
		Time (24 HR)				Time (24 HR)	

Unless otherwise agreed to, submissions and use of services are governed by Bureau Veritas' standard terms and conditions which can be found at www.bvna.com.

Triage Information

Sampled By (Print)	# of Coolers/Pkgs				
Tom Ryan	1	Rush	☑	Immediate Test	☐	Food Residue	☐
		Micro	☐			Food Chemistry	☐

***** Laboratory Use Only *****

Received At	MISSISSAUGA
Labeled By	MUM
Verified By	

Lab Comments:

C285750

Custody Seal		Cooling Media	Temperature °C		
Present (Y/N)	Intact (Y/N)	Present (Y/N)	1	2	3
Y	Y	Y	0	1	3

Drinking Water Metals Preservation Check Done (Circle) **YES** **NO**

COR FCD-00340 /5 PAGE 1 of 1

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: March 30, 2022

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Bureau Veritas Mississauga

Consultant Project Number: 21506016-1155

Sample Submission Number: C285750

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within
Extraction Surrogate Recovery	X			acceptance criteria.
Method Blank Concentration	X			
Matrix Duplicate RPD	X			
Matrix Spike Recovery	X			
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	No field QC samples were collected.
Trip Blank Concentration			X	
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): Amanda Newberry

Date: April 4, 2022

APPENDIX E

Quality Assurance/Quality Control

QUALITY ASSURANCE/QUALITY CONTROL

In conjunction with the field investigations completed to date, a quality assurance/quality control (QA/QC) program was implemented to ensure the integrity of the soil, groundwater and soil vapour sampling and analytical testing results.

1.0 FIELD PROGRAM

All sampling activities were completed in accordance with Golder's Technical Field Procedures by trained Golder personnel. All field activities were documented in field notes and results were recorded on standard field forms. All reusable field equipment involved in the sampling and monitoring of soil and groundwater was decontaminated between sampling locations in accordance with Golder's Technical Procedures. Soil samples were collected using appropriate handling protocols and were placed in sample containers provided by Bureau Veritas Laboratories (BVL).

Soil samples were not directly contacted by hand. To help prevent cross-contamination, stainless steel sampling instruments and a new pair of clean nitrile gloves were used for the collection of each sample. Soil samples that were collected for field methanol preservation were collected using dedicated, laboratory-supplied, untampered syringes.

All soil and groundwater samples are placed in laboratory-supplied containers suitable for the analytes, and where applicable, the appropriate laboratory-supplied preservative is added to the samples, as outlined in the following table.

Analyte	Laboratory Containers	Preservative	Field Filtered
Soil Samples			
BTEX and PHC Fractions F1	2 x 40-mL clear glass vials	Methanol	n/a
PHC Fractions F2 to F4	2 x 120-mL clear glass jars	No preservative	n/a
Lead	1 x 250-mL clear glass jar	No preservative	n/a
n-Hexane	1 x 60-mL clear glass jar	No preservative	n/a
Groundwater samples			
BTEX and PHC Fraction F1	3 x 40-mL clear glass vials	Sodium bisulphate	No
PHC Fraction F2 to F4	2 x 100-mL amber glass bottles	Sodium bisulphate	No
Lead	1 x 120-mL HDPE bottle	Nitric acid	Yes

Notes: BTEX – benzene, toluene, ethylbenzene, xylenes; HDPE – high density polyethylene; mL – millilitres; n/a – not applicable; PHC – petroleum hydrocarbon

Samples were given unique identification numbers and the sampling containers were preserved in ice-filled coolers to maintain temperatures below 10 degrees Celsius (ºC). Samples were logged onto formal chain-of-custody documents and transported to BVL for chemical analysis. BVL is accredited by the Standards Council of Canada (SCC).

Blind field duplicate soil and groundwater samples were submitted for analysis. Trip and field blanks are submitted for analysis, as necessary, to evaluate the potential for cross contamination during the sampling and transportation of the samples. Submission of blind field duplicate QC samples was at a minimum rate of 10 percent (%) of total samples.

Soil Vapour

Field QA/QC for soil vapour sample collection included:

- Using new, dedicated polytetrafluoroethylene (PTFE, i.e., Teflon™) tubing for each sample to avoid cross-contamination;
- Calibrating field instruments prior to use;
- Conducting a helium leak tracer test for each probe;
- Sealing all probes when not in use;
- Storing all sampling materials away from potential sources of contamination;
- Following chain-of-custody procedures during all sampling events; and
- Monitoring of the SummaTM canister vacuums in the field before and after sampling using a pressure gauge supplied by BVL.

One field duplicate soil vapour sample was collected for the analysis of BTEX, PHC Fractions F1 and F2, and volatile organic compounds. One field blank (ambient air) sample and one trip blank were also submitted to the laboratory as part of the soil vapour program.

2.0 LABORATORY PROGRAM

The laboratory QA/QC program included adherence to laboratory sampling and analysis protocols (e.g., hold times, sample containers, preservatives, detection limits and approved methodology) and the analysis of laboratory method blanks, laboratory sample duplicates, surrogate recovery and chemical spikes.

Laboratory method blank samples are free of the target analytes and are analyzed through the same analytical method than the test samples. Method blank results are used to detect interferences or impurities introduced by the laboratory equipment, reagents, or solvents.

Laboratory control samples are fortified with a known concentration of the select target analytes and then analyzed through the same analytical method than the test samples. Laboratory control samples are used to monitor the analyte recovery and validate the calibration of the instrumentation.

For laboratory duplicate samples, a second aliquot from a randomly selected sample within an analytical batch is processed through the same analytical method. Laboratory duplicate sample results are used to evaluate the reproducibility of the analytical method.

Surrogate recovery is analyzed for organics parameters by spiking samples with known quantities of surrogate chemicals which have similar chemical properties to the parameters being analyzed. The reported recovery provides an indication of the analytical method accuracy for that sample.

Matrix spikes were conducted by adding known concentrations of the analyte of interest to a sample to evaluate the effects of the sample matrix on the analytical method.

Soil Vapour

The Summa canisters were batched certified as clean before delivery to the Site. The Summa canister vacuums measured between -29.0 and -26.0 inches Hg [vac] before sampling and were measured between -9.0 and -8.5 inches Hg [vac] after sampling.

The laboratory QA/QC included the analyses of method blanks, laboratory control samples and continuing calibration verification standards.

3.0 DATA RECEPTION

Once laboratory analytical results were received, Golder completed a review of field and laboratory quality. This included review of laboratory QC performance to confirm results are within acceptance criteria, as well as evaluation of field duplicate and blank results to confirm they were within alert limits. Upon receipt of the analytical results, relative percent difference (RPD) values between the original samples and their blind field duplicates were calculated as follows:

$$\text{RPD}\% = \frac{|\text{S} - \text{D}|}{\frac{1}{2}(\text{S} + \text{D})} \times 100$$

Where: RPD = relative percent difference
S = sample value
D = blind field duplicate or replicate value.

Since analytical error increases near the reportable detection limit (RDL), the RPD was only calculated where the concentrations of both the original and blind field duplicate samples were greater than five times the RDL. The calculated RPDs were then compared to parameter specific alert limits.

Exceedances of the QC acceptance or alert criteria were investigated with the laboratory and, if warranted, a corrective action report was requested from the laboratory.

4.0 DATA QUALITY REVIEW RESULTS

Results of the data quality review are summarized in Table E1. The RPD calculations and QC results are presented in Tables E2 to E8.

Two soil field duplicates were collected and submitted to the laboratory as part of the soil QC program.

Three groundwater field duplicates, three field blanks and three trip blanks were submitted to the laboratory as part of the groundwater QC program.

One soil vapour field duplicate, one field blank and one trip blank were also submitted to the laboratory as part of the groundwater QC program.

Based on the data quality review, no data quality issues were identified. All duplicated parameters, field blank and trip blank concentrations were within acceptable RPD alert limits. The data presented in this report are considered to be reliable.

5.0 SUMMARY OF RESULTS

Based on the review of the QA/QC results, the data presented in this report are considered to be reliable.

Table E1
Summary of Quality Control Sample Results
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

BVL Job Number	Matrix	BVL Sample ID Affected	Test Affected	Data Quality Issue	Comments
C1Y2874	Soil	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
C1Y3398	Groundwater	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
C1Y3401	Water	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
C1Y6956	Soil Vapour	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
C1Y9274	Ambient Air	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
C2A2163	Water	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
C2A2236	Groundwater	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
C278945	Groundwater	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
C278953	Water	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
C281791	Soil	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
C285750	Groundwater	n/a	n/a	No data quality issues were identified.	The data are considered reliable.

Notes:
BVL - Bureau Veritas Laboratories
n/a - not applicable

Table E2
Summary of Soil Field Duplicate Sample Results - Petroleum Hydrocarbons
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location	Units	Alert Limit	RDL	MW21-02-04	DUP A	RPD %	MW22-02-02	DUP A	RPD %
Sample Collection Date				01-Dec-21	01-Dec-21		26-Mar-22	26-Mar-22	
BVL Sample ID				RHG801	RHG802		SFF367	SFF368	
Sample Depth (mbgs)				2.20 - 2.40	2.20 - 2.40		1.10 - 1.40	1.10 - 1.40	
Benzene	µg/g	>100%	0.020	<0.020	<0.020	n/c	<0.020	<0.020	n/c
Toluene	µg/g	>100%	0.020	<0.020	<0.020	n/c	<0.020	<0.020	n/c
Ethylbenzene	µg/g	>100%	0.020	<0.020	<0.020	n/c	<0.020	<0.020	n/c
Xylenes (Total)	µg/g	>100%	0.040	<0.040	<0.040	n/c	<0.040	<0.040	n/c
F1 (C_6-C_{10}) - BTEX	µg/g	>100%	10	<10	<10	n/c	<10	<10	n/c
F2 (C_{10}-C_{16})	µg/g	>100%	10	<10	<10	n/c	<10	<10	n/c
F3 (C_{16}-C_{34})	µg/g	>100%	50	<50	<50	n/c	<50	<50	n/c
F4 (C_{34}-C_{50})	µg/g	>100%	50	<50	<50	n/c	<50	<50	n/c
n-Hexane	µg/g	>100%	0.50	<0.50	<0.50	n/c	-	-	n/a
Lead	µg/g	>100%	5.0	<5.0	<5.0	n/c	-	-	n/a

Notes:

Bold/Underline - RPD exceeds alert limit
BTEX - benzene, toluene, ethylbenzene, xylenes
BVL - Bureau Veritas Laboratories
F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3 and 4
mbgs - metres below ground surface
n/a - not applicable
n/c - not calculated
RDL - reportable detection limit
RPD - relative percent difference
µg/g - micrograms per gram
- not available
< - less than
> - greater than

Table E3
Summary of Groundwater Field Duplicate Sample Results - Petroleum Hydrocarbons
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location	Units	Alert Limit	RDL	MW21-01	DUP A	RPD %	TH6	DUP A	RPD %	TH100	DUP A	RPD %
Sample Collection Date				03-Dec-21	03-Dec-21		21-Mar-22	21-Mar-22		13-Apr-22	13-Apr-22	
BVL Sample ID				RHJ392	RHJ394		SEM993	SEM997		SJU498	SJU505	
Benzene	µg/g	>80%	0.20	<0.20	<0.20	n/c	<0.20	<0.20	n/c	<0.20	<0.20	n/c
Toluene	µg/g	>80%	0.20	<0.20	<0.20	n/c	<0.20	<0.20	n/c	<0.20	<0.20	n/c
Ethylbenzene	µg/g	>80%	0.20	<0.20	<0.20	n/c	<0.20	<0.20	n/c	<0.20	<0.20	n/c
Xylenes (Total)	µg/g	>80%	0.40	<0.40	<0.40	n/c	<0.40	<0.40	n/c	<0.40	<0.40	n/c
F1 (C_6-C_{10}) - BTEX	µg/g	>80%	25	<25	<25	n/c	<25	<25	n/c	<25	<25	n/c
F2 (C_{10}-C_{16})	µg/g	>80%	100	<100	<100	n/c	<100	<100	n/c	<100	<100	n/c
F3 (C_{16}-C_{34})	µg/g	>80%	200	<200	<200	n/c	<200	<200	n/c	<200	<200	n/c
F4 (C_{34}-C_{50})	µg/g	>80%	200	<200	<200	n/c	<200	<200	n/c	<200	<200	n/c
Dissolved Lead	µg/g	>50%	0.50	<0.50	<0.50	n/c	<0.50	<0.50	n/c	<0.50	<2.5	n/c

Notes:

Bold/Underline - RPD exceeds alert limit

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3 and 4

n/c - not calculated

RDL - reportable detection limit

RPD - relative percent difference

µg/L - micrograms per litre

< - less than

> - greater than

Table E4
Summary of Soil Vapour Field Duplicate Sample Results - Petroleum Hydrocarbons
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location	Units	Alert Limit	RDL	SV16-01	DUP A	RPD %
Sample Collection Date				09-Dec-21	09-Dec-21	
BVL Sample ID				RIC797	RIC798	
Benzene	µg/m^3	>50%	0.32	<0.32	<0.32	n/c
Toluene	µg/m^3	>50%	0.38	<0.38	<0.38	n/c
Ethylbenzene	µg/m^3	>50%	0.43	<0.43	<0.43	n/c
Xylenes, Total	µg/m^3	>50%	1.3	<1.3	<1.3	n/c
F1-BTEX, C_6-C_{10} (as Toluene)	µg/m^3	>50%	5.0	19.3	23.8	n/c
F2, C_{10}-C_{16} (as Decane)	µg/m^3	>50%	5.0	53.8	50.2	7

Notes:

Bold/Underline - RPD exceeds alert limit

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2 - petroleum hydrocarbon fractions 1, 2

n/c - not calculated

RDL - reportable detection limit

RPD - relative percent difference

µg/m^3 - micrograms per cubic metre

< - less than

> - greater than

Table E5
Summary of Soil Vapour Field Duplicate Sample Results - Volatile Organic Compounds
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location	Units	Alert Limit	RDL	SV16-01	DUP A	RPD %
Sample Collection Date				09-Dec-21	09-Dec-21	
BVL Sample ID				RIC797	RIC798	
Benzyl chloride	µg/m^3	>50%	2.6	<2.6	<2.6	n/c
Bromodichloromethane	µg/m^3	>50%	1.3	<1.3	<1.3	n/c
Bromoform	µg/m^3	>50%	2.1	<2.1	<2.1	n/c
Bromomethane	µg/m^3	>50%	0.39	<0.39	<0.39	n/c
1,3-Butadiene	µg/m^3	>50%	1.1	<1.1	<1.1	n/c
Carbon Disulfide	µg/m^3	>50%	1.6	<1.6	<1.6	n/c
Carbon Tetrachloride	µg/m^3	>50%	0.63	<0.63	<0.63	n/c
Chlorobenzene	µg/m^3	>50%	0.46	<0.46	<0.46	n/c
Chloroethane	µg/m^3	>50%	0.79	<0.79	<0.79	n/c
Chloroform	µg/m^3	>50%	0.49	<0.49	<0.49	n/c
Chloromethane	µg/m^3	>50%	0.62	<0.62	<0.62	n/c
Cyclohexane	µg/m^3	>50%	0.69	<0.69	<0.69	n/c
Dibromochloromethane	µg/m^3	>50%	1.7	<1.7	<1.7	n/c
1,2-Dibromoethane (Ethylene Dibromide	µg/m^3	>50%	0.77	<0.77	<0.77	n/c
1,2-Dichlorobenzene	µg/m^3	>50%	0.60	<0.60	<0.60	n/c
1,3-Dichlorobenzene	µg/m^3	>50%	2.4	<2.4	<2.4	n/c
1,4-Dichlorobenzene	µg/m^3	>50%	0.60	<0.60	<0.60	n/c
Dichlorodifluoromethane (FREON 12)	µg/m^3	>50%	0.99	11.0	11.6	5
1,1-Dichloroethane	µg/m^3	>50%	0.40	<0.40	<0.40	n/c
1,2-Dichloroethane	µg/m^3	>50%	0.40	<0.40	<0.40	n/c
1,1-Dichloroethylene	µg/m^3	>50%	0.40	<0.40	<0.40	n/c
cis-1,2-Dichloroethylene	µg/m^3	>50%	0.40	<0.40	<0.40	n/c
trans-1,2-Dichloroethylene	µg/m^3	>50%	0.40	<0.40	<0.40	n/c
1,2-Dichloropropane	µg/m^3	>50%	0.46	<0.46	<0.46	n/c
cis-1,3-Dichloropropene	µg/m^3	>50%	0.45	<0.45	<0.45	n/c
trans-1,3-Dichloropropene	µg/m^3	>50%	0.45	<0.45	<0.45	n/c
1,2-Dichlorotetrafluoroethane	µg/m^3	>50%	1.2	<1.2	<1.2	n/c
1,4-Dioxane	µg/m^3	>50%	3.6	<3.6	<3.6	n/c
Ethanol (ethyl alcohol)	µg/m^3	>50%	1.9	2.5	<1.9	n/c
Ethyl Acetate	µg/m^3	>50%	3.6	<3.6	<3.6	n/c
4-ethyltoluene	µg/m^3	>50%	2.5	<2.5	<2.5	n/c
Heptane	µg/m^3	>50%	1.2	<1.2	<1.2	n/c
Hexachlorobutadiene	µg/m^3	>50%	5.3	<5.3	<5.3	n/c
Hexane	µg/m^3	>50%	0.7	<0.70	<0.70	n/c

Notes:

Bold/Underline - RPD exceeds alert limit

BVL - Bureau Veritas Laboratories

n/c - not calculated

RDL - reportable detection limit

RPD - relative percent difference

µg/m^3 - micrograms per cubic metre

< - less than

> - greater than

Table E5
Summary of Soil Vapour Field Duplicate Sample Results - Volatile Organic Compounds
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location	Units	Alert Limit	RDL	SV16-01	DUP A	RPD %
Sample Collection Date				09-Dec-21	09-Dec-21	
BVL Sample ID				RIC797	RIC798	
Methyl Butyl Ketone (2-Hexanone)	µg/m^3	>50%	4.1	<4.1	<4.1	n/c
Methyl Ethyl Ketone (2-Butanone)	µg/m^3	>50%	2.9	<0.59	<0.59	n/c
Methyl Isobutyl Ketone	µg/m^3	>50%	4.1	<0.82	<0.82	n/c
Methyl t-butyl ether (MTBE)	µg/m^3	>50%	0.72	<0.72	<0.72	n/c
Methylene Chloride(Dichloromethane)	µg/m^3	>50%	2.8	<2.1	<2.1	n/c
Naphthalene	µg/m^3	>50%	1	<1.0	<1.0	n/c
2-propanol (Isopropanol)	µg/m^3	>50%	2.5	<2.5	<2.5	n/c
2-Propanone (Acetone)	µg/m^3	>50%	1.9	4.3	3.5	
Propene (Propylene)	µg/m^3	>50%	0.86	<0.86	<0.86	n/c
Styrene	µg/m^3	>50%	0.43	<0.43	<0.43	n/c
1,1,1,2-Tetrachloroethane	µg/m^3	>50%	0.69	<0.69	<0.69	n/c
1,1,2,2-Tetrachloroethane	µg/m^3	>50%	0.69	<0.69	<0.69	n/c
Tetrachloroethylene	µg/m^3	>50%	0.68	<0.68	0.68	n/c
Tetrahydrofuran	µg/m^3	>50%	1.2	<1.2	<1.2	n/c
1,2,4-Trichlorobenzene	µg/m^3	>50%	3.7	<3.7	<3.7	n/c
1,1,1-Trichloroethane	µg/m^3	>50%	0.55	<0.55	<0.55	n/c
1,1,2-Trichloroethane	µg/m^3	>50%	0.55	<0.55	<0.55	n/c
Trichloroethylene	µg/m^3	>50%	0.54	11.4	12.3	8
Trichlorofluoromethane (FREON 11)	µg/m^3	>50%	1.1	<1.1	<1.1	n/c
Trichlorotrifluoroethane (FREON 113)	µg/m^3	>50%	1.2	<1.2	<1.2	n/c
1,2,4-Trimethylbenzene	µg/m^3	>50%	2.5	<2.5	<2.5	n/c
1,3,5-Trimethylbenzene	µg/m^3	>50%	2.5	<2.5	<2.5	n/c
2,2,4-Trimethylpentane	µg/m^3	>50%	0.93	<0.93	<0.93	n/c
Vinyl Acetate	µg/m^3	>50%	0.70	<0.70	<0.70	n/c
Vinyl Bromide	µg/m^3	>50%	0.87	<0.87	<0.87	n/c
Vinyl Chloride	µg/m^3	>50%	0.26	<0.26	<0.26	n/c

Notes:

Bold/Underline - RPD exceeds alert limit

BVL - Bureau Veritas Laboratories

n/c - not calculated

RDL - reportable detection limit

RPD - relative percent difference

µg/m^3 - micrograms per cubic metre

< - less than

> - greater than

Table E6
Summary of Groundwater Trip Blank Sample Results - Petroleum Hydrocarbons and Dissolved Lead
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location	Units	Alert Limit	RDL	Field Blank	Do the Results Exceed the Alert Limit?	Trip Blank	Do the Results Exceed the Alert Limit?	Field Blank	Do the Results Exceed the Alert Limit?	Trip Blank	Do the Results Exceed the Alert Limit?
Sample Collection Date				**03-Dec-21**		**03-Dec-21**		**22-Mar-22**		**22-Mar-22**	
BVL Sample ID				**RHJ399**		**RHJ400**		**SEN029**		**SEN030**	
Benzene	µg/L	>5X RDL	0.20	<0.20	no	<0.20	no	<0.20	no	<0.20	no
Toluene	µg/L	>5X RDL	0.20	<0.20	no	<0.20	no	<0.20	no	<0.20	no
Ethylbenzene	µg/L	>5X RDL	0.20	<0.20	no	<0.20	no	<0.20	no	<0.20	no
Xylenes (Total)	µg/L	>5X RDL	0.20	<0.40	no	<0.40	no	<0.40	no	<0.40	no
F1 (C_6-C_{10}) - BTEX	µg/L	>2X RDL	25	<25	no	<25	no	<25	no	<25	no
F2 (C_{10}-C_{16})	µg/L	>2X RDL	100	<100	no	-	n/a	<100	no	<100	no
F3 (C_{16}-C_{34})	µg/L	>2X RDL	200	<200	no	-	n/a	<200	no	<200	no
F4 (C_{34}-C_{50})	µg/L	>2X RDL	200	<200	no	-	n/a	<200	no	<200	no
Dissolved Lead	µg/L	>5X RDL	0.50	<0.50	no	-	n/a	<0.50	no	<0.50	no

Sample Location	Units	Alert Limit	RDL	Field Blank	Do the Results Exceed the Alert Limit?	Trip Blank	Do the Results Exceed the Alert Limit?
Sample Collection Date				**13-Apr-22**		**13-Apr-22**	
BVL Sample ID				**SJU132**		**SJU131**	
Benzene	µg/L	>5X RDL	0.20	<0.20	no	<0.20	no
Toluene	µg/L	>5X RDL	0.20	<0.20	no	<0.20	no
Ethylbenzene	µg/L	>5X RDL	0.20	<0.20	no	<0.20	no
Xylenes (Total)	µg/L	>5X RDL	0.20	<0.40	no	<0.40	no
F1 (C_6-C_{10}) - BTEX	µg/L	>2X RDL	25	<25	no	<25	no
F2 (C_{10}-C_{16})	µg/L	>2X RDL	100	<100	no	<100	no
F3 (C_{16}-C_{34})	µg/L	>2X RDL	200	<200	no	<200	no
F4 (C_{34}-C_{50})	µg/L	>2X RDL	200	<200	no	<200	no
Dissolved Lead	µg/L	>5X RDL	0.50	<0.50	no	<0.50	no

Notes:

Bold/Underlined - value exceeds alert limit

BTEX - benzene, toluene, ethylbenzene, xylene

BVL - Bureau Veritas Laboratories

F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3 and 4

n/a - not applicable

RDL - reportable detection limit

µg/L - micrograms per litre

- not available

< - less than

> - greater than

Table E7
Summary of Soil Vapour Field and Trip Blank Sample Results - Petroleum Hydrocarbons
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location	Units	Alert Limit	RDL	Field Blank	Do the Results Exceed the Alert Limit?	Trip Blank	Do the Results Exceed the Alert Limit?
Sample Collection Date				10-Dec-21		10-Dec-21	
BVL Sample ID				RIQ245		RIQ246	
Benzene	µg/m^3	>5X RDL	0.32	0.46	no	<0.32	no
Toluene	µg/m^3	>5X RDL	0.38	<0.38	no	<0.38	no
Ethylbenzene	µg/m^3	>5X RDL	0.43	<0.43	no	<0.43	no
Xylenes (Total)	µg/m^3	>5X RDL	1.3	<1.3	no	<1.3	no
F1 (C_6-C_{10}) - BTEX	µg/m^3	>5X RDL	5	<5.0	no	<5.0	no
F2 (C_{10}-C_{16})	µg/m^3	>5X RDL	5	<5.0	no	<5.0	no

Notes:

Bold/Underlined - value exceeds alert limit

BTEX - benzene, toluene, ethylbenzene, xylene

BVL - Bureau Veritas Laboratories

F1, F2 - petroleum hydrocarbon fractions 1, 2

RDL - reportable detection limit

µg/m^3 - micrograms per cubic metre

< - less than

> - greater than

Table E8
Summary of Soil Vapour Field and Trip Blank Sample Results - Volatile Organic Compounds
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location	Units	Alert Limit	RDL	Field Blank	Do the Results Exceed the Alert Limit?	Trip Blank	Do the Results Exceed the Alert Limit?
Sample Collection Date				10-Dec-21		10-Dec-21	
BVL Sample ID				RIQ245		RIQ246	
Benzyl chloride	µg/m^3	>5X RDL	2.6	<2.6	no	<2.6	no
Bromodichloromethane	µg/m^3	>5X RDL	1.3	<1.3	no	<1.3	no
Bromoform	µg/m^3	>5X RDL	2.1	<2.1	no	<2.1	no
Bromomethane	µg/m^3	>5X RDL	0.39	<0.39	no	<0.39	no
1,3-Butadiene	µg/m^3	>5X RDL	1.1	<1.1	no	<1.1	no
Carbon Disulfide	µg/m^3	>5X RDL	1.6	<1.6	no	<1.6	no
Carbon Tetrachloride	µg/m^3	>5X RDL	0.63	<0.63	no	<0.63	no
Chlorobenzene	µg/m^3	>5X RDL	0.46	<0.46	no	<0.46	no
Chloroethane	µg/m^3	>5X RDL	0.79	<0.79	no	<0.79	no
Chloroform	µg/m^3	>5X RDL	0.49	<0.49	no	<0.49	no
Chloromethane	µg/m^3	>5X RDL	0.62	1.30	no	<0.62	no
Cyclohexane	µg/m^3	>5X RDL	0.69	<0.69	no	<0.69	no
Dibromochloromethane	µg/m^3	>5X RDL	1.7	<1.7	no	<1.7	no
1,2-Dibromoethane (Ethylene Dibromide)	µg/m^3	>5X RDL	0.77	<0.77	no	<0.77	no
1,2-Dichlorobenzene	µg/m^3	>5X RDL	0.60	<0.60	no	<0.60	no
1,3-Dichlorobenzene	µg/m^3	>5X RDL	2.4	<2.4	no	<2.4	no
1,4-Dichlorobenzene	µg/m^3	>5X RDL	0.60	<0.60	no	<0.60	no
Dichlorodifluoromethane (FREON 12)	µg/m^3	>5X RDL	0.99	2.38	no	<0.99	no
1,1-Dichloroethane	µg/m^3	>5X RDL	0.40	<0.40	no	<0.40	no
1,2-Dichloroethane	µg/m^3	>5X RDL	0.40	<0.40	no	<0.40	no
1,1-Dichloroethylene	µg/m^3	>5X RDL	0.40	<0.40	no	<0.40	no
cis-1,2-Dichloroethylene	µg/m^3	>5X RDL	0.40	<0.40	no	<0.40	no
trans-1,2-Dichloroethylene	µg/m^3	>5X RDL	0.40	<0.40	no	<0.40	no
1,2-Dichloropropane	µg/m^3	>5X RDL	0.46	<0.46	no	<0.46	no
cis-1,3-Dichloropropene	µg/m^3	>5X RDL	0.45	<0.45	no	<0.45	no
trans-1,3-Dichloropropene	µg/m^3	>5X RDL	0.45	<0.45	no	<0.45	no
1,2-Dichlorotetrafluoroethane	µg/m^3	>5X RDL	1.2	<1.2	no	<1.2	no
1,4-Dioxane	µg/m^3	>5X RDL	3.6	<3.6	no	<3.6	no
Ethanol (ethyl alcohol)	µg/m^3	>5X RDL	1.9	4.9	no	<1.9	no
Ethyl Acetate	µg/m^3	>5X RDL	3.6	<3.6	no	<3.6	no
4-ethyltoluene	µg/m^3	>5X RDL	2.5	<2.5	no	<2.5	no
Heptane	µg/m^3	>5X RDL	1.2	<1.2	no	<1.2	no
Hexachlorobutadiene	µg/m^3	>5X RDL	5.3	<5.3	no	<5.3	no
Hexane	µg/m^3	>5X RDL	0.7	<0.70	no	<0.70	no

Notes:

Bold/Underlined - value exceeds alert limit

BVL - Bureau Veritas Laboratories

RDL - reportable detection limit

µg/m^3 - micrograms per cubic metre

< - less than

> - greater than

Table E8
Summary of Soil Vapour Field and Trip Blank Sample Results - Volatile Organic Compounds
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location	Units	Alert Limit	RDL	Field Blank	Do the Results Exceed the Alert Limit?	Trip Blank	Do the Results Exceed the Alert Limit?
Sample Collection Date				10-Dec-21		10-Dec-21	
BVL Sample ID				RIQ245		RIQ246	
Methyl Butyl Ketone (2-Hexanone)	µg/m^3	>5X RDL	4.1	<4.1	no	<4.1	no
Methyl Ethyl Ketone (2-Butanone)	µg/m^3	>5X RDL	2.9	<0.59	no	<0.59	no
Methyl Isobutyl Ketone	µg/m^3	>5X RDL	4.1	<0.82	no	<0.82	no
Methyl t-butyl ether (MTBE)	µg/m^3	>5X RDL	0.72	<0.72	no	<0.72	no
Methylene Chloride(Dichloromethane)	µg/m^3	>5X RDL	2.8	<2.1	no	<2.1	no
Naphthalene	µg/m^3	>5X RDL	1	<1.0	no	<1.0	no
2-propanol (Isopropanol)	µg/m^3	>5X RDL	2.5	<2.5	no	<2.5	no
2-Propanone (Acetone)	µg/m^3	>5X RDL	1.9	1.7	no	<1.4	no
Propene (Propylene)	µg/m^3	>5X RDL	0.86	<0.86	no	<0.86	no
Styrene	µg/m^3	>5X RDL	0.43	<0.43	no	<0.43	no
1,1,1,2-Tetrachloroethane	µg/m^3	>5X RDL	0.69	<0.69	no	<0.69	no
1,1,2,2-Tetrachloroethane	µg/m^3	>5X RDL	0.69	<0.69	no	<0.69	no
Tetrachloroethylene	µg/m^3	>5X RDL	0.68	<0.68	no	<0.68	no
Tetrahydrofuran	µg/m^3	>5X RDL	1.2	<1.2	no	<1.2	no
1,2,4-Trichlorobenzene	µg/m^3	>5X RDL	3.7	<3.7	no	<3.7	no
1,1,1-Trichloroethane	µg/m^3	>5X RDL	0.55	<0.55	no	<0.55	no
1,1,2-Trichloroethane	µg/m^3	>5X RDL	0.55	<0.55	no	<0.55	no
Trichloroethylene	µg/m^3	>5X RDL	0.54	<0.54	no	<0.54	no
Trichlorofluoromethane (FREON 11)	µg/m^3	>5X RDL	1.1	1.2	no	<1.1	no
Trichlorotrifluoroethane (FREON 113)	µg/m^3	>5X RDL	1.2	<1.2	no	<1.2	no
1,2,4-Trimethylbenzene	µg/m^3	>5X RDL	2.5	<2.5	no	<2.5	no
1,3,5-Trimethylbenzene	µg/m^3	>5X RDL	2.5	<2.5	no	<2.5	no
2,2,4-Trimethylpentane	µg/m^3	>5X RDL	0.93	<0.93	no	<0.93	no
Vinyl Acetate	µg/m^3	>5X RDL	0.70	<0.70	no	<0.70	no
Vinyl Bromide	µg/m^3	>5X RDL	0.87	<0.87	no	<0.87	no
Vinyl Chloride	µg/m^3	>5X RDL	0.26	<0.26	no	<0.26	no

Notes:

Bold/Underlined - value exceeds alert limit

BVL - Bureau Veritas Laboratories

RDL - reportable detection limit

µg/m^3 - micrograms per cubic metre

< - less than

> - greater than



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April 11, 2022

Sabreen Sherwani
Project Manager, Execution
Environmental Services, Imperial Oil Limited
505 Quarry Park Blvd S.E.
Calgary, Alberta
T2C 5N1

Groundwater Monitoring Program – 1660 Merivale Road, Ottawa, Ontario
TSSA Service Request # 791084

Dear Ms. Sherwani,

Thank you for submitting the following groundwater monitoring and sampling reports for the above captioned property:

- *"2021 Groundwater and Soil Vapour Probe Monitoring and Sampling Report, 1660 Merivale Road, Ottawa, Ontario",* prepared by Golder Associates Ltd. (Golder), dated September 9, 2021.
- *"2022 Action Plan, 1660 Merivale Road, Ottawa, Ontario",* prepared by Golder, dated February 4, 2022.

The 2021 groundwater monitoring report provides the following information:

- Seventeen (17) monitoring wells (TH1 through TH9, TH11, TH12, TH100 to TH102, MW15-01, MW15-02, MW16-01) were monitored for depth to groundwater, petroleum vapour concentrations and presence or absence of liquid petroleum hydrocarbon (LPH) on July 13-14, 2021.
- The depth to groundwater measured in the monitoring wells ranged from 2.39 metres below ground surface (mbgs) (in MW15-01) to 3.76 mbgs (in TH2). The inferred groundwater flow direction is to the south.
- The headspace vapour concentrations were not measured in the monitoring wells during this monitoring event.
- LPH was not detected in any monitoring wells except less than 1 mm LPH was observed in monitoring wells TH1 and TH4.
- Golder selected the Ontario Ministry of the Environment Conservation and Parks (MECP) Table 3 full depth generic Site Condition Standards (SCS) for all types of property use in a non-potable groundwater condition, and medium to fine textured soils as being applicable for use at this site.
- Groundwater samples were collected from fifteen (15) monitoring wells (TH2, TH3, TH5, TH6, TH7, TH8, TH9, TH11, TH12, TH100, TH101, TH102, MW15-01, MW15-02, MW16-01) during one or both the sampling events on July 13-14, 2021. The groundwater samples were submitted to Bureau Veritas Laboratories (BV Labs), an accredited laboratory by the Canadian Association for Laboratory Accreditation Inc. (CALA). Groundwater samples

were submitted for laboratory analysis of benzene, toluene, ethylbenzene, xylenes (BTEX), petroleum hydrocarbon fractions F1 to F4 (PHC F1-F4) and lead.

- The analytical results of the submitted groundwater samples were reported by Golder to be below the selected MECP Table 3 SCS for all analyzed parameters with the exceptions of the groundwater samples collected from the following monitoring wells which exceeded for concentrations of one or more of PHC F1-F4 and lead:
    - TH3 – PHC F2
    - TH5 – PHC F1-F4, lead
    - TH8 – PHC F3-F4
    - TH9 – PHC F3-F4
    - TH11 – PHC F2-F4
    - TH12 – PHC F1-F2
    - TH100 – PHC F3-F4
    - TH101 – PHC F1-F2
    - MW16-01 – PHC F3-F4

The 2022 action plan provides the following information:

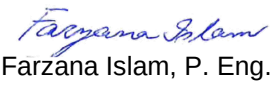
- A sub-surface investigation program was completed between November 30 and December 10, 2021.
- Two monitoring wells (MW21-01 and MW21-02) were installed west of TH1 to a maximum depth of approximately 6.2 metres below ground surface (mbgs).
- Three (3) soil vapour probes (SV21-01 to SV21-03) were installed at the west east and south of site boundaries, respectively.
- Additional sub-surface investigation has been scheduled for 2022 involving installation of two monitoring wells east of TH101 and TH201 on the school property to the east. The proposed plan is pending approval by the Ottawa-Carleton District School Board.
- Off-site monitoring wells located north of the site will be re-developed using a hydro vacuum truck and sampled in 2022.
- A report summarizing the above mentioned will be submitted to the TSSA following the completion of the work.

Our review of the report indicates that the petroleum hydrocarbon (PHC) impacts have been identified in groundwater both on-site (TH1, TH5 and TH4) and off-site (TH8, TH9, MW16-01, TH11, TH12, TH100 and TH101). The identified impacts have not been completely delineated. We understand that additional sub-surface investigation program has been planned for the site to address the identified impacts. Please submit the report to the TSSA within 60 calendar days of the completion of the work.

Please note, the soil vapour intrusion assessment guidance document titled "*Draft Technical Guidance: Soil Vapour Intrusion Assessment, September 2013*" has not been finalized by the MECP. It also has not been made available to public for use and is not in effect to date. As such, TSSA cannot provide comments on the soil vapour monitoring and sampling results.

Should you have any further questions, please do not hesitate to contact me directly. For general enquiries, please contact a Customer Service Advisor at 1.877.682.TSSA (8772) or e-mail customerservices@tssa.org. When contacting TSSA regarding this file, please refer to the Service Request number provided above.

Yours truly,



Farzana Islam, P. Eng.
Fuels Safety Program
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February 4, 2022

Project No. 20447743-1155

THIS REPORT CONTAINS PROVISIONS LIMITING LIABILITY, THE SCOPE OF THE REPORT AND THIRD PARTY RELIANCE

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Farzana Islam, PEng
Fuels Safety Program
Technical Standards and Safety Authority
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2022 ACTION PLAN
1660 MERIVALE ROAD, OTTAWA, ONTARIO

Dear Ms. Islam,

Golder Associates Ltd. (Golder) has been retained by Imperial Oil Limited (Imperial) to prepare an action plan based on the information provided during the Site review meeting with Imperial and the Technical Standards and Safety Authority (TSSA) on November 12, 2021, in regards to the service station located at 1660 Merivale Road in Ottawa, Ontario (the Site).

Delineation of Identified Impacts

An on-site subsurface program was conducted between November 30 and December 10, 2021. The scope of work included drilling and installing two monitoring wells (MW21-01 and MW21-02) west of TH1 and collecting soil samples at each borehole location. The monitoring wells were installed to a depth of approximately 6.2 metres below ground surface (mbgs) and screened across the same stratigraphic unit as TH1. Three soil vapour probes (SV21-01 to SV21-03) were installed at the west, east and south Site boundaries, respectively (Figure 1).

Contingent on an access agreement with the Ottawa-Carleton District School Board, additional subsurface work is scheduled for Q1 of 2022 which includes the drilling and installation of two monitoring wells east of TH101 and TH201on the school property to the east. Soil samples will be collected during borehole drilling and the monitoring well will be installed at a depth of approximately 6 mbgs to match the stratigraphic unit which TH101 was installed. This proposed plan is pending approval by the Ottawa-Carleton District School Board.

Monitoring Well Redevelopment and Purging

Off-site monitoring well locations north of Site which have yielded petroleum hydrocarbon (PHC) F3/F4 exceedances (TH8 and TH9, TH11, TH12, MW16-01 and TH100) will be redeveloped with the use of a hydrovacuum truck and sampled in Q1 of 2022.

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Groundwater Monitoring Program

The proposed annual monitoring and sampling program will be expedited and completed in Q1 2022 following the well cleaning and off-site well installation scopes.

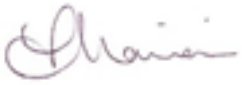
The groundwater program will include eleven on-site wells (TH1 to TH7, MW15-01, MW15-02, MW21-01, and MW21-02) and ten off-site wells (TH8, TH9, TH11, TH12, TH100 to TH102, MW16-01, and proposed MW22-01 and MW22-02) as shown in Figure 1.

An annual report summarizing the results of the aforementioned scopes will be provided to the TSSA following the completion of the work.

We trust that this action plan meets your current requirements. Should you have any questions concerning this letter, or wish to further discuss our approach, please do not hesitate to contact the undersigned.

Yours truly,

Golder Associates Ltd.





Leandra Mariani (BSc (Hons), OCGC)
Environmental Scientist

Sandra Carrelas, MESc, PEng
Principal, Senior Geo-Environmental Engineer

LM/IS/SC/hf

Attachments: Limitations of Liability, Scope of Report and Third Party Reliance
Figure 1

https://golderassociates.sharepoint.com/sites/16601g/1100 to 1195/1155/xx16 - reporting/2021/tssa action letter/1155_tssa action plan.docx

LIMITATIONS OF LIABILITY, SCOPE OF REPORT AND THIRD PARTY RELIANCE

This report has been prepared and the work referred to in this report has been undertaken by Golder Associates Ltd. for Imperial Oil Limited. It is intended for the sole and exclusive use of Imperial Oil Limited, its affiliated companies and partners and their respective insurers, agents, employees and advisors (collectively, “Imperial Oil”). Any use, reliance on or decision made by any person other than Imperial Oil based on this report is the sole responsibility of such other person. Imperial Oil and Golder Associates Ltd. make no representation or warranty to any other person with regard to this report and the work referred to in this report, and they accept no duty of care to any other person or any liability or responsibility whatsoever for any losses, expenses, damages, fines, penalties or other harm that may be suffered or incurred by any other person as a result of the use of, or reliance on, any decision made or any action taken based on this report or the work referred to in this report.

The investigation undertaken by Golder Associates Ltd. with respect to this report and any conclusions or recommendations made in this report reflect Golder Associates Ltd.’s judgement based on the site conditions observed at the time of the site inspection on the date(s) set out in this report, and on information available at the time of preparation of this report. This report has been prepared for specific application to this site and it is based, in part, upon visual observation of the site, subsurface investigation at discrete locations and depths, and specific analysis of specific chemical parameters and materials during a specific time interval, all as described in this report.

Unless otherwise stated, the findings cannot be extended to previous or future site conditions, portions of the site which were unavailable for direct investigation, subsurface locations which were not investigated directly, or chemical parameters, materials or analysis which were not addressed. Substances other than those addressed by the investigation described in this report may exist within the site, substances addressed by the investigation may exist in areas of the site not investigated and concentrations of substances addressed which are different than those reported may exist in areas other than the locations from which samples were taken.

If site conditions or applicable standards change or if any additional information becomes available at a future date, modifications to the findings, conclusions and recommendations in this report may be necessary.

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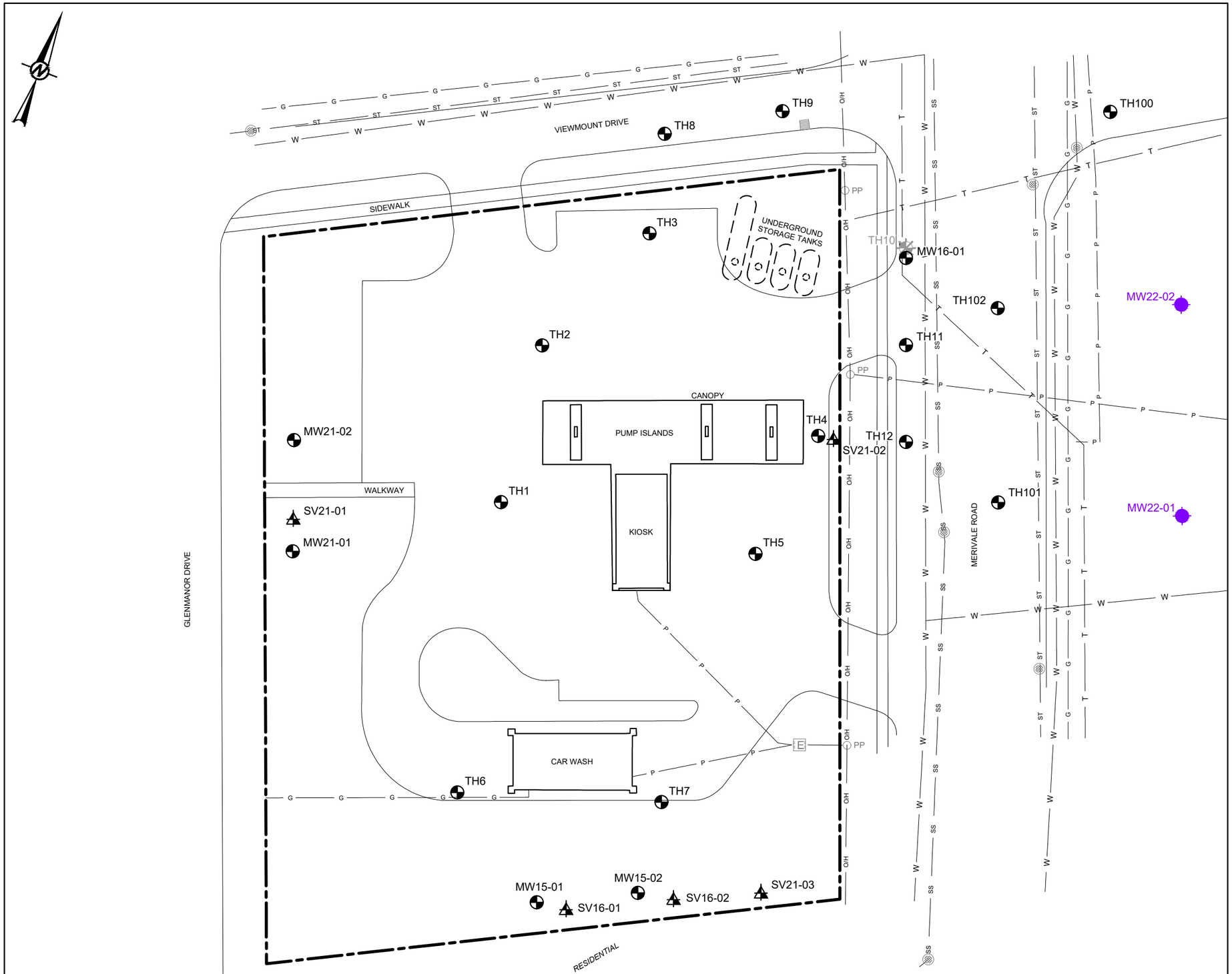

LEGEND

- PROPERTY BOUNDARY
- O/H — OVERHEAD POWER LINE
- G — UNDERGROUND GAS LINE
- P — UNDERGROUND POWER LINE
- SS — UNDERGROUND SANITARY LINE
- ST — UNDERGROUND STORM SEWER LINE
- T — UNDERGROUND TELEPHONE LINE
- W — UNDERGROUND WATERLINE
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL (DECOMMISSIONED)
- PROPOSED MONITORING LOCATION
- SOIL VAPOUR PROBE LOCATION
- CATCH BASIN
- ELECTRICAL PEDESTAL
- MANHOLE
- PP — POWER POLE

REFERENCE

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No.: 11010-SITE PLAN ONSITE-JUN14; SCALE: UNKNOWN; DATE: JUNE 2014.

0 10 20
1:500 METRES

CLIENT
IMPERIAL OIL LIMITED

PROJECT
FORMER RETAIL FUEL OUTLET
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
SITE PLAN WITH MONITORING WELL, PROPOSED MONITORING AND SOIL VAPOUR PROBE LOCATIONS

CONSULTANT
GOLDER
MEMBER OF WSP

YYYY-MM-DD	2022-01-31
DESIGNED	LMariani
PREPARED	PRicord
REVIEWED	ISosney
APPROVED	SCarrelas

PROJECT NO.	PHASE-TASK	REV.	FIGURE
20447743	1155-2116H	0	1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25 mm

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TECHNICAL STANDARDS and SAFETY AUTHORITY

345 Carlingview Drive
Toronto, Ontario M9W 6N9
Toll free 1-877-682-8772
www.tssa.org

FS Inspection Report

Service Request #	**3045902**
Inspection Report #	**9100635**

Inspection Address: **1660 MERIVALE RD** **NEPEAN;ON** **CA K2G 3K4**	Reference Number(s): **000203342**	Inspection Completion Date: **JAN 24, 2022**
	Facility Type: **FS Gasoline Station - Self Serve**	Equipment Type:
Customer Name and Address: **CANADIAN TIRE CORPORATION LIMITED** **2180 YONGE ST PO BOX 770 STN K** **TORONTO;ON** **CA M4P 2V8**	Task Type: FS-Follow up LF Inspect	
	The facility/equipment is inspected in accordance with Ontario's Technical Standards & Safety Act and the appropriate regulations and codes. When an Inspector's order is issued, time limits for compliance reflect the severity of the violation and serve to avoid disruption of service.	

Orders Issued To: CANADIAN TIRE CORPORATION, LIMITED:

Task Notes

TSSA Inspector David Barclay received an email with attached documents on Jan.13, 2022 from Mr. John Lastoria regarding orders issued to the petroleum facility at 1660 Merivale Rd; Ottawa.

After reviewing the documents this Inspector is satisfied all orders have been complied with.

Inspection Complete.

Customer Signature & Position / Date:		**Inspector Name:** Barclay, David	**Inspector Contact Number:** 613-808-2727
Report Received By: John Lastoria via: john.lastoria@cantire.com	**Customer Contact Number:** 416-480-9780	**Inspector Email**: dbarclay@tssa.org	**Inspector Fax**: 647-789-2129

As a not-for-profit regulatory authority, TSSA operates on a cost recovery basis. An Invoice will be issued for the Total Charges Incurred.
(Note: This is not an invoice)

TECHNICAL STANDARDS and SAFETY AUTHORITY

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FS Inspection Report

Service Request #	**3045902**
Inspection Report #	**9002392**

Inspection Address: **1660 MERIVALE RD** **NEPEAN;ON** **CA K2G 3K4**	Reference Number(s): **000203342**	Inspection Completion Date: **SEP 17, 2021**
	Facility Type: **FS Gasoline Station - Self Serve**	Equipment Type:
Customer Name and Address: **CANADIAN TIRE CORPORATION LIMITED** **2180 YONGE ST PO BOX 770 STN K** **TORONTO;ON** **CA M4P 2V8**	Task Type: FS-Follow up LF Inspect	
	The facility/equipment is inspected in accordance with Ontario's Technical Standards & Safety Act and the appropriate regulations and codes. When an Inspector's order is issued, time limits for compliance reflect the severity of the violation and serve to avoid disruption of service.	

Orders Issued To: CANADIAN TIRE CORPORATION, LIMITED:

Line	Reference and Order(s)	Compliance Date
911586-1	Liquid Fuels Handling Code 2017 Clause 4.6.9 - Shear valves and leak detection systems shall be maintained and tested at least once per year or in accordance with the manufacturer's instructions and a written record of the maintenance and testing shall be retained. During the facility inspection a copy of the annual report regarding the maintenance and testing of the shear valve and leak detection system was not available for review by this Inspector. Latest copy available was from 2019. You are hereby ordered to comply with clause 4.6.9 of the Liquid Fuels Handling Code 2017 and provide a written record of the maintenance and testing of the shear valves and leak detection system.	OCT 18, 2021
911586-2	ONTARIO REGULATION 212/01. (GASEOUS FUELS) 15 - Duty to maintain in safe operating condition. An owner or user of an appliance, equipment, a work or any other thing employed in the handling or use of gas shall ensure that the appliance, equipment, work or thing employed in the handling or use of gas is maintained in a safe operating condition. O. Reg. 212/01, s. 15. During the facility inspection a copy of the annual report regarding the maintenance of the natural gas appliances installed within the Car Wash mechanical room was not available for review by this Inspector. As an owner or user of an appliance, equipment or work, or any other thing employed in the handling or use of gas, you are hereby ordered to comply with section 15 of O. Reg. 212/01 and ensure that it is maintained in a safe operating condition.	OCT 18, 2021

Task Notes

TSSA Inspector David Barclay travelled to 1660 Merivale Rd; Ottawa (Canadian Tire) on September 14th, 2021 to conduct a follow up inspection regarding orders issued to the petroleum facility.

Consulted with gas attendant on site during facility inspection verifying compliance with orders issued. This Inspector has found all orders complied with except for the missing testing reports of the shear valve and leak detection sensors, and the maintenance of the natural gas appliances within the Car Wash mechanical room.

A compliance date of October 18, 2021 has been issued.

Pursuant to my Authority under Section 21(1) of the Technical Standards and Safety Act, 2000, s.o. 2000, I order you to comply with the above Orders.

Customer Signature & Position / Date:		**Inspector Name:** Barclay, David	**Inspector Contact Number:** 613-808-2727
Report Received By: John Lastoria via: john.lastoria@cantire.com	**Customer Contact Number:** 416-480-9780	**Inspector Email**: dbarclay@tssa.org	**Inspector Fax**: 647-789-2129

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(Note: This is not an invoice)

TECHNICAL STANDARDS and SAFETY AUTHORITY

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www.tssa.org

FS Inspection Report

Service Request #	**3045902**
Inspection Report #	**9002392**

Inspection Address: **1660 MERIVALE RD** **NEPEAN;ON** **CA K2G 3K4**	Reference Number(s): **000203342**	Inspection Completion Date: **SEP 17, 2021**
	Facility Type: **FS Gasoline Station - Self Serve**	Equipment Type:
Customer Name and Address: **CANADIAN TIRE CORPORATION LIMITED** **2180 YONGE ST PO BOX 770 STN K** **TORONTO;ON** **CA M4P 2V8**	Task Type: FS-Follow up LF Inspect	
	The facility/equipment is inspected in accordance with Ontario's Technical Standards & Safety Act and the appropriate regulations and codes. When an Inspector's order is issued, time limits for compliance reflect the severity of the violation and serve to avoid disruption of service.	

Customer Signature & Position / Date:		**Inspector Name:** Barclay, David	**Inspector Contact Number:** 613-808-2727
Report Received By: John Lastoria via: john.lastoria@cantire.com	**Customer Contact Number:** 416-480-9780	**Inspector Email**: dbarclay@tssa.org	**Inspector Fax**: 647-789-2129

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(Note: This is not an invoice)

GOLDER
MEMBER OF WSP

September 9, 2021 Project No. 20447743-1155

THIS REPORT CONTAINS PROVISIONS LIMITING LIABILITY, THE SCOPE OF THE REPORT AND THIRD PARTY RELIANCE

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Imperial Oil Limited
505 Quarry Park Blvd SE
Calgary, Alberta T2C 5N1

2021 GROUNDWATER AND SOIL VAPOUR PROBE MONITORING AND SAMPLING REPORT
1660 MERIVALE ROAD, OTTAWA, ONTARIO
SAP 88001627

INTRODUCTION

Golder Associates Ltd. was retained by Imperial Oil Limited to conduct a groundwater and soil vapour probe monitoring and sampling program at the former retail fuel outlet and active Canadian Tire station, at 1660 Merivale Road, Ottawa, Ontario (the Site) (Figures 1 and 2). The fieldwork was conducted on January 27, July 12 to 15 and July 22, 2021.

SCOPE OF WORK

Groundwater

- Annual monitoring of nine on-site (TH1 to TH7, MW15-01 and MW15-02) and eight off-site (TH8, TH9, TH11, TH12, TH100 to TH102 and MW16-01) groundwater monitoring wells for depth to groundwater and the thickness, if present, of light non-aqueous phase liquid (LNAPL);
- Redevelop monitoring well TH1;
- Collecting annual groundwater samples from nine on-site (TH1 to TH7, MW15-01, and MW15-02) and eight off-site (TH8, TH9, TH11, TH12, TH100 to TH102, and MW16-01) monitoring wells using the low-flow sampling method for laboratory analysis of benzene, toluene, ethylbenzene, xylenes (BTEX), petroleum hydrocarbon (PHC) fractions F1 to F4 and dissolved lead;
- Comparing the groundwater analytical results to the following standards:
  - Ministry of the Environment (MOE, now Ministry of the Environment, Conservation and Parks [MECP]) Table 3 Full Depth Generic Site Condition Standards for groundwater in medium and fine textured soil in a non-potable groundwater from the document titled "Soil, Ground Water, and Sediment Standards for

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Use Under Part XV.1 of the *Environmental Protection Act*," dated April 15, 2011 (hereafter referred to as the Table 3 Standards).

Soil Vapour

- Collecting winter and summer soil vapour samples from two on-site soil vapour probes (SV16-01 and SV16-02) for laboratory analysis of BTEX, PHC Fractions F1 and F2, and volatile organic compounds (VOCs);
- Comparing the soil vapour analytical results to the following guidelines:
  - Health-Based Indoor Air Criteria provided by Ministry of the Environment and Climate Change (MOECC, now MECP) Modified Generic Risk Assessment (Tier 2) Spreadsheet Model (November 1, 2016) for residential land use.
  - Soil vapour screening levels generated for residential buildings with a basement (probe depth 0 to 30 centimetres below base of the building foundation) calculated by dividing Health-Based Indoor Air Criteria by an attenuation factor of 0.02.

METHODOLOGY

Groundwater

Depth to Groundwater and LNAPL Thickness

- Depth to groundwater was measured and, if present, the thickness of LNAPL using an oil/water interface probe. If LNAPL is detected, then its presence is confirmed visually using a bailer. Prior to use in each well, the interface probe was cleaned using a phosphate-free detergent and water solution and rinsed with deionized water to minimize the potential for cross-contamination. Depth to groundwater measurements were taken from the top of casing.

Low-Flow Sampling

- Groundwater samples were collected using the low-flow sampling method. Water was pumped from each well, at a rate of 0.1 to 1 litre per minute (L/min), using high density polyethylene (HDPE) tubing connected to a peristaltic pump with a portion of silicon tubing. Routine water quality indicator parameters were measured during pumping using a multi-parameter water quality meter and flow through cell. The parameters measured included electrical conductivity (EC), pH, temperature, dissolved oxygen (DO), redox potential and turbidity. Calibration of the meter was completed as per the manufacturer's instructions. Purged water was retained on-site in barrels for future off-site disposal.
- Nineteen samples, including two duplicates, 15 groundwater samples and one field and one trip blank were collected between July 12 and 15, 2021.
- Monitoring well TH1 was blocked during development and could not be sampled. For monitoring well TH4 the groundwater sample had presence of globules of free product; therefore, the sample was not submitted.

Laboratory Analysis of Groundwater Samples

- Samples were submitted under chain-of-custody to Bureau Veritas Laboratories (BVL) in Mississauga, Ontario, a Standards Council of Canada accredited laboratory, for analysis of BTEX, PHC Fractions F1 to F4 and dissolved lead.
- Groundwater samples for BTEX and PHC Fraction F1 analysis were placed in 40-millilitre (mL) clear glass vials provided by the laboratory and preserved with sodium bisulphate as a microbial inhibitor. The groundwater samples for PHC Fractions F2 to F4 analysis were placed in 250-mL amber glass bottles and preserved with sodium bisulphate. Groundwater samples for dissolved lead analysis were placed in 120-mL high-density polyethylene bottles, field filtered and preserved with nitric acid.
- All sampling containers were placed in an ice-filled cooler immediately following sampling and transported to BVL for chemical analysis.

Soil Vapour

Weather Conditions during Sampling

- Weather conditions[1] on January 27, 2021 were clear and sunny with some clouds and snow. Outdoor air temperatures were between -8.6 and -3.6 degrees Celsius (°C), relative humidity was between 81 and 90%, and barometric pressure was measured between 99.88 and 100.81 kilopascals (kPa) (Environmental Canada 2021, internet site).
- Weather conditions[2] on July 22, 2021 were sunny with some clouds. Outdoor air temperatures were between 17 and 26 °C, relative humidity was between 69 and 77%, and barometric pressure was measured between 98.82 and 98.84 kPa (Environmental Canada 2021, internet site).

Probe Leak Testing

- The soil vapour probes (SV16-01 and SV16-02) were leak tested on January 27, 2021, to assess whether ambient air was penetrating the ground surface (e.g., along the outside of the tubing) and mixing with soil vapours during sampling.
- Prior to sample collection, three probe volumes were purged from the soil vapour probe using a sampling pump connected to the probe using dedicated Teflon tubing. Purging was conducted at a nominal flow rate between 200 and 320 millilitres per minute (mL/min). During purging, the flow rate and vacuum were measured using an inline flow calibrator and manometer.
- After purging each of the three probe volumes, a soil gas screening sample was indirectly collected into a 1-L Tedlar bag using a vacuum chamber to eliminate cross-contamination from the sampling pump. The concentrations of methane, carbon dioxide, oxygen and combustible gases in the screening sample were measured using a GEM 5000 and RKI GX-6000. The integrity of each vapour sampling probe and its connection to the sampling equipment was evaluated in January using helium leak testing. A plastic shroud was placed over the sample probe and was continuously filled with helium. The soil gas screening sample

[1] Weather information was taken from the meteorological station (*2021 Hourly Data Report. Ottawa INTL A, Ontario*) closest to the Site. Environment Canada 2021, internet site.

[2] Weather information was taken from the meteorological station (*2021 Hourly Data Report. Ottawa INTL A, Ontario*) closest to the Site. Environment Canada 2021, internet site.

was tested for helium. Sample acceptance was based upon obtaining a helium concentration in the screening sample that was less than 1% of the shroud concentration.

Soil Vapour Sampling

- Soil vapour samples were collected following procedures outlined in the United States Environmental Protection Agency Method TO-15. A flow regulator supplied by BVL was used to regulate the volumetric soil vapour flow rate into the Summa canister at a flow rate of 140 mL/min during a 10-minute sampling period during the January 2021 sampling event, and between 150 to 180 mL/min during an 8- to 9-minute sampling period during the July 2021 sampling event.
- A 1.4-L Summa canister, batch certified by BVL to be free of contaminants, was fitted with a flow regulator for sample collection. Prior to use, the initial Summa canister pressure was confirmed, with a vacuum gauge, to be less than or equal to -27 inches of mercury during the January sampling event, and -26 inches of mercury during the July sampling event, when gauged.

Laboratory Analysis of Soil Vapour Samples

- Soil vapour samples were collected and submitted to the BVL Mississauga facility, for analysis of BTEX, PHC Fractions F1 and F2, and VOCs. During the January 2021 sampling event, four samples, including one field duplicate, one field blank and two soil vapour probe samples, were submitted to BVL for analysis. During the July 2021 sampling event, five samples, including one field duplicate, one trip blank, one field blank and two soil vapour probe samples, were submitted to BVL for analysis.

RESULTS

Groundwater

LNAPL Occurrence (Date; Observations)

- July 13 and 14, 2021; not detected (Table 1).

Groundwater Monitoring (Date; Depth to Groundwater Range; Groundwater Direction)

- July 13 and 14, 2021; depth to groundwater ranged from 1.59 to 5.06 metres below ground surface (mbgs) (Table 1); inferred to the south (Figure 3, Table 1).

Groundwater Analytical Results (Date; Parameters; No. of wells)

- July 12 to 15, 2021; BTEX and PHC Fractions F1 to F4; exceedances of one or more parameters listed were identified at nine locations (Figure 4, Table 2).

Soil Vapour

Probe Leak Test Results (Date; Probe; Result expressed as % helium)

- January 27, 2021; SV16-01 and SV16-02; 0% (Table 3).

Field Organic Vapour Results (Date; Range)

- January 27, 2021; not detected to 50 parts per billion by volume (ppbv) (Table 3).
- July 22, 2021; 57 to 344 ppbv (Table 3).

Soil Vapour Analytical Results (Date; Parameters; No. of probes)

- January 27, 2021; BTEX, PHC Fractions F1 and F2; No exceedances were identified (Figure 5, Table 4).
- January 27, 2021; VOCs; No exceedances were identified (Figure 6, Table 5).
- July 22, 2021; BTEX, PHC Fractions F1 and F2; No exceedances were identified (Figure 5, Table 4).
- July 22, 2021; VOCs; Exceedance of one parameter was identified at one location (Figure 6, Table 5).

FIELD AND LABORATORY QUALITY ASSURANCE / QUALITY CONTROL

- Copies of the associated laboratory certificates of analysis are provided in Appendix A.
- A quality assurance/quality control (QA/QC) program was followed to minimize and quantify impacts introduced during sample collection, handling, shipping, and analysis. As part of the QA/QC program, sampling protocols included minimizing sample handling, submitting field QA/QC samples, using dedicated non-contaminating sampling equipment, using sample-specific identification and labelling procedures, and using chain-of-custody records. A discussion of the QA/QC program is included in Appendix B.
- Based on the data quality review, no groundwater data quality issues were identified. Thirteen soil vapour data quality issues were identified. These issues are considered unlikely to have a material effect on the quality of the data presented in this report.

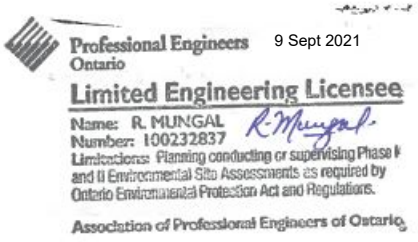
CLOSURE

We trust the information provided herein meets your requirements. If you have any questions about the contents of the letter, please contact the undersigned.

Yours truly,

Golder Associates Ltd.





Paola Ricord, OCAD

Environmental Field Tech

Roopnarine Mungal, B.Sc., M.Phil.(Chem.; Chem.Eng.); LEL, QPESA C.Chem.

Associate, Senior Environmental Consultant

PR/IS/RM/kdc

Attachments: Limitations of Liability, Scope of Report and Third Party Reliance
Figures
Tables
Appendix A: Laboratory Certificates of Analysis and Data Quality Review Checklists
Appendix B: Quality Assurance/Quality Control

LIMITATIONS OF LIABILITY, SCOPE OF REPORT AND THIRD PARTY RELIANCE

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The investigation undertaken by Golder Associates Ltd. with respect to this report and any conclusions or recommendations made in this report reflect Golder Associates Ltd.’s judgement based on the site conditions observed at the time of the site inspection on the date(s) set out in this report, and on information available at the time of preparation of this report. This report has been prepared for specific application to this site and it is based, in part, upon visual observation of the site, subsurface investigation at discrete locations and depths, and specific analysis of specific chemical parameters and materials during a specific time interval, all as described in this report.

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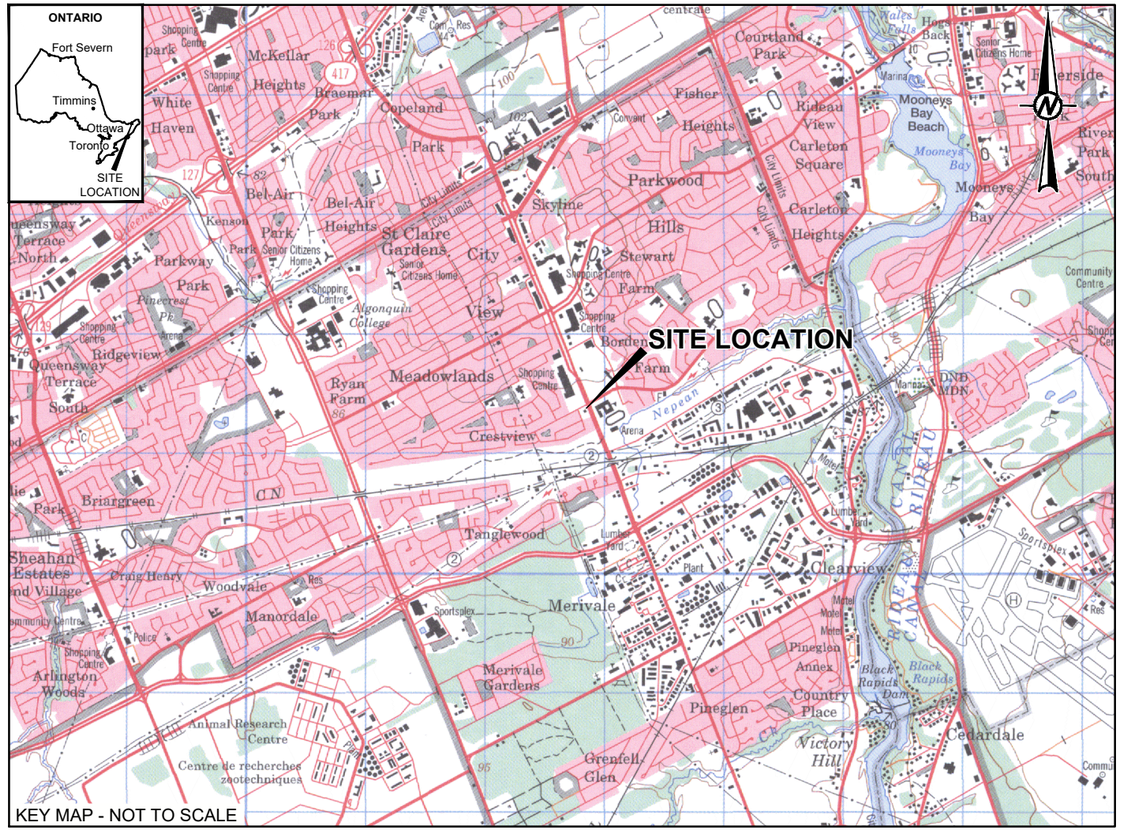

LEGEND

PROPERTY BOUNDARY

REFERENCE

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No: 11010-SITE PLAN OFFSITE-OCT14; SCALE: UNKNOWN; DATE: OCTOBER 2014.

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PROJECTION: TRANSVERSE MERCATOR; DATUM: NAD83; COORDINATE SYSTEM: UTM ZONE 18.

0 50 100
(APPROX.) METRES

CLIENT
IMPERIAL OIL LIMITED

CONSULTANT
GOLDER
MEMBER OF WSP

YYYY-MM-DD	2021-09-09
DESIGNED	PRicord
PREPARED	PRicord
REVIEWED	ISosney
APPROVED	RMungal

PROJECT
FORMER RETAIL FUEL OUTLET
1660 MERIVALE ROAD
OTTAWA, ONTARIO

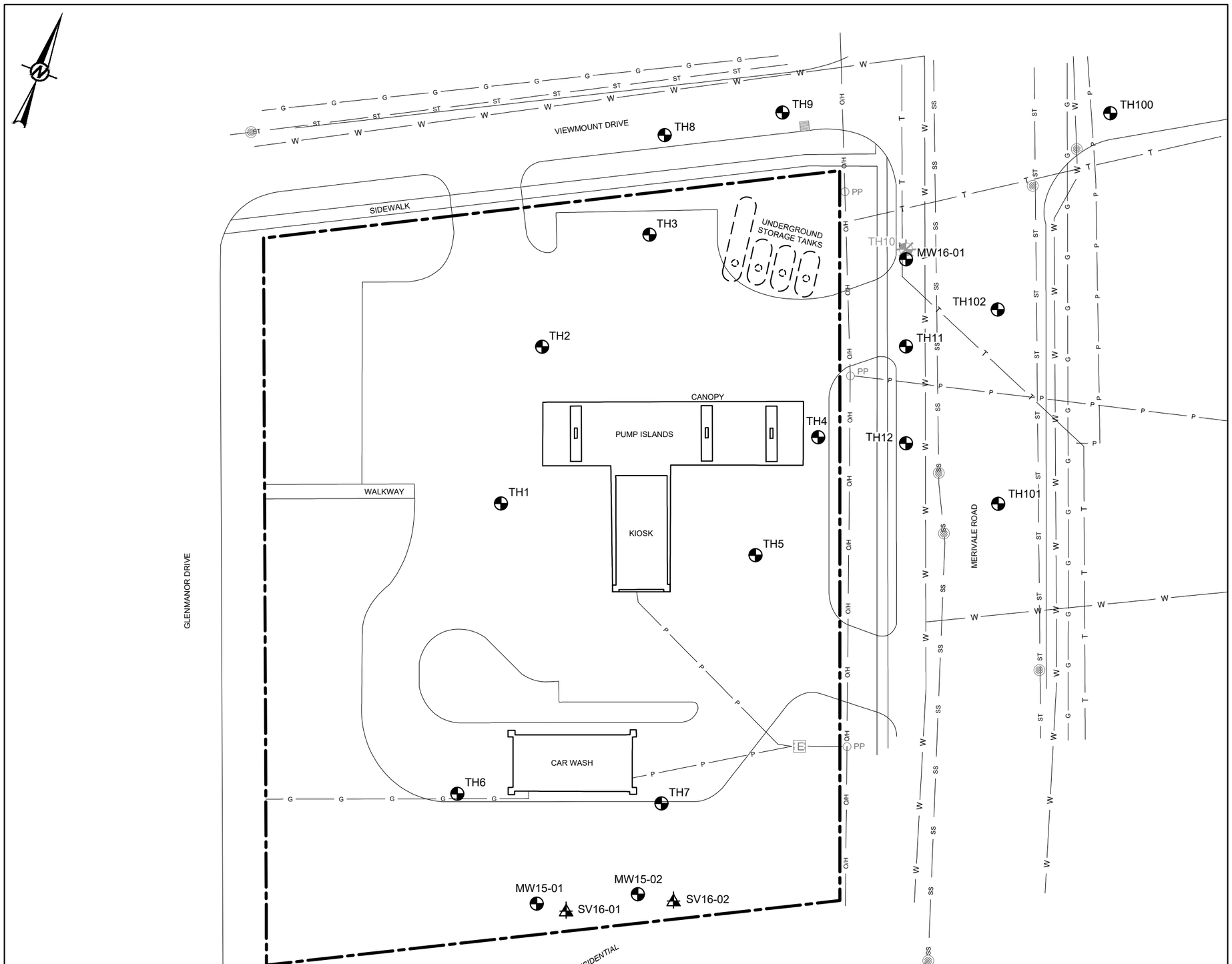
TITLE
SITE LOCATION PLAN

PROJECT NO.	PHASE-TASK	REV.	FIGURE
20447743	1155-2116	0	1

Path: \\golder.gds\gal\calgary\CAL\MCAD\IMPERIAL_OIL\DOWNSTREAM\OTTAWA_ON_1660_MERIVALE_ROAD\99_PROJECTS\20447743\02_PRODUCTION\1155-2116\ONSITE\DWG\ | File Name: 20447743-11155-HS-G001.dwg | Last Edited By: pricord Date: 2021-08-18 Time:5:06:56 PM | Printed By: PRicord Date: 2021-09-09 Time:1:45:22 PM

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

0 25 mm



LEGEND

- PROPERTY BOUNDARY
- O/H — OVERHEAD POWER LINE
- G — UNDERGROUND GAS LINE
- P — UNDERGROUND POWER LINE
- SS — UNDERGROUND SANITARY LINE
- ST — UNDERGROUND STORM SEWER LINE
- T — UNDERGROUND TELEPHONE LINE
- W — UNDERGROUND WATERLINE
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL (DECOMMISSIONED)
- SOIL VAPOUR PROBE LOCATION
- CATCH BASIN
- ELECTRICAL PEDESTAL
- MANHOLE
- PP — POWER POLE

REFERENCE

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No.: 11010-SITE PLAN ONSITE-JUN14; SCALE: UNKNOWN; DATE: JUNE 2014.

0 10 20
1:500 METRES

CLIENT
IMPERIAL OIL LIMITED

PROJECT
FORMER RETAIL FUEL OUTLET
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
SITE PLAN WITH MONITORING WELL AND SOIL VAPOUR LOCATIONS

CONSULTANT
GOLDER
MEMBER OF WSP

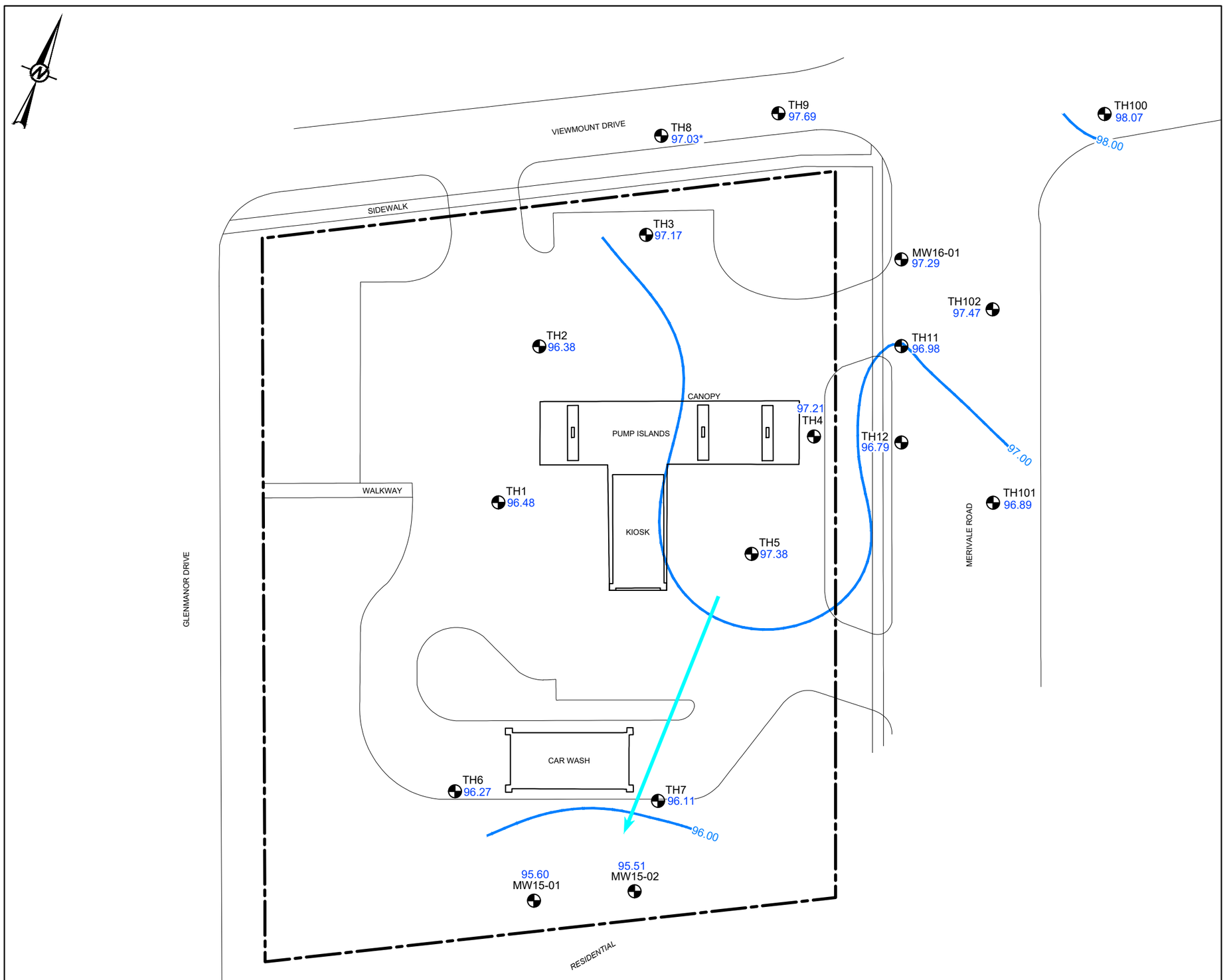
YYYY-MM-DD	2021-09-09
DESIGNED	PRicord
PREPARED	PRicord
REVIEWED	ISosney
APPROVED	RMungal

PROJECT NO.	PHASE-TASK	REV.	FIGURE
20447743	1155-2116	0	2

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B

25 mm

Path: \\golder.gds\gal\calgary\CAL\MCAD\IMPERIAL_OIL\DOWNSTREAM\OTTAWA_ON_1660_MERIVALE_ROAD\99_PROJECTS\20447743\02_PRODUCTION\1155-2116\ONSITE\DWG\ | File Name: 20447743-11155-HS-0002.dwg | Last Edited By: pricord Date: 2021-09-09 Time:1:37:43 PM | Printed By: PRicord Date: 2021-09-09 Time:1:45:48 PM



LEGEND

- PROPERTY BOUNDARY
- 97.00 GROUNDWATER CONTOUR (m)
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL
- 97.47 GROUNDWATER ELEVATION (m)
- 97.03* NOT USED IN GROUNDWATER FLOW CALCULATION (m)
- DIRECTION OF GROUNDWATER FLOW

LIST OF APPLICABLE ABBREVIATIONS

m	METRE

NOTE

ELEVATIONS ARE RELATIVE TO A LOCAL BENCHMARK (CENTRE OF STORM SEWER CATCH BASIN LOCATED APPROXIMATELY 5 m WEST OF KIOSK), WITH AN ASSIGNED ELEVATION OF 100.00 m (EXP. 2013).

REFERENCE

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No.: 11010-SITE PLAN ONSITE-JUN14; SCALE: UNKNOWN; DATE: JUNE 2014.

0 10 20
1:500 METRES

CLIENT
IMPERIAL OIL LIMITED

PROJECT
FORMER RETAIL FUEL OUTLET
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
GROUNDWATER ELEVATIONS
July 13 and 14, 2021

CONSULTANT
GOLDER
MEMBER OF WSP

YYYY-MM-DD	2021-09-09
DESIGNED	PRicord
PREPARED	PRicord
REVIEWED	ISosney
APPROVED	RMungal

PROJECT NO.	PHASE-TASK	REV.	FIGURE
20447743	1155-2116	0	3

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25 mm

Path: \\golder.gd9\gal\calgary\CAL\MCAD\IMPERIAL_OIL\DOWNSTREAM\OTTAWA_ON_1660_MERIVALE_ROAD\99_PROJECTS\20447743\02_PRODUCTION\1155-2116\ONSITE\DWG\ | File Name: 20447743-1155-HS-0003.dwg | Last Edited By: pricord Date: 2021-09-09 Time:1:37:58 PM | Printed By: PRicord Date: 2021-09-09 Time:1:46:13 PM

TH1 — Screen Interval: 2.6 to 5.6 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-11	<0.20	<0.20	<0.20	<0.40	<25	<100	<100	<100	<5.0	<0.50
13-Jun-13	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	0.53
26-Aug-14	<0.20	0.75	<0.20	1.2	<25	<100	<200	<200	<5.0	<0.50
17-Nov-15	<0.20	0.27	0.28	<0.40	<25	<100	<200	<200	<5.0	<0.50
10-Aug-16	<0.20	<0.20	<0.20	<0.40	<25	<100	300	1,200[bs]	<5.0	<0.50
05-Dec-16	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50
21-Jun-17	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50
16-Aug-18	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50
30-Jul-19	<0.20	<0.20	<0.20	<0.40	<25	<100	350	1,400[bs]	<5.0	<0.50
29-Jul-20	<0.20	<0.20	<0.20	<0.40	<25	400	24,000	160,000[bs]	-	1.5
13-Jul-21	LNAPL THICKNESS: <0.001 m									

TH2 — Screen Interval: 3.2 to 4.7 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-11	0.77	<0.20	1.3	0.48	<25	<100	<100	<100	<5.0	<0.50
13-Jun-13	0.62	<0.20	2.2	<0.40	<25	<100	<200	<200	<5.0	<0.50
27-Aug-14	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
17-Nov-15	<0.20	0.29	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
17-Nov-15 (DUP)	<0.20	0.28	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
09-Aug-16	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50
21-Jun-17	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50
15-Aug-18	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50
31-Jul-19	<0.20	<0.20	<0.20	<0.40	<25	<100	250	<200	-	<0.50
28-Jul-20	0.44	<0.20	<0.20	3.6	<25	<100	<200	<200	-	<0.50
13-Jul-21	<0.20	<0.20	<0.20	<0.40	31	<100	<200	<200	-	<0.50

TH3 — Screen Interval: 3.2 to 4.7 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-11	27	2.4	79	150	1,100	430	<100	130	20	3.8
31-Aug-11 (DUP)	23	2.1	69	130	1,100	380	<100	110	17	3.9
13-Jun-13	11	0.61	66	85	900	350	<200	<200	<5.0	3.1
26-Aug-14	14	0.28	19	5.2	520	180	<200	<200	<5.0	2.2
28-Oct-15	25	<0.20	15	0.89	450	<100	<200	<200	<5.0	2.0
10-Aug-16	42	<0.20	26	1.5	560	110	<200	<200	<5.0	0.98
21-Jun-17	19	0.29	77	20	630	140	<200	<200	-	<0.50
15-Aug-18	7.4	<0.20	7.2	3.3	310	<100	<200	<200	-	0.76
31-Jul-19	18	<0.20	26	2.1	380	120	<200	<200	-	2.2
29-Jul-20	9.8	<0.20	6.4	0.58	310	<100	<200	<200	-	3.7
13-Jul-21	23	0.28	17	0.83	330	170	<200	<200	-	0.83

TH4 — Screen Interval: 3.4 to 4.9 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-11	610	610	3,400	19,000	26,000	17,000	360	170	540	2.6
13-Jun-13	200	35	1200	4,300	6,200	19,000	580	430	<100	5.8
26-Aug-14	500	37	1400	2600	4,700	1,400	<200	<200	58	3.0
26-Aug-14 (DUP)	540	40	1600	2700	400	1,400	<200	<200	62	1.9
17-Nov-15	180	18	560	930	1,900	940	240	230	<100	3.1
10-Aug-16	210	11	550	1,500	1,800	370	<200	<200	31	1.1
10-Aug-16 (DUP)	190	9.7	490	1,400	1,600	400	210	<200	27	1.7
21-Jun-17	210	28	470	1,500	2,000	930	<200	<200	-	0.78
16-Aug-18	400	14	860	3,400	3,100	1,300	250	<200	-	30
16-Aug-18 (DUP)	420	14	890	3,500	2,800	1,200	260	210	-	32
31-Jul-19	36	1.9	41	270	1,500	1,400	280	<200	-	12
27-Jul-20	LNAPL THICKNESS: 0.002 m									
13-Jul-21	LNAPL THICKNESS: <0.001 m									

TH5 — Screen Interval: 3.5 to 5.0 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-11	750	140	3,000	13,000	85,000	20,000	690	620	1,400	5.5
13-Jun-13	530	44	1600	3800	9,900	160,000	12,000	6,800	<100	8.3
13-Jun-13 (DUP)	550	44	1600	3800	9,200	110,000	7,000	4,300	<100	8
27-Aug-14	450	46	1600	3100	11,000	2,800	<200	<200	210	4.1
17-Nov-15	360	26	930	1,300	3,300	2,900	320	240	<100	3.7
10-Aug-16	420	43	1,500	3,700	13,000	11,000	1,100	810	240	0.81
21-Jun-17	210	25	690	1,800	4,400	3,600	420	350	-	1.8
21-Jun-17 (DUP)	190	23	640	1,600	4,400	3,200	490	450	-	2.2
16-Aug-18	510	37	1,400	2,600	6,700	3,300	300	<200	-	2.6
31-Jul-19	380	24	910	2,800	5,600	5,400	350	<200	-	8.4
31-Jul-19 (DUP)	380	26	940	2,900	5,700	4,100	290	<200	-	8.3
29-Jul-20	200	12	830	1,400	6,000	8,500	570	<200	-	26
29-Jul-20 (DUP)	200	12	790	1,300	5,900	8,500	470	<200	-	25
13-Jul-21	210	19	720	1,700	6,300	14,000	1,000	590	-	37
13-Jul-21 (DUP)	270	26	930	2,100	6,300	13,000	910	550	-	39

TH6 — Screen Interval: 3.6 to 5.1 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
20-Oct-11	<0.20	<0.20	<0.20	<0.40	<25	<100	<100	<100	<5.0	<0.50
20-Oct-11 (DUP)	<0.20	<0.20	<0.20	<0.40	<25	<100	<100	<100	<5.0	<0.50
13-Jun-13	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	0.6
27-Aug-14	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
28-Oct-15	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
28-Oct-15 (DUP)	<0.20	0.38	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
09-Aug-16	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50
22-Jun-17	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50
14-Aug-18	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50
29-Jul-19	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50
27-Jul-20	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50
13-Jul-21	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50

TH7 — Screen Interval: 4.4 to 5.8 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
14-Nov-11	31	5.4	160	340	430	<100	<100	<100	<30	<0.5
13-Jun-13	37	2.8	140	130	550	460	<200	<200	<5.0	3.2
27-Aug-14	150	18	610	730	1,900	540	<200	<200	22	2.1
28-Oct-15	93	8.4	270	300	1,000	280	<200	<200	<5.0	1.2
09-Aug-16	62	5.8	120	140	500	150	<200	<200	<5.0	<0.50
22-Jun-17	93	8.7	240	190	800	190	<200	<200	-	0.54
14-Aug-18	22	0.53	8.8	0.60	68	<100	<200	<200	-	<0.50
29-Jul-19	46	1.4	43	2.5	400	110	<200	<200	-	<0.50
27-Jul-20	27	1.3	35	3.1	270	<100	<200	<200	-	<0.50
13-Jul-21	21	0.60	4.5	0.70	150	<100	<200	<200	-	0.50

TH8 — Screen Interval: 3.3 to 4.9 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
13-Jun-13	3.9	<0.20	4.1	0.61	48	<100	<200	<200	<0.5	1.1
27-Oct-15	4.4	<0.20	0.51	0.41	<25	<100	<200	<200	<5.0	0.82
10-Aug-16	3.0	<0.20	0.66	<0.40	70	<100	<200	<200	<5.0	0.77
15-Aug-18	0.99	<0.20	0.80	<0.40	<25	<100	<200	<200	-	<2.5
15-Aug-18 (DUP)	1.0	<0.20	0.78	<0.40	<25	<100	<200	<200	-	<2.5
30-Jul-19	3.7	<0.20	1.0	<0.40	220	<100	440	1,500[bs]	-	1.2
28-Jul-20	4.5	<0.20	5.4	0.75	170	130	780	500	-	1.2
14-Oct-20	0.96	<0.20	1.2	<0.40	29	<100	<200	<200	-	0.61
14-Jul-21	3.8	<0.20	2.0	<0.40	110	<100	1,200	890	-	0.56

TH9 — Screen Interval: 3.4 to 4.9 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
06-Oct-14	31	3	230	290	1,000	570	610	420	15	1.1
27-Oct-15	51	7.2	390	350	2,500	1,100	220	360	35	2.6
10-Aug-16	23	1.8	250	70	1,600	350	<200	<200	11	1.1
20-Jun-17	36	5.5	460	370	4,200	1,200	<200	<200	-	2.3
15-Aug-18	12	0.69	78	49	740	190	350	1,600[bs]	-	<0.50
30-Jul-19	0.81	<0.20	2.5	0.47	50	<100	540	1,900[bs]	-	<0.50
30-Jul-19 (DUP)	0.84	<0.20	2.6	0.51	63	<100	1,200	3,000[bs]	-	<0.50
28-Jul-20	4.4	<0.20	7.8	<0.40	51	<100	700	520	-	<0.50
14-Oct-20	54	6.3	420	210	1,500	480	<200	<200	-	<0.50
14-Jul-21	<0.20	<0.20	0.29	<0.40	<25	<100	810	780	-	<0.50

TH10 — Screen Interval: 3.3 to 4.9 mbgs

Date	B	T	E	X	F1	F2	F3	F4	H	Pb
11-Jun-13	73	58	52	200	1,400	560	<200	<200	35	1.2

TH11 — Screen Interval: 3.3 to 4.9 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
11-Jun-13	370	34	2,200	3,400	11,000	1,400	<200	<200	130	2.6
28-Oct-15	96	8.1	710	120	4,400	2,500	1,300	820	72	4.6
11-Aug-16	100	6.3	590	160	5,000	6,700	2,200	1,300	37	6.0
11-Aug-16 (DUP)	110	7.1	610	170	4,900	7,100	2,400	1,400	43	3.3
28-Jul-20	5.9	0.36	8.8	3.4	490	12,000	36,000	150,000[bs]	-	<0.50
14-Oct-20	170	19	820	640	3,300	1,000	300	<200	-	<0.50
14-Jul-21	9.6	0.72	68	22	740	630	1,100	800	-	0.82

TH12 — Screen Interval: 3.3 to 4.9 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
11-Jun-13	380	35	2,300	3,500	11,000	3,100	<200	<200	<100	6.8
11-Jun-13 (DUP)	360	34	2,300	3,500	11,000	2,800	<200	<200	<100	6.9
28-Oct-15	95	14	620	400	4,500	1,600	540	320	140	4.5
11-Aug-16	130	17	1,100	630	6,800	1,800	900	510	120	2.1
20-Jun-17	160	11	1,200	170	7,900	2,800	750	460	-	3.8
20-Jun-17 (DUP)	150	11	1,200	160	7,300	2,600	700	430	-	4.5
14-Oct-20	37	4.7	240	69	4,100	1,900	270	<200	-	0.90
15-Jul-21	15	1.4	72	<2.0	3,400	1,500	350	<200	-	1.7

TH100 — Screen Interval: 3.0 to 4.9 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
06-Oct-14	<0.20	<0.20	0.31	0.91	<25	<100	<200	<200	<5.0	<0.50
27-Oct-15	<0.20	<0.20	0.94	1.1	<25	<100	<200	<200	<5.0	<0.50
27-Oct-15 (DUP)	<0.20	<0.20	0.24	<0.40	<25	<100	<200	<200	<5.0	<0.50
10-Aug-16	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
20-Jun-17	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50
15-Aug-18	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<2.5
31-Jul-19	<0.20	<0.20	1.3	<0.40	<25	<100	460	1,400[bs]	-	<0.50
29-Jul-20	<0.20	<0.20	<0.20	<0.40	<25	<100	1,100	820	-	<0.50
14-Oct-20	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50
14-Oct-20 (DUP)	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50
14-Jul-21	0.25	<0.20	<0.20	<0.40	<25	<100	730	580	-	<0.50

TH101 — Screen Interval: 3.0 to 4.9 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
06-Oct-14	85	12	580	500	4,100	830	<200	<200	44	2.9
06-Oct-14 (DUP)	84	12	580	510	4,100	910	<200	<200	54	4.2
28-Oct-15	110	16	740	590	3,400	830	<200	<200	64	4.6
11-Aug-16	49	8.6	580	390	2,200	590	<200	<200	23	0.63
20-Jun-17	76	14	870	410	4,800	1,100	<200	<200	-	0.84
15-Aug-18	110	9.2	1,200	130	5,900	1,700	<200	<200	-	3.8
31-Jul-19	73	7.5	870	130	5,100	1,500	<200	<200	-	3.2
28-Jul-20	86	7.1	1,000	69	5,700	1,400	<200	<200	-	6.6
28-Jul-20 (DUP)	76	6.5	900	61	4,900	1,500	<200	<200	-	6.4
14-Jul-21	61	8.9	1,300	1,700	5,300	1,900	280	<200	-	4.2
14-Jul-21 (DUP)	59	8.3	1,200	1,700	5,200	1,800	260	<200	-	6.2

TH102 — Screen Interval: 3.0 to 4.9 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
06-Oct-14	0.72	0.52	16	42	360	360	<200	<200	7.2	3.9
28-Oct-15	42	1.6	100	140	970	350	<200	<200	23	1.5
11-Aug-16	8.3	<0.20	33	21	510	180	<200	<200	18	1.4
20-Jun-17	19	3.1	190	120	1,800	500	<200	<200	-	<0.50
31-Jul-19	4.5	1.5	33	27	500	270	<200	<200	-	2.8
29-Jul-20	0.26	<0.20	0.71	0.55	66	<100	<200	<200	-	0.71
14-Jul-21	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50

MW15-01 — Screen Interval: 3.0 to 6.0 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
17-Nov-15	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
09-Aug-16	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
22-Jun-17	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50
15-Aug-18	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50
29-Jul-19	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50
27-Jul-20	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50
13-Jul-21	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50

MW15-02 — Screen Interval: 2.7 to 4.9 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
17-Nov-15	44	5.9	180	170	2,300	750	<200	<200	35	2.2
09-Aug-16	78	4.7	73	25	800	450	<200	<200	5.5	<0.50
22-Jun-17	20	1.0	1.5	2.3	190	110	<200	<200	-	1.1
14-Aug-18	2.0	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50
29-Jul-19	1.7	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50
27-Jul-20	0.79	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50
13-Jul-21	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	-	<0.50

MW16-01 — Screen Interval: 3.3 - 4.8 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-16	18	3.8	41	59	250	<100	<200	<200	-	0.53
21-Jun-17	46	3.7	170	79	820	260	<200	<200	-	1.2
16-Aug-18	15	0.39	30	0.81	88	<100	260	<200	-	0.53
30-Jul-19	110	0.57	41	0.79	470	140	<200	<200	-	0.71
28-Jul-20	38	0.63	20	1.3	260	<100	<200	<200	-	<0.50
14-Jul-21	18	0.51	18	3.3	110	<100	880	670	-	<0.50

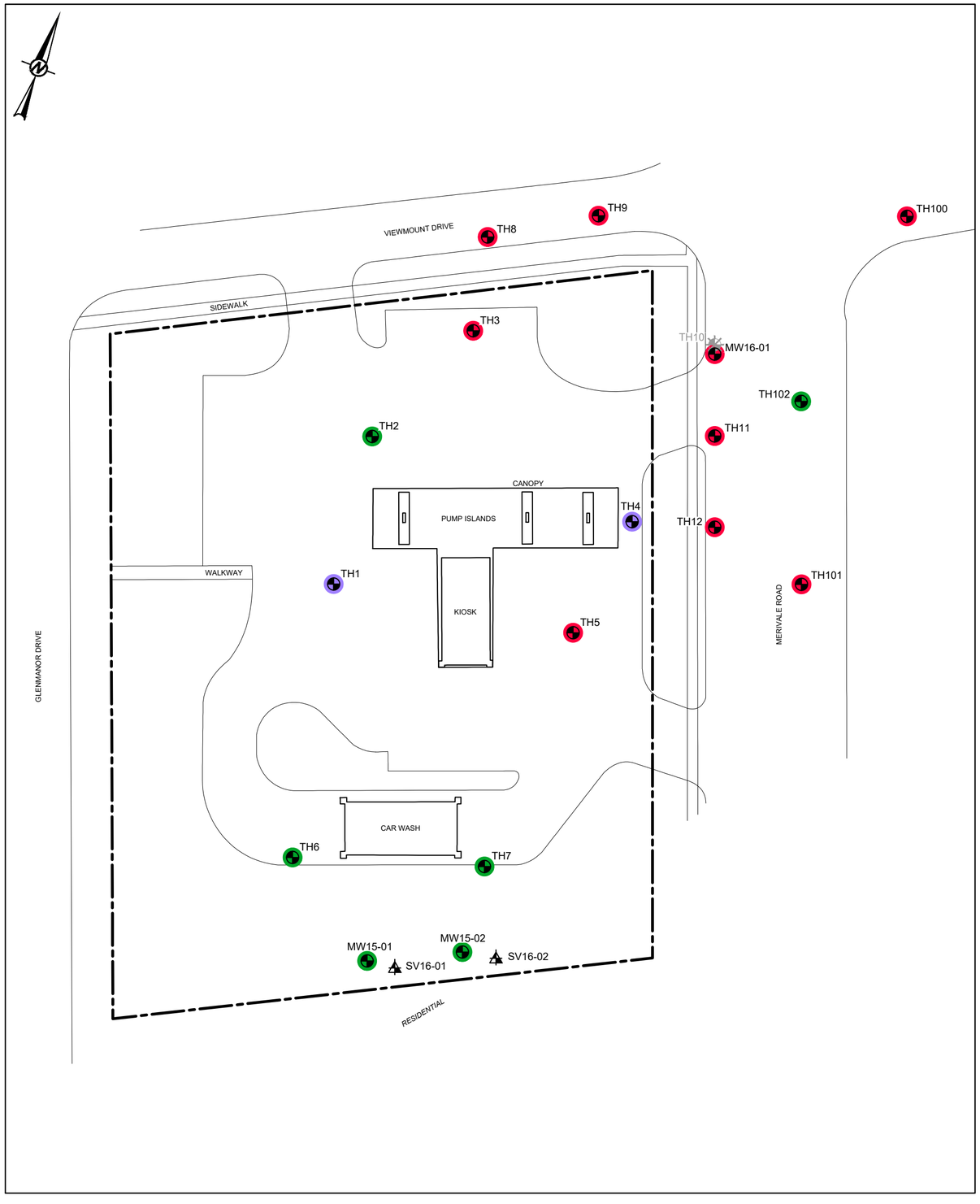
ONTARIO STANDARDS

PARAMETERS	B	T	E	X	F1	F2	F3	F4	HA	Pb
CRITERIA[a]	430	18,000	2,300	4,200	750[c]	150	500	500	520	25
RDL	0.20	0.20	0.20	0.40	100	100	200	200	10	0.50
UNITS	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L

(a) O.REG 153 (2011) TABLE 3 FULL DEPTH GENERIC SITE CONDITION STANDARDS FOR ALL TYPES OF PROPERTY USE FOR GROUNDWATER IN MEDIUM AND FINE TEXTURED SOIL IN A NON-POTABLE GROUNDWATER CONDITION.

(b) BASELINE WAS NOT REACHED AT CARBON 50. VALUE PRESENTED CORRESPONDS TO THE GREATER OF THE F4 AND F4G VALUES.

(c) F1 FRACTION DOES NOT INCLUDE BTEX; HOWEVER, THE PROPONENT HAS THE CHOICE AS TO WHETHER OR NOT TO SUBTRACT BTEX FROM THE ANALYTICAL RESULT.



LIST OF APPLICABLE ABBREVIATIONS

<	LESS THAN	F4	PETROLEUM HYDROCARBON FRACTION 4 (C_{34}-C_{50})
µg/L	MICROGRAMS PER LITRE	F4G	PETROLEUM HYDROCARBON 4 GRAVIMETRIC
-	NOT AVAILABLE OR NO DATA	HA	n-HEXANE
B	BENZENE	LNAPL	LIGHT NON-AQUEOUS PHASE LIQUID
T	TOLUENE	mbgs	METRES BELOW GROUND SURFACE
E	ETHYLBENZENE	na	NOT ANALYZED
X	XYLENES	O.REG	ONTARIO REGULATION
F1	PETROLEUM HYDROCARBON FRACTION 1 (C_6-C_{10}) LESS BTEX	Pb	DISSOLVED LEAD
F2	PETROLEUM HYDROCARBON FRACTION 2 (C_{10}-C_{16})	RDL	REPORTABLE DETECTION LIMIT
F3	PETROLEUM HYDROCARBON FRACTION 3 (C_{16}-C_{34})		

LEGEND

- PROPERTY BOUNDARY
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL (DECOMMISSIONED)
- SOIL VAPOUR PROBE LOCATION

REFERENCE

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No.: 11010-SITE PLAN ONSITE-JUN14; SCALE: UNKNOWN; DATE: JUNE 2014.

1:500 — 0, 10, 20 METRES

NOTES

1. LOCATIONS WHERE CURRENT GROUNDWATER SAMPLE MEETS APPLICABLE GUIDELINES/STANDARDS FOR ALL PARAMETERS ANALYZED SHOWN IN **GREEN**.
2. LOCATIONS WHERE CURRENT GROUNDWATER SAMPLE EXCEEDS APPLICABLE GUIDELINES/STANDARDS FOR AT LEAST ONE OF THE PARAMETERS ANALYZED SHOWN IN **RED**.
3. LOCATIONS WHERE LNAPL WAS ENCOUNTERED SHOWN IN **PURPLE**.
4. EXCEEDANCES OF APPLICABLE GUIDELINES/STANDARDS IN TEXT ARE SHOWN IN **RED.**
5. LIGHT NON-AQUEOUS PHASE LIQUID (LNAPL) THICKNESSES IN TEXT SHOWN IN **PURPLE.**
6. LOCATION WHERE NO SAMPLES WERE TAKEN IN THE CURRENT SAMPLING EVENT SHOWN IN **BLACK**.
7. LNAPL REPORTED IN METRES (m).

CLIENT
IMPERIAL OIL LIMITED

CONSULTANT
GOLDER
MEMBER OF WSP

YYYY-MM-DD	2021-09-09
DESIGNED	PRicord
PREPARED	PRicord
REVIEWED	ISosney
APPROVED	RMungal

PROJECT
FORMER RETAIL FUEL OUTLET
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
GROUNDWATER ANALYTICAL RESULTS - BTEX, PHC FRACTIONS F1-F4, n-HEXANE AND DISSOLVED LEAD

PROJECT NO.	PHASE-TASK	REV.	FIGURE
20447743	1155-2116	0	4

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI C

25 mm

0

Path: \\golder.gds\gal\calgary\CALIMCAD\IMPERIAL_OIL\DOWNSTREAM\OTTAWA_ON_1660_MERIVALE_ROAD\99_PROJECTS\20447743\02_PRODUCTION\11155-2116\ONSITE.DWG | File Name: 20447743-1155-HS-0004.dwg | Last Edited By: pricord Date: 2021-09-09 Time: 1:38:39 PM | Printed By: PRicord Date: 2021-09-09 Time: 1:46:43 PM

LEGEND

PROPERTY BOUNDARY

BOREHOLE LOCATION COMPLETED AS A MONITORING WELL

BOREHOLE LOCATION COMPLETED AS A MONITORING WELL (DECOMMISSIONED)

SOIL VAPOUR PROBE LOCATION

LIST OF APPLICABLE ABBREVIATIONS

>	GREATER THAN	Aro >C_{12}-C_{16}	AROMATIC >C_{12}-C_{16}
<	LESS THAN	B	BENZENE
µg/m^3	MICROGRAMS PER METRE CUBE	T	TOLUENE
-	NOT AVAILABLE OR NO DATA	E	ETHYLBENZENE
Ali >C_5-C_6	ALIPHATICS >C_5-C_6	X	XYLENES
Ali >C_6-C_8	ALIPHATICS >C_6-C_8	F1	PETROLEUM HYDROCARBON FRACTION 1 (C_6-C_{10}) LESS BTEX
Ali >C_8-C_{10}	ALIPHATICS >C_8-C_{10}	F2	PETROLEUM HYDROCARBON FRACTION 2 (C/10-C/16)
Ali >C_{10}-C_{12}	ALIPHATICS >C_{10}-C_{12}	m	METRE
Ali >C_{12}-C_{16}	ALIPHATICS >C_{12}-C_{16}	mbgs	METRES BELOW GROUND SURFACE
Aro >C_7-C_8	AROMATIC >C_7-C_8	n/s	NO STANDARD
Aro >C_8-C_{10}	AROMATIC >C_8-C_{10}	RDL	REPORTABLE DETECTION LIMIT
Aro >C_{10}-C_{12}	AROMATIC >C_{10}-C_{12}	SVSL	SOIL VAPOUR SCREENING LEVEL

NOTES

1. LOCATIONS WHERE CURRENT SOIL VAPOUR SAMPLE MEETS APPLICABLE GUIDELINES/STANDARDS FOR ALL PARAMETERS ANALYZED SHOWN IN **GREEN.**
2. LOCATIONS WHERE CURRENT SOIL VAPOUR SAMPLE EXCEEDS APPLICABLE GUIDELINES/STANDARDS FOR AT LEAST ONE OF THE PARAMETERS ANALYZED SHOWN IN **RED.**
3. EXCEEDANCES OF APPLICABLE GUIDELINES/STANDARDS IN TEXT ARE SHOWN IN **RED.**

REFERENCE

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No.: 11010-SITE PLAN ONSITE-JUN14; SCALE: UNKNOWN; DATE: JUNE 2014.

SV16-01																**Screen Interval: 1.35 - 1.50 mbgs**
Date	**B**	**T**	**E**	**X**	**F1**	**F2**	**Ali >C_5-C_6**	**Ali >C_6-C_8**	**Ali >C_8-C_{10}**	**Ali >C_{10}-C_{12}**	**Ali >C_{12}-C_{16}**	**Aro >C_7-C_8**	**Aro >C_8-C_{10}**	**Aro >C_{10}-C_{12}**	**Aro >C_{12}-C_{16}**
13-Dec-16	2.13	11.3	4.30	15.4	449	862	-	-	-	-	-	-	-	-	-
21-Jul-17	<0.32	3.93	4.56	21.7	424	6,090	-	-	-	-	-	-	-	-	-
21-Jul-17 (DUP)	<0.32	5.28	4.43	21.1	389	5,610	-	-	-	-	-	-	-	-	-
21-Nov-17	<0.32	1.28	1.41	5.2	145	501	-	-	-	-	-	-	-	-	-
3-Jul-18	<0.32	1.59	1.92	7.6	715	2,880	-	-	-	-	-	-	-	-	-
3-Jul-18 (DUP)	<0.32	1.71	2.35	9.4	832	3,400	-	-	-	-	-	-	-	-	-
30-Oct-18	<0.32	1.31	1.45	4.6	224	1,220	<5.0	<5.0	61.7	666	9.4	<5.0	<5.0	<5.0	<5.0
30-Oct-18 (DUP)	<0.32	1.33	1.27	4.1	188	1,040	<5.0	<5.0	52.6	551	13.9	<5.0	<5.0	<5.0	<5.0
21-Jun-19	<0.32	1.56	1.63	6.3	243	1,470	-	-	-	-	-	-	-	-	-
21-Jun-19 (DUP)	<0.32	0.52	<0.43	<0.30	165	360	-	-	-	-	-	-	-	-	-
12-Nov-19	<0.32	0.83	1.10	3.7	148	233	-	-	-	-	-	-	-	-	-
12-Nov-19 (DUP)	<0.32	0.65	<0.43	<1.3	110	166	-	-	-	-	-	-	-	-	-
28-Feb-20	<0.32	<0.38	0.47	1.8	102	227	-	-	-	-	-	-	-	-	-
28-Feb-20 (DUP)	<0.32	0.49	<0.43	1.7	134	197	-	-	-	-	-	-	-	-	-
31-Aug-20	<0.32	0.73	0.72	3.0	285	761	-	-	-	-	-	-	-	-	-
31-Aug-20 (DUP)	<0.32	0.65	0.80	3.1	217	760	-	-	-	-	-	-	-	-	-
27-Jan-21	<0.32	<0.38	0.5	1.9	138	197	-	-	-	-	-	-	-	-	-
22-Jul-21	<0.32	1.41	1.89	7.2	280	1,100	-	-	-	-	-	-	-	-	-

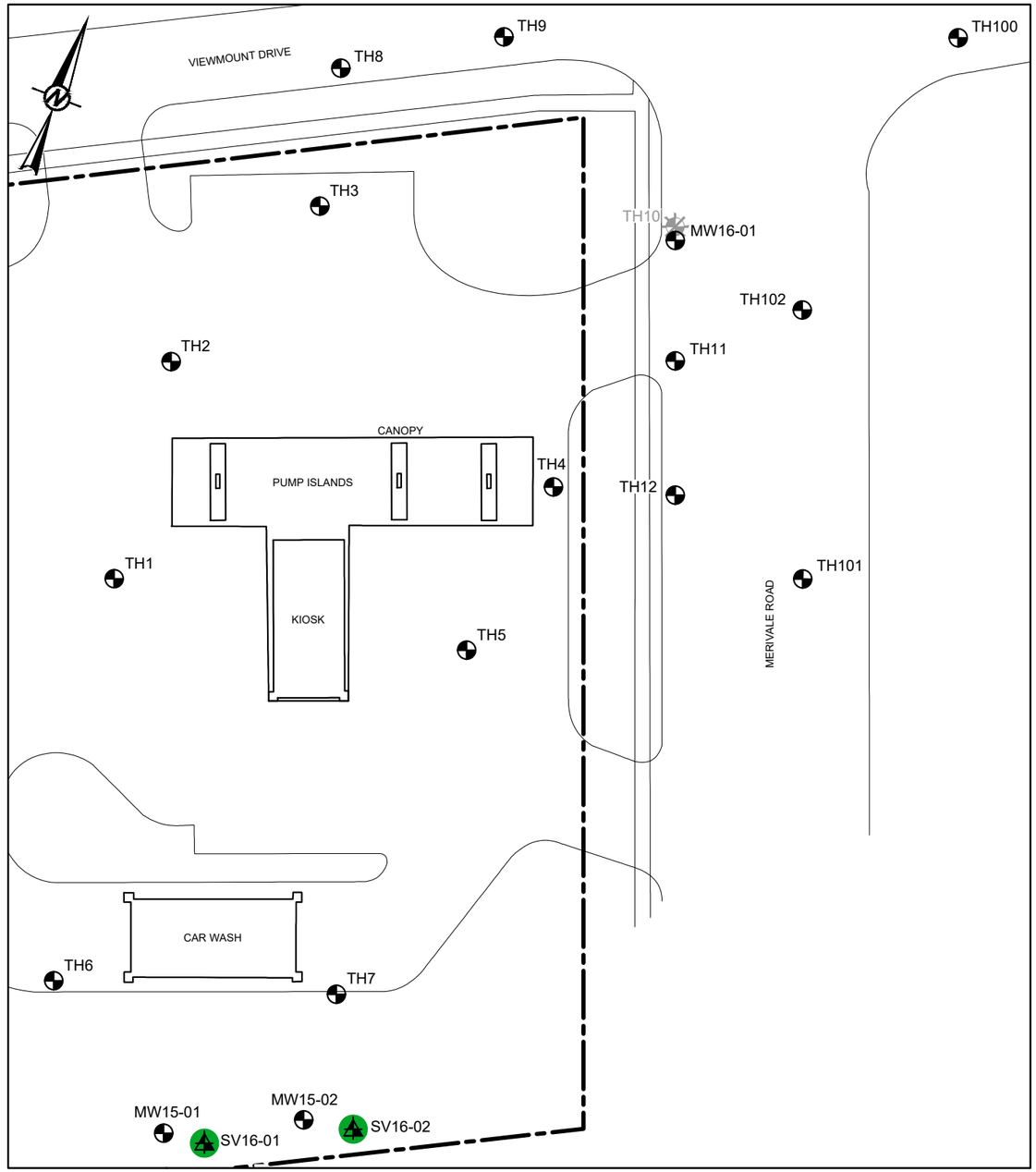
SV16-02																**Screen Interval: 1.45 - 1.6 mbgs**
Date	**B**	**T**	**E**	**X**	**F1**	**F2**	**Ali >C_5-C_6**	**Ali >C_6-C_8**	**Ali >C_8-C_{10}**	**Ali >C_{10}-C_{12}**	**Ali >C_{12}-C_{16}**	**Aro >C_7-C_8**	**Aro >C_8-C_{10}**	**Aro >C_{10}-C_{12}**	**Aro >C_{12}-C_{16}**
13-Dec-16	1.38	8.57	2.75	9.6	439	563	-	-	-	-	-	-	-	-	-
13-Dec-16 (DUP)	1.45	8.70	2.76	10.1	448	559	-	-	-	-	-	-	-	-	-
21-Jul-17	<0.32	2.14	2.33	10.1	157	2,310	-	-	-	-	-	-	-	-	-
21-Nov-17	<0.32	0.68	0.67	2.5	98.3	281	-	-	-	-	-	-	-	-	-
21-Nov-17 (DUP)	<0.32	0.58	0.69	2.5	64.6	292	-	-	-	-	-	-	-	-	-
3-Jul-18	0.38	1.54	0.59	2.1	689	678	-	-	-	-	-	-	-	-	-
30-Oct-18	<0.32	<0.38	<0.43	<1.3	36.4	400	<5.0	<5.0	16.6	229	9.3	<5.0	<5.0	<5.0	<5.0
21-Jun-19	<0.32	0.39	<0.43	<1.3	70.6	331	-	-	-	-	-	-	-	-	-
12-Nov-19	<0.32	1.30	<0.43	<1.3	113	131	-	-	-	-	-	-	-	-	-
28-Feb-20	<0.32	<0.38	<0.43	<1.3	98.0	118	-	-	-	-	-	-	-	-	-
31-Aug-20	<0.32	0.42	<0.43	<1.3	95.9	353	-	-	-	-	-	-	-	-	-
27-Jan-21	<0.32	<0.38	<0.43	<1.3	32.1	89.6	-	-	-	-	-	-	-	-	-
27-Jan-21 (DUP)	0.33	1.44	<0.43	1.5	45.1	84.7	-	-	-	-	-	-	-	-	-
22-Jul-21	<0.32	0.64	<0.43	<1.3	93.1	435	-	-	-	-	-	-	-	-	-
22-Jul-21 (DUP)	<0.32	<0.38	<0.43	<1.3	70.2	445	-	-	-	-	-	-	-	-	-

ONTARIO STANDARDS

PARAMETERS	**B**	**T**	**E**	**X**	**F1**	**F2**	**Ali >C_5-C_6**	**Ali >C_6-C_8**	**Ali >C_8-C_{10}**	**Ali >C_{10}-C_{12}**	**Ali >C_{12}-C_{16}**	**Aro >C_7-C_8**	**Aro >C_8-C_{10}**	**Aro >C_{10}-C_{12}**	**Aro >C_{12}-C_{16}**
Health-Based Indoor Air Criteria[a]	0.51	1,043	209	146	2,491	471	n/s	9,594	521	521	521	n/s	104	104	104
SVSL[b]	25	52,143	10,429	7,300	124,530	23,530	n/s	479,714	26,071	26,071	26,071	n/s	5,214	5,214	5,214
RDL	0.32	0.38	0.43	1.3	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
UNITS	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m3	µg/m^3

(a) HEALTH-BASED INDOOR AIR CRITERIA - RESIDENTIAL, PROVIDED BY MOECC MODIFIED GENERIC RISK ASSESSMENT (TIER 2), SPREADSHEET MODEL (NOVEMBER 2016).

(b) SVSLs FOR A RESIDENTIAL BUILDING WITH BASEMENT (PROBE DEPTH 0 - 30 CENTIMETRES BELOW BASE OF THE BUILDING FOUNDATION) CALCULATED BY DIVIDING HEALTH-BASED INDOOR AIR CRITERIA BY AN ATTENUATION FACTOR OF 0.02.



CLIENT
IMPERIAL OIL LIMITED

CONSULTANT
GOLDER
MEMBER OF WSP

YYYY-MM-DD	2021-09-09
DESIGNED	PRicord
PREPARED	PRicord
REVIEWED	ISosney
APPROVED	RMungal

PROJECT
FORMER RETAIL FUEL OUTLET
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
SOIL VAPOUR ANALYTICAL RESULTS - PETROLEUM HYDROCARBONS

PROJECT NO.	PHASE-TASK	REV.	FIGURE
20447743	1155-2116	0	5

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

0 25 mm

Path: \\golder.gds\gal\calgary\CAL\MCAD\IMPERIAL_OIL\DOWNSTREAM\OTTAWA_ON_1660_MERIVALE_ROAD\99_PROJECTS\20447743\02_PRODUCTION\1155-2116\ONSITE\DWG\ | File Name: 20447743-1155-HS-0005.dwg | Last Edited By: pricord Date: 2021-09-09 Time:1:40:48 PM | Printed By: PRicord Date: 2021-09-09 Time:1:44:54 PM

LEGEND

PROPERTY BOUNDARY

BOREHOLE LOCATION COMPLETED AS A MONITORING WELL

BOREHOLE LOCATION COMPLETED AS A MONITORING WELL (DECOMMISSIONED)

SOIL VAPOUR PROBE LOCATION

LIST OF APPLICABLE ABBREVIATIONS

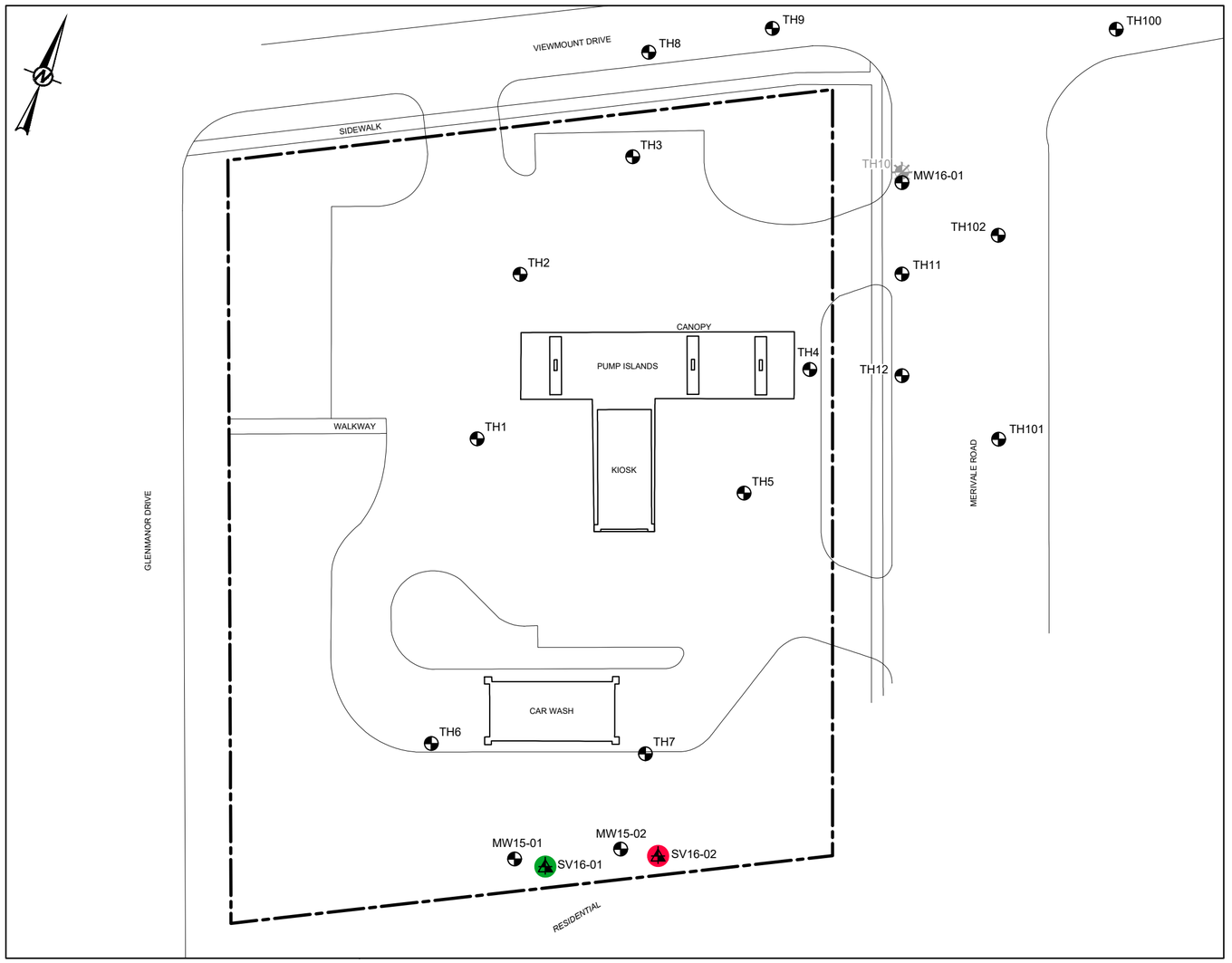
<	LESS THAN	CYHA	CYCLOHEXANE
µg/m³	MICROGRAMS PER METRE CUBE	DBCM	DIBROMOCHLOROMETHANE
-	NOT AVAILABLE OR NO DATA	DCDFMA	DICHLORODIFLUOROMETHANE
1,1,1,2-PCA	1,1,1,2-TETRACHLOROETHANE	DCM	DICHLOROMETHANE
1,1,1-TCA	1,1,1-TRICHLOROETHANE	EAC	ETHYL ACETATE
1,1,2,2-PCA	1,1,2,2-TETRACHLOROETHANE	ETOH	ETHANOL
1,1,2-TCA	1,1,2-TRICHLOROETHANE	F113	TRICHLOROTRIFLUOROETHANE (FREON 113)
1,1-DCA	1,1-DICHLOROETHANE	HA	n-HEXANE
1,1-DCE	1,1-DICHLOROETHENE	HPA	HEPTANE OR n-HELPTANE
1,2,4-TCB	1,2,4-TRICHLOROBENZENE	HXCBDE	HEXACHLOROBUTADIENE
1,2,4-TMB	1,2,4-TRIMETHYLBENZENE	IPA	ISOPROPANOL OR 2-PROPANOL
1,2-DBA	1,2-DIBROMOETHANE OR ETHYLENE DIBROMIDE	mbgs	METRES BELOW GROUND SURFACE
1,2-DCA	1,2-DICHLOROETHANE	MBK	METHYL BUTYL KETONE (2-HEXANONE)
1,2-DCB	1,2-DICHLOROBENZENE	MCB	CHLOROBENZENE
1,2-DCPA	1,2-DICHLOROPROPANE	MEK	METHYL ETHYL KETONE (2-BUTANONE)
1,2-DCTFA	1,2-DICHLOROTETRAFLUOROETHANE	MIBK	4-METHYL-2-PENTANONE OR METHYL ISOBUTYL KETONE
1,3,5-TMB	1,3,5-TRIMETHYLBENZENE	MTBE	METHYL TERTIARY BUTYL ETHER
1,3-BDE	1,3-BUTADIENE	n/s	NO STANDARD
1,3-DCB	1,3-DICHLOROBENZENE	NPT	NAPHTHALENE
1,4-DCB	1,4-DICHLOROBENZENE	PCE	TETRACHLOROETHENE
1,4-DOX	1,4-DIOXANE	PE	PROPENE OR PROPYLENE
2,2,4-TMP	2,2,4-TRIMETHYLPENTANE	RDL	REPORTABLE DETECTION LIMIT
4-ETT	4-ETHYLTOLUENE	ST	STYRENE
ACTN	ACETONE	SVSL	SOIL VAPOUR SCREENING LEVELS
BDCMA	BROMODICHLOROMETHANE	t-1,2-DCE	TRANS-1,2-DICHLOROETHENE
BF	BROMOFORM	t-1,3-DCPE	TRANS-1,3-DICHLOROPROPENE
BMA	BROMOMETHANE	TCE	TRICHLOROETHENE
BZLC	BENZYL CHLORIDE	TCFMA	TRICHLOROFLUOROMETHANE
c-1,2-DCE	CIS-1,2-DICHLOROETHENE	TCM	CHLOROFORM
c-1,3-DCPE	CIS-1,3-DICHLOROPROPENE	THF	TETRAHYDROFURAN
CA	CHLOROETHANE	VAC	VINYL ACETATE
CDS	CARBON DISULFIDE	VBr	VINYL BROMIDE
CMA	CHLOROMETHANE	VC	VINYL CHLORIDE
CT	CARBON TETRACHLORIDE		

NOTES

1. LOCATIONS WHERE CURRENT SOIL VAPOUR SAMPLE MEETS APPLICABLE GUIDELINES/STANDARDS FOR ALL PARAMETERS ANALYZED SHOWN IN **GREEN**.
2. LOCATIONS WHERE CURRENT SOIL VAPOUR SAMPLE EXCEEDS APPLICABLE GUIDELINES/STANDARDS FOR AT LEAST ONE OF THE PARAMETERS ANALYZED SHOWN IN **RED**.
3. EXCEEDANCES OF APPLICABLE GUIDELINES/STANDARDS IN TEXT ARE SHOWN IN **RED.**

REFERENCE

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No.: 11010-SITE PLAN ONSITE-JUN14; SCALE: UNKNOWN; DATE: JUNE 2014.



SV16-01 — Screen Interval: 1.35 - 1.50 mbgs

Date	ACTN	BZLC	BDCMA	BF	BMA	1,3-BDE	CDS	CT	MCB	CA	TCM	CMA	CYHA	DBCM	1,2-DBA	1,2-DCB	1,3-DCB	1,4-DCB	DCDFMA	1,1-DCA	1,2-DCA	1,1-DCE	c-1,2-DCE	t-1,2-DCE	1,2-DCPA	c-1,3-DCPE	t-1,3-DCPE	1,2-DCTFA	1,4-DOX	ETOH	EAC	4-ETT	HPA	HXCBDE	HA	MBK	MEK	MIBK	MTBE	DCM	NPT	IPA	PE	ST	1,1,1,2-TCA	1,1,2,2-TCA	PCE	THF	1,2,4-TCB	1,2,4-TMB	1,1,1-TCA	1,1,2-TCA	TCE	TCFMA	F113	1,3,5-TMB	2,2,4-TMP	VAC	VBr	VC
13-Dec-16	29.3	<2.6	<1.3	<2.1	<0.39	<1.1	61.2	0.72	<0.46	<0.79	8.72	<0.62	0.86	<1.7	<0.77	<0.60	<2.4	<0.60	4.93	<0.40	<0.40	<0.40	0.97	47.5	<0.46	<0.45	<0.45	<1.2	<3.6	<1.9	<3.6	<2.5	3.7	<5.3[a]	15.9	<4.1	11.7	<4.1	<0.72	<2.8	-	3.3	<19	<0.43	<0.69	5.98	5.5	<3.7	3.1	<0.55	<0.55	<0.54	2.5	1.5	<2.5	1.72	1.42	<0.87	<0.26
21-Jul-17	76.5	<2.6	<1.3	<2.1	<0.39	<1.1	26.8	<0.63	<0.46	<0.79	2.95	<0.62	<0.69	<1.7	<0.77	<0.60	4.6	1.31	12.9	<0.40	<0.40	<0.40	<0.40	1.33	<0.46	<0.45	<0.45	<1.2	<3.6	2.2	<3.6	2.8	<1.2	<5.3[a]	2.4	<4.1	4.0	<4.1	<0.72	3.2	-	<2.5	<2.6	<0.43	<0.69	7.03	<1.2	<3.7	11.4	<0.55	<0.55	1.09	2.7	<1.2	3.5	<0.93	<0.70	<0.87	<0.26
21-Jul-17 (DUP)	78.5	<2.6	<1.3	<2.1	<0.39	<1.1	26.3	<0.63	<0.46	<0.79	2.78	<0.62	<0.69	<1.7	<0.77	<0.60	2.8	1.20	13.5	<0.40	<0.40	<0.40	<0.40	1.34	<0.46	<0.45	<0.45	<1.2	<3.6	2.3	<3.6	2.8	<1.6	<5.3[a]	2.0	<4.1	3.8	<4.1	<0.72	3.6	-	8.3	<1.7	<0.43	<0.69	7.21	<1.2	<3.7	12.1	<0.55	<0.55	<0.54	2.7	<1.2	3.6	<0.93	<0.70	<0.87	<0.26
21-Nov-17	2.9	<2.6	<1.3	<2.1	<0.39	<1.1	3.8	<0.63	<0.46	<0.79	1.68	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	6.05	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	<1.9	<3.6	<2.5	<1.2	<5.3[a]	<1.1	<4.1	<2.9	<4.1	<0.72	<2.8	-	<2.5	<0.86	<0.43	<0.69	66.1	<1.2	<3.7	<2.5	<0.55	<0.55	<0.54	1.3	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
3-Jul-18	89.5	<2.6	<1.3	<2.1	<0.39	<1.1	27.0	<0.63	<0.46	<0.79	0.74	<0.62	1.90	<1.7	<0.77	<0.60	<2.4	0.67	8.19	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	6.7	<3.6	<2.5	2.7	<5.3[a]	9.1	<4.1	7.6	<4.1	<0.72	<2.8	-	<2.5	0.95	<0.43	<0.69	3.98	<1.2	<3.7	6.3	<0.55	<0.55	<0.54	1.6	<1.2	<2.5	2.26	<0.70	<0.87	<0.26
3-Jul-18 (DUP)	103	<2.6	<1.3	<2.1	<0.39	<1.1	41.6	<0.63	<0.46	<0.79	0.93	<0.62	2.44	<1.7	<0.77	<0.60	<2.4	0.83	9.31	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	6.9	<3.6	<2.5	4.7	<5.3[a]	10.4	<4.1	9.0	<4.1	<0.72	<2.8	-	<2.5	1.27	<0.43	<0.69	4.90	<1.2	<3.7	7.7	<0.55	<0.55	<0.54	1.7	<1.2	<2.5	2.32	<0.70	<0.87	<0.26
30-Oct-18	7.5	<2.6	<1.3	<2.1	<0.39	<1.1	2.0	<0.63	<0.46	<0.79	182	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	4.85	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	5.4	<3.6	<2.5	<1.2	<5.3[a]	<1.1	<4.1	<2.9	<4.1	<0.72	<2.8	-	<2.5	<0.86	<0.43	<0.69	3.07	<1.2	<3.7	<2.5	<0.55	<0.55	<0.54	1.2	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
30-Oct-18 (DUP)	7.8	<2.6	<1.3	<2.1	<0.39	<1.1	1.8	<0.63	<0.46	<0.79	159	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	4.54	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	2.5	<3.6	<2.5	<1.2	<5.3[a]	1.2	<4.1	<2.9	<4.1	<0.72	<2.8	-	<2.5	<0.86	<0.43	<0.69	2.66	<1.2	<3.7	<2.5	<0.55	<0.55	<0.54	1.2	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
21-Jun-19	148	<2.6	<1.3	<2.1	<0.39	<1.1	3.0	<0.63	<0.46	<0.79	76.7	0.68	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	17.2	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	<2.5	<1.2	<5.3	1.22	<4.1[a]	7.82	<0.82	<0.72	<2.1	<0.20	<1.0	-	<2.5	<1.6	<0.43	<0.69	9.95	<1.2	<3.7	<2.5	<0.55	<0.55	<0.54	1.6	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
21-Jun-19 (DUP)	155	<2.6	<1.3	<2.1	<0.39	<1.1	<1.6	<0.63	<0.46	<0.79	87.6	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	22.0	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	<2.5	<1.2	<5.3	<0.70	<4.1[a]	4.58	<0.82	<0.72	<2.1	<0.20	<1.0	-	<2.5	<1.6	<0.43	<0.69	7.89	<1.2	<3.7	<2.5	<0.55	<0.55	<0.54	2.1	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
12-Nov-19	4.7	<2.6	<1.3	<2.1	<0.39	<1.1	<1.6	<0.63	<0.46	<0.79	52.9	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	6.13	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	2.3	<3.6	<2.5	<1.2	<5.3[a]	<0.70	<4.1	<0.59	<0.82	<0.72	<2.1	-	<2.5	<0.86	<0.43	<0.69	3.36	<1.2	<3.7	<2.5	<0.55	<0.55	<0.54	<1.1	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
28-Feb-20	13.4	<2.6	<1.3	<2.1	<0.39	<1.1	<1.6	<0.63	<0.46	<0.79	12.9	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	8.60	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	5.6	<3.6	<2.5	<1.2	<5.3	<0.70	<4.1	1.29	<0.82	<0.72	<2.1	<1.0	<2.5	<0.86	<0.43	<0.69	1.80	<1.2	<3.7	<2.5	<0.55	<0.55	<0.54	<1.1	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
28-Feb-20 (DUP)	12.6	<2.6	<1.3	<2.1	<0.39	<1.1	<1.6	<0.63	<0.46	<0.79	12.7	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	7.80	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	3.6	<3.6	<2.5	<1.2	<5.3	<0.70	<4.1	1.19	<0.82	<0.72	<2.1	<1.0	<2.5	<0.86	<0.43	<0.69	1.60	<1.2	<3.7	<2.5	<0.55	<0.55	<0.54	<1.1	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
31-Aug-20	34.3	<2.6	<1.3	<2.1	<0.39	<1.1	<1.6	<0.63	<0.46	<0.79	44.2	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	0.81	21.1	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	3.7	<3.6	<2.5	<1.2	<5.3	<0.70	<4.1	3.07	<0.82	<0.72	<2.1	<1.0	<2.5	<0.86	<0.43	<0.69	7.23	<1.2	<3.7	3.0	<0.55	<0.55	<0.54	2.0	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
31-Aug-20 (DUP)	34.5	<2.6	<1.3	<2.1	<0.39	<1.1	<1.6	<0.63	<0.46	<0.79	44.9	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	0.83	21.1	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	12.7	<3.6	<2.5	<1.2	<5.3	<0.70	<4.1	3.19	<0.82	<0.72	<2.1	<1.0	<2.5	<0.86	<0.43	<0.69	7.38	<1.2	<3.7	3.0	<0.55	<0.55	<0.54	2.1	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
27-Jan-21	10.0	<2.6	<1.3	<2.1	<0.39	<1.1	<1.6	<0.63	<0.46	<0.79	13.3	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	4.49	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	4.4	<3.6	<2.5	<1.2	<5.3[a]	<0.70	<4.1	1.83	<0.82	<0.72	<2.1	<1.0	<2.5	<0.86	<0.43	<0.69	2.38	<1.2	<3.7	<2.5	<0.55	<0.55	<0.54	<1.1	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
22-Jul-21	240	<2.6	<1.3	<2.1	<0.39	<1.1	<1.6	<0.63	<0.46	<0.79	20.2	<0.72	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	9.39	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	14.0	<3.6	<2.5	<1.2	<5.3[a]	0.94	4.2	33.0	<0.82	<0.72	<2.1	<1.0	<2.5	8.48	<0.43	<0.69	5.71	<1.2	<3.7	3.4	<0.55	<0.55	<0.54	1.5	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26

SV16-02 — Screen Interval: 1.45 - 1.6 mbgs

Date	ACTN	BZLC	BDCMA	BF	BMA	1,3-BDE	CDS	CT	MCB	CA	TCM	CMA	CYHA	DBCM	1,2-DBA	1,2-DCB	1,3-DCB	1,4-DCB	DCDFMA	1,1-DCA	1,2-DCA	1,1-DCE	c-1,2-DCE	t-1,2-DCE	1,2-DCPA	c-1,3-DCPE	t-1,3-DCPE	1,2-DCTFA	1,4-DOX	ETOH	EAC	4-ETT	HPA	HXCBDE	HA	MBK	MEK	MIBK	MTBE	DCM	NPT	IPA	PE	ST	1,1,1,2-TCA	1,1,2,2-TCA	PCE	THF	1,2,4-TCB	1,2,4-TMB	1,1,1-TCA	1,1,2-TCA	TCE	TCFMA	F113	1,3,5-TMB	2,2,4-TMP	VAC	VBr	VC
13-Dec-16	13.0	<2.6	<1.3	<2.1	<0.39	<1.1	13.5	<0.63	<0.46	<0.79	10.8	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	6.46	<0.40	<0.40	<0.40	<0.40	12.6	<0.46	<0.45	<0.45	<1.2	<3.6	<1.9	<3.6	<2.5	1.4	<5.3[a]	3.4	<4.1	5.9	<4.1	<0.72	<2.8	-	<2.5	<1.5	<0.43	<0.69	<0.69	<0.68	<1.2	<3.7	2.6	<0.55	<0.55	4.55	1.5	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
13-Dec-16 (DUP)	14.0	<2.6	<1.3	<2.1	<0.39	<1.1	13.9	<0.63	<0.46	<0.79	11.1	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	6.55	<0.40	<0.40	<0.40	<0.40	13.1	<0.46	<0.45	<0.45	<1.2	<3.6	<1.9	<3.6	<2.5	1.5	<5.3[a]	3.7	<4.1	6.3	<4.1	<0.72	<2.8	-	<2.5	<1.5	<0.43	<0.69	<0.69	<0.68	<1.2	<3.7	2.7	<0.55	<0.55	4.94	1.4	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
21-Jul-17	17.6	<2.6	<1.3	<2.1	<0.39	<1.1	15.8	<0.63	<0.46	<0.79	2.56	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	36.0	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	<1.9	<3.6	<2.5	<1.2	<5.3[a]	<1.1	<4.1	<2.9	<4.1	<0.72	4.2	-	<2.5	<0.86	<0.43	<0.69	1.38	<1.2	<3.7	3.4	<0.55	<0.55	5.04	2.4	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
21-Nov-17	<1.9	<2.6	<1.3	<2.1	<0.39	<1.1	3.3	<0.63	<0.46	<0.79	1.38	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	13.1	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	<1.9	<3.6	<2.5	<1.2	<5.3[a]	<1.1	<4.1	<2.9	<4.1	<0.72	<2.8	-	<2.5	<0.86	<0.43	<0.69	81.9	<1.2	<3.7	<2.5	<0.55	<0.55	4.27	1.2	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
21-Nov-17 (DUP)	2.4	<2.6	<1.3	<2.1	<0.39	<1.1	3.3	<0.63	<0.46	<0.79	1.38	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	13.0	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	<1.9	<3.6	<2.5	<1.2	<5.3[a]	<1.1	<4.1	<2.9	<4.1	<0.72	<2.8	-	<2.5	<0.86	<0.43	<0.69	<0.69	<1.2	<3.7	<2.5	<0.55	<0.55	4.42	1.2	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
3-Jul-18	97.1	<2.6	<1.3	<2.1	<0.39	<1.1	12.8	<0.63	<0.46	<0.79	0.51	<0.62	2.09	<1.7	<0.77	<0.60	<2.4	<0.60	11.9	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	6.5	<3.6	<2.5	2.6	<5.3[a]	9.3	<4.1	7.9	<4.1	<0.72	<2.8	-	<2.5	0.99	0.54	<0.69	<0.69	<0.68	<1.2	<3.7	<2.5	<0.55	<0.55	0.95	1.4	<1.2	<2.5	2.29	<0.70	<0.87	<0.26
30-Oct-18	5.5	<2.6	<1.3	<2.1	<0.39	<1.1	<1.6	<0.63	<0.46	<0.79	<0.49	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	4.19	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	<1.9	<3.6	<2.5	<1.2	<5.3[a]	<1.1	<4.1	<2.9	<4.1	<0.72	<2.8	-	<2.5	<0.86	<0.43	<0.69	<0.69	<0.68	<1.2	<3.7	<2.5	<0.55	<0.55	2.12	<1.1	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
21-Jun-19	28.0	<2.6	<1.3	<2.1	<0.39	<1.1	3.1	<0.63	<0.46	<0.79	1.17	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	29.2	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	<1.9	<3.6	<2.5	<1.2	<5.3[a]	<0.70	<4.1	1.18	<0.82	<0.72	<2.1	-	<2.5	<0.86	<0.43	<0.69	0.75	<1.2	<3.7	<2.5	<0.55	<0.55	2.82	2.0	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
12-Nov-19	6.1	<2.6	<1.3	<2.1	<0.39	<1.1	<1.6	<0.63	<0.46	<0.79	0.52	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	15.6	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	6.2	<3.6	<2.5	<1.2	<5.3[a]	0.84	<4.1	0.66	<0.82	<0.72	<2.1	-	<2.5	<0.86	<0.43	<0.69	<0.68	<1.2	<3.7	<2.5	<0.55	<0.55	**14.9**	1.3	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
12-Nov-19 (DUP)	5.1	<2.6	<1.3	<2.1	<0.39	<1.1	<1.6	<0.63	<0.46	<0.79	0.58	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	16.4	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	2.4	<3.6	<2.5	<1.2	<5.3[a]	<0.70	<4.1	<0.59	<0.82	<0.72	<2.1	-	<2.5	<0.86	<0.43	<0.69	0.79	<1.2	<3.7	<2.5	<0.55	<0.55	**17.3**	1.3	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
28-Feb-20	23.8	<2.6	<1.3	<2.1	<0.39	<1.1	<1.6	<0.63	<0.46	<0.79	<0.49	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	22.9	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	8.3	<3.6	<2.5	<1.2	<5.3	<0.70	<4.1	1.58	<0.82	<0.72	<2.1	<1.0	<2.5	<0.86	<0.43	<0.69	<0.68	<1.2	<3.7	<2.5	<0.55	<0.55	4.33	<1.1	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
31-Aug-20	34.3	<2.6	<1.3	<2.1	<0.39	<1.1	2.2	<0.63	<0.46	<0.79	0.73	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	49.4	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	6.2	<3.6	<2.5	<1.2	<5.3	<0.70	<4.1	1.66	<0.82	<0.72	<2.1	<1.0	<2.5	<0.86	<0.43	<0.69	1.21	<1.2	<3.7	<2.5	<0.55	<0.55	**15.9**	1.6	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
27-Jan-21	4.7	<2.6	<1.3	<2.1	<0.39	<1.1	<1.6	<0.63	<0.46	<0.79	<0.49	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	8.77	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	2.9	<3.6	<2.5	<1.2	<5.3[a]	<0.70	<4.1	<0.59	<0.82	<0.72	<2.1	<1.0	<2.5	<0.86	<0.43	<0.69	<0.68	<1.2	<3.7	<2.5	<0.55	<0.55	7.33	<1.1	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
27-Jan-21 (DUP)	20.1	<2.6	<1.3	<2.1	<0.39	<1.1	2.9	<0.63	<0.46	<0.79	<0.49	0.87	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	8.41	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	8.7	10.5	<3.6	<2.5	<1.2	<5.3[a]	2.62	<4.1	0.63	<0.82	<0.72	<2.1	<1.0	<2.5	<0.86	<0.43	<0.69	<0.68	<1.2	<3.7	<2.5	<0.55	<0.55	6.92	<1.1	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
22-Jul-21	66.3	<2.6	<1.3	<2.1	<0.39	<1.1	<1.6	<0.63	<0.46	<0.79	0.50	0.99	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	49.0	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	<1.9	<3.6	<2.5	<1.2	<5.3[a]	<0.70	<4.1	6.77	<0.82	<0.72	<2.1	<1.0	<2.5	1.75	<0.43	<0.69	1.87	<1.2	<3.7	<2.5	<0.55	<0.55	**15.5**	1.4	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
22-Jul-21 (DUP)	61.1	<2.6	<1.3	<2.1	<0.39	<1.1	<1.6	<0.63	<0.46	<0.79	0.61	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	49.6	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	<1.9	<3.6	<2.5	<1.2	<5.3[a]	<0.70	<4.1	3.63	<0.82	<0.72	<2.1	<1.0	<2.5	0.99	<0.43	<0.69	1.87	<1.2	<3.7	<2.5	<0.55	<0.55	**17.0**	1.4	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26

ONTARIO STANDARDS

PARAMETERS	ACTN	BZLC	BDCMA	BF	BMA	1,3-BDE	CDS	CT	MCB	CA	TCM	CMA	CYHA	DBCM	1,2-DBA	1,2-DCB	1,3-DCB	1,4-DCB	DCDFMA	1,1-DCA	1,2-DCA	1,1-DCE	c-1,2-DCE	t-1,2-DCE	1,2-DCPA	c-1,3-DCPE	t-1,3-DCPE	1,2-DCTFA	1,4-DOX	ETOH	EAC	4-ETT	HPA	HXCBDE	HA	MBK	MEK	MIBK	MTBE	DCM	NPT	IPA	PE	ST	1,1,1,2-TCA	1,1,2,2-TCA	PCE	THF	1,2,4-TCB	1,2,4-TMB	1,1,1-TCA	1,1,2-TCA	TCE	TCFMA	F113	1,3,5-TMB	2,2,4-TMP	VAC	VBr	VC

Table 1
Summary of Groundwater Field Monitoring Results
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Well Name	Screen Interval (mbgs)	Top of Casing Elevation[(a)] (m)	Ground Elevation[(a)] (m)	Monitoring Date	Depth to Groundwater (mbtoc)	Depth to Groundwater (mbgs)	Groundwater Elevation[(a)] (m)	LNAPL Thickness (mm)	Headspace Vapours (ppmv)
TH1	2.6 - 5.6	99.99	100.08	21-Jun-17	3.23	3.32	96.76	n/d	n/d
				14-Aug-18	3.71	3.80	96.28	n/d	30
				29-Jul-19	3.61	3.70	96.39	n/d	n/m
				27-Jul-20	3.57	3.66	96.42	n/d	n/m
				13-Jul-21	3.51	3.60	96.48	<1	n/m
TH2	3.2 - 4.7	100.04	100.14	21-Jun-17	3.58	3.67	96.47	n/d	n/d
				14-Aug-18	3.66	3.76	96.38	n/d	230
				29-Jul-19	3.56	3.65	96.49	n/d	n/m
				27-Jul-20	3.68	3.78	96.36	n/d	n/m
				13-Jul-21	3.66	3.76	96.38	n/d	n/m
TH3	3.2 - 4.7	100.28	100.41	21-Jun-17	3.10	3.23	97.18	n/d	180
				14-Aug-18	3.29	3.42	97.00	n/d	25% LEL
				29-Jul-19	3.17	3.30	97.11	n/d	n/m
				27-Jul-20	3.30	3.43	96.98	n/d	n/m
				13-Jul-21	3.11	3.24	97.17	n/d	n/m
TH4	3.4 - 4.9	100.27	100.35	21-Jun-17	3.08	3.16	97.19	n/d	n/d
				14-Aug-18	3.10	3.18	97.17	n/d	100% LEL
				29-Jul-19	3.10	3.18	97.17	n/d	n/m
				27-Jul-20	3.06	3.14	97.21	0.002	n/m
				13-Jul-21	3.07	3.15	97.21	<1	n/m
TH5	3.5 - 5.0	100.12	100.23	21-Jun-17	2.82	2.93	97.30	n/d	n/d
				14-Aug-18	2.87	2.98	97.25	n/d	n/d
				29-Jul-19	2.82	2.93	97.31	n/d	n/m
				27-Jul-20	2.74	2.85	97.38	n/d	n/m
				13-Jul-21	2.74	2.85	97.38	n/d	n/m
TH6	3.6 - 5.1	99.99	99.54	21-Jun-17	3.58	3.68	95.86	n/d	n/d
				14-Aug-18	3.61	3.16	96.38	n/d	n/d
				29-Jul-19	3.70	3.25	96.29	n/d	n/m
				27-Jul-20	3.69	3.24	96.30	n/d	n/m
				13-Jul-21	3.72	3.27	96.27	n/d	n/m
TH7	4.4 - 5.8	100.50	99.66	21-Jun-17	4.78	3.94	95.72	n/d	n/d
				14-Aug-18	4.67	3.83	95.83	n/d	n/d
				29-Jul-19	4.82	3.98	95.68	n/d	n/m
				27-Jul-20	4.86	4.02	95.65	n/d	n/m
				13-Jul-21	4.39	3.55	96.11	n/d	n/m
TH8	3.3 - 4.9	100.03	100.16	15-Aug-18	3.36	3.49	96.68	n/d	n/d
				30-Jul-19	2.98	3.11	97.06	n/d	n/m
				28-Jul-20	3.15	3.28	96.88	n/d	n/m
				14-Oct-20	3.67	3.80	96.37	n/d	n/m
				14-Jul-21	3.00	3.13	97.03	n/d	n/m

Notes:

[(a)] Elevations are relative to a local benchmark (centre of storm sewer catch basin approximately 5 m west of kiosk), with an assigned elevation of 100.00 m (exp. 2013).

< - less than

LEL - lower explosive limit

LNAPL - light non-aqueous phase liquid

m - metres

mbgs - metres below ground surface

mbtoc - metres below top of casing

mm - millimetres

n/a - not applicable

n/d - not detected

n/m - not measured

ppmv - parts per million by volume

Table 1
Summary of Groundwater Field Monitoring Results
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Well Name	Screen Interval (mbgs)	Top of Casing Elevation[(a)] (m)	Ground Elevation[(a)] (m)	Monitoring Date	Depth to Groundwater (mbtoc)	Depth to Groundwater (mbgs)	Groundwater Elevation[(a)] (m)	LNAPL Thickness (mm)	Headspace Vapours (ppmv)
TH9	3.4 - 4.9	100.46	100.59	15-Aug-18	2.74	2.87	97.72	n/d	84% LEL
				30-Jul-19	2.74	2.87	97.72	n/d	n/m
				28-Jul-20	2.83	2.96	97.63	n/d	n/m
				14-Oct-20	2.86	2.99	97.60	n/d	n/m
				14-Jul-21	2.77	2.90	97.69	n/d	n/m
TH10	3.3 - 4.9	100.17	100.26	10-Jun-13	n/m	3.03	97.24	n/d	170
				6-Oct-14	n/m	n/a	n/a	n/m	n/m
				27-Oct-15	Destroyed				
				TH10 decommissioned on August 24, 2016					
TH11	3.3 - 4.9	99.90	100.04	15-Aug-18	n/m	n/a	n/a	n/m	n/m
				31-Jul-19	2.81	2.95	97.09	n/d	n/m
				28-Jul-20	2.80	2.94	97.10	n/d	n/m
				14-Oct-20	3.12	3.26	96.78	n/d	n/m
				14-Jul-21	2.92	3.06	96.98	n/d	n/m
TH12	3.3 - 4.9	99.60	99.74	20-Jun-17	2.61	2.75	97.00	n/d	880
				15-Aug-18	n/m	n/a	n/a	n/m	n/m
				31-Jul-19	n/m	n/a	n/a	n/m	n/m
				28-Jul-20	n/m	n/a	n/a	n/m	n/m
				14-Oct-20	2.73	2.87	96.87	n/d	n/m
				14-Jul-21	2.81	2.95	96.79	n/d	n/m
TH100	3.0 - 4.9	101.40	101.52	15-Aug-18	3.39	3.50	98.02	n/d	n/d
				30-Jul-19	3.44	3.56	97.96	n/d	n/m
				29-Jul-20	3.21	3.33	98.19	n/d	n/m
				14-Oct-20	3.41	3.52	98.00	n/d	n/m
				14-Jul-21	3.33	3.45	98.07	n/d	n/m
TH101	3.0 - 4.9	99.94	100.06	10-Aug-16	3.05	3.17	96.89	n/d	9,450
				20-Jun-17	2.94	3.06	97.00	n/d	100% LEL
				15-Aug-18	2.91	3.03	97.03	n/d	100% LEL
				30-Jul-19	2.94	3.06	97.01	n/d	n/m
				28-Jul-20	3.02	3.14	96.92	n/d	n/m
				14-Jul-21	3.06	3.18	96.89	n/d	n/m
TH102	3.0 - 4.9	100.59	100.69	20-Jun-17	3.06	3.16	97.53	n/d	420
				15-Aug-18	n/m	n/a	n/a	n/m	n/m
				30-Jul-19	3.08	3.18	97.51	n/d	n/m
				29-Jul-20	3.10	3.20	97.49	n/d	n/m
				14-Jul-21	3.12	3.22	97.47	n/d	n/m
MW15-01	3.0 - 6.0	97.84	97.99	21-Jun-17	2.16	2.31	95.68	n/d	n/d
				14-Aug-18	3.16	3.31	94.68	n/d	n/d
				29-Jul-19	2.35	2.49	95.50	n/d	n/m
				27-Jul-20	2.29	2.44	95.55	n/d	n/m
				13-Jul-21	2.24	2.39	95.60	n/d	n/m
MW15-02	2.7 - 4.9	98.01	98.08	21-Jun-17	2.52	2.58	95.50	n/d	n/d
				14-Aug-18	2.38	2.44	95.64	n/d	n/d
				29-Jul-19	2.50	2.57	95.51	n/d	n/m
				27-Jul-20	2.54	2.61	95.47	n/d	n/m
				13-Jul-21	2.50	2.57	95.51	n/d	n/m
MW16-01	3.3 - 4.8	100.19	100.30	21-Jun-17	2.89	3.00	97.30	n/d	145
				15-Aug-18	2.82	2.93	97.37	n/d	n/d
				30-Jul-19	2.88	2.99	97.31	n/d	n/m
				28-Jul-20	2.82	2.93	97.37	n/d	n/m
				14-Jul-21	2.90	3.00	97.29	n/d	n/m

Notes:

[(a)] Elevations are relative to a local benchmark (centre of storm sewer catch basin approximately 5 m west of kiosk), with an assigned elevation of 100.00 m (exp. 2013).

< - less than

LEL - lower explosive limit

LNAPL - light non-aqueous phase liquid

m - metres

mbgs - metres below ground surface

mbtoc - metres below top of casing

mm - millimetres

n/a - not applicable

n/d - not detected

n/m - not measured

ppmv - parts per million by volume

Table 2
Summary of Groundwater Analytical Results - Petroleum Hydrocarbons and Dissolved Lead
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

			Sample Location	**MW15-01**	**MW15-02**	**MW16-01**	**TH100**	**TH101**	**TH101**	**TH102**	**TH11**	**TH12**	**TH2**
			Sample ID	MW15-01	MW15-02	MW16-01	TH100	TH101	DUP A	TH102	TH11	TH12	TH2
			BVL Sample ID	QCN105	QCN106	QCM608	QCM605	QCM606	QCM609	QCM607	QCM603	QCM604	QCN100
			BVL Job Number	C1J7455	C1J7455	C1J7368	C1J7368	C1J7368	C1J7368	C1J7368	C1J7368	C1J7368	C1J7455
			Sample Date	13-Jul-21	13-Jul-21	14-Jul-21	14-Jul-21	14-Jul-21	14-Jul-21	14-Jul-21	14-Jul-21	15-Jul-21	13-Jul-21
Parameters	**Units**	**RDL**	**Standard[a]**										
Benzene	µg/L	0.20	430	<0.20	<0.20	18	0.25	61	59	<0.20	9.6	15	<0.20
Toluene	µg/L	0.20	18,000	<0.20	<0.20	0.51	<0.20	8.9	8.3	<0.20	0.72	1.4	<0.20
Ethylbenzene	µg/L	0.20	2,300	<0.20	<0.20	18	<0.20	1,300	1,200	<0.20	68	72	<0.20
Xylenes	µg/L	0.40	4,200	<0.40	<0.40	3.3	<0.40	1,700	1,700	<0.40	22	<2.0	<0.40
F1 (C_6-C_{10}) - BTEX	µg/L	130	750[b]	<25	<25	110	<25	**5,300**	**5,200**	<25	740	**3,400**	31
F2 (C_{10}-C_{16})	µg/L	100	150	<100	<100	<100	<100	**1,900**	**1,800**	<100	**630**	**1,500**	<100
F3 (C_{16}-C_{34})	µg/L	200	500	<200	<200	**880**	**730**	280	260	<200	**1,100**	350	<200
F4 (C_{34}-C_{50})	µg/L	200	500	<200	<200	**670**	**580**	<200	<200	<200	**800**	<200	<200
Dissolved Lead	µg/L	0.50	25	<0.50	<0.50	<0.50	<0.50	4.2	6.2	<0.50	0.82	1.7	<0.50

Notes:

[a] O.Reg 153 (2011) Table 3 Full Depth Generic Site Condition Standards for all types of property use for groundwater in medium and fine textured soil in in a non-potable ground water condition

[b] F1 fraction does not include BTEX; however, the proponent has the choice as to whether or not to subtract BTEX from the analytical result.

Bold/Underlined - value exceeds criteria/standard

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3 and 4

F4G - petroleum hydrocarbon 4 gravimetric

RDL - reportable detection limit

< - less than

µg/L - micrograms per litre

- not available

Table 2
Summary of Groundwater Analytical Results - Petroleum Hydrocarbons and Dissolved Lead
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

			Sample Location	**TH3**	**TH5**	**TH5**	**TH6**	**TH7**	**TH8**	**TH9**
			Sample ID	TH3	TH5	DUP B	TH6	TH7	TH8	TH9
			BVL Sample ID	QCN101	QCN102	QCN107	QCN103	QCN104	QCM601	QCM602
			BVL Job Number	C1J7455	C1J7455	C1J7455	C1J7455	C1J7455	C1J7368	C1J7368
			Sample Date	13-Jul-21	13-Jul-21	13-Jul-21	13-Jul-21	13-Jul-21	14-Jul-21	14-Jul-21
Parameters	**Units**	**RDL**	**Standard[a]**							
Benzene	µg/L	0.20	430	23	210	270	<0.20	21	3.8	<0.20
Toluene	µg/L	0.20	18,000	0.28	19	26	<0.20	0.60	<0.20	<0.20
Ethylbenzene	µg/L	0.20	2,300	17	720	930	<0.20	4.5	2.0	0.29
Xylenes	µg/L	0.40	4,200	0.83	1,700	2,100	<0.40	0.70	<0.40	<0.40
F1 (C_6-C_{10}) - BTEX	µg/L	130	750[b]	330	**6,300**	**6,300**	<25	150	110	<25
F2 (C_{10}-C_{16})	µg/L	100	150	**170**	**14,000**	**13,000**	<100	<100	<100	<100
F3 (C_{16}-C_{34})	µg/L	200	500	<200	**1,000**	**910**	<200	<200	**1,200**	**810**
F4 (C_{34}-C_{50})	µg/L	200	500	<200	**590**	**550**	<200	<200	**890**	**780**
Dissolved Lead	µg/L	0.50	25	0.83	**37**	**39**	<0.50	0.50	0.56	<0.50

Notes:

[a] O.Reg 153 (2011) Table 3 Full Depth Generic Site Condition Standards for all types of property use for groundwater in medium and fine textured soil in in a non-potable ground water condition

[b] F1 fraction does not include BTEX; however, the proponent has the choice as to whether or not to subtract BTEX from the analytical result.

Bold/Underlined - value exceeds criteria/standard

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3 and 4

F4G - petroleum hydrocarbon 4 gravimetric

RDL - reportable detection limit

< - less than

µg/L - micrograms per litre

- not available

Table 3
Field Screening and Leak Test Measurements
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Sampling Location	Sampling Date	Organic Vapour Concentration (ppbv)	Methane Concentration (%)	Carbon dioxide Concentration (%)	Oxygen Concentration (%)	Helium Concentration - Shroud (ppmv)	Helium Concentration - Screening Sample (ppmv)	Helium Ratio of Below Grade/Shroud Concentration (%)	Pass Leak Test[(a)] (Y/N)
SV16-01	27-Jan-21	50	0.2	3.9	15.6	750,000	0	0.00	Y
		50	0.2	3.5	15.7	n/m	n/m	n/a	n/a
		50	0.2	3.2	15.8	n/m	n/m	n/a	n/a
SV16-02	27-Jan-21	0	0.7	1.8	18.8	750,000	0	0.00	Y
		0	0.2	2.5	18.6	n/m	n/m	n/a	n/a
		0	0.2	2.5	18.6	n/m	n/m	n/a	n/a

Notes:

[(a)] A leak test passes if the helium ratio of below grade to shroud concentration is less than 1%

n/a - not applicable

n/c - not calculated

n/m - not measured

ppbv - parts per billion by volume

ppmv - parts per million by volume

> - greater than

< - less than

Table 4
Summary of Soil Vapour Analytical Results - Petroleum Hydrocarbons
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

		Sample Location	**SV16-01**		**SV16-02**				**Health-Based Indoor Air Criteria[a]**	**SVSL[b]**
		Sample ID	SV16-01	SV16-01	SV16-02	DUP A	SV16-02	DUP A		
		BVL Sample ID	OSE272	QFA556	OSE273	OSE274	QFA557	QFA558		
		BVL Job Number	C123966	C1K9532	C123966	C123966	C1K9532	C1K9532		
		Sample Date	27-Jan-21	22-Jul-21	27-Jan-21	27-Jan-21	22-Jul-21	22-Jul-21		
Parameters	**Units**	**RDL**								
Benzene	µg/m^3	0.32	<0.32	<0.32	<0.32	0.33	<0.32	<0.32	0.51	25
Toluene	µg/m^3	0.38	<0.38	1.41	<0.38	1.44	0.64	<0.38	1,043	52,143
Ethylbenzene	µg/m^3	0.43	0.5	1.89	<0.43	<0.43	<0.43	<0.43	209	10,429
Xylenes, Total	µg/m^3	1.3	1.9	7.2	<1.3	1.5	<1.3	<1.3	146	7,300
F1-BTEX, C_6-C_{10} (as Toluene)	µg/m^3	5.0	138	280	32.1	45.1	93.1	70.2	2,491	124,530
F2, C_{10}-C_{16} (as Decane)	µg/m^3	5.0	197	1,100	89.6	84.7	435	445	471	23,530

Notes:

[a] Health-Based Indoor Air Criteria - Residential, provided by MOECC Modified Generic Risk Assessment (Tier 2), Spreadsheet Model (November 2016).

[b] SVSLs for a residential building with basement (probe depth 0 - 30 centimetres below base of the building foundation) calculated by dividing Health-Based Indoor Air Criteria by an attenuation factor of 0.02.

Bold/Underlined - value exceeds SVSL criteria

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3 and 4

RDL - reportable detection limit

SVSL - soil vapour screening level

µg/m^3 - micrograms per cubic metre

< - less than

Table 5
Summary of Soil Vapour Analytical Results - Volatile Organic Compounds
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

			Sample Location	SV16-01		SV16-02				Health-Based Indoor Air Criteria[a]	SVSL[b]
			Sample ID	SV16-01	SV16-01	SV16-02	DUP A	SV16-02	DUP A		
			BVL Sample ID	OSE272	QFA556	OSE273	OSE274	QFA557	QFA558		
			BVL Job Number	C123966	C1K9532	C123966	C123966	C1K9532	C1K9532		
			Sample Date	27-Jan-21	22-Jul-21	27-Jan-21	27-Jan-21	22-Jul-21	22-Jul-21		
Parameters	**Units**	**RDL**									
Benzyl chloride	µg/m^3	2.6	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6	n/s	n/s
Bromodichloromethane	µg/m^3	1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	n/s	n/s
Bromoform	µg/m^3	2.1	<2.1	<2.1	<2.1	<2.1	<2.1	<2.1	n/s	n/s
Bromomethane	µg/m^3	0.39	<0.39	<0.39	<0.39	<0.39	<0.39	<0.39	1.04	52.14
1,3-Butadiene	µg/m^3	1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	n/s	n/s
Carbon Disulfide	µg/m^3	1.6	<1.6	<1.6	<1.6	2.9	<1.6	<1.6	n/s	n/s
Carbon Tetrachloride	µg/m^3	0.63	<0.63	<0.63	<0.63	<0.63	<0.63	<0.63	0.42	20.86
Chlorobenzene	µg/m^3	0.46	<0.46	<0.46	<0.46	<0.46	<0.46	<0.46	209	10,429
Chloroethane	µg/m^3	0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	n/s	n/s
Chloroform	µg/m^3	0.49	13.3	20.20	<0.49	<0.49	0.50	0.61	20.86	1,043
Chloromethane	µg/m^3	0.62	<0.62	<0.72	<0.62	0.87	0.99	<0.62	n/s	n/s
Cyclohexane	µg/m^3	0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	n/s	n/s
Dibromochloromethane	µg/m^3	1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	n/s	n/s
1,2-Dibromoethane (Ethylene Dibromide)	µg/m^3	0.77	<0.77	<0.77	<0.77	<0.77	<0.77	<0.77	0.17	8.34
1,2-Dichlorobenzene	µg/m^3	0.60	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60	125	6,257
1,3-Dichlorobenzene	µg/m^3	2.4	<2.4	<2.4	<2.4	<2.4	<2.4	<2.4	n/s	n/s
1,4-Dichlorobenzene	µg/m^3	0.60	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60	0.28	13.90
Dichlorodifluoromethane (FREON 12)	µg/m^3	0.99	4.49	9.39	8.77	8.41	49.0	49.6	n/s	n/s
1,1-Dichloroethane	µg/m^3	0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	34.41	1,721
1,2-Dichloroethane	µg/m^3	0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	0.04	2.14
1,1-Dichloroethylene	µg/m^3	0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	14.60	730
cis-1,2-Dichloroethylene	µg/m^3	0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	31.29	1,564
trans-1,2-Dichloroethylene	µg/m^3	0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	12.51	626
1,2-Dichloropropane	µg/m^3	0.46	<0.46	<0.46	<0.46	<0.46	<0.46	<0.46	0.83	41.71
cis-1,3-Dichloropropene	µg/m^3	0.45	<0.45	<0.45	<0.45	<0.45	<0.45	<0.45	0.28	13.90
trans-1,3-Dichloropropene	µg/m^3	0.45	<0.45	<0.45	<0.45	<0.45	<0.45	<0.45	0.28	13.90
1,2-Dichlorotetrafluoroethane	µg/m^3	1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	n/s	n/s
1,4-Dioxane	µg/m^3	3.6	<3.6	<3.6	<3.6	8.7	<3.6	<3.6	751	37,543
Ethanol (ethyl alcohol)	µg/m^3	1.9	4.4	14.0	2.9	10.5	<1.9	<1.9	n/s	n/s
Ethyl Acetate	µg/m^3	3.6	<3.6	<3.6	<3.6	<3.6	<3.6	<3.6	n/s	n/s
4-ethyltoluene	µg/m^3	2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	n/s	n/s
Heptane	µg/m^3	1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	n/s	n/s
Hexachlorobutadiene	µg/m^3	5.3	<5.3[c]	<5.3[c]	<5.3[c]	<5.3[c]	<5.3[c]	<5.3[c]	0.05	2.53
Hexane	µg/m^3	0.7	<0.70	0.94	<0.70	2.62	<0.70	<0.70	521	26,071

Notes:

[a] Health-Based Indoor Air Criteria - Residential, provided by MOECC Modified Generic Risk Assessment (Tier 2), Spreadsheet Model (November 2016).

[b] SVSLs for a residential building with basement (probe depth 0 - 30 centimetres below base of the building foundation) calculated by dividing Health-Based Indoor Air Criteria by an attenuation factor of 0.02.

[c] RDL greater than SVSL

Bold/Underlined - value exceeds SVSL criteria

BVL - Bureau Veritas Laboratories

n/s - no standard

RDL - reportable detection limit

SVSL - soil vapour screening level

µg/m^3 - micrograms per cubic metre

< - less than

Table to be read in conjunction with Laboratory Certificate of Analysis

Table 5
Summary of Soil Vapour Analytical Results - Volatile Organic Compounds
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

			Sample Location	SV16-01		SV16-02				Health-Based Indoor Air Criteria[a]	SVSL[b]
			Sample ID	SV16-01	SV16-01	SV16-02	DUP A	SV16-02	DUP A		
			BVL Sample ID	OSE272	QFA556	OSE273	OSE274	QFA557	QFA558		
			BVL Job Number	C123966	C1K9532	C123966	C123966	C1K9532	C1K9532		
			Sample Date	27-Jan-21	22-Jul-21	27-Jan-21	27-Jan-21	22-Jul-21	22-Jul-21		
Parameters	**Units**	**RDL**									
Methyl Butyl Ketone (2-Hexanone)	µg/m^3	4.1	<4.1	4.2	<4.1	<4.1	<4.1	<4.1	n/s	n/s
Methyl Ethyl Ketone (2-Butanone)	µg/m^3	2.9	1.83	33.0	<0.59	0.63	6.77	3.63	1,003	50,137
Methyl Isobutyl Ketone	µg/m^3	4.1	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	602	30,082
Methyl t-butyl ether (MTBE)	µg/m^3	0.72	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72	4.28	214
Methylene Chloride(Dichloromethane)	µg/m^3	2.8	<2.1	<2.1	<2.1	<2.1	<2.1	<2.1	48.36	2,418
Naphthalene	µg/m^3	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.77	38.60
2-propanol (Isopropanol)	µg/m^3	2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	n/s	n/s
2-Propanone (Acetone)	µg/m^3	1.9	10.0	240	4.7	20.1	66.3	61.1	2,503	125,143
Propene (Propylene)	µg/m^3	0.86	<0.86	8.48	<0.86	<0.86	1.75	0.99	n/s	n/s
Styrene	µg/m^3	0.43	<0.43	<0.43	<0.43	<0.43	<0.43	<0.43	54.23	2,711
1,1,1,2-Tetrachloroethane	µg/m^3	0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	0.15	7.51
1,1,2,2-Tetrachloroethane	µg/m^3	0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	0.02	0.96
Tetrachloroethylene	µg/m^3	0.68	2.38	5.71	<0.68	<0.68	1.87	1.87	4.28	214
Tetrahydrofuran	µg/m^3	1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	n/s	n/s
1,2,4-Trichlorobenzene	µg/m^3	3.7	<3.7	<3.7	<3.7	<3.7	<3.7	<3.7	1.67	83.43
1,2,4-Trimethylbenzene	µg/m^3	2.5	<2.5	3.4	<2.5	<2.5	<2.5	<2.5	n/s	n/s
1,1,1-Trichloroethane	µg/m^3	0.55	<0.55	<0.55	<0.55	<0.55	<0.55	<0.55	209	10,429
1,1,2-Trichloroethane	µg/m^3	0.55	<0.55	<0.55	<0.55	<0.55	<0.55	<0.55	0.07	3.48
Trichloroethylene	µg/m^3	0.54	<0.54	<0.54	7.33	6.92	**15.5**	**17.0**	0.27	13.56
Trichlorofluoromethane (FREON 11)	µg/m^3	1.1	<1.1	1.5	<1.1	<1.1	1.4	1.4	n/s	n/s
Trichlorotrifluoroethane (FREON 113)	µg/m^3	1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	n/s	n/s
1,3,5-Trimethylbenzene	µg/m^3	2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	n/s	n/s
2,2,4-Trimethylpentane	µg/m^3	0.93	<0.93	<0.93	<0.93	<0.93	<0.93	<0.93	n/s	n/s
Vinyl Acetate	µg/m^3	0.70	<0.70	<0.70	<0.70	<0.70	<0.70	<0.70	n/s	n/s
Vinyl Bromide	µg/m^3	0.87	<0.87	<0.87	<0.87	<0.87	<0.87	<0.87	n/s	n/s
Vinyl Chloride	µg/m^3	0.26	<0.26	<0.26	<0.26	<0.26	<0.26	<0.26	0.13	6.32

Notes:

[a] Health-Based Indoor Air Criteria - Residential, provided by MOECC Modified Generic Risk Assessment, Approved Model (November 1, 2016)

[b] SVSLs for a residential building with basement (probe depth 0 - 30 centimetres below base of the building foundation) calculated by dividing Health-Based Indoor Air Criteria by an attenuation factor of 0.02.

[c] RDL greater than SVSL

Bold/Underlined - value exceeds SVSL criteria

BVL - Bureau Veritas Laboratories

n/s - no standard

RDL - reportable detection limit

SVSL - soil vapour screening level

µg/m^3 - micrograms per cubic metre

< - less than

Table to be read in conjunction with Laboratory Certificate of Analysis

APPENDIX A

Laboratory Certificates of Analysis and Data Quality Review Checklists

Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107
Your C.O.C. #: 375820

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2021/07/20
Report #: R6728364
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1J7368
Received: 2021/07/15, 15:33

Sample Matrix: Ground Water
Samples Received: 9

Analyses	Quantity	Laboratory Method	Analytical Method
Petroleum Hydro. CCME F1 & BTEX in Water	9	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1)	9	CAM SOP-00316	CCME PHC-CWS m
Dissolved Metals by ICPMS	9	CAM SOP-00447	EPA 6020B m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard. All samples were analyzed within hold time unless otherwise flagged.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas Laboratories conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following “Alberta Environment’s Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003”. Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107
Your C.O.C. #: 375820

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2021/07/20
Report #: R6728364
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1J7368
Received: 2021/07/15, 15:33

Encryption Key



Gina Baybayan
Project Manager
21 Jul 2021 17:08:06

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Gina Baybayan, Project Manager
Email: Gina.Baybayan@bureauveritas.com
Phone# (905)817-5766

==========

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C1J7368
Report Date: 2021/07/20

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107

LEAD (DISSOLVED) IN WATER

BV Labs ID		QCM601	QCM602	QCM603	QCM604	QCM605	QCM606	QCM607		
Sampling Date		2021/07/14 19:45	2021/07/14 20:12	2021/07/14 23:45	2021/07/15 00:15	2021/07/14 21:10	2021/07/14 22:05	2021/07/14 22:40		
COC Number		375820	375820	375820	375820	375820	375820	375820		
	UNITS	**TH8**	**TH9**	**TH11**	**TH12**	**TH100**	**TH101**	**TH102**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	0.56	<0.50	0.82	1.7	<0.50	4.2	<0.50	0.50	7467733

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

BV Labs ID		QCM608	QCM609		
Sampling Date		2021/07/14 23:20	2021/07/14 22:05		
COC Number		375820	375820		
	UNITS	**MW16-01**	**DUP A**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	<0.50	6.2	0.50	7467733

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C1J7368
Report Date: 2021/07/20

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107

O.REG 153 PHCS IN WATER (GROUND WATER)

BV Labs ID		QCM601	QCM602	QCM603		QCM604		QCM605		QCM606		
Sampling Date		2021/07/14 19:45	2021/07/14 20:12	2021/07/14 23:45		2021/07/15 00:15		2021/07/14 21:10		2021/07/14 22:05		
COC Number		375820	375820	375820		375820		375820		375820		
	UNITS	**TH8**	**TH9**	**TH11**	**RDL**	**TH12**	**RDL**	**TH100**	**RDL**	**TH101**	**RDL**	**QC Batch**
Benzene	ug/L	3.8	<0.20	9.6	0.20	15 (1)	1.0	0.25	0.20	61	4.0	7469518
Toluene	ug/L	<0.20	<0.20	0.72	0.20	1.4	1.0	<0.20	0.20	8.9	4.0	7469518
Ethylbenzene	ug/L	2.0	0.29	68	0.20	72	1.0	<0.20	0.20	1300	4.0	7469518
o-Xylene	ug/L	<0.20	<0.20	1.7	0.20	1.6	1.0	<0.20	0.20	16	4.0	7469518
p+m-Xylene	ug/L	<0.40	<0.40	20	0.40	<2.0	2.0	<0.40	0.40	1700	8.0	7469518
Total Xylenes	ug/L	<0.40	<0.40	22	0.40	<2.0	2.0	<0.40	0.40	1700	8.0	7469518
F1 (C6-C10)	ug/L	120	<25	840	25	3500	130	<25	25	8300	500	7469518
F1 (C6-C10) - BTEX	ug/L	110	<25	740	25	3400	130	<25	25	5300	500	7469518
F2 (C10-C16 Hydrocarbons)	ug/L	<100	<100	630	100	1500	100	<100	100	1900	100	7469612
F3 (C16-C34 Hydrocarbons)	ug/L	1200	810	1100	200	350	200	730	200	280	200	7469612
F4 (C34-C50 Hydrocarbons)	ug/L	890	780	800	200	<200	200	580	200	<200	200	7469612
Reached Baseline at C50	ug/L	Yes	Yes	Yes		Yes		Yes		Yes		7469612
Extraction Surrogate Recovery (%)												
D10-o-Xylene	%	95	92	100		93		96		106		7469518
o-Terphenyl	%	99	99	105		100		99		105		7469612
Instrument Surrogate Recovery (%)												
1,4-Difluorobenzene	%	98	98	94		96		102		98		7469518
4-Bromofluorobenzene	%	104	102	105		107		87		104		7469518
D4-1,2-Dichloroethane	%	108	108	96		94		102		94		7469518

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C1J7368
Report Date: 2021/07/20

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107

O.REG 153 PHCS IN WATER (GROUND WATER)

BV Labs ID		QCM607	QCM608		QCM609		
Sampling Date		2021/07/14 22:40	2021/07/14 23:20		2021/07/14 22:05		
COC Number		375820	375820		375820		
	UNITS	**TH102**	**MW16-01**	**RDL**	**DUP A**	**RDL**	**QC Batch**
Benzene	ug/L	<0.20	18	0.20	59	4.0	7469518
Toluene	ug/L	<0.20	0.51	0.20	8.3	4.0	7469518
Ethylbenzene	ug/L	<0.20	18	0.20	1200	4.0	7469518
o-Xylene	ug/L	<0.20	0.60	0.20	16	4.0	7469518
p+m-Xylene	ug/L	<0.40	2.7	0.40	1700	8.0	7469518
Total Xylenes	ug/L	<0.40	3.3	0.40	1700	8.0	7469518
F1 (C6-C10)	ug/L	<25	160	25	8100	500	7469518
F1 (C6-C10) - BTEX	ug/L	<25	110	25	5200	500	7469518
F2 (C10-C16 Hydrocarbons)	ug/L	<100	<100	100	1800	100	7469612
F3 (C16-C34 Hydrocarbons)	ug/L	<200	880	200	260	200	7469612
F4 (C34-C50 Hydrocarbons)	ug/L	<200	670	200	<200	200	7469612
Reached Baseline at C50	ug/L	Yes	Yes		Yes		7469612
Extraction Surrogate Recovery (%)							
D10-o-Xylene	%	95	92		104		7469518
o-Terphenyl	%	100	99		99		7469612
Instrument Surrogate Recovery (%)							
1,4-Difluorobenzene	%	99	97		96		7469518
4-Bromofluorobenzene	%	99	100		104		7469518
D4-1,2-Dichloroethane	%	108	107		93		7469518

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C1J7368
Report Date: 2021/07/20

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107

TEST SUMMARY

BV Labs ID: QCM601
Sample ID: TH8
Matrix: Ground Water

Collected: 2021/07/14
Relinquished: 2021/07/15
Received: 2021/07/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7469518	N/A	2021/07/19	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7469612	2021/07/19	2021/07/20	Jeevaraj Jeevaratrnam
Dissolved Metals by ICPMS	ICP/MS	7467733	N/A	2021/07/16	Azita Fazaeli

BV Labs ID: QCM602
Sample ID: TH9
Matrix: Ground Water

Collected: 2021/07/14
Relinquished: 2021/07/15
Received: 2021/07/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7469518	N/A	2021/07/19	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7469612	2021/07/19	2021/07/20	Jeevaraj Jeevaratrnam
Dissolved Metals by ICPMS	ICP/MS	7467733	N/A	2021/07/16	Azita Fazaeli

BV Labs ID: QCM603
Sample ID: TH11
Matrix: Ground Water

Collected: 2021/07/14
Relinquished: 2021/07/15
Received: 2021/07/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7469518	N/A	2021/07/19	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7469612	2021/07/19	2021/07/20	Jeevaraj Jeevaratrnam
Dissolved Metals by ICPMS	ICP/MS	7467733	N/A	2021/07/16	Azita Fazaeli

BV Labs ID: QCM604
Sample ID: TH12
Matrix: Ground Water

Collected: 2021/07/15
Relinquished: 2021/07/15
Received: 2021/07/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7469518	N/A	2021/07/19	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7469612	2021/07/19	2021/07/20	Jeevaraj Jeevaratrnam
Dissolved Metals by ICPMS	ICP/MS	7467733	N/A	2021/07/16	Azita Fazaeli

BV Labs ID: QCM605
Sample ID: TH100
Matrix: Ground Water

Collected: 2021/07/14
Relinquished: 2021/07/15
Received: 2021/07/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7469518	N/A	2021/07/19	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7469612	2021/07/19	2021/07/20	Jeevaraj Jeevaratrnam
Dissolved Metals by ICPMS	ICP/MS	7467733	N/A	2021/07/16	Azita Fazaeli

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C1J7368
Report Date: 2021/07/20

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107

TEST SUMMARY

BV Labs ID: QCM606
Sample ID: TH101
Matrix: Ground Water

Collected: 2021/07/14
Relinquished: 2021/07/15
Received: 2021/07/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7469518	N/A	2021/07/19	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7469612	2021/07/19	2021/07/20	Jeevaraj Jeevaratrnam
Dissolved Metals by ICPMS	ICP/MS	7467733	N/A	2021/07/16	Azita Fazaeli

BV Labs ID: QCM607
Sample ID: TH102
Matrix: Ground Water

Collected: 2021/07/14
Relinquished: 2021/07/15
Received: 2021/07/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7469518	N/A	2021/07/19	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7469612	2021/07/19	2021/07/20	Jeevaraj Jeevaratrnam
Dissolved Metals by ICPMS	ICP/MS	7467733	N/A	2021/07/16	Azita Fazaeli

BV Labs ID: QCM608
Sample ID: MW16-01
Matrix: Ground Water

Collected: 2021/07/14
Relinquished: 2021/07/15
Received: 2021/07/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7469518	N/A	2021/07/19	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7469612	2021/07/19	2021/07/20	Jeevaraj Jeevaratrnam
Dissolved Metals by ICPMS	ICP/MS	7467733	N/A	2021/07/16	Azita Fazaeli

BV Labs ID: QCM609
Sample ID: DUP A
Matrix: Ground Water

Collected: 2021/07/14
Relinquished: 2021/07/15
Received: 2021/07/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7469518	N/A	2021/07/19	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7469612	2021/07/19	2021/07/20	Jeevaraj Jeevaratrnam
Dissolved Metals by ICPMS	ICP/MS	7467733	N/A	2021/07/16	Azita Fazaeli

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	8.3°C

Sample QCM604 [TH12] : F1 BTEX Analysis: Due to high concentration of target analytes, sample required dilution. Reporting limits were adjusted accordingly.

Sample QCM606 [TH101] : F1 BTEX Analysis: Due to high concentration of target analytes, sample required dilution. Reporting limits were adjusted accordingly.

Sample QCM609 [DUP A] : F1 BTEX Analysis: Due to high concentration of target analytes, sample required dilution. Reporting limits were adjusted accordingly.

Results relate only to the items tested.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C1J7368
Report Date: 2021/07/20

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7467733	AFZ	Method Blank	Dissolved Lead (Pb)	2021/07/16	<0.50		ug/L	
7469518	AAI	Method Blank	1,4-Difluorobenzene	2021/07/19		101	%	70 - 130
			4-Bromofluorobenzene	2021/07/19		98	%	70 - 130
			D10-o-Xylene	2021/07/19		104	%	70 - 130
			D4-1,2-Dichloroethane	2021/07/19		101	%	70 - 130
			Benzene	2021/07/19	<0.20		ug/L	
			Toluene	2021/07/19	<0.20		ug/L	
			Ethylbenzene	2021/07/19	<0.20		ug/L	
			o-Xylene	2021/07/19	<0.20		ug/L	
			p+m-Xylene	2021/07/19	<0.40		ug/L	
			Total Xylenes	2021/07/19	<0.40		ug/L	
			F1 (C6-C10)	2021/07/19	<25		ug/L	
			F1 (C6-C10) - BTEX	2021/07/19	<25		ug/L	
7469612	JJE	Method Blank	o-Terphenyl	2021/07/20		100	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2021/07/20	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2021/07/20	<200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2021/07/20	<200		ug/L	
7467733	AFZ	LCS	Dissolved Lead (Pb)	2021/07/16		95	%	80 - 120
7469518	AAI	LCS	1,4-Difluorobenzene	2021/07/19		93	%	70 - 130
			4-Bromofluorobenzene	2021/07/19		105	%	70 - 130
			D10-o-Xylene	2021/07/19		92	%	70 - 130
			D4-1,2-Dichloroethane	2021/07/19		91	%	70 - 130
			Benzene	2021/07/19		91	%	50 - 140
			Toluene	2021/07/19		86	%	50 - 140
			Ethylbenzene	2021/07/19		100	%	50 - 140
			o-Xylene	2021/07/19		98	%	50 - 140
			p+m-Xylene	2021/07/19		94	%	50 - 140
			F1 (C6-C10)	2021/07/19		87	%	60 - 140
7469612	JJE	LCS	o-Terphenyl	2021/07/20		101	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2021/07/20		105	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2021/07/20		105	%	60 - 130
			F4 (C34-C50 Hydrocarbons)	2021/07/20		107	%	60 - 130

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

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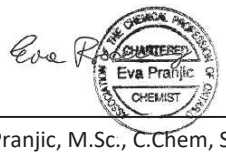
Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C1J7368
Report Date: 2021/07/20

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



Ewa Pranjic, M.Sc., C.Chem, Scientific Specialist

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

eCOC: T375820

Project Information:	C1J7368
Job Received:	2021/07/15 15:33
Results Required By:	2021/07/22 17:00
Expected Arrival:	2021/07/15 17:00
Submitted By:	Nancy Kessler
Submitted To:	Mississauga, ON (Env. Lab)

Invoice Information

Attn: Imperial Accounts Payable
Imperial Oil Ltd - Golder Associates Ltd
102, 2535-3rd Avenue SE
Calgary , AB , T2A 7W5
Email to:
canadaaccountspayableinvoices@golder.com

Report Information

Attn: Ian Sosney
Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines , ON , L2W 1A4
Email to:
ian_sosney@golder.com
iol_1390@golder.com
iol_equis@golder.com

Project Information

Quote #:	B73682
PO/AFE#:	A2601436
Project #:	20447743-1155-2107
Site Location:	N/A;1660 Merivale Road, Ottawa, ON
Site #:	NA
Task Order:	20447743-1155-7777
Line Item:	NA

Analytical Summary

A: 2021/07/22 17:00
M: Manually added test

Client Sample ID	Clnt Ref	Sampling Date/Time	Matrix	#Cont	O.Reg 153 PHCs in Water	BTEX	Dissolved Lead
TH8	1	2021/07/14 19:45	GROUND WATER	10	A	M	M
TH9	2	2021/07/14 20:12	GROUND WATER	10	A	M	M
TH11	3	2021/07/14 23:45	GROUND WATER	10	A	M	M
TH12	4	2021/07/15 00:15	GROUND WATER	10	A	M	M
TH100	5	2021/07/14 21:10	GROUND WATER	10	A	M	M
TH101	6	2021/07/14 22:05	GROUND WATER	10	A	M	M
TH102	7	2021/07/14 22:40	GROUND WATER	10	A	M	M
MW16-01	8	2021/07/14 23:20	GROUND WATER	10	A	M	M
DUP A	9	2021/07/14 22:05	GROUND WATER	10	A	M	M

Deadlines are estimates only and are subject to change. Please refer to your Job Confirmation report for final due dates.
Criteria : Reg153/04 T3-GW-F/M

eCOC: T375820

Project Information:	C1J7368
Job Received:	2021/07/15 15:33
Results Required By:	2021/07/22 17:00
Expected Arrival:	2021/07/15 17:00
Submitted By:	Nancy Kessler
Submitted To:	Mississauga, ON (Env. Lab)

Submission Information

# of Samples: 9

Details: SAP#: 88001627
IES#: A2601436
Bubbles may develop due to degassing. Sediment may be present due to water column.

Custody Tracking Form

~~CIJ 7368 - KTN~~
KTN 2021/07/15

offsite

eCOC Number
T375820

Please use this form for custody tracking when submitting the work instructions via eCOC (electronic Chain of Custody). Please ensure your form **has a barcode or a Bureau Veritas eCOC confirmation number** in the top right hand side. This number links your electronic submission to your samples. This form should be **placed in the cooler with your samples.**

Relinquished By				Received By			
Colleen Chapman Colleen Chapman		Date	15/07/21		2021/07/15 MP	Date	
		Time (24 HR)	3:25pm			Time (24 HR)	
Nancy Kessler	N Kessler	Date	3:25pm			Date	2021/07/15
		Time (24 HR)	15/07/21	[illegible]		Time (24 HR)	15:33
		Date				Date	
		Time (24 HR)				Time (24 HR)	

Unless otherwise agreed to, submissions and use of services are governed by Bureau Veritas' standard terms and conditions which can be found at www.bvna.com.

Triage Information

Sampled By (Print)	# of Coolers/Pkgs			
Colleen Chapman Nancy Kessler	1	Rush ☐ Micro ☐	Immediate Test ☐	Food Residue ☐ Food Chemistry ☐

***** Laboratory Use Only *****

Received At	Mississauga
Labeled By	KTN
Verified By	DSG

Lab Comments: CIJ 7368

Custody Seal		Cooling Media	Temperature °C		
Present (Y/N)	Intact (Y/N)	Present (Y/N)	1	2	3
4	4	4	9	9	7

Drinking Water Metals Preservation Check Done (Circle) YES NO

COR FCD-00340 /5 PAGE 1 of 1

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: July 14 and 15, 2021

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Bureau Veritas Mississauga

Consultant Project Number: 20447743-1155

Sample Submission Number: C1J7368

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within
Extraction Surrogate Recovery	X			acceptance criteria.
Method Blank Concentration	X			
Matrix Duplicate RPD			X	
Matrix Spike Recovery			X	
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	All field QC samples are within
Trip Blank Concentration			X	alert limits.
Field Duplicate RPD	X			

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): Amanda Newberry

Date: July 22, 2021

Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107
Your C.O.C. #: 375815

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2021/07/20
Report #: R6728222
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1J7455
Received: 2021/07/15, 15:33

Sample Matrix: Ground Water
Samples Received: 8

Analyses	Quantity	Laboratory Method	Analytical Method
Petroleum Hydro. CCME F1 & BTEX in Water	8	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1)	8	CAM SOP-00316	CCME PHC-CWS m
Dissolved Metals by ICPMS	8	CAM SOP-00447	EPA 6020B m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard. All samples were analyzed within hold time unless otherwise flagged.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas Laboratories conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following “Alberta Environment’s Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003”. Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107
Your C.O.C. #: 375815

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2021/07/20
Report #: R6728222
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1J7455
Received: 2021/07/15, 15:33

Encryption Key



Gina Baybayan
Project Manager
20 Jul 2021 17:38:10

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Gina Baybayan, Project Manager
Email: Gina.Baybayan@bureauveritas.com
Phone# (905)817-5766

==========

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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BV Labs Job #: C1J7455
Report Date: 2021/07/20

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107

LEAD (DISSOLVED) IN WATER

BV Labs ID		QCN100	QCN101	QCN101	QCN102	QCN103	QCN104	QCN105		
Sampling Date		2021/07/13 12:15	2021/07/13 12:45	2021/07/13 12:45	2021/07/13 09:20	2021/07/13 10:35	2021/07/13 10:00	2021/07/13 11:10		
COC Number		375815	375815	375815	375815	375815	375815	375815		
	UNITS	**TH2**	**TH3**	**TH3 Lab-Dup**	**TH5**	**TH6**	**TH7**	**MW15-01**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	<0.50	0.83	0.89	37	<0.50	0.50	<0.50	0.50	7467733

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

BV Labs ID		QCN106	QCN107		
Sampling Date		2021/07/13 11:45	2021/07/13 09:20		
COC Number		375815	375815		
	UNITS	**MW15-02**	**DUP B**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	<0.50	39	0.50	7467733

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C1J7455
Report Date: 2021/07/20

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107

O.REG 153 PHCS IN WATER (GROUND WATER)

BV Labs ID		QCN100	QCN101		QCN102		QCN103	QCN104	QCN105		
Sampling Date		2021/07/13 12:15	2021/07/13 12:45		2021/07/13 09:20		2021/07/13 10:35	2021/07/13 10:00	2021/07/13 11:10		
COC Number		375815	375815		375815		375815	375815	375815		
	UNITS	**TH2**	**TH3**	**RDL**	**TH5**	**RDL**	**TH6**	**TH7**	**MW15-01**	**RDL**	**QC Batch**
Benzene	ug/L	<0.20	23	0.20	210	1.0	<0.20	21	<0.20	0.20	7470294
Toluene	ug/L	<0.20	0.28	0.20	19	1.0	<0.20	0.60	<0.20	0.20	7470294
Ethylbenzene	ug/L	<0.20	17	0.20	720	1.0	<0.20	4.5	<0.20	0.20	7470294
o-Xylene	ug/L	<0.20	0.25	0.20	31	1.0	<0.20	<0.20	<0.20	0.20	7470294
p+m-Xylene	ug/L	<0.40	0.58	0.40	1700	2.0	<0.40	0.70	<0.40	0.40	7470294
Total Xylenes	ug/L	<0.40	0.83	0.40	1700	2.0	<0.40	0.70	<0.40	0.40	7470294
F1 (C6-C10)	ug/L	31	370	25	9000	130	<25	180	<25	25	7470294
F1 (C6-C10) - BTEX	ug/L	31	330	25	6300	130	<25	150	<25	25	7470294
F2 (C10-C16 Hydrocarbons)	ug/L	<100	170	100	14000	100	<100	<100	<100	100	7469680
F3 (C16-C34 Hydrocarbons)	ug/L	<200	<200	200	1000	200	<200	<200	<200	200	7469680
F4 (C34-C50 Hydrocarbons)	ug/L	<200	<200	200	590	200	<200	<200	<200	200	7469680
Reached Baseline at C50	ug/L	Yes	Yes		Yes		Yes	Yes	Yes		7469680
Extraction Surrogate Recovery (%)											
D10-o-Xylene	%	103	107		96		101	107	100		7470294
o-Terphenyl	%	100	101		102		100	98	97		7469680
Instrument Surrogate Recovery (%)											
1,4-Difluorobenzene	%	97	93		92		97	91	97		7470294
4-Bromofluorobenzene	%	99	104		112		101	105	97		7470294
D4-1,2-Dichloroethane	%	119	107		94		119	110	121		7470294

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107

O.REG 153 PHCS IN WATER (GROUND WATER)

BV Labs ID		QCN106		QCN107		
Sampling Date		2021/07/13 11:45		2021/07/13 09:20		
COC Number		375815		375815		
	UNITS	**MW15-02**	**RDL**	**DUP B**	**RDL**	**QC Batch**
Benzene	ug/L	<0.20	0.20	270	1.0	7470294
Toluene	ug/L	<0.20	0.20	26	1.0	7470294
Ethylbenzene	ug/L	<0.20	0.20	930	1.0	7470294
o-Xylene	ug/L	<0.20	0.20	48	1.0	7470294
p+m-Xylene	ug/L	<0.40	0.40	2100	2.0	7470294
Total Xylenes	ug/L	<0.40	0.40	2100	2.0	7470294
F1 (C6-C10)	ug/L	<25	25	9600	130	7470294
F1 (C6-C10) - BTEX	ug/L	<25	25	6300	130	7470294
F2 (C10-C16 Hydrocarbons)	ug/L	<100	100	13000	100	7469680
F3 (C16-C34 Hydrocarbons)	ug/L	<200	200	910	200	7469680
F4 (C34-C50 Hydrocarbons)	ug/L	<200	200	550	200	7469680
Reached Baseline at C50	ug/L	Yes		Yes		7469680
Extraction Surrogate Recovery (%)						
D10-o-Xylene	%	104		96		7470294
o-Terphenyl	%	96		100		7469680
Instrument Surrogate Recovery (%)						
1,4-Difluorobenzene	%	97		90		7470294
4-Bromofluorobenzene	%	95		114		7470294
D4-1,2-Dichloroethane	%	119		94		7470294

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C1J7455
Report Date: 2021/07/20

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107

TEST SUMMARY

BV Labs ID: QCN100
Sample ID: TH2
Matrix: Ground Water

Collected: 2021/07/13
Relinquished: 2021/07/15
Received: 2021/07/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7470294	N/A	2021/07/19	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7469680	2021/07/19	2021/07/20	Jeevaraj Jeevaratrnam
Dissolved Metals by ICPMS	ICP/MS	7467733	N/A	2021/07/16	Azita Fazaeli

BV Labs ID: QCN101
Sample ID: TH3
Matrix: Ground Water

Collected: 2021/07/13
Relinquished: 2021/07/15
Received: 2021/07/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7470294	N/A	2021/07/19	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7469680	2021/07/19	2021/07/20	Jeevaraj Jeevaratrnam
Dissolved Metals by ICPMS	ICP/MS	7467733	N/A	2021/07/16	Azita Fazaeli

BV Labs ID: QCN101 Dup
Sample ID: TH3
Matrix: Ground Water

Collected: 2021/07/13
Relinquished: 2021/07/15
Received: 2021/07/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Metals by ICPMS	ICP/MS	7467733	N/A	2021/07/16	Azita Fazaeli

BV Labs ID: QCN102
Sample ID: TH5
Matrix: Ground Water

Collected: 2021/07/13
Relinquished: 2021/07/15
Received: 2021/07/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7470294	N/A	2021/07/19	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7469680	2021/07/19	2021/07/20	Jeevaraj Jeevaratrnam
Dissolved Metals by ICPMS	ICP/MS	7467733	N/A	2021/07/16	Azita Fazaeli

BV Labs ID: QCN103
Sample ID: TH6
Matrix: Ground Water

Collected: 2021/07/13
Relinquished: 2021/07/15
Received: 2021/07/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7470294	N/A	2021/07/19	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7469680	2021/07/19	2021/07/20	Jeevaraj Jeevaratrnam
Dissolved Metals by ICPMS	ICP/MS	7467733	N/A	2021/07/16	Azita Fazaeli

BV Labs ID: QCN104
Sample ID: TH7
Matrix: Ground Water

Collected: 2021/07/13
Relinquished: 2021/07/15
Received: 2021/07/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7470294	N/A	2021/07/19	Lincoln Ramdahin

BV Labs Job #: C1J7455
Report Date: 2021/07/20

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107

TEST SUMMARY

BV Labs ID: QCN104
Sample ID: TH7
Matrix: Ground Water

Collected: 2021/07/13
Relinquished: 2021/07/15
Received: 2021/07/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7469680	2021/07/19	2021/07/20	Jeevaraj Jeevaratrnam
Dissolved Metals by ICPMS	ICP/MS	7467733	N/A	2021/07/16	Azita Fazaeli

BV Labs ID: QCN105
Sample ID: MW15-01
Matrix: Ground Water

Collected: 2021/07/13
Relinquished: 2021/07/15
Received: 2021/07/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7470294	N/A	2021/07/19	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7469680	2021/07/19	2021/07/20	Jeevaraj Jeevaratrnam
Dissolved Metals by ICPMS	ICP/MS	7467733	N/A	2021/07/16	Azita Fazaeli

BV Labs ID: QCN106
Sample ID: MW15-02
Matrix: Ground Water

Collected: 2021/07/13
Relinquished: 2021/07/15
Received: 2021/07/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7470294	N/A	2021/07/19	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7469680	2021/07/19	2021/07/20	Jeevaraj Jeevaratrnam
Dissolved Metals by ICPMS	ICP/MS	7467733	N/A	2021/07/16	Azita Fazaeli

BV Labs ID: QCN107
Sample ID: DUP B
Matrix: Ground Water

Collected: 2021/07/13
Relinquished: 2021/07/15
Received: 2021/07/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7470294	N/A	2021/07/19	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7469680	2021/07/19	2021/07/20	Jeevaraj Jeevaratrnam
Dissolved Metals by ICPMS	ICP/MS	7467733	N/A	2021/07/16	Azita Fazaeli

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C1J7455
Report Date: 2021/07/20

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	3.3°C

Sample QCN102 [TH5] : F1/BTEX Analysis: Due to high concentration of target analytes, sample required dilution. Reporting limits were adjusted accordingly.

Sample QCN107 [DUP B] : F1/BTEX Analysis: Due to high concentration of target analytes, sample required dilution. Reporting limits were adjusted accordingly.

Results relate only to the items tested.

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BV Labs Job #: C1J7455
Report Date: 2021/07/20

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7467733	AFZ	Method Blank	Dissolved Lead (Pb)	2021/07/16	<0.50		ug/L	
7469680	JJE	Method Blank	o-Terphenyl	2021/07/20		102	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2021/07/20	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2021/07/20	<200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2021/07/20	<200		ug/L	
7470294	LRA	Method Blank	1,4-Difluorobenzene	2021/07/19		98	%	70 - 130
			4-Bromofluorobenzene	2021/07/19		97	%	70 - 130
			D10-o-Xylene	2021/07/19		102	%	70 - 130
			D4-1,2-Dichloroethane	2021/07/19		110	%	70 - 130
			Benzene	2021/07/19	<0.20		ug/L	
			Toluene	2021/07/19	<0.20		ug/L	
			Ethylbenzene	2021/07/19	<0.20		ug/L	
			o-Xylene	2021/07/19	<0.20		ug/L	
			p+m-Xylene	2021/07/19	<0.40		ug/L	
			Total Xylenes	2021/07/19	<0.40		ug/L	
			F1 (C6-C10)	2021/07/19	<25		ug/L	
			F1 (C6-C10) - BTEX	2021/07/19	<25		ug/L	
7467733	AFZ	RPD [QCN101-05]	Dissolved Lead (Pb)	2021/07/16	7.1		%	20
7467733	AFZ	Matrix Spike [QCN101-05]	Dissolved Lead (Pb)	2021/07/16		92	%	80 - 120
7467733	AFZ	LCS	Dissolved Lead (Pb)	2021/07/16		95	%	80 - 120
7469680	JJE	LCS	o-Terphenyl	2021/07/20		101	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2021/07/20		99	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2021/07/20		98	%	60 - 130
			F4 (C34-C50 Hydrocarbons)	2021/07/20		101	%	60 - 130
7470294	LRA	LCS	1,4-Difluorobenzene	2021/07/19		93	%	70 - 130
			4-Bromofluorobenzene	2021/07/19		105	%	70 - 130
			D10-o-Xylene	2021/07/19		97	%	70 - 130
			D4-1,2-Dichloroethane	2021/07/19		95	%	70 - 130
			Benzene	2021/07/19		105	%	50 - 140
			Toluene	2021/07/19		97	%	50 - 140
			Ethylbenzene	2021/07/19		115	%	50 - 140
			o-Xylene	2021/07/19		112	%	50 - 140
			p+m-Xylene	2021/07/19		101	%	50 - 140
			F1 (C6-C10)	2021/07/19		92	%	60 - 140

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

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BV Labs Job #: C1J7455
Report Date: 2021/07/20

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



Brad Newman, B.Sc., C.Chem., Scientific Service Specialist

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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eCOC: T375815

Project Information:	C1J7455
Job Received:	2021/07/15 15:33
Results Required By:	2021/07/22 17:00
Expected Arrival:	2021/07/15 17:00
Submitted By:	Nancy Kessler
Submitted To:	Mississauga, ON (Env. Lab)

Invoice Information

Attn: Imperial Accounts Payable
Imperial Oil Ltd - Golder Associates Ltd
102, 2535-3rd Avenue SE
Calgary , AB , T2A 7W5
Email to:
canadaaccountspayableinvoices@golder.com

Report Information

Attn: Ian Sosney
Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines , ON , L2W 1A4
Email to:
ian_sosney@golder.com
iol_1390@golder.com
iol_equis@golder.com

Project Information

Quote #:	B73682
PO/AFE#:	A2601436
Project #:	20447743-1155-2107
Site Location:	N/A;1660 Merivale Road, Ottawa, ON
Site #:	NA
Task Order:	20447743-1155-7777
Line Item:	NA

Analytical Summary

A: 2021/07/22 17:00
M: Manually added test

Client Sample ID	Clnt Ref	Sampling Date/Time	Matrix	#Cont	O.Reg 153 PHCs in Water	BTEX	Dissolved Lead
TH2	1	2021/07/13 12:15	GROUND WATER	10	A	M	M
TH3	2	2021/07/13 12:45	GROUND WATER	10	A	M	M
TH5	3	2021/07/13 09:20	GROUND WATER	10	A	M	M
TH6	4	2021/07/13 10:35	GROUND WATER	10	A	M	M
TH7	5	2021/07/13 10:00	GROUND WATER	10	A	M	M
MW15-01	6	2021/07/13 11:10	GROUND WATER	10	A	M	M
MW15-02	7	2021/07/13 11:45	GROUND WATER	10	A	M	M
DUP B	8	2021/07/13 09:20	GROUND WATER	10	A	M	M

Deadlines are estimates only and are subject to change. Please refer to your Job Confirmation report for final due dates.
Criteria : Reg153/04 T3-GW-F/M

Submission Information

# of Samples: 8

Details: SAP #: 88001627
IES#: A2601436
Bubbles may develop due to degassing. Sediment may be present due to water column.

eCOC: T375815

Project Information:	C1J7455
Job Received:	2021/07/15 15:33
Results Required By:	2021/07/22 17:00
Expected Arrival:	2021/07/15 17:00
Submitted By:	Nancy Kessler
Submitted To:	Mississauga, ON (Env. Lab)

Custody Tracking Form

onsite

eCOC Number
T 375815

Please use this form for custody tracking when submitting the work instructions via eCOC (electronic Chain of Custody). Please ensure your form **has a barcode or a Bureau Veritas eCOC confirmation number** in the top right hand side. This number links your electronic submission to your samples. This form should be **placed in the cooler with your samples.**

Relinquished By				Received By			
Colleen Chapman		Date	15/07/21			Date	
Colleen Chapman		Time (24 HR)	3:25			Time (24 HR)	
Nancy Kessler		Date	15/07/21			Date	15/07/15
		Time (24 HR)	3:25			Time (24 HR)	15:33
		Date				Date	
		Time (24 HR)				Time (24 HR)	

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Triage Information

Sampled By (Print)	# of Coolers/Pkgs				
Nancy Kessler Colleen Chapman	1	Rush ☐	Immediate Test ☐	Food Residue ☐	
		Micro ☐		Food Chemistry ☐	

••• Laboratory Use Only •••

Received At	Mississauga
Labeled By	KTN
Verified By	URE

Lab Comments: CIJ7455

Custody Seal		Cooling Media	Temperature °C		
Present (Y/N)	Intact (Y/N)	Present (Y/N)	1	2	3
Y	Y	Y	3	3	4

Drinking Water Metals Preservation Check Done (Circle) YES NO

COR FCD-00340 /5 PAGE 1 of 1

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: July 13, 2021

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Bureau Veritas Mississauga

Consultant Project Number: 20447743-1155

Sample Submission Number: C1J7455

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within
Extraction Surrogate Recovery	X			acceptance criteria.
Method Blank Concentration	X			
Matrix Duplicate RPD	X			
Matrix Spike Recovery	X			
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	All field QC samples are within
Trip Blank Concentration			X	alert limits.
Field Duplicate RPD	X			

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): Amanda Newberry

Date: July 22, 2021

Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107
Your C.O.C. #: 375823

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2021/07/20
Report #: R6728286
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1J7459
Received: 2021/07/15, 16:41

Sample Matrix: Water
Samples Received: 2

Analyses	Quantity	Laboratory Method	Analytical Method
Petroleum Hydro. CCME F1 & BTEX in Water	2	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1)	2	CAM SOP-00316	CCME PHC-CWS m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard. All samples were analyzed within hold time unless otherwise flagged.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
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Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas Laboratories conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following "Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003". Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107
Your C.O.C. #: 375823

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2021/07/20
Report #: R6728286
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1J7459
Received: 2021/07/15, 16:41

Encryption Key



Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Gina Baybayan, Project Manager
Email: Gina.Baybayan@bureauveritas.com
Phone# (905)817-5766

==========

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

BV Labs Job #: C1J7459
Report Date: 2021/07/20

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107

O.REG 153 PHCS IN WATER (WATER)

BV Labs ID			QCN132	QCN133		
Sampling Date			2021/07/15 01:50	2021/07/15 01:45		
COC Number			375823	375823		
	UNITS	**Criteria**	**Trip Blank**	**F. Blank**	**RDL**	**QC Batch**
Benzene	ug/L	**430**	<0.20	<0.20	0.20	7470294
Toluene	ug/L	**18000**	<0.20	<0.20	0.20	7470294
Ethylbenzene	ug/L	**2300**	<0.20	<0.20	0.20	7470294
o-Xylene	ug/L	-	<0.20	<0.20	0.20	7470294
p+m-Xylene	ug/L	-	<0.40	<0.40	0.40	7470294
Total Xylenes	ug/L	**4200**	<0.40	<0.40	0.40	7470294
F1 (C6-C10)	ug/L	**750**	<25	<25	25	7470294
F1 (C6-C10) - BTEX	ug/L	**750**	<25	<25	25	7470294
F2 (C10-C16 Hydrocarbons)	ug/L	**150**	<100	<100	100	7471595
F3 (C16-C34 Hydrocarbons)	ug/L	**500**	<200	<200	200	7471595
F4 (C34-C50 Hydrocarbons)	ug/L	**500**	<200	<200	200	7471595
Reached Baseline at C50	ug/L	-	Yes	Yes		7471595
Extraction Surrogate Recovery (%)						
D10-o-Xylene	%	-	102	103		7470294
o-Terphenyl	%	-	95	91		7471595
Instrument Surrogate Recovery (%)						
1,4-Difluorobenzene	%	-	98	97		7470294
4-Bromofluorobenzene	%	-	100	101		7470294
D4-1,2-Dichloroethane	%	-	118	113		7470294

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition
Non-Potable Ground Water - All Types of Property Uses - Medium and Fine Textured Soil

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C1J7459
Report Date: 2021/07/20

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107

TEST SUMMARY

BV Labs ID: QCN132
Sample ID: Trip Blank
Matrix: Water

Collected: 2021/07/15
Relinquished: 2021/07/15
Received: 2021/07/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7470294	N/A	2021/07/19	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7471595	2021/07/19	2021/07/20	Ksenia Trofimova

BV Labs ID: QCN133
Sample ID: F. Blank
Matrix: Water

Collected: 2021/07/15
Relinquished: 2021/07/15
Received: 2021/07/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7470294	N/A	2021/07/19	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7471595	2021/07/19	2021/07/20	Ksenia Trofimova

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C1J7459
Report Date: 2021/07/20

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107

GENERAL COMMENTS

Results relate only to the items tested.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C1J7459
Report Date: 2021/07/20

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7470294	LRA	Method Blank	1,4-Difluorobenzene	2021/07/19		98	%	70 - 130
			4-Bromofluorobenzene	2021/07/19		97	%	70 - 130
			D10-o-Xylene	2021/07/19		102	%	70 - 130
			D4-1,2-Dichloroethane	2021/07/19		110	%	70 - 130
			Benzene	2021/07/19	<0.20		ug/L	
			Toluene	2021/07/19	<0.20		ug/L	
			Ethylbenzene	2021/07/19	<0.20		ug/L	
			o-Xylene	2021/07/19	<0.20		ug/L	
			p+m-Xylene	2021/07/19	<0.40		ug/L	
			Total Xylenes	2021/07/19	<0.40		ug/L	
			F1 (C6-C10)	2021/07/19	<25		ug/L	
			F1 (C6-C10) - BTEX	2021/07/19	<25		ug/L	
7471595	KTR	Method Blank	o-Terphenyl	2021/07/20		92	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2021/07/20	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2021/07/20	<200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2021/07/20	<200		ug/L	
7470294	LRA	LCS	1,4-Difluorobenzene	2021/07/19		93	%	70 - 130
			4-Bromofluorobenzene	2021/07/19		105	%	70 - 130
			D10-o-Xylene	2021/07/19		97	%	70 - 130
			D4-1,2-Dichloroethane	2021/07/19		95	%	70 - 130
			Benzene	2021/07/19		105	%	50 - 140
			Toluene	2021/07/19		97	%	50 - 140
			Ethylbenzene	2021/07/19		115	%	50 - 140
			o-Xylene	2021/07/19		112	%	50 - 140
			p+m-Xylene	2021/07/19		101	%	50 - 140
			F1 (C6-C10)	2021/07/19		92	%	60 - 140
7471595	KTR	LCS	o-Terphenyl	2021/07/20		91	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2021/07/20		92	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2021/07/20		92	%	60 - 130
			F4 (C34-C50 Hydrocarbons)	2021/07/20		94	%	60 - 130

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C1J7459
Report Date: 2021/07/20

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2107

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



Brad Newman, B.Sc., C.Chem., Scientific Service Specialist

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

eCOC: T375823

Project Information:	C1J7459
Job Received:	2021/07/15 16:41
Results Required By:	2021/07/22 17:00
Expected Arrival:	2021/07/15 17:00
Submitted By:	Nancy Kessler
Submitted To:	Mississauga, ON (Env. Lab)

Invoice Information

Attn: Imperial Accounts Payable
Imperial Oil Ltd - Golder Associates Ltd
102, 2535-3rd Avenue SE
Calgary , AB , T2A 7W5
Email to:
canadaaccountspayableinvoices@golder.com

Report Information

Attn: Ian Sosney
Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines , ON , L2W 1A4
Email to:
ian_sosney@golder.com
iol_1390@golder.com
iol_equis@golder.com

Project Information

Quote #:	B73682
PO/AFE#:	A2601436
Project #:	20447743-1155-2107
Site Location:	N/A;1660 Merivale Road, Ottawa, ON
Site #:	NA
Task Order:	20447743-1155-7777
Line Item:	NA

Analytical Summary

A: 2021/07/22 17:00
M: Manually added test

Client Sample ID	Clnt Ref	Sampling Date/Time	Matrix	#Cont	O.Reg 153 PHCs in Water	BTEX
Trip Blank	1	2021/07/15 01:50	WATER	6	A	M
F. Blank	2	2021/07/15 01:45	WATER	6	A	M

Deadlines are estimates only and are subject to change. Please refer to your Job Confirmation report for final due dates.
Criteria : Reg153/04 T3-GW-F/M

Submission Information

# of Samples:	2
Details:	SAP#: 88001627 IES#: A2601436

Custody Tracking Form

TB/FB

eCOC Number
T375823

Please use this form for custody tracking when submitting the work instructions via eCOC (electronic Chain of Custody). Please ensure your form **has a barcode or a Bureau Veritas eCOC confirmation number** in the top right hand side. This number links your electronic submission to your samples. This form should be **placed in the cooler with your samples.**

Relinquished By			Received By			
Colleen Chapman		Date: 15/07/21			Date:	
Colleen Chapman		Time (24 HR): 3:25			Time (24 HR):	
Nancy Kossler	Nancy Kossler	Date: 15/07/21	Mark McCue		Date: 15/07/15	
		Time (24 HR): 3:25			Time (24 HR): 15:33	
		Date:			Date:	
		Time (24 HR):			Time (24 HR):	

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Triage Information

Sampled By (Print): Nancy Kossler / Colleen Chapman

# of Coolers/Pkgs: 1

Rush ☐ Immediate Test ☐ Food Residue ☐

Micro ☐ Food Chemistry ☐

***** Laboratory Use Only *****

Received At: Mississauga

Labeled By: KTN

Verified By: URE

Lab Comments: CIJ7459

Custody Seal		Cooling Media	Temperature °C		
Present (Y/N)	Intact (Y/N)	Present (Y/N)	1	2	3
Y	Y	Y	3	3	4

Drinking Water Metals Preservation Check Done (Circle) YES NO

COR FCD-00340/5 PAGE 1 of 1

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: July 15, 2021

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Bureau Veritas Mississauga

Consultant Project Number: 20447743-1155

Sample Submission Number: C1J7459

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within
Extraction Surrogate Recovery	X			acceptance criteria.
Method Blank Concentration	X			
Matrix Duplicate RPD			X	
Matrix Spike Recovery			X	
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration	X			All field QC samples are within
Trip Blank Concentration	X			alert limits.
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): Amanda Newberry

Date: July 22, 2021

Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2123
Your C.O.C. #: 82073

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2021/02/09
Report #: R6511548
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C123966
Received: 2021/01/28, 09:30

Sample Matrix: Air
Samples Received: 3

Analyses	Quantity	Laboratory Method	Analytical Method
BTEX and CCME Compounds in Air(TO-15mod)	3	BRL SOP-00304	EPA TO-15 m
Canister Pressure (TO-15)	3	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (ug/m3)	3	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (TO-15) (1)	3	BRL SOP-00304	EPA TO-15 m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard. All samples were analyzed within hold time unless otherwise flagged.

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Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Air sampling canisters have been cleaned in accordance with U.S. EPA Method TO15. At the end of the cleaning, evacuation, and pressurization cycles, one canister was selected and was pressurized with Zero Air. This canister was then analyzed via TO15 on a GC/MS. The canister must have been found to contain <0.2 ppbv concentration of all target analytes in order for the batch to have been considered clean. Each canister also underwent a leak check prior to shipment.

Please Note: SUMMA® canister samples will be retained by Bureau Veritas Laboratories for a period of 5 calendar days or as contractually agreed from the date of this report, after which time they will be cleaned for reuse. If you require a longer sample storage period, please contact your service representative.

Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2123
Your C.O.C. #: 82073

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2021/02/09
Report #: R6511548
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C123966
Received: 2021/01/28, 09:30

Encryption Key

Kyle Reinhart
CET LEAD-Air Toxics, Source Evaluation
09 Feb 2021 17:31:52

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kyle Reinhart, CET LEAD-Air Toxics, Source Evaluation
Email: Kyle.Reinhart@bureauveritas.com
Phone# (905)817-5802

==========

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C123966
Report Date: 2021/02/09

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2123

RESULTS OF ANALYSES OF AIR

BV Labs ID		OSE272	OSE273	OSE274	
Sampling Date		2021/01/27 12:56	2021/01/27 14:24	2021/01/27 14:24	
COC Number		82073	82073	82073	
	UNITS	**SV16-01**	**SV16-02**	**DUP A**	**QC Batch**
Pressure on Receipt	psig	(-1.9)	(-2.5)	(-2.3)	7177834
QC Batch = Quality Control Batch					

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BV Labs Job #: C123966
Report Date: 2021/02/09

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2123

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		OSE272	OSE272	OSE273	OSE274		
Sampling Date		2021/01/27 12:56	2021/01/27 12:56	2021/01/27 14:24	2021/01/27 14:24		
COC Number		82073	82073	82073	82073		
	UNITS	**SV16-01**	**SV16-01 Lab-Dup**	**SV16-02**	**DUP A**	**RDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ppbv	0.91	0.93	1.77	1.70	0.20	7175213
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	<0.17	<0.17	<0.17	0.17	7175213
Chloromethane	ppbv	<0.30	<0.30	<0.30	0.42	0.30	7175213
Vinyl Chloride	ppbv	<0.10	<0.10	<0.10	<0.10	0.10	7175213
Chloroethane	ppbv	<0.30	<0.30	<0.30	<0.30	0.30	7175213
1,3-Butadiene	ppbv	<0.50	<0.50	<0.50	<0.50	0.50	7175213
Trichlorofluoromethane (FREON 11)	ppbv	<0.20	<0.20	<0.20	<0.20	0.20	7175213
Ethanol (ethyl alcohol)	ppbv	2.3	1.6	1.6	5.6	1.0	7175213
Trichlorotrifluoroethane	ppbv	<0.15	<0.15	<0.15	<0.15	0.15	7175213
2-propanol	ppbv	<1.0	<1.0	<1.0	<1.0	1.0	7175213
2-Propanone	ppbv	4.21	4.24	1.96	8.45	0.60	7175213
Methyl Ethyl Ketone (2-Butanone)	ppbv	0.62	0.65	<0.20	0.21	0.20	7175213
Methyl Isobutyl Ketone	ppbv	<0.20	<0.20	<0.20	<0.20	0.20	7175213
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	<1.0	<1.0	<1.0	1.0	7175213
Methyl t-butyl ether (MTBE)	ppbv	<0.20	<0.20	<0.20	<0.20	0.20	7175213
Ethyl Acetate	ppbv	<1.0	<1.0	<1.0	<1.0	1.0	7175213
1,1-Dichloroethylene	ppbv	<0.10	<0.10	<0.10	<0.10	0.10	7175213
cis-1,2-Dichloroethylene	ppbv	<0.10	<0.10	<0.10	<0.10	0.10	7175213
trans-1,2-Dichloroethylene	ppbv	<0.10	<0.10	<0.10	<0.10	0.10	7175213
Methylene Chloride(Dichloromethane)	ppbv	<0.60	<0.60	<0.60	<0.60	0.60	7175213
Chloroform	ppbv	2.72	2.74	<0.10	<0.10	0.10	7175213
Carbon Tetrachloride	ppbv	<0.10	<0.10	<0.10	<0.10	0.10	7175213
1,1-Dichloroethane	ppbv	<0.10	<0.10	<0.10	<0.10	0.10	7175213
1,2-Dichloroethane	ppbv	<0.10	<0.10	<0.10	<0.10	0.10	7175213
Ethylene Dibromide	ppbv	<0.10	<0.10	<0.10	<0.10	0.10	7175213
1,1,1-Trichloroethane	ppbv	<0.10	<0.10	<0.10	<0.10	0.10	7175213
1,1,2-Trichloroethane	ppbv	<0.10	<0.10	<0.10	<0.10	0.10	7175213
1,1,2,2-Tetrachloroethane	ppbv	<0.10	<0.10	<0.10	<0.10	0.10	7175213
cis-1,3-Dichloropropene	ppbv	<0.10	<0.10	<0.10	<0.10	0.10	7175213
trans-1,3-Dichloropropene	ppbv	<0.10	<0.10	<0.10	<0.10	0.10	7175213
1,2-Dichloropropane	ppbv	<0.10	<0.10	<0.10	<0.10	0.10	7175213
Bromomethane	ppbv	<0.10	<0.10	<0.10	<0.10	0.10	7175213
Bromoform	ppbv	<0.20	<0.20	<0.20	<0.20	0.20	7175213

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		OSE272	OSE272	OSE273	OSE274		
Sampling Date		2021/01/27 12:56	2021/01/27 12:56	2021/01/27 14:24	2021/01/27 14:24		
COC Number		82073	82073	82073	82073		
	UNITS	**SV16-01**	**SV16-01 Lab-Dup**	**SV16-02**	**DUP A**	**RDL**	**QC Batch**
Bromodichloromethane	ppbv	<0.20	<0.20	<0.20	<0.20	0.20	7175213
Dibromochloromethane	ppbv	<0.20	<0.20	<0.20	<0.20	0.20	7175213
Trichloroethylene	ppbv	<0.10	<0.10	1.36	1.29	0.10	7175213
Tetrachloroethylene	ppbv	0.35	0.36	<0.10	<0.10	0.10	7175213
Benzene	ppbv	<0.10	<0.10	<0.10	0.10	0.10	7175213
Toluene	ppbv	<0.10	<0.10	<0.10	0.38	0.10	7175213
Ethylbenzene	ppbv	0.12	0.12	<0.10	<0.10	0.10	7175213
p+m-Xylene	ppbv	0.34	0.34	<0.20	0.35	0.20	7175213
o-Xylene	ppbv	0.10	0.11	<0.10	<0.10	0.10	7175213
Styrene	ppbv	<0.10	<0.10	<0.10	<0.10	0.10	7175213
4-ethyltoluene	ppbv	<0.50	<0.50	<0.50	<0.50	0.50	7175213
1,3,5-Trimethylbenzene	ppbv	<0.50	<0.50	<0.50	<0.50	0.50	7175213
1,2,4-Trimethylbenzene	ppbv	<0.50	<0.50	<0.50	<0.50	0.50	7175213
Chlorobenzene	ppbv	<0.10	<0.10	<0.10	<0.10	0.10	7175213
Benzyl chloride	ppbv	<0.50	<0.50	<0.50	<0.50	0.50	7175213
1,3-Dichlorobenzene	ppbv	<0.40	<0.40	<0.40	<0.40	0.40	7175213
1,4-Dichlorobenzene	ppbv	<0.10	<0.10	<0.10	<0.10	0.10	7175213
1,2-Dichlorobenzene	ppbv	<0.10	<0.10	<0.10	<0.10	0.10	7175213
1,2,4-Trichlorobenzene	ppbv	<0.50	<0.50	<0.50	<0.50	0.50	7175213
Hexachlorobutadiene	ppbv	<0.50	<0.50	<0.50	<0.50	0.50	7175213
Hexane	ppbv	<0.20	<0.20	<0.20	0.74	0.20	7175213
Heptane	ppbv	<0.30	<0.30	<0.30	<0.30	0.30	7175213
Cyclohexane	ppbv	<0.20	<0.20	<0.20	<0.20	0.20	7175213
Tetrahydrofuran	ppbv	<0.40	<0.40	<0.40	<0.40	0.40	7175213
1,4-Dioxane	ppbv	<1.0	<1.0	<1.0	2.4	1.0	7175213
Naphthalene	ppbv	<0.20	<0.20	<0.20	<0.20	0.20	7175213
Total Xylenes	ppbv	0.44	0.44	<0.30	0.35	0.30	7175213
1,1,1,2-Tetrachloroethane	ppbv	<0.10	<0.10	<0.10	<0.10	0.10	7175213
Vinyl Bromide	ppbv	<0.20	<0.20	<0.20	<0.20	0.20	7175213
Propene	ppbv	<0.50	<0.50	<0.50	<0.50	0.50	7175213
2,2,4-Trimethylpentane	ppbv	<0.20	<0.20	<0.20	<0.20	0.20	7175213
Carbon Disulfide	ppbv	<0.50	<0.50	<0.50	0.94	0.50	7175213
Vinyl Acetate	ppbv	<0.20	<0.20	<0.20	<0.20	0.20	7175213

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C123966
Report Date: 2021/02/09

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2123

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		OSE272	OSE272	OSE273	OSE274		
Sampling Date		2021/01/27 12:56	2021/01/27 12:56	2021/01/27 14:24	2021/01/27 14:24		
COC Number		82073	82073	82073	82073		
	UNITS	**SV16-01**	**SV16-01 Lab-Dup**	**SV16-02**	**DUP A**	**RDL**	**QC Batch**
Instrument Surrogate Recovery (%)							
Bromochloromethane	%	103	102	104	103		7175213
D5-Chlorobenzene	%	101	100	100	100		7175213
Difluorobenzene	%	105	104	106	105		7175213

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2123

CALCULATED VOLATILE ORGANICS (AIR)

BV Labs ID		OSE272	OSE272	OSE273	OSE274		
Sampling Date		2021/01/27 12:56	2021/01/27 12:56	2021/01/27 14:24	2021/01/27 14:24		
COC Number		82073	82073	82073	82073		
	UNITS	**SV16-01**	**SV16-01 Lab-Dup**	**SV16-02**	**DUP A**	**RDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ug/m3	4.49	4.58	8.77	8.41	0.99	7173488
1,2-Dichlorotetrafluoroethane	ug/m3	<1.2	<1.2	<1.2	<1.2	1.2	7173488
Chloromethane	ug/m3	<0.62	<0.62	<0.62	0.87	0.62	7173488
Vinyl Chloride	ug/m3	<0.26	<0.26	<0.26	<0.26	0.26	7173488
Chloroethane	ug/m3	<0.79	<0.79	<0.79	<0.79	0.79	7173488
1,3-Butadiene	ug/m3	<1.1	<1.1	<1.1	<1.1	1.1	7173488
Trichlorofluoromethane (FREON 11)	ug/m3	<1.1	<1.1	<1.1	<1.1	1.1	7173488
Ethanol (ethyl alcohol)	ug/m3	4.4	3.1	2.9	10.5	1.9	7173488
Trichlorotrifluoroethane	ug/m3	<1.2	<1.2	<1.2	<1.2	1.2	7173488
2-propanol	ug/m3	<2.5	<2.5	<2.5	<2.5	2.5	7173488
2-Propanone	ug/m3	10.0	10.1	4.7	20.1	1.4	7173488
Methyl Ethyl Ketone (2-Butanone)	ug/m3	1.83	1.92	<0.59	0.63	0.59	7173488
Methyl Isobutyl Ketone	ug/m3	<0.82	<0.82	<0.82	<0.82	0.82	7173488
Methyl Butyl Ketone (2-Hexanone)	ug/m3	<4.1	<4.1	<4.1	<4.1	4.1	7173488
Methyl t-butyl ether (MTBE)	ug/m3	<0.72	<0.72	<0.72	<0.72	0.72	7173488
Ethyl Acetate	ug/m3	<3.6	<3.6	<3.6	<3.6	3.6	7173488
1,1-Dichloroethylene	ug/m3	<0.40	<0.40	<0.40	<0.40	0.40	7173488
cis-1,2-Dichloroethylene	ug/m3	<0.40	<0.40	<0.40	<0.40	0.40	7173488
trans-1,2-Dichloroethylene	ug/m3	<0.40	<0.40	<0.40	<0.40	0.40	7173488
Methylene Chloride(Dichloromethane)	ug/m3	<2.1	<2.1	<2.1	<2.1	2.1	7173488
Chloroform	ug/m3	13.3	13.4	<0.49	<0.49	0.49	7173488
Carbon Tetrachloride	ug/m3	<0.63	<0.63	<0.63	<0.63	0.63	7173488
1,1-Dichloroethane	ug/m3	<0.40	<0.40	<0.40	<0.40	0.40	7173488
1,2-Dichloroethane	ug/m3	<0.40	<0.40	<0.40	<0.40	0.40	7173488
Ethylene Dibromide	ug/m3	<0.77	<0.77	<0.77	<0.77	0.77	7173488
1,1,1-Trichloroethane	ug/m3	<0.55	<0.55	<0.55	<0.55	0.55	7173488
1,1,2-Trichloroethane	ug/m3	<0.55	<0.55	<0.55	<0.55	0.55	7173488
1,1,2,2-Tetrachloroethane	ug/m3	<0.69	<0.69	<0.69	<0.69	0.69	7173488
cis-1,3-Dichloropropene	ug/m3	<0.45	<0.45	<0.45	<0.45	0.45	7173488
trans-1,3-Dichloropropene	ug/m3	<0.45	<0.45	<0.45	<0.45	0.45	7173488
1,2-Dichloropropane	ug/m3	<0.46	<0.46	<0.46	<0.46	0.46	7173488
Bromomethane	ug/m3	<0.39	<0.39	<0.39	<0.39	0.39	7173488
Bromoform	ug/m3	<2.1	<2.1	<2.1	<2.1	2.1	7173488

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2123

CALCULATED VOLATILE ORGANICS (AIR)

BV Labs ID		OSE272	OSE272	OSE273	OSE274		
Sampling Date		2021/01/27 12:56	2021/01/27 12:56	2021/01/27 14:24	2021/01/27 14:24		
COC Number		82073	82073	82073	82073		
	UNITS	**SV16-01**	**SV16-01 Lab-Dup**	**SV16-02**	**DUP A**	**RDL**	**QC Batch**
Bromodichloromethane	ug/m3	<1.3	<1.3	<1.3	<1.3	1.3	7173488
Dibromochloromethane	ug/m3	<1.7	<1.7	<1.7	<1.7	1.7	7173488
Trichloroethylene	ug/m3	<0.54	<0.54	7.33	6.92	0.54	7173488
Tetrachloroethylene	ug/m3	2.38	2.46	<0.68	<0.68	0.68	7173488
Benzene	ug/m3	<0.32	<0.32	<0.32	0.33	0.32	7173488
Toluene	ug/m3	<0.38	<0.38	<0.38	1.44	0.38	7173488
Ethylbenzene	ug/m3	0.50	0.51	<0.43	<0.43	0.43	7173488
p+m-Xylene	ug/m3	1.46	1.46	<0.87	1.51	0.87	7173488
o-Xylene	ug/m3	0.44	0.47	<0.43	<0.43	0.43	7173488
Styrene	ug/m3	<0.43	<0.43	<0.43	<0.43	0.43	7173488
4-ethyltoluene	ug/m3	<2.5	<2.5	<2.5	<2.5	2.5	7173488
1,3,5-Trimethylbenzene	ug/m3	<2.5	<2.5	<2.5	<2.5	2.5	7173488
1,2,4-Trimethylbenzene	ug/m3	<2.5	<2.5	<2.5	<2.5	2.5	7173488
Chlorobenzene	ug/m3	<0.46	<0.46	<0.46	<0.46	0.46	7173488
Benzyl chloride	ug/m3	<2.6	<2.6	<2.6	<2.6	2.6	7173488
1,3-Dichlorobenzene	ug/m3	<2.4	<2.4	<2.4	<2.4	2.4	7173488
1,4-Dichlorobenzene	ug/m3	<0.60	<0.60	<0.60	<0.60	0.60	7173488
1,2-Dichlorobenzene	ug/m3	<0.60	<0.60	<0.60	<0.60	0.60	7173488
1,2,4-Trichlorobenzene	ug/m3	<3.7	<3.7	<3.7	<3.7	3.7	7173488
Hexachlorobutadiene	ug/m3	<5.3	<5.3	<5.3	<5.3	5.3	7173488
Hexane	ug/m3	<0.70	<0.70	<0.70	2.62	0.70	7173488
Heptane	ug/m3	<1.2	<1.2	<1.2	<1.2	1.2	7173488
Cyclohexane	ug/m3	<0.69	<0.69	<0.69	<0.69	0.69	7173488
Tetrahydrofuran	ug/m3	<1.2	<1.2	<1.2	<1.2	1.2	7173488
1,4-Dioxane	ug/m3	<3.6	<3.6	<3.6	8.7	3.6	7173488
Naphthalene	ug/m3	<1.0	<1.0	<1.0	<1.0	1.0	7173488
Total Xylenes	ug/m3	1.9	1.9	<1.3	1.5	1.3	7173488
1,1,1,2-Tetrachloroethane	ug/m3	<0.69	<0.69	<0.69	<0.69	0.69	7173488
Vinyl Bromide	ug/m3	<0.87	<0.87	<0.87	<0.87	0.87	7173488
Propene	ug/m3	<0.86	<0.86	<0.86	<0.86	0.86	7173488
2,2,4-Trimethylpentane	ug/m3	<0.93	<0.93	<0.93	<0.93	0.93	7173488
Carbon Disulfide	ug/m3	<1.6	<1.6	<1.6	2.9	1.6	7173488
Vinyl Acetate	ug/m3	<0.70	<0.70	<0.70	<0.70	0.70	7173488

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C123966
Report Date: 2021/02/09

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2123

VOLATILE ORGANIC HYDROCARBONS BY GC/MS (AIR)

BV Labs ID		OSE272	OSE272	OSE273	OSE274		
Sampling Date		2021/01/27 12:56	2021/01/27 12:56	2021/01/27 14:24	2021/01/27 14:24		
COC Number		82073	82073	82073	82073		
	UNITS	**SV16-01**	**SV16-01 Lab-Dup**	**SV16-02**	**DUP A**	**RDL**	**QC Batch**
F1-BTEX, C6-C10 (as Toluene)	ug/m3	138	170	32.1	45.1	5.0	7179788
F2, C10-C16 (as Decane)	ug/m3	197	198	89.6	84.7	5.0	7179788

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C123966
Report Date: 2021/02/09

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2123

TEST SUMMARY

BV Labs ID: OSE272
Sample ID: SV16-01
Matrix: Air

Collected: 2021/01/27
Relinquished: 2021/01/27
Received: 2021/01/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	7179788	N/A	2021/01/29	Nicholas Smith
Canister Pressure (TO-15)	PRES	7177834	N/A	2021/01/29	Nicholas Smith
Volatile Organics in Air (ug/m3)	GC/MS	7173488	N/A	2021/02/02	Automated Statchk
Volatile Organics in Air (TO-15)	GC/MS	7175213	N/A	2021/01/29	Nicholas Smith

BV Labs ID: OSE272 Dup
Sample ID: SV16-01
Matrix: Air

Collected: 2021/01/27
Relinquished: 2021/01/27
Received: 2021/01/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	7179788	N/A	2021/01/29	Nicholas Smith
Volatile Organics in Air (ug/m3)	GC/MS	7173488	N/A	2021/02/09	Automated Statchk
Volatile Organics in Air (TO-15)	GC/MS	7175213	N/A	2021/01/29	Nicholas Smith

BV Labs ID: OSE273
Sample ID: SV16-02
Matrix: Air

Collected: 2021/01/27
Relinquished: 2021/01/27
Received: 2021/01/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	7179788	N/A	2021/01/29	Nicholas Smith
Canister Pressure (TO-15)	PRES	7177834	N/A	2021/01/29	Nicholas Smith
Volatile Organics in Air (ug/m3)	GC/MS	7173488	N/A	2021/02/02	Automated Statchk
Volatile Organics in Air (TO-15)	GC/MS	7175213	N/A	2021/01/29	Nicholas Smith

BV Labs ID: OSE274
Sample ID: DUP A
Matrix: Air

Collected: 2021/01/27
Relinquished: 2021/01/27
Received: 2021/01/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	7179788	N/A	2021/01/29	Nicholas Smith
Canister Pressure (TO-15)	PRES	7177834	N/A	2021/01/29	Nicholas Smith
Volatile Organics in Air (ug/m3)	GC/MS	7173488	N/A	2021/02/02	Automated Statchk
Volatile Organics in Air (TO-15)	GC/MS	7175213	N/A	2021/01/29	Nicholas Smith

GENERAL COMMENTS

Results relate only to the items tested.

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7175213	NS2	Method Blank	Bromochloromethane	2021/01/29		105	%	60 - 140
			D5-Chlorobenzene	2021/01/29		102	%	60 - 140
			Difluorobenzene	2021/01/29		107	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2021/01/29	<0.20		ppbv	
			1,2-Dichlorotetrafluoroethane	2021/01/29	<0.17		ppbv	
			Chloromethane	2021/01/29	<0.30		ppbv	
			Vinyl Chloride	2021/01/29	<0.10		ppbv	
			Chloroethane	2021/01/29	<0.30		ppbv	
			1,3-Butadiene	2021/01/29	<0.50		ppbv	
			Trichlorofluoromethane (FREON 11)	2021/01/29	<0.20		ppbv	
			Ethanol (ethyl alcohol)	2021/01/29	<1.0		ppbv	
			Trichlorotrifluoroethane	2021/01/29	<0.15		ppbv	
			2-propanol	2021/01/29	<1.0		ppbv	
			2-Propanone	2021/01/29	<0.60		ppbv	
			Methyl Ethyl Ketone (2-Butanone)	2021/01/29	<0.20		ppbv	
			Methyl Isobutyl Ketone	2021/01/29	<0.20		ppbv	
			Methyl Butyl Ketone (2-Hexanone)	2021/01/29	<1.0		ppbv	
			Methyl t-butyl ether (MTBE)	2021/01/29	<0.20		ppbv	
			Ethyl Acetate	2021/01/29	<1.0		ppbv	
			1,1-Dichloroethylene	2021/01/29	<0.10		ppbv	
			cis-1,2-Dichloroethylene	2021/01/29	<0.10		ppbv	
			trans-1,2-Dichloroethylene	2021/01/29	<0.10		ppbv	
			Methylene Chloride(Dichloromethane)	2021/01/29	<0.60		ppbv	
			Chloroform	2021/01/29	<0.10		ppbv	
			Carbon Tetrachloride	2021/01/29	<0.10		ppbv	
			1,1-Dichloroethane	2021/01/29	<0.10		ppbv	
			1,2-Dichloroethane	2021/01/29	<0.10		ppbv	
			Ethylene Dibromide	2021/01/29	<0.10		ppbv	
			1,1,1-Trichloroethane	2021/01/29	<0.10		ppbv	
			1,1,2-Trichloroethane	2021/01/29	<0.10		ppbv	
			1,1,2,2-Tetrachloroethane	2021/01/29	<0.10		ppbv	
			cis-1,3-Dichloropropene	2021/01/29	<0.10		ppbv	
			trans-1,3-Dichloropropene	2021/01/29	<0.10		ppbv	
			1,2-Dichloropropane	2021/01/29	<0.10		ppbv	
			Bromomethane	2021/01/29	<0.10		ppbv	
			Bromoform	2021/01/29	<0.20		ppbv	
			Bromodichloromethane	2021/01/29	<0.20		ppbv	
			Dibromochloromethane	2021/01/29	<0.20		ppbv	
			Trichloroethylene	2021/01/29	<0.10		ppbv	
			Tetrachloroethylene	2021/01/29	<0.10		ppbv	
			Benzene	2021/01/29	<0.10		ppbv	
			Toluene	2021/01/29	<0.10		ppbv	
			Ethylbenzene	2021/01/29	<0.10		ppbv	
			p+m-Xylene	2021/01/29	<0.20		ppbv	
			o-Xylene	2021/01/29	<0.10		ppbv	
			Styrene	2021/01/29	<0.10		ppbv	
			4-ethyltoluene	2021/01/29	<0.50		ppbv	
			1,3,5-Trimethylbenzene	2021/01/29	<0.50		ppbv	
			1,2,4-Trimethylbenzene	2021/01/29	<0.50		ppbv	
			Chlorobenzene	2021/01/29	<0.10		ppbv	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Benzyl chloride	2021/01/29	<0.50		ppbv	
			1,3-Dichlorobenzene	2021/01/29	<0.40		ppbv	
			1,4-Dichlorobenzene	2021/01/29	<0.10		ppbv	
			1,2-Dichlorobenzene	2021/01/29	<0.10		ppbv	
			1,2,4-Trichlorobenzene	2021/01/29	<0.50		ppbv	
			Hexachlorobutadiene	2021/01/29	<0.50		ppbv	
			Hexane	2021/01/29	<0.20		ppbv	
			Heptane	2021/01/29	<0.30		ppbv	
			Cyclohexane	2021/01/29	<0.20		ppbv	
			Tetrahydrofuran	2021/01/29	<0.40		ppbv	
			1,4-Dioxane	2021/01/29	<1.0		ppbv	
			Naphthalene	2021/01/29	<0.20		ppbv	
			Total Xylenes	2021/01/29	<0.30		ppbv	
			1,1,1,2-Tetrachloroethane	2021/01/29	<0.10		ppbv	
			Vinyl Bromide	2021/01/29	<0.20		ppbv	
			Propene	2021/01/29	<0.50		ppbv	
			2,2,4-Trimethylpentane	2021/01/29	<0.20		ppbv	
			Carbon Disulfide	2021/01/29	<0.50		ppbv	
			Vinyl Acetate	2021/01/29	<0.20		ppbv	
7179788	NS2	Method Blank	F1-BTEX, C6-C10 (as Toluene)	2021/01/29	<5.0		ug/m3	
			F2, C10-C16 (as Decane)	2021/01/29	<5.0		ug/m3	
7173488	RAE	RPD [OSE272-01]	Dichlorodifluoromethane (FREON 12)	2021/02/09	1.8		%	25
			1,2-Dichlorotetrafluoroethane	2021/02/09	NC		%	25
			Chloromethane	2021/02/09	NC		%	25
			Vinyl Chloride	2021/02/09	NC		%	25
			Chloroethane	2021/02/09	NC		%	25
			1,3-Butadiene	2021/02/09	NC		%	25
			Trichlorofluoromethane (FREON 11)	2021/02/09	NC		%	25
			Ethanol (ethyl alcohol)	2021/02/09	NC		%	25
			Trichlorotrifluoroethane	2021/02/09	NC		%	25
			2-propanol	2021/02/09	NC		%	25
			2-Propanone	2021/02/09	0.72		%	25
			Methyl Ethyl Ketone (2-Butanone)	2021/02/09	4.9		%	25
			Methyl Isobutyl Ketone	2021/02/09	NC		%	25
			Methyl Butyl Ketone (2-Hexanone)	2021/02/09	NC		%	25
			Methyl t-butyl ether (MTBE)	2021/02/09	NC		%	25
			Ethyl Acetate	2021/02/09	NC		%	25
			1,1-Dichloroethylene	2021/02/09	NC		%	25
			cis-1,2-Dichloroethylene	2021/02/09	NC		%	25
			trans-1,2-Dichloroethylene	2021/02/09	NC		%	25
			Methylene Chloride(Dichloromethane)	2021/02/09	NC		%	25
			Chloroform	2021/02/09	0.66		%	25
			Carbon Tetrachloride	2021/02/09	NC		%	25
			1,1-Dichloroethane	2021/02/09	NC		%	25
			1,2-Dichloroethane	2021/02/09	NC		%	25
			Ethylene Dibromide	2021/02/09	NC		%	25
			1,1,1-Trichloroethane	2021/02/09	NC		%	25
			1,1,2-Trichloroethane	2021/02/09	NC		%	25
			1,1,2,2-Tetrachloroethane	2021/02/09	NC		%	25
			cis-1,3-Dichloropropene	2021/02/09	NC		%	25

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			trans-1,3-Dichloropropene	2021/02/09	NC		%	25
			1,2-Dichloropropane	2021/02/09	NC		%	25
			Bromomethane	2021/02/09	NC		%	25
			Bromoform	2021/02/09	NC		%	25
			Bromodichloromethane	2021/02/09	NC		%	25
			Dibromochloromethane	2021/02/09	NC		%	25
			Trichloroethylene	2021/02/09	NC		%	25
			Tetrachloroethylene	2021/02/09	3.4		%	25
			Benzene	2021/02/09	NC		%	25
			Toluene	2021/02/09	NC		%	25
			Ethylbenzene	2021/02/09	1.5		%	25
			p+m-Xylene	2021/02/09	0.38		%	25
			o-Xylene	2021/02/09	6.1		%	25
			Styrene	2021/02/09	NC		%	25
			4-ethyltoluene	2021/02/09	NC		%	25
			1,3,5-Trimethylbenzene	2021/02/09	NC		%	25
			1,2,4-Trimethylbenzene	2021/02/09	NC		%	25
			Chlorobenzene	2021/02/09	NC		%	25
			Benzyl chloride	2021/02/09	NC		%	25
			1,3-Dichlorobenzene	2021/02/09	NC		%	25
			1,4-Dichlorobenzene	2021/02/09	NC		%	25
			1,2-Dichlorobenzene	2021/02/09	NC		%	25
			1,2,4-Trichlorobenzene	2021/02/09	NC		%	25
			Hexachlorobutadiene	2021/02/09	NC		%	25
			Hexane	2021/02/09	NC		%	25
			Heptane	2021/02/09	NC		%	25
			Cyclohexane	2021/02/09	NC		%	25
			Tetrahydrofuran	2021/02/09	NC		%	25
			1,4-Dioxane	2021/02/09	NC		%	25
			Naphthalene	2021/02/09	NC		%	25
			Total Xylenes	2021/02/09	1.2		%	25
			1,1,1,2-Tetrachloroethane	2021/02/09	NC		%	25
			Vinyl Bromide	2021/02/09	NC		%	25
			Propene	2021/02/09	NC		%	25
			2,2,4-Trimethylpentane	2021/02/09	NC		%	25
			Carbon Disulfide	2021/02/09	NC		%	25
			Vinyl Acetate	2021/02/09	NC		%	25
7175213	NS2	RPD [OSE272-01]	Dichlorodifluoromethane (FREON 12)	2021/01/29	1.8		%	25
			1,2-Dichlorotetrafluoroethane	2021/01/29	NC		%	25
			Chloromethane	2021/01/29	NC		%	25
			Vinyl Chloride	2021/01/29	NC		%	25
			Chloroethane	2021/01/29	NC		%	25
			1,3-Butadiene	2021/01/29	NC		%	25
			Trichlorofluoromethane (FREON 11)	2021/01/29	NC		%	25
			Ethanol (ethyl alcohol)	2021/01/29	NC		%	25
			Trichlorotrifluoroethane	2021/01/29	NC		%	25
			2-propanol	2021/01/29	NC		%	25
			2-Propanone	2021/01/29	0.72		%	25
			Methyl Ethyl Ketone (2-Butanone)	2021/01/29	4.9		%	25
			Methyl Isobutyl Ketone	2021/01/29	NC		%	25

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Methyl Butyl Ketone (2-Hexanone)	2021/01/29	NC		%	25
			Methyl t-butyl ether (MTBE)	2021/01/29	NC		%	25
			Ethyl Acetate	2021/01/29	NC		%	25
			1,1-Dichloroethylene	2021/01/29	NC		%	25
			cis-1,2-Dichloroethylene	2021/01/29	NC		%	25
			trans-1,2-Dichloroethylene	2021/01/29	NC		%	25
			Methylene Chloride(Dichloromethane)	2021/01/29	NC		%	25
			Chloroform	2021/01/29	0.66		%	25
			Carbon Tetrachloride	2021/01/29	NC		%	25
			1,1-Dichloroethane	2021/01/29	NC		%	25
			1,2-Dichloroethane	2021/01/29	NC		%	25
			Ethylene Dibromide	2021/01/29	NC		%	25
			1,1,1-Trichloroethane	2021/01/29	NC		%	25
			1,1,2-Trichloroethane	2021/01/29	NC		%	25
			1,1,2,2-Tetrachloroethane	2021/01/29	NC		%	25
			cis-1,3-Dichloropropene	2021/01/29	NC		%	25
			trans-1,3-Dichloropropene	2021/01/29	NC		%	25
			1,2-Dichloropropane	2021/01/29	NC		%	25
			Bromomethane	2021/01/29	NC		%	25
			Bromoform	2021/01/29	NC		%	25
			Bromodichloromethane	2021/01/29	NC		%	25
			Dibromochloromethane	2021/01/29	NC		%	25
			Trichloroethylene	2021/01/29	NC		%	25
			Tetrachloroethylene	2021/01/29	3.4		%	25
			Benzene	2021/01/29	NC		%	25
			Toluene	2021/01/29	NC		%	25
			Ethylbenzene	2021/01/29	1.5		%	25
			p+m-Xylene	2021/01/29	0.38		%	25
			o-Xylene	2021/01/29	6.1		%	25
			Styrene	2021/01/29	NC		%	25
			4-ethyltoluene	2021/01/29	NC		%	25
			1,3,5-Trimethylbenzene	2021/01/29	NC		%	25
			1,2,4-Trimethylbenzene	2021/01/29	NC		%	25
			Chlorobenzene	2021/01/29	NC		%	25
			Benzyl chloride	2021/01/29	NC		%	25
			1,3-Dichlorobenzene	2021/01/29	NC		%	25
			1,4-Dichlorobenzene	2021/01/29	NC		%	25
			1,2-Dichlorobenzene	2021/01/29	NC		%	25
			1,2,4-Trichlorobenzene	2021/01/29	NC		%	25
			Hexachlorobutadiene	2021/01/29	NC		%	25
			Hexane	2021/01/29	NC		%	25
			Heptane	2021/01/29	NC		%	25
			Cyclohexane	2021/01/29	NC		%	25
			Tetrahydrofuran	2021/01/29	NC		%	25
			1,4-Dioxane	2021/01/29	NC		%	25
			Naphthalene	2021/01/29	NC		%	25
			Total Xylenes	2021/01/29	1.2		%	25
			1,1,1,2-Tetrachloroethane	2021/01/29	NC		%	25
			Vinyl Bromide	2021/01/29	NC		%	25
			Propene	2021/01/29	NC		%	25

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			2,2,4-Trimethylpentane	2021/01/29	NC		%	25
			Carbon Disulfide	2021/01/29	NC		%	25
			Vinyl Acetate	2021/01/29	NC		%	25
7179788	NS2	RPD [OSE272-01]	F1-BTEX, C6-C10 (as Toluene)	2021/01/29	21		%	25
			F2, C10-C16 (as Decane)	2021/01/29	0.71		%	25
7175213	NS2	LCS	Bromochloromethane	2021/01/29		108	%	60 - 140
			D5-Chlorobenzene	2021/01/29		107	%	60 - 140
			Difluorobenzene	2021/01/29		109	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2021/01/29		106	%	70 - 130
			1,2-Dichlorotetrafluoroethane	2021/01/29		106	%	70 - 130
			Chloromethane	2021/01/29		101	%	70 - 130
			Vinyl Chloride	2021/01/29		108	%	70 - 130
			Chloroethane	2021/01/29		107	%	70 - 130
			1,3-Butadiene	2021/01/29		107	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2021/01/29		102	%	70 - 130
			Ethanol (ethyl alcohol)	2021/01/29		70	%	70 - 130
			Trichlorotrifluoroethane	2021/01/29		110	%	70 - 130
			2-propanol	2021/01/29		118	%	70 - 130
			2-Propanone	2021/01/29		105	%	70 - 130
			Methyl Ethyl Ketone (2-Butanone)	2021/01/29		116	%	70 - 130
			Methyl Isobutyl Ketone	2021/01/29		113	%	70 - 130
			Methyl Butyl Ketone (2-Hexanone)	2021/01/29		109	%	70 - 130
			Methyl t-butyl ether (MTBE)	2021/01/29		111	%	70 - 130
			Ethyl Acetate	2021/01/29		108	%	70 - 130
			1,1-Dichloroethylene	2021/01/29		108	%	70 - 130
			cis-1,2-Dichloroethylene	2021/01/29		108	%	70 - 130
			trans-1,2-Dichloroethylene	2021/01/29		112	%	70 - 130
			Methylene Chloride(Dichloromethane)	2021/01/29		110	%	70 - 130
			Chloroform	2021/01/29		104	%	70 - 130
			Carbon Tetrachloride	2021/01/29		110	%	70 - 130
			1,1-Dichloroethane	2021/01/29		109	%	70 - 130
			1,2-Dichloroethane	2021/01/29		106	%	70 - 130
			Ethylene Dibromide	2021/01/29		100	%	70 - 130
			1,1,1-Trichloroethane	2021/01/29		110	%	70 - 130
			1,1,2-Trichloroethane	2021/01/29		102	%	70 - 130
			1,1,2,2-Tetrachloroethane	2021/01/29		103	%	70 - 130
			cis-1,3-Dichloropropene	2021/01/29		106	%	70 - 130
			trans-1,3-Dichloropropene	2021/01/29		111	%	70 - 130
			1,2-Dichloropropane	2021/01/29		106	%	70 - 130
			Bromomethane	2021/01/29		116	%	70 - 130
			Bromoform	2021/01/29		104	%	70 - 130
			Bromodichloromethane	2021/01/29		109	%	70 - 130
			Dibromochloromethane	2021/01/29		109	%	70 - 130
			Trichloroethylene	2021/01/29		105	%	70 - 130
			Tetrachloroethylene	2021/01/29		106	%	70 - 130
			Benzene	2021/01/29		105	%	70 - 130
			Toluene	2021/01/29		105	%	70 - 130
			Ethylbenzene	2021/01/29		100	%	70 - 130
			p+m-Xylene	2021/01/29		101	%	70 - 130
			o-Xylene	2021/01/29		99	%	70 - 130

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Styrene	2021/01/29		106	%	70 - 130
			4-ethyltoluene	2021/01/29		106	%	70 - 130
			1,3,5-Trimethylbenzene	2021/01/29		118	%	70 - 130
			1,2,4-Trimethylbenzene	2021/01/29		119	%	70 - 130
			Chlorobenzene	2021/01/29		101	%	70 - 130
			Benzyl chloride	2021/01/29		140 (1)	%	70 - 130
			1,3-Dichlorobenzene	2021/01/29		113	%	70 - 130
			1,4-Dichlorobenzene	2021/01/29		112	%	70 - 130
			1,2-Dichlorobenzene	2021/01/29		111	%	70 - 130
			1,2,4-Trichlorobenzene	2021/01/29		114	%	70 - 130
			Hexachlorobutadiene	2021/01/29		115	%	70 - 130
			Hexane	2021/01/29		112	%	70 - 130
			Heptane	2021/01/29		114	%	70 - 130
			Cyclohexane	2021/01/29		113	%	70 - 130
			Tetrahydrofuran	2021/01/29		115	%	70 - 130
			1,4-Dioxane	2021/01/29		103	%	70 - 130
			Naphthalene	2021/01/29		114	%	70 - 130
			Total Xylenes	2021/01/29		100	%	70 - 130
			1,1,1,2-Tetrachloroethane	2021/01/29		104	%	70 - 130
			Vinyl Bromide	2021/01/29		97	%	70 - 130
			Propene	2021/01/29		104	%	70 - 130
			2,2,4-Trimethylpentane	2021/01/29		114	%	70 - 130
			Carbon Disulfide	2021/01/29		99	%	70 - 130
			Vinyl Acetate	2021/01/29		194 (1)	%	70 - 130

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C123966
Report Date: 2021/02/09

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2123

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Melanie Mabini, Team Leader

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.

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6740 Campobello Road
Mississauga, ON L5N 2L8
www.bvlabs.com

Phone: (905) 817-5700
Fax: (905) 817-5779
Toll Free: 1-800-563-6266

EXXONMOBIL/IMPERIAL OIL - BUREAU VERITAS
AIR CHAIN OF CUSTODY RECORD

C of C # 82073

INVOICE INFORMATION	REPORT INFORMATION
Company Name: ☒ Imperial Oil ☐ ExxonMobil	Company Name: Golder Associates Ltd.
Contact Name: IOL Accounts Payable	Contact Name: Ian SoSney
Address: 102, 2535-3rd Ave Calgary, AB, T2A 7W5	Address: 110 Hannover Dr. #203A St. Catharines, ON, L2W 1A4
Email: CanadaAccountsPayableInvoices@	Email: Ian_SoSney@Golder.com
Ph: Golder.com 403-299-5600	Ph: 647-527-4698
Sampler Name (Print): Beau Drieschner	Consultant Project #: 20447743-1155-2123

	FIELD SAMPLE ID	Canister Serial #	Flow Regulator Serial #	Sample Collection DATE (YYYY/MM/DD)	Sample Collection TIME (24 HR)	Media Type (See Legend)	FLOW RATE (mL/min)	LENGTH OF SAMPLING (minutes)	End Vacuum (inches of Hg)	BTEX	Aromatic/Aliphatic Hydrocarbon Fractionations	F1 (C6-C10) - F2 (C10-C16)	VOC (TO15)	Do Not Analyze
1	SV16-01	00274	FX1598	2021/01/27	1256	S	140	10	-6	X		X	X	
2	SV16-02	1230	FX1433	↓	1424	S	140	10	-6	X		X	X	
3	DUP A	2532	FX0334	↓	1424	S	140	10	-6	X		X	X	
4	UNUSED	1767	FX1119	—	Na	S	Na	Na	Na					X
5														
6														
7														
8														
9														
10														
11														

IOL SITE LOCATION: 1660 Merivale Rd. Ottawa, ON

IOL PROJECT # (if applicable): Na

BUREAU VERITAS TASK ORDER # OR SERVICE ORDER # + LINE ITEM: 20447743-1155-7777

REGULATORY CRITERIA / DETECTION LIMITS: (PLEASE SPECIFY): NA

SPECIAL INSTRUCTIONS: IES: A2601436
SAP: 8800 1627

LEGEND
S - Summa Can
T - Tube
TB - Tedlar Bag
O - Other(Specify)
*TEMP N/A for SUMMA CAN

TURNAROUND TIME
Standard (10 days) ☒
Rush (9 days) ☐
(6 days) ☐
(3 days) ☐
Date Required

	YES	NO	COOLER ID #	TEMP °C 1	2	3
SEAL PRESENT	✓					
SEAL INTACT	✓					
COOLING MEDIA PRESENT		✓				

	YES	NO	COOLER ID #	TEMP °C 1	2	3
SEAL PRESENT						
SEAL INTACT						
COOLING MEDIA PRESENT						

	YES	NO	COOLER ID #	TEMP °C 1	2	3
SEAL PRESENT						
SEAL INTACT						
COOLING MEDIA PRESENT						

LAB USE ONLY
BUREAU VERITAS JOB # C123966

RELINQUISHED BY:		DATE:	TIME (24 HR)	RECEIVED BY:		DATE:	TIME (24 HR)
1. ~~B Drieschner~~ signature	~~Beau Drieschner~~ printed name	~~2021/01/27~~ YYYY/MM/DD	~~1600~~ HH:MM	1. Maudupin signature	Maudupin printed name	2021/01/29 YYYY/MM/DD	0930 HH:MM
2. B Drieschner signature	Beau Drieschner printed name	2021/01/27 YYYY/MM/DD	1630 HH:MM	2. signature	printed name	YYYY/MM/DD	HH:MM
3. signature	printed name	YYYY/MM/DD	HH:MM	3. signature	printed name	YYYY/MM/DD	HH:MM

SAMPLES
LABELED BY: MDK
VERIFIED BY: AKP

IOL COC-AIR-(08/19) White: Bureau Veritas Yellow: Client

Unless otherwise agreed to in writing, work submitted on this Chain of Custody is subject to Bureau Veritas Laboratories' standard Terms and Conditions. Signing of this Chain of Custody document is acknowledgment and acceptance of our terms available at http://www.bvlabs.com/terms-and-conditions

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: January 27, 2021

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Bureau Veritas Mississauga

Consultant Project Number: 20447743-1155

Sample Submission Number: C123966

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			Lab control sample recovery outside acceptance range
Extraction Surrogate Recovery			X	of 70-130% for benzyl chloride (140%) and vinyl
Method Blank Concentration	X			acetate (194%). All remaining laboratory QC results
Matrix Duplicate RPD	X			are within acceptance criteria.
Matrix Spike Recovery			X	
Lab Control Sample Recovery		X		

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	All field QC samples are within
Trip Blank Concentration			X	alert limits.
Field Duplicate RPD	X			

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	n/a

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): Amanda Newberry

Date: February 10, 2021

Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2123
Your C.O.C. #: 82074

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2021/02/09
Report #: R6511830
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C123972
Received: 2021/01/28, 09:30

Sample Matrix: Air
Samples Received: 1

Analyses	Quantity	Laboratory Method	Analytical Method
BTEX and CCME Compounds in Air(TO-15mod)	1	BRL SOP-00304	EPA TO-15 m
Canister Pressure (TO-15)	1	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (ug/m3)	1	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (TO-15) (1)	1	BRL SOP-00304	EPA TO-15 m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard. All samples were analyzed within hold time unless otherwise flagged.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Air sampling canisters have been cleaned in accordance with U.S. EPA Method TO15. At the end of the cleaning, evacuation, and pressurization cycles, one canister was selected and was pressurized with Zero Air. This canister was then analyzed via TO15 on a GC/MS. The canister must have been found to contain <0.2 ppbv concentration of all target analytes in order for the batch to have been considered clean. Each canister also underwent a leak check prior to shipment.

Please Note: SUMMA® canister samples will be retained by Bureau Veritas Laboratories for a period of 5 calendar days or as contractually agreed from the date of this report, after which time they will be cleaned for reuse. If you require a longer sample storage period, please contact your service representative.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2123
Your C.O.C. #: 82074

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2021/02/09
Report #: R6511830
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C123972
Received: 2021/01/28, 09:30

Encryption Key



Kyle Reinhart
CET LEAD-Air Toxics, Source Evaluation
09 Feb 2021 17:30:45

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kyle Reinhart, CET LEAD-Air Toxics, Source Evaluation
Email: Kyle.Reinhart@bureauveritas.com
Phone# (905)817-5802

==========

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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BV Labs Job #: C123972
Report Date: 2021/02/09

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2123

RESULTS OF ANALYSES OF AIR

BV Labs ID		OSE289	
Sampling Date		2021/01/27 15:05	
COC Number		82074	
	UNITS	**FIELD BLANK**	**QC Batch**
Pressure on Receipt	psig	(-2.7)	7176536
QC Batch = Quality Control Batch			

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Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2123

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		OSE289		
Sampling Date		2021/01/27 15:05		
COC Number		82074		
	UNITS	**FIELD BLANK**	**RDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ppbv	0.44	0.20	7176542
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	0.17	7176542
Chloromethane	ppbv	0.43	0.30	7176542
Vinyl Chloride	ppbv	<0.10	0.10	7176542
Chloroethane	ppbv	<0.30	0.30	7176542
1,3-Butadiene	ppbv	<0.50	0.50	7176542
Trichlorofluoromethane (FREON 11)	ppbv	0.21	0.20	7176542
Ethanol (ethyl alcohol)	ppbv	4.4	1.0	7176542
Trichlorotrifluoroethane	ppbv	<0.15	0.15	7176542
2-propanol	ppbv	<1.0	1.0	7176542
2-Propanone	ppbv	0.90	0.60	7176542
Methyl Ethyl Ketone (2-Butanone)	ppbv	0.23	0.20	7176542
Methyl Isobutyl Ketone	ppbv	<0.20	0.20	7176542
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	1.0	7176542
Methyl t-butyl ether (MTBE)	ppbv	<0.20	0.20	7176542
Ethyl Acetate	ppbv	<1.0	1.0	7176542
1,1-Dichloroethylene	ppbv	<0.10	0.10	7176542
cis-1,2-Dichloroethylene	ppbv	<0.10	0.10	7176542
trans-1,2-Dichloroethylene	ppbv	<0.10	0.10	7176542
Methylene Chloride(Dichloromethane)	ppbv	<0.60	0.60	7176542
Chloroform	ppbv	<0.10	0.10	7176542
Carbon Tetrachloride	ppbv	<0.10	0.10	7176542
1,1-Dichloroethane	ppbv	<0.10	0.10	7176542
1,2-Dichloroethane	ppbv	<0.10	0.10	7176542
Ethylene Dibromide	ppbv	<0.10	0.10	7176542
1,1,1-Trichloroethane	ppbv	<0.10	0.10	7176542
1,1,2-Trichloroethane	ppbv	<0.10	0.10	7176542
1,1,2,2-Tetrachloroethane	ppbv	<0.10	0.10	7176542
cis-1,3-Dichloropropene	ppbv	<0.10	0.10	7176542
trans-1,3-Dichloropropene	ppbv	<0.10	0.10	7176542
1,2-Dichloropropane	ppbv	<0.10	0.10	7176542
Bromomethane	ppbv	<0.10	0.10	7176542
Bromoform	ppbv	<0.20	0.20	7176542
Bromodichloromethane	ppbv	<0.20	0.20	7176542

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2123

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		OSE289		
Sampling Date		2021/01/27 15:05		
COC Number		82074		
	UNITS	**FIELD BLANK**	**RDL**	**QC Batch**
Dibromochloromethane	ppbv	<0.20	0.20	7176542
Trichloroethylene	ppbv	<0.10	0.10	7176542
Tetrachloroethylene	ppbv	<0.10	0.10	7176542
Benzene	ppbv	<0.10	0.10	7176542
Toluene	ppbv	<0.10	0.10	7176542
Ethylbenzene	ppbv	<0.10	0.10	7176542
p+m-Xylene	ppbv	<0.20	0.20	7176542
o-Xylene	ppbv	<0.10	0.10	7176542
Styrene	ppbv	<0.10	0.10	7176542
4-ethyltoluene	ppbv	<0.50	0.50	7176542
1,3,5-Trimethylbenzene	ppbv	<0.50	0.50	7176542
1,2,4-Trimethylbenzene	ppbv	<0.50	0.50	7176542
Chlorobenzene	ppbv	<0.10	0.10	7176542
Benzyl chloride	ppbv	<0.50	0.50	7176542
1,3-Dichlorobenzene	ppbv	<0.40	0.40	7176542
1,4-Dichlorobenzene	ppbv	<0.10	0.10	7176542
1,2-Dichlorobenzene	ppbv	<0.10	0.10	7176542
1,2,4-Trichlorobenzene	ppbv	<0.50	0.50	7176542
Hexachlorobutadiene	ppbv	<0.50	0.50	7176542
Hexane	ppbv	<0.20	0.20	7176542
Heptane	ppbv	<0.30	0.30	7176542
Cyclohexane	ppbv	<0.20	0.20	7176542
Tetrahydrofuran	ppbv	<0.40	0.40	7176542
1,4-Dioxane	ppbv	<1.0	1.0	7176542
Naphthalene	ppbv	<0.20	0.20	7176542
Total Xylenes	ppbv	<0.30	0.30	7176542
1,1,1,2-Tetrachloroethane	ppbv	<0.10	0.10	7176542
Vinyl Bromide	ppbv	<0.20	0.20	7176542
Propene	ppbv	<0.50	0.50	7176542
2,2,4-Trimethylpentane	ppbv	<0.20	0.20	7176542
Carbon Disulfide	ppbv	<0.50	0.50	7176542
Vinyl Acetate	ppbv	<0.20	0.20	7176542

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C123972
Report Date: 2021/02/09

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2123

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		OSE289		
Sampling Date		2021/01/27 15:05		
COC Number		82074		
	UNITS	**FIELD BLANK**	**RDL**	**QC Batch**
Instrument Surrogate Recovery (%)				
Bromochloromethane	%	91		7176542
D5-Chlorobenzene	%	89		7176542
Difluorobenzene	%	87		7176542

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

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Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2123

CALCULATED VOLATILE ORGANICS (AIR)

BV Labs ID		OSE289		
Sampling Date		2021/01/27 15:05		
COC Number		82074		
	UNITS	**FIELD BLANK**	**RDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ug/m3	2.17	0.99	7173488
1,2-Dichlorotetrafluoroethane	ug/m3	<1.2	1.2	7173488
Chloromethane	ug/m3	0.88	0.62	7173488
Vinyl Chloride	ug/m3	<0.26	0.26	7173488
Chloroethane	ug/m3	<0.79	0.79	7173488
1,3-Butadiene	ug/m3	<1.1	1.1	7173488
Trichlorofluoromethane (FREON 11)	ug/m3	1.2	1.1	7173488
Ethanol (ethyl alcohol)	ug/m3	8.3	1.9	7173488
Trichlorotrifluoroethane	ug/m3	<1.2	1.2	7173488
2-propanol	ug/m3	<2.5	2.5	7173488
2-Propanone	ug/m3	2.1	1.4	7173488
Methyl Ethyl Ketone (2-Butanone)	ug/m3	0.67	0.59	7173488
Methyl Isobutyl Ketone	ug/m3	<0.82	0.82	7173488
Methyl Butyl Ketone (2-Hexanone)	ug/m3	<4.1	4.1	7173488
Methyl t-butyl ether (MTBE)	ug/m3	<0.72	0.72	7173488
Ethyl Acetate	ug/m3	<3.6	3.6	7173488
1,1-Dichloroethylene	ug/m3	<0.40	0.40	7173488
cis-1,2-Dichloroethylene	ug/m3	<0.40	0.40	7173488
trans-1,2-Dichloroethylene	ug/m3	<0.40	0.40	7173488
Methylene Chloride(Dichloromethane)	ug/m3	<2.1	2.1	7173488
Chloroform	ug/m3	<0.49	0.49	7173488
Carbon Tetrachloride	ug/m3	<0.63	0.63	7173488
1,1-Dichloroethane	ug/m3	<0.40	0.40	7173488
1,2-Dichloroethane	ug/m3	<0.40	0.40	7173488
Ethylene Dibromide	ug/m3	<0.77	0.77	7173488
1,1,1-Trichloroethane	ug/m3	<0.55	0.55	7173488
1,1,2-Trichloroethane	ug/m3	<0.55	0.55	7173488
1,1,2,2-Tetrachloroethane	ug/m3	<0.69	0.69	7173488
cis-1,3-Dichloropropene	ug/m3	<0.45	0.45	7173488
trans-1,3-Dichloropropene	ug/m3	<0.45	0.45	7173488
1,2-Dichloropropane	ug/m3	<0.46	0.46	7173488
Bromomethane	ug/m3	<0.39	0.39	7173488
Bromoform	ug/m3	<2.1	2.1	7173488
Bromodichloromethane	ug/m3	<1.3	1.3	7173488

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2123

CALCULATED VOLATILE ORGANICS (AIR)

BV Labs ID		OSE289		
Sampling Date		2021/01/27 15:05		
COC Number		82074		
	UNITS	**FIELD BLANK**	**RDL**	**QC Batch**
Dibromochloromethane	ug/m3	<1.7	1.7	7173488
Trichloroethylene	ug/m3	<0.54	0.54	7173488
Tetrachloroethylene	ug/m3	<0.68	0.68	7173488
Benzene	ug/m3	<0.32	0.32	7173488
Toluene	ug/m3	<0.38	0.38	7173488
Ethylbenzene	ug/m3	<0.43	0.43	7173488
p+m-Xylene	ug/m3	<0.87	0.87	7173488
o-Xylene	ug/m3	<0.43	0.43	7173488
Styrene	ug/m3	<0.43	0.43	7173488
4-ethyltoluene	ug/m3	<2.5	2.5	7173488
1,3,5-Trimethylbenzene	ug/m3	<2.5	2.5	7173488
1,2,4-Trimethylbenzene	ug/m3	<2.5	2.5	7173488
Chlorobenzene	ug/m3	<0.46	0.46	7173488
Benzyl chloride	ug/m3	<2.6	2.6	7173488
1,3-Dichlorobenzene	ug/m3	<2.4	2.4	7173488
1,4-Dichlorobenzene	ug/m3	<0.60	0.60	7173488
1,2-Dichlorobenzene	ug/m3	<0.60	0.60	7173488
1,2,4-Trichlorobenzene	ug/m3	<3.7	3.7	7173488
Hexachlorobutadiene	ug/m3	<5.3	5.3	7173488
Hexane	ug/m3	<0.70	0.70	7173488
Heptane	ug/m3	<1.2	1.2	7173488
Cyclohexane	ug/m3	<0.69	0.69	7173488
Tetrahydrofuran	ug/m3	<1.2	1.2	7173488
1,4-Dioxane	ug/m3	<3.6	3.6	7173488
Naphthalene	ug/m3	<1.0	1.0	7173488
Total Xylenes	ug/m3	<1.3	1.3	7173488
1,1,1,2-Tetrachloroethane	ug/m3	<0.69	0.69	7173488
Vinyl Bromide	ug/m3	<0.87	0.87	7173488
Propene	ug/m3	<0.86	0.86	7173488
2,2,4-Trimethylpentane	ug/m3	<0.93	0.93	7173488
Carbon Disulfide	ug/m3	<1.6	1.6	7173488
Vinyl Acetate	ug/m3	<0.70	0.70	7173488

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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BV Labs Job #: C123972
Report Date: 2021/02/09

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2123

VOLATILE ORGANIC HYDROCARBONS BY GC/MS (AIR)

BV Labs ID		OSE289		
Sampling Date		2021/01/27 15:05		
COC Number		82074		
	UNITS	**FIELD BLANK**	**RDL**	**QC Batch**
F1-BTEX, C6-C10 (as Toluene)	ug/m3	46.3	5.0	7178717
F2, C10-C16 (as Decane)	ug/m3	17.7	5.0	7178717

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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BV Labs Job #: C123972
Report Date: 2021/02/09

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2123

TEST SUMMARY

BV Labs ID: OSE289
Sample ID: FIELD BLANK
Matrix: Air

Collected: 2021/01/27
Relinquished: 2021/01/27
Received: 2021/01/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	7178717	N/A	2021/01/29	Dany Marqass
Canister Pressure (TO-15)	PRES	7176536	N/A	2021/01/29	Dany Marqass
Volatile Organics in Air (ug/m3)	GC/MS	7173488	N/A	2021/02/01	Automated Statchk
Volatile Organics in Air (TO-15)	GC/MS	7176542	N/A	2021/01/29	Dany Marqass

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BV Labs Job #: C123972
Report Date: 2021/02/09

Golder Associates Ltd
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Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2123

GENERAL COMMENTS

WS# 7176542: 3 compounds exceed were outside the 70-130% recovery criteria in the reference standard. These compounds meet the %RSD criteria in the continuing calibration standard. The failure of these 3 compounds is not believed to have an effect on the integrity of the results. Vinyl Acetate exceeded 140% recovery in the reference standard. There were no positives found for this compound therefore the data should not be affected.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7176542	DM2	Method Blank	Bromochloromethane	2021/01/29		97	%	60 - 140
			D5-Chlorobenzene	2021/01/29		93	%	60 - 140
			Difluorobenzene	2021/01/29		97	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2021/01/29	<0.20		ppbv	
			1,2-Dichlorotetrafluoroethane	2021/01/29	<0.17		ppbv	
			Chloromethane	2021/01/29	<0.30		ppbv	
			Vinyl Chloride	2021/01/29	<0.10		ppbv	
			Chloroethane	2021/01/29	<0.30		ppbv	
			1,3-Butadiene	2021/01/29	<0.50		ppbv	
			Trichlorofluoromethane (FREON 11)	2021/01/29	<0.20		ppbv	
			Ethanol (ethyl alcohol)	2021/01/29	<1.0		ppbv	
			Trichlorotrifluoroethane	2021/01/29	<0.15		ppbv	
			2-propanol	2021/01/29	<1.0		ppbv	
			2-Propanone	2021/01/29	<0.60		ppbv	
			Methyl Ethyl Ketone (2-Butanone)	2021/01/29	<0.20		ppbv	
			Methyl Isobutyl Ketone	2021/01/29	<0.20		ppbv	
			Methyl Butyl Ketone (2-Hexanone)	2021/01/29	<1.0		ppbv	
			Methyl t-butyl ether (MTBE)	2021/01/29	<0.20		ppbv	
			Ethyl Acetate	2021/01/29	<1.0		ppbv	
			1,1-Dichloroethylene	2021/01/29	<0.10		ppbv	
			cis-1,2-Dichloroethylene	2021/01/29	<0.10		ppbv	
			trans-1,2-Dichloroethylene	2021/01/29	<0.10		ppbv	
			Methylene Chloride(Dichloromethane)	2021/01/29	<0.60		ppbv	
			Chloroform	2021/01/29	<0.10		ppbv	
			Carbon Tetrachloride	2021/01/29	<0.10		ppbv	
			1,1-Dichloroethane	2021/01/29	<0.10		ppbv	
			1,2-Dichloroethane	2021/01/29	<0.10		ppbv	
			Ethylene Dibromide	2021/01/29	<0.10		ppbv	
			1,1,1-Trichloroethane	2021/01/29	<0.10		ppbv	
			1,1,2-Trichloroethane	2021/01/29	<0.10		ppbv	
			1,1,2,2-Tetrachloroethane	2021/01/29	<0.10		ppbv	
			cis-1,3-Dichloropropene	2021/01/29	<0.10		ppbv	
			trans-1,3-Dichloropropene	2021/01/29	<0.10		ppbv	
			1,2-Dichloropropane	2021/01/29	<0.10		ppbv	
			Bromomethane	2021/01/29	<0.10		ppbv	
			Bromoform	2021/01/29	<0.20		ppbv	
			Bromodichloromethane	2021/01/29	<0.20		ppbv	
			Dibromochloromethane	2021/01/29	<0.20		ppbv	
			Trichloroethylene	2021/01/29	<0.10		ppbv	
			Tetrachloroethylene	2021/01/29	<0.10		ppbv	
			Benzene	2021/01/29	<0.10		ppbv	
			Toluene	2021/01/29	<0.10		ppbv	
			Ethylbenzene	2021/01/29	<0.10		ppbv	
			p+m-Xylene	2021/01/29	<0.20		ppbv	
			o-Xylene	2021/01/29	<0.10		ppbv	
			Styrene	2021/01/29	<0.10		ppbv	
			4-ethyltoluene	2021/01/29	<0.50		ppbv	
			1,3,5-Trimethylbenzene	2021/01/29	<0.50		ppbv	
			1,2,4-Trimethylbenzene	2021/01/29	<0.50		ppbv	
			Chlorobenzene	2021/01/29	<0.10		ppbv	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Benzyl chloride	2021/01/29	<0.50		ppbv	
			1,3-Dichlorobenzene	2021/01/29	<0.40		ppbv	
			1,4-Dichlorobenzene	2021/01/29	<0.10		ppbv	
			1,2-Dichlorobenzene	2021/01/29	<0.10		ppbv	
			1,2,4-Trichlorobenzene	2021/01/29	<0.50		ppbv	
			Hexachlorobutadiene	2021/01/29	<0.50		ppbv	
			Hexane	2021/01/29	<0.20		ppbv	
			Heptane	2021/01/29	<0.30		ppbv	
			Cyclohexane	2021/01/29	<0.20		ppbv	
			Tetrahydrofuran	2021/01/29	<0.40		ppbv	
			1,4-Dioxane	2021/01/29	<1.0		ppbv	
			Naphthalene	2021/01/29	<0.20		ppbv	
			Total Xylenes	2021/01/29	<0.30		ppbv	
			1,1,1,2-Tetrachloroethane	2021/01/29	<0.10		ppbv	
			Vinyl Bromide	2021/01/29	<0.20		ppbv	
			Propene	2021/01/29	<0.50		ppbv	
			2,2,4-Trimethylpentane	2021/01/29	<0.20		ppbv	
			Carbon Disulfide	2021/01/29	<0.50		ppbv	
			Vinyl Acetate	2021/01/29	<0.20		ppbv	
7178717	DM2	Method Blank	F1-BTEX, C6-C10 (as Toluene)	2021/01/29	<5.0		ug/m3	
			F2, C10-C16 (as Decane)	2021/01/29	<5.0		ug/m3	
7176542	DM2	LCS	Bromochloromethane	2021/01/29		99	%	60 - 140
			D5-Chlorobenzene	2021/01/29		101	%	60 - 140
			Difluorobenzene	2021/01/29		101	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2021/01/29		96	%	70 - 130
			1,2-Dichlorotetrafluoroethane	2021/01/29		90	%	70 - 130
			Chloromethane	2021/01/29		85	%	70 - 130
			Vinyl Chloride	2021/01/29		89	%	70 - 130
			Chloroethane	2021/01/29		84	%	70 - 130
			1,3-Butadiene	2021/01/29		91	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2021/01/29		95	%	70 - 130
			Ethanol (ethyl alcohol)	2021/01/29		64 (1)	%	70 - 130
			Trichlorotrifluoroethane	2021/01/29		95	%	70 - 130
			2-propanol	2021/01/29		102	%	70 - 130
			2-Propanone	2021/01/29		86	%	70 - 130
			Methyl Ethyl Ketone (2-Butanone)	2021/01/29		99	%	70 - 130
			Methyl Isobutyl Ketone	2021/01/29		98	%	70 - 130
			Methyl Butyl Ketone (2-Hexanone)	2021/01/29		99	%	70 - 130
			Methyl t-butyl ether (MTBE)	2021/01/29		100	%	70 - 130
			Ethyl Acetate	2021/01/29		90	%	70 - 130
			1,1-Dichloroethylene	2021/01/29		94	%	70 - 130
			cis-1,2-Dichloroethylene	2021/01/29		94	%	70 - 130
			trans-1,2-Dichloroethylene	2021/01/29		96	%	70 - 130
			Methylene Chloride(Dichloromethane)	2021/01/29		95	%	70 - 130
			Chloroform	2021/01/29		91	%	70 - 130
			Carbon Tetrachloride	2021/01/29		115	%	70 - 130
			1,1-Dichloroethane	2021/01/29		94	%	70 - 130
			1,2-Dichloroethane	2021/01/29		94	%	70 - 130
			Ethylene Dibromide	2021/01/29		91	%	70 - 130
			1,1,1-Trichloroethane	2021/01/29		105	%	70 - 130

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,1,2-Trichloroethane	2021/01/29		91	%	70 - 130
			1,1,2,2-Tetrachloroethane	2021/01/29		90	%	70 - 130
			cis-1,3-Dichloropropene	2021/01/29		95	%	70 - 130
			trans-1,3-Dichloropropene	2021/01/29		106	%	70 - 130
			1,2-Dichloropropane	2021/01/29		92	%	70 - 130
			Bromomethane	2021/01/29		86	%	70 - 130
			Bromoform	2021/01/29		96	%	70 - 130
			Bromodichloromethane	2021/01/29		97	%	70 - 130
			Dibromochloromethane	2021/01/29		101	%	70 - 130
			Trichloroethylene	2021/01/29		98	%	70 - 130
			Tetrachloroethylene	2021/01/29		97	%	70 - 130
			Benzene	2021/01/29		96	%	70 - 130
			Toluene	2021/01/29		97	%	70 - 130
			Ethylbenzene	2021/01/29		94	%	70 - 130
			p+m-Xylene	2021/01/29		95	%	70 - 130
			o-Xylene	2021/01/29		92	%	70 - 130
			Styrene	2021/01/29		103	%	70 - 130
			4-ethyltoluene	2021/01/29		93	%	70 - 130
			1,3,5-Trimethylbenzene	2021/01/29		110	%	70 - 130
			1,2,4-Trimethylbenzene	2021/01/29		115	%	70 - 130
			Chlorobenzene	2021/01/29		97	%	70 - 130
			Benzyl chloride	2021/01/29		134 (1)	%	70 - 130
			1,3-Dichlorobenzene	2021/01/29		106	%	70 - 130
			1,4-Dichlorobenzene	2021/01/29		104	%	70 - 130
			1,2-Dichlorobenzene	2021/01/29		105	%	70 - 130
			1,2,4-Trichlorobenzene	2021/01/29		117	%	70 - 130
			Hexachlorobutadiene	2021/01/29		107	%	70 - 130
			Hexane	2021/01/29		96	%	70 - 130
			Heptane	2021/01/29		100	%	70 - 130
			Cyclohexane	2021/01/29		99	%	70 - 130
			Tetrahydrofuran	2021/01/29		98	%	70 - 130
			1,4-Dioxane	2021/01/29		92	%	70 - 130
			Naphthalene	2021/01/29		107	%	70 - 130
			Total Xylenes	2021/01/29		94	%	70 - 130
			1,1,1,2-Tetrachloroethane	2021/01/29		102	%	70 - 130
			Vinyl Bromide	2021/01/29		82	%	70 - 130
			Propene	2021/01/29		92	%	70 - 130
			2,2,4-Trimethylpentane	2021/01/29		99	%	70 - 130
			Carbon Disulfide	2021/01/29		84	%	70 - 130
			Vinyl Acetate	2021/01/29		166 (1)	%	70 - 130

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

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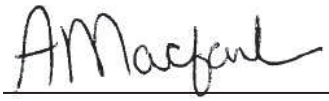
BV Labs Job #: C123972
Report Date: 2021/02/09

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2123

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Anke Macfarlane, Laboratory Manager, VOC

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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EXXONMOBIL/IMPERIAL OIL - BUREAU VERITAS
AIR CHAIN OF CUSTODY RECORD

C of C # 82074

INVOICE INFORMATION

Company Name: ☑ Imperial Oil ☐ ExxonMobil
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REPORT INFORMATION

Company Name: Golder Associates Ltd.
Contact Name: Ian Sosney
Address: 110 Hannover Dr #203A
St. Catharines, ON, L2W1A4
Email: Ian_Sosney@Golder.com
Ph: 647-522-4698
Consultant Project #: 20447743-1155-2123

ANALYSIS REQUESTED

FIELD SAMPLE ID	Canister Serial #	Flow Regulator Serial #	Sample Collection DATE (YYYY/MM/DD)	Sample Collection TIME (24 HR)	Media Type (See Legend)	FLOW RATE (mL/min)	LENGTH OF SAMPLING (minutes)	End Vacuum (inches of Hg)	BTEX	Aromatic/Aliphatic Hydrocarbon Fractionations	F1 (C6-C10) - F2 (C10-C16)	VOC (TO15)
1 FIELD BLANK	2065	FX1605	2021/01/27	1505	S	140	10	-6	X		X	X
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												

IOL SITE LOCATION: 1660 Merivale Rd. Ottawa, ON

IOL PROJECT # (if applicable): Na

BUREAU VERITAS TASK ORDER # OR SERVICE ORDER # + LINE ITEM: 20447743-1155-7777

REGULATORY CRITERIA / DETECTION LIMITS: (PLEASE SPECIFY): Na

SPECIAL INSTRUCTIONS: IES: A2601436
SAP: 88001627

LEGEND
S - Summa Can
T - Tube
TB - Tedlar Bag
O - Other(Specify)
*TEMP N/A for SUMMA CAN

TURNAROUND TIME
Standard (10 days) ☒
Rush (9 days) ☐
(6 days) ☐
(3 days) ☐
Date Required

	YES	NO	COOLER ID #	TEMP °C 1	2	3
SEAL PRESENT	✓					
SEAL INTACT	✓					
COOLING MEDIA PRESENT		✓				

	YES	NO	COOLER ID #	TEMP °C 1	2	3
SEAL PRESENT						
SEAL INTACT						
COOLING MEDIA PRESENT						

	YES	NO	COOLER ID #	TEMP °C 1	2	3
SEAL PRESENT						
SEAL INTACT						
COOLING MEDIA PRESENT						

LAB USE ONLY
BUREAU VERITAS JOB # C123972

RELINQUISHED BY:		DATE:	TIME (24 HR)	RECEIVED BY:		DATE:	TIME (24 HR)
1. BDrieschner	Beau Drieschner	2021/01/27	1635	1. Manduple	Manduple	2021/01/28	0930
2. signature	printed name	YYYY/MM/DD	HH:MM	2. signature	printed name	YYYY/MM/DD	HH:MM
3. signature	printed name	YYYY/MM/DD	HH:MM	3. signature	printed name	YYYY/MM/DD	HH:MM

SAMPLES
LABELED BY: MDL
VERIFIED BY: AKP

IOL COC-AIR-(08/19) White: Bureau Veritas Yellow: Client

Unless otherwise agreed to in writing, work submitted on this Chain of Custody is subject to Bureau Veritas Laboratories' standard Terms and Conditions. Signing of this Chain of Custody document is acknowledgment and acceptance of our terms available at http://www.bvlabs.com/terms-and-conditions

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: January 27, 2021

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Bureau Veritas Mississauga

Consultant Project Number: 20447743-1155

Sample Submission Number: C123972

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			Lab control sample recovery outside acceptance range
Extraction Surrogate Recovery			X	of 70-130% for ethanol (64%), benzyl chloride
Method Blank Concentration	X			(134%) and vinyl acetate (166%). All remaining
Matrix Duplicate RPD			X	laboratory QC results are within acceptance criteria.
Matrix Spike Recovery			X	
Lab Control Sample Recovery		X		

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration		X		Field blank sample exceeded alert limits for F1. All
Trip Blank Concentration			X	remaining field QC samples are within alert limits.
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	n/a

Is data considered to be reliable (Yes/No/Suspect)?: Suspect

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): Amanda Newberry

Date: February 10, 2021

Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2123B
Your C.O.C. #: 82384

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2021/08/10
Report #: R6758366
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1K9532
Received: 2021/07/27, 09:30

Sample Matrix: Air
Samples Received: 3

Analyses	Quantity	Laboratory Method	Analytical Method
BTEX and CCME Compounds in Air(TO-15mod)	3	BRL SOP-00304	EPA TO-15 m
Canister Pressure (TO-15)	3	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (ug/m3)	3	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (TO-15) (1)	3	BRL SOP-00304	EPA TO-15 m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard. All samples were analyzed within hold time unless otherwise flagged.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Air sampling canisters have been cleaned in accordance with U.S. EPA Method TO15. At the end of the cleaning, evacuation, and pressurization cycles, one canister was selected and was pressurized with Zero Air. This canister was then analyzed via TO15 on a GC/MS. The canister must have been found to contain <0.2 ppbv concentration of all target analytes in order for the batch to have been considered clean. Each canister also underwent a leak check prior to shipment.

Please Note: SUMMA® canister samples will be retained by Bureau Veritas Laboratories for a period of 5 calendar days or as contractually agreed from the date of this report, after which time they will be cleaned for reuse. If you require a longer sample storage period, please contact your service representative.

Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2123B
Your C.O.C. #: 82384

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2021/08/10
Report #: R6758366
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1K9532
Received: 2021/07/27, 09:30

Encryption Key



Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Gina Baybayan, Project Manager
Email: Gina.Baybayan@bureauveritas.com
Phone# (905)817-5766

==========

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C1K9532
Report Date: 2021/08/10

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2123B

RESULTS OF ANALYSES OF AIR

BV Labs ID		QFA556	QFA557	QFA558	
Sampling Date		2021/07/22 14:45	2021/07/22 14:37	2021/07/22 14:37	
COC Number		82384	82384	82384	
	UNITS	**SV16-01**	**SV16-02**	**DUP A**	**QC Batch**
Pressure on Receipt	psig	(-1.4)	(-0.7)	(-1.3)	7507029
QC Batch = Quality Control Batch					

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		QFA556		QFA557	QFA557	QFA558		
Sampling Date		2021/07/22 14:45		2021/07/22 14:37	2021/07/22 14:37	2021/07/22 14:37		
COC Number		82384		82384	82384	82384		
	UNITS	**SV16-01**	**RDL**	**SV16-02**	**SV16-02 Lab-Dup**	**DUP A**	**RDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ppbv	1.90	0.20	9.91	9.89	10.0	0.20	7507030
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	0.17	<0.17	<0.17	<0.17	0.17	7507030
Chloromethane	ppbv	<0.35	0.35	0.48	0.40	<0.30	0.30	7507030
Vinyl Chloride	ppbv	<0.10	0.10	<0.10	<0.10	<0.10	0.10	7507030
Chloroethane	ppbv	<0.30	0.30	<0.30	<0.30	<0.30	0.30	7507030
1,3-Butadiene	ppbv	<0.50	0.50	<0.50	<0.50	<0.50	0.50	7507030
Trichlorofluoromethane (FREON 11)	ppbv	0.27	0.20	0.24	0.24	0.25	0.20	7507030
Ethanol (ethyl alcohol)	ppbv	7.4	1.0	<1.0	<1.0	<1.0	1.0	7507030
Trichlorotrifluoroethane	ppbv	<0.15	0.15	<0.15	<0.15	<0.15	0.15	7507030
2-propanol	ppbv	<1.0	1.0	<1.0	<1.0	<1.0	1.0	7507030
2-Propanone	ppbv	101	0.60	27.9	27.5	25.7	0.60	7507030
Methyl Ethyl Ketone (2-Butanone)	ppbv	11.2	0.20	2.29	2.20	1.23	0.20	7507030
Methyl Isobutyl Ketone	ppbv	<0.20	0.20	<0.20	<0.20	<0.20	0.20	7507030
Methyl Butyl Ketone (2-Hexanone)	ppbv	1.0	1.0	<1.0	<1.0	<1.0	1.0	7507030
Methyl t-butyl ether (MTBE)	ppbv	<0.20	0.20	<0.20	<0.20	<0.20	0.20	7507030
Ethyl Acetate	ppbv	<1.0	1.0	<1.0	<1.0	<1.0	1.0	7507030
1,1-Dichloroethylene	ppbv	<0.10	0.10	<0.10	<0.10	<0.10	0.10	7507030
cis-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.10	<0.10	<0.10	0.10	7507030
trans-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.10	<0.10	<0.10	0.10	7507030
Methylene Chloride(Dichloromethane)	ppbv	<0.60	0.60	<0.60	<0.60	<0.60	0.60	7507030
Chloroform	ppbv	4.15	0.10	0.10	0.10	0.13	0.10	7507030
Carbon Tetrachloride	ppbv	<0.10	0.10	<0.10	<0.10	<0.10	0.10	7507030
1,1-Dichloroethane	ppbv	<0.10	0.10	<0.10	<0.10	<0.10	0.10	7507030
1,2-Dichloroethane	ppbv	<0.10	0.10	<0.10	<0.10	<0.10	0.10	7507030
Ethylene Dibromide	ppbv	<0.10	0.10	<0.10	<0.10	<0.10	0.10	7507030
1,1,1-Trichloroethane	ppbv	<0.10	0.10	<0.10	<0.10	<0.10	0.10	7507030
1,1,2-Trichloroethane	ppbv	<0.10	0.10	<0.10	<0.10	<0.10	0.10	7507030
1,1,2,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.10	<0.10	<0.10	0.10	7507030
cis-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.10	<0.10	<0.10	0.10	7507030
trans-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.10	<0.10	<0.10	0.10	7507030
1,2-Dichloropropane	ppbv	<0.10	0.10	<0.10	<0.10	<0.10	0.10	7507030
Bromomethane	ppbv	<0.10	0.10	<0.10	<0.10	<0.10	0.10	7507030
Bromoform	ppbv	<0.20	0.20	<0.20	<0.20	<0.20	0.20	7507030

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2123B

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		QFA556		QFA557	QFA557	QFA558		
Sampling Date		2021/07/22 14:45		2021/07/22 14:37	2021/07/22 14:37	2021/07/22 14:37		
COC Number		82384		82384	82384	82384		
	UNITS	**SV16-01**	**RDL**	**SV16-02**	**SV16-02 Lab-Dup**	**DUP A**	**RDL**	**QC Batch**
Bromodichloromethane	ppbv	<0.20	0.20	<0.20	<0.20	<0.20	0.20	7507030
Dibromochloromethane	ppbv	<0.20	0.20	<0.20	<0.20	<0.20	0.20	7507030
Trichloroethylene	ppbv	<0.10	0.10	2.89	2.84	3.16	0.10	7507030
Tetrachloroethylene	ppbv	0.84	0.10	0.28	0.28	0.28	0.10	7507030
Benzene	ppbv	<0.10	0.10	<0.10	<0.10	<0.10	0.10	7507030
Toluene	ppbv	0.37	0.10	0.17	0.17	<0.10	0.10	7507030
Ethylbenzene	ppbv	0.43	0.10	<0.10	<0.10	<0.10	0.10	7507030
p+m-Xylene	ppbv	1.23	0.20	<0.20	<0.20	<0.20	0.20	7507030
o-Xylene	ppbv	0.42	0.10	<0.10	<0.10	<0.10	0.10	7507030
Styrene	ppbv	<0.10	0.10	<0.10	<0.10	<0.10	0.10	7507030
4-ethyltoluene	ppbv	<0.50	0.50	<0.50	<0.50	<0.50	0.50	7507030
1,3,5-Trimethylbenzene	ppbv	<0.50	0.50	<0.50	<0.50	<0.50	0.50	7507030
1,2,4-Trimethylbenzene	ppbv	0.69	0.50	<0.50	<0.50	<0.50	0.50	7507030
Chlorobenzene	ppbv	<0.10	0.10	<0.10	<0.10	<0.10	0.10	7507030
Benzyl chloride	ppbv	<0.50	0.50	<0.50	<0.50	<0.50	0.50	7507030
1,3-Dichlorobenzene	ppbv	<0.40	0.40	<0.40	<0.40	<0.40	0.40	7507030
1,4-Dichlorobenzene	ppbv	<0.10	0.10	<0.10	<0.10	<0.10	0.10	7507030
1,2-Dichlorobenzene	ppbv	<0.10	0.10	<0.10	<0.10	<0.10	0.10	7507030
1,2,4-Trichlorobenzene	ppbv	<0.50	0.50	<0.50	<0.50	<0.50	0.50	7507030
Hexachlorobutadiene	ppbv	<0.50	0.50	<0.50	<0.50	<0.50	0.50	7507030
Hexane	ppbv	0.27	0.20	<0.20	<0.20	<0.20	0.20	7507030
Heptane	ppbv	<0.30	0.30	<0.30	<0.30	<0.30	0.30	7507030
Cyclohexane	ppbv	<0.20	0.20	<0.20	<0.20	<0.20	0.20	7507030
Tetrahydrofuran	ppbv	<0.40	0.40	<0.40	<0.40	<0.40	0.40	7507030
1,4-Dioxane	ppbv	<1.0	1.0	<1.0	<1.0	<1.0	1.0	7507030
Naphthalene	ppbv	<0.20	0.20	<0.20	<0.20	<0.20	0.20	7507030
Total Xylenes	ppbv	1.65	0.30	<0.30	<0.30	<0.30	0.30	7507030
1,1,1,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.10	<0.10	<0.10	0.10	7507030
Vinyl Bromide	ppbv	<0.20	0.20	<0.20	<0.20	<0.20	0.20	7507030
Propene	ppbv	4.93	0.50	1.02	0.99	0.57	0.50	7507030
2,2,4-Trimethylpentane	ppbv	<0.20	0.20	<0.20	<0.20	<0.20	0.20	7507030
Carbon Disulfide	ppbv	<0.50	0.50	<0.50	<0.50	<0.50	0.50	7507030
Vinyl Acetate	ppbv	<0.20	0.20	<0.20	<0.20	<0.20	0.20	7507030

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		QFA556		QFA557	QFA557	QFA558		
Sampling Date		2021/07/22 14:45		2021/07/22 14:37	2021/07/22 14:37	2021/07/22 14:37		
COC Number		82384		82384	82384	82384		
	UNITS	**SV16-01**	**RDL**	**SV16-02**	**SV16-02 Lab-Dup**	**DUP A**	**RDL**	**QC Batch**
Instrument Surrogate Recovery (%)								
Bromochloromethane	%	84		84	84	84		7507030
D5-Chlorobenzene	%	83		82	82	82		7507030
Difluorobenzene	%	85		86	86	86		7507030

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

CALCULATED VOLATILE ORGANICS (AIR)

BV Labs ID		QFA556		QFA557	QFA557	QFA558		
Sampling Date		2021/07/22 14:45		2021/07/22 14:37	2021/07/22 14:37	2021/07/22 14:37		
COC Number		82384		82384	82384	82384		
	UNITS	**SV16-01**	**RDL**	**SV16-02**	**SV16-02 Lab-Dup**	**DUP A**	**RDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ug/m3	9.39	0.99	49.0	48.9	49.6	0.99	7485951
1,2-Dichlorotetrafluoroethane	ug/m3	<1.2	1.2	<1.2	<1.2	<1.2	1.2	7485951
Chloromethane	ug/m3	<0.72	0.72	0.99	0.82	<0.62	0.62	7485951
Vinyl Chloride	ug/m3	<0.26	0.26	<0.26	<0.26	<0.26	0.26	7485951
Chloroethane	ug/m3	<0.79	0.79	<0.79	<0.79	<0.79	0.79	7485951
1,3-Butadiene	ug/m3	<1.1	1.1	<1.1	<1.1	<1.1	1.1	7485951
Trichlorofluoromethane (FREON 11)	ug/m3	1.5	1.1	1.4	1.4	1.4	1.1	7485951
Ethanol (ethyl alcohol)	ug/m3	14.0	1.9	<1.9	<1.9	<1.9	1.9	7485951
Trichlorotrifluoroethane	ug/m3	<1.2	1.2	<1.2	<1.2	<1.2	1.2	7485951
2-propanol	ug/m3	<2.5	2.5	<2.5	<2.5	<2.5	2.5	7485951
2-Propanone	ug/m3	240	1.4	66.3	65.2	61.1	1.4	7485951
Methyl Ethyl Ketone (2-Butanone)	ug/m3	33.0	0.59	6.77	6.48	3.63	0.59	7485951
Methyl Isobutyl Ketone	ug/m3	<0.82	0.82	<0.82	<0.82	<0.82	0.82	7485951
Methyl Butyl Ketone (2-Hexanone)	ug/m3	4.2	4.1	<4.1	<4.1	<4.1	4.1	7485951
Methyl t-butyl ether (MTBE)	ug/m3	<0.72	0.72	<0.72	<0.72	<0.72	0.72	7485951
Ethyl Acetate	ug/m3	<3.6	3.6	<3.6	<3.6	<3.6	3.6	7485951
1,1-Dichloroethylene	ug/m3	<0.40	0.40	<0.40	<0.40	<0.40	0.40	7485951
cis-1,2-Dichloroethylene	ug/m3	<0.40	0.40	<0.40	<0.40	<0.40	0.40	7485951
trans-1,2-Dichloroethylene	ug/m3	<0.40	0.40	<0.40	<0.40	<0.40	0.40	7485951
Methylene Chloride(Dichloromethane)	ug/m3	<2.1	2.1	<2.1	<2.1	<2.1	2.1	7485951
Chloroform	ug/m3	20.2	0.49	0.50	0.49	0.61	0.49	7485951
Carbon Tetrachloride	ug/m3	<0.63	0.63	<0.63	<0.63	<0.63	0.63	7485951
1,1-Dichloroethane	ug/m3	<0.40	0.40	<0.40	<0.40	<0.40	0.40	7485951
1,2-Dichloroethane	ug/m3	<0.40	0.40	<0.40	<0.40	<0.40	0.40	7485951
Ethylene Dibromide	ug/m3	<0.77	0.77	<0.77	<0.77	<0.77	0.77	7485951
1,1,1-Trichloroethane	ug/m3	<0.55	0.55	<0.55	<0.55	<0.55	0.55	7485951
1,1,2-Trichloroethane	ug/m3	<0.55	0.55	<0.55	<0.55	<0.55	0.55	7485951
1,1,2,2-Tetrachloroethane	ug/m3	<0.69	0.69	<0.69	<0.69	<0.69	0.69	7485951
cis-1,3-Dichloropropene	ug/m3	<0.45	0.45	<0.45	<0.45	<0.45	0.45	7485951
trans-1,3-Dichloropropene	ug/m3	<0.45	0.45	<0.45	<0.45	<0.45	0.45	7485951
1,2-Dichloropropane	ug/m3	<0.46	0.46	<0.46	<0.46	<0.46	0.46	7485951
Bromomethane	ug/m3	<0.39	0.39	<0.39	<0.39	<0.39	0.39	7485951
Bromoform	ug/m3	<2.1	2.1	<2.1	<2.1	<2.1	2.1	7485951

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

BV Labs Job #: C1K9532
Report Date: 2021/08/10

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2123B

CALCULATED VOLATILE ORGANICS (AIR)

BV Labs ID		QFA556		QFA557	QFA557	QFA558		
Sampling Date		2021/07/22 14:45		2021/07/22 14:37	2021/07/22 14:37	2021/07/22 14:37		
COC Number		82384		82384	82384	82384		
	UNITS	**SV16-01**	**RDL**	**SV16-02**	**SV16-02 Lab-Dup**	**DUP A**	**RDL**	**QC Batch**
Bromodichloromethane	ug/m3	<1.3	1.3	<1.3	<1.3	<1.3	1.3	7485951
Dibromochloromethane	ug/m3	<1.7	1.7	<1.7	<1.7	<1.7	1.7	7485951
Trichloroethylene	ug/m3	<0.54	0.54	15.5	15.3	17.0	0.54	7485951
Tetrachloroethylene	ug/m3	5.71	0.68	1.87	1.87	1.87	0.68	7485951
Benzene	ug/m3	<0.32	0.32	<0.32	<0.32	<0.32	0.32	7485951
Toluene	ug/m3	1.41	0.38	0.64	0.65	<0.38	0.38	7485951
Ethylbenzene	ug/m3	1.89	0.43	<0.43	<0.43	<0.43	0.43	7485951
p+m-Xylene	ug/m3	5.33	0.87	<0.87	<0.87	<0.87	0.87	7485951
o-Xylene	ug/m3	1.82	0.43	<0.43	<0.43	<0.43	0.43	7485951
Styrene	ug/m3	<0.43	0.43	<0.43	<0.43	<0.43	0.43	7485951
4-ethyltoluene	ug/m3	<2.5	2.5	<2.5	<2.5	<2.5	2.5	7485951
1,3,5-Trimethylbenzene	ug/m3	<2.5	2.5	<2.5	<2.5	<2.5	2.5	7485951
1,2,4-Trimethylbenzene	ug/m3	3.4	2.5	<2.5	<2.5	<2.5	2.5	7485951
Chlorobenzene	ug/m3	<0.46	0.46	<0.46	<0.46	<0.46	0.46	7485951
Benzyl chloride	ug/m3	<2.6	2.6	<2.6	<2.6	<2.6	2.6	7485951
1,3-Dichlorobenzene	ug/m3	<2.4	2.4	<2.4	<2.4	<2.4	2.4	7485951
1,4-Dichlorobenzene	ug/m3	<0.60	0.60	<0.60	<0.60	<0.60	0.60	7485951
1,2-Dichlorobenzene	ug/m3	<0.60	0.60	<0.60	<0.60	<0.60	0.60	7485951
1,2,4-Trichlorobenzene	ug/m3	<3.7	3.7	<3.7	<3.7	<3.7	3.7	7485951
Hexachlorobutadiene	ug/m3	<5.3	5.3	<5.3	<5.3	<5.3	5.3	7485951
Hexane	ug/m3	0.94	0.70	<0.70	<0.70	<0.70	0.70	7485951
Heptane	ug/m3	<1.2	1.2	<1.2	<1.2	<1.2	1.2	7485951
Cyclohexane	ug/m3	<0.69	0.69	<0.69	<0.69	<0.69	0.69	7485951
Tetrahydrofuran	ug/m3	<1.2	1.2	<1.2	<1.2	<1.2	1.2	7485951
1,4-Dioxane	ug/m3	<3.6	3.6	<3.6	<3.6	<3.6	3.6	7485951
Naphthalene	ug/m3	<1.0	1.0	<1.0	<1.0	<1.0	1.0	7485951
Total Xylenes	ug/m3	7.2	1.3	<1.3	<1.3	<1.3	1.3	7485951
1,1,1,2-Tetrachloroethane	ug/m3	<0.69	0.69	<0.69	<0.69	<0.69	0.69	7485951
Vinyl Bromide	ug/m3	<0.87	0.87	<0.87	<0.87	<0.87	0.87	7485951
Propene	ug/m3	8.48	0.86	1.75	1.70	0.99	0.86	7485951
2,2,4-Trimethylpentane	ug/m3	<0.93	0.93	<0.93	<0.93	<0.93	0.93	7485951
Carbon Disulfide	ug/m3	<1.6	1.6	<1.6	<1.6	<1.6	1.6	7485951
Vinyl Acetate	ug/m3	<0.70	0.70	<0.70	<0.70	<0.70	0.70	7485951

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C1K9532
Report Date: 2021/08/10

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2123B

VOLATILE ORGANIC HYDROCARBONS BY GC/MS (AIR)

BV Labs ID		QFA556	QFA557	QFA557	QFA558		
Sampling Date		2021/07/22 14:45	2021/07/22 14:37	2021/07/22 14:37	2021/07/22 14:37		
COC Number		82384	82384	82384	82384		
	UNITS	**SV16-01**	**SV16-02**	**SV16-02 Lab-Dup**	**DUP A**	**RDL**	**QC Batch**
F1-BTEX, C6-C10 (as Toluene)	ug/m3	280	93.1	95.7	70.2	5.0	7509705
F2, C10-C16 (as Decane)	ug/m3	1100	435	437	445	5.0	7509705

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C1K9532
Report Date: 2021/08/10

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2123B

TEST SUMMARY

BV Labs ID: QFA556
Sample ID: SV16-01
Matrix: Air

Collected: 2021/07/22
Relinquished: 2021/07/22
Received: 2021/07/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	7509705	N/A	2021/08/07	Dany Marqass
Canister Pressure (TO-15)	PRES	7507029	N/A	2021/08/07	Dany Marqass
Volatile Organics in Air (ug/m3)	GC/MS	7485951	N/A	2021/08/10	Automated Statchk
Volatile Organics in Air (TO-15)	GC/MS	7507030	N/A	2021/08/07	Dany Marqass

BV Labs ID: QFA557
Sample ID: SV16-02
Matrix: Air

Collected: 2021/07/22
Relinquished: 2021/07/22
Received: 2021/07/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	7509705	N/A	2021/08/07	Dany Marqass
Canister Pressure (TO-15)	PRES	7507029	N/A	2021/08/07	Dany Marqass
Volatile Organics in Air (ug/m3)	GC/MS	7485951	N/A	2021/08/10	Automated Statchk
Volatile Organics in Air (TO-15)	GC/MS	7507030	N/A	2021/08/07	Dany Marqass

BV Labs ID: QFA557 Dup
Sample ID: SV16-02
Matrix: Air

Collected: 2021/07/22
Relinquished: 2021/07/22
Received: 2021/07/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	7509705	N/A	2021/08/07	Dany Marqass
Volatile Organics in Air (ug/m3)	GC/MS	7485951	N/A	2021/08/10	Automated Statchk
Volatile Organics in Air (TO-15)	GC/MS	7507030	N/A	2021/08/07	Dany Marqass

BV Labs ID: QFA558
Sample ID: DUP A
Matrix: Air

Collected: 2021/07/22
Relinquished: 2021/07/22
Received: 2021/07/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	7509705	N/A	2021/08/07	Dany Marqass
Canister Pressure (TO-15)	PRES	7507029	N/A	2021/08/07	Dany Marqass
Volatile Organics in Air (ug/m3)	GC/MS	7485951	N/A	2021/08/10	Automated Statchk
Volatile Organics in Air (TO-15)	GC/MS	7507030	N/A	2021/08/07	Dany Marqass

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GENERAL COMMENTS

Sample QFA556 [SV16-01] : Increased DL for Chloromethane due to an interference.

Results relate only to the items tested.

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7507030	DM2	Method Blank	Bromochloromethane	2021/08/07		96	%	60 - 140
			D5-Chlorobenzene	2021/08/07		91	%	60 - 140
			Difluorobenzene	2021/08/07		97	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2021/08/07	<0.20		ppbv	
			1,2-Dichlorotetrafluoroethane	2021/08/07	<0.17		ppbv	
			Chloromethane	2021/08/07	<0.30		ppbv	
			Vinyl Chloride	2021/08/07	<0.10		ppbv	
			Chloroethane	2021/08/07	<0.30		ppbv	
			1,3-Butadiene	2021/08/07	<0.50		ppbv	
			Trichlorofluoromethane (FREON 11)	2021/08/07	<0.20		ppbv	
			Ethanol (ethyl alcohol)	2021/08/07	<1.0		ppbv	
			Trichlorotrifluoroethane	2021/08/07	<0.15		ppbv	
			2-propanol	2021/08/07	<1.0		ppbv	
			2-Propanone	2021/08/07	<0.60		ppbv	
			Methyl Ethyl Ketone (2-Butanone)	2021/08/07	<0.20		ppbv	
			Methyl Isobutyl Ketone	2021/08/07	<0.20		ppbv	
			Methyl Butyl Ketone (2-Hexanone)	2021/08/07	<1.0		ppbv	
			Methyl t-butyl ether (MTBE)	2021/08/07	<0.20		ppbv	
			Ethyl Acetate	2021/08/07	<1.0		ppbv	
			1,1-Dichloroethylene	2021/08/07	<0.10		ppbv	
			cis-1,2-Dichloroethylene	2021/08/07	<0.10		ppbv	
			trans-1,2-Dichloroethylene	2021/08/07	<0.10		ppbv	
			Methylene Chloride(Dichloromethane)	2021/08/07	<0.60		ppbv	
			Chloroform	2021/08/07	<0.10		ppbv	
			Carbon Tetrachloride	2021/08/07	<0.10		ppbv	
			1,1-Dichloroethane	2021/08/07	<0.10		ppbv	
			1,2-Dichloroethane	2021/08/07	<0.10		ppbv	
			Ethylene Dibromide	2021/08/07	<0.10		ppbv	
			1,1,1-Trichloroethane	2021/08/07	<0.10		ppbv	
			1,1,2-Trichloroethane	2021/08/07	<0.10		ppbv	
			1,1,2,2-Tetrachloroethane	2021/08/07	<0.10		ppbv	
			cis-1,3-Dichloropropene	2021/08/07	<0.10		ppbv	
			trans-1,3-Dichloropropene	2021/08/07	<0.10		ppbv	
			1,2-Dichloropropane	2021/08/07	<0.10		ppbv	
			Bromomethane	2021/08/07	<0.10		ppbv	
			Bromoform	2021/08/07	<0.20		ppbv	
			Bromodichloromethane	2021/08/07	<0.20		ppbv	
			Dibromochloromethane	2021/08/07	<0.20		ppbv	
			Trichloroethylene	2021/08/07	<0.10		ppbv	
			Tetrachloroethylene	2021/08/07	<0.10		ppbv	
			Benzene	2021/08/07	<0.10		ppbv	
			Toluene	2021/08/07	<0.10		ppbv	
			Ethylbenzene	2021/08/07	<0.10		ppbv	
			p+m-Xylene	2021/08/07	<0.20		ppbv	
			o-Xylene	2021/08/07	<0.10		ppbv	
			Styrene	2021/08/07	<0.10		ppbv	
			4-ethyltoluene	2021/08/07	<0.50		ppbv	
			1,3,5-Trimethylbenzene	2021/08/07	<0.50		ppbv	
			1,2,4-Trimethylbenzene	2021/08/07	<0.50		ppbv	
			Chlorobenzene	2021/08/07	<0.10		ppbv	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Benzyl chloride	2021/08/07	<0.50		ppbv	
			1,3-Dichlorobenzene	2021/08/07	<0.40		ppbv	
			1,4-Dichlorobenzene	2021/08/07	<0.10		ppbv	
			1,2-Dichlorobenzene	2021/08/07	<0.10		ppbv	
			1,2,4-Trichlorobenzene	2021/08/07	<0.50		ppbv	
			Hexachlorobutadiene	2021/08/07	<0.50		ppbv	
			Hexane	2021/08/07	<0.20		ppbv	
			Heptane	2021/08/07	<0.30		ppbv	
			Cyclohexane	2021/08/07	<0.20		ppbv	
			Tetrahydrofuran	2021/08/07	<0.40		ppbv	
			1,4-Dioxane	2021/08/07	<1.0		ppbv	
			Naphthalene	2021/08/07	<0.20		ppbv	
			Total Xylenes	2021/08/07	<0.30		ppbv	
			1,1,1,2-Tetrachloroethane	2021/08/07	<0.10		ppbv	
			Vinyl Bromide	2021/08/07	<0.20		ppbv	
			Propene	2021/08/07	<0.50		ppbv	
			2,2,4-Trimethylpentane	2021/08/07	<0.20		ppbv	
			Carbon Disulfide	2021/08/07	<0.50		ppbv	
			Vinyl Acetate	2021/08/07	<0.20		ppbv	
7509705	DM2	Method Blank	F1-BTEX, C6-C10 (as Toluene)	2021/08/07	<5.0		ug/m3	
			F2, C10-C16 (as Decane)	2021/08/07	<5.0		ug/m3	
7485951	RAE	RPD [QFA557-01]	Dichlorodifluoromethane (FREON 12)	2021/08/10	0.18		%	25
			1,2-Dichlorotetrafluoroethane	2021/08/10	NC		%	25
			Chloromethane	2021/08/10	18		%	25
			Vinyl Chloride	2021/08/10	NC		%	25
			Chloroethane	2021/08/10	NC		%	25
			1,3-Butadiene	2021/08/10	NC		%	25
			Trichlorofluoromethane (FREON 11)	2021/08/10	1.4		%	25
			Ethanol (ethyl alcohol)	2021/08/10	NC		%	25
			Trichlorotrifluoroethane	2021/08/10	NC		%	25
			2-propanol	2021/08/10	NC		%	25
			2-Propanone	2021/08/10	1.7		%	25
			Methyl Ethyl Ketone (2-Butanone)	2021/08/10	4.3		%	25
			Methyl Isobutyl Ketone	2021/08/10	NC		%	25
			Methyl Butyl Ketone (2-Hexanone)	2021/08/10	NC		%	25
			Methyl t-butyl ether (MTBE)	2021/08/10	NC		%	25
			Ethyl Acetate	2021/08/10	NC		%	25
			1,1-Dichloroethylene	2021/08/10	NC		%	25
			cis-1,2-Dichloroethylene	2021/08/10	NC		%	25
			trans-1,2-Dichloroethylene	2021/08/10	NC		%	25
			Methylene Chloride(Dichloromethane)	2021/08/10	NC		%	25
			Chloroform	2021/08/10	2.6		%	25
			Carbon Tetrachloride	2021/08/10	NC		%	25
			1,1-Dichloroethane	2021/08/10	NC		%	25
			1,2-Dichloroethane	2021/08/10	NC		%	25
			Ethylene Dibromide	2021/08/10	NC		%	25
			1,1,1-Trichloroethane	2021/08/10	NC		%	25
			1,1,2-Trichloroethane	2021/08/10	NC		%	25
			1,1,2,2-Tetrachloroethane	2021/08/10	NC		%	25
			cis-1,3-Dichloropropene	2021/08/10	NC		%	25

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			trans-1,3-Dichloropropene	2021/08/10	NC		%	25
			1,2-Dichloropropane	2021/08/10	NC		%	25
			Bromomethane	2021/08/10	NC		%	25
			Bromoform	2021/08/10	NC		%	25
			Bromodichloromethane	2021/08/10	NC		%	25
			Dibromochloromethane	2021/08/10	NC		%	25
			Trichloroethylene	2021/08/10	1.7		%	25
			Tetrachloroethylene	2021/08/10	0.0036		%	25
			Benzene	2021/08/10	NC		%	25
			Toluene	2021/08/10	1.5		%	25
			Ethylbenzene	2021/08/10	NC		%	25
			p+m-Xylene	2021/08/10	NC		%	25
			o-Xylene	2021/08/10	NC		%	25
			Styrene	2021/08/10	NC		%	25
			4-ethyltoluene	2021/08/10	NC		%	25
			1,3,5-Trimethylbenzene	2021/08/10	NC		%	25
			1,2,4-Trimethylbenzene	2021/08/10	NC		%	25
			Chlorobenzene	2021/08/10	NC		%	25
			Benzyl chloride	2021/08/10	NC		%	25
			1,3-Dichlorobenzene	2021/08/10	NC		%	25
			1,4-Dichlorobenzene	2021/08/10	NC		%	25
			1,2-Dichlorobenzene	2021/08/10	NC		%	25
			1,2,4-Trichlorobenzene	2021/08/10	NC		%	25
			Hexachlorobutadiene	2021/08/10	NC		%	25
			Hexane	2021/08/10	NC		%	25
			Heptane	2021/08/10	NC		%	25
			Cyclohexane	2021/08/10	NC		%	25
			Tetrahydrofuran	2021/08/10	NC		%	25
			1,4-Dioxane	2021/08/10	NC		%	25
			Naphthalene	2021/08/10	NC		%	25
			Total Xylenes	2021/08/10	NC		%	25
			1,1,1,2-Tetrachloroethane	2021/08/10	NC		%	25
			Vinyl Bromide	2021/08/10	NC		%	25
			Propene	2021/08/10	3.2		%	25
			2,2,4-Trimethylpentane	2021/08/10	NC		%	25
			Carbon Disulfide	2021/08/10	NC		%	25
			Vinyl Acetate	2021/08/10	NC		%	25
7507030	DM2	RPD [QFA557-01]	Dichlorodifluoromethane (FREON 12)	2021/08/07	0.18		%	25
			1,2-Dichlorotetrafluoroethane	2021/08/07	NC		%	25
			Chloromethane	2021/08/07	18		%	25
			Vinyl Chloride	2021/08/07	NC		%	25
			Chloroethane	2021/08/07	NC		%	25
			1,3-Butadiene	2021/08/07	NC		%	25
			Trichlorofluoromethane (FREON 11)	2021/08/07	1.4		%	25
			Ethanol (ethyl alcohol)	2021/08/07	NC		%	25
			Trichlorotrifluoroethane	2021/08/07	NC		%	25
			2-propanol	2021/08/07	NC		%	25
			2-Propanone	2021/08/07	1.7		%	25
			Methyl Ethyl Ketone (2-Butanone)	2021/08/07	4.3		%	25
			Methyl Isobutyl Ketone	2021/08/07	NC		%	25

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Methyl Butyl Ketone (2-Hexanone)	2021/08/07	NC		%	25
			Methyl t-butyl ether (MTBE)	2021/08/07	NC		%	25
			Ethyl Acetate	2021/08/07	NC		%	25
			1,1-Dichloroethylene	2021/08/07	NC		%	25
			cis-1,2-Dichloroethylene	2021/08/07	NC		%	25
			trans-1,2-Dichloroethylene	2021/08/07	NC		%	25
			Methylene Chloride(Dichloromethane)	2021/08/07	NC		%	25
			Chloroform	2021/08/07	2.6		%	25
			Carbon Tetrachloride	2021/08/07	NC		%	25
			1,1-Dichloroethane	2021/08/07	NC		%	25
			1,2-Dichloroethane	2021/08/07	NC		%	25
			Ethylene Dibromide	2021/08/07	NC		%	25
			1,1,1-Trichloroethane	2021/08/07	NC		%	25
			1,1,2-Trichloroethane	2021/08/07	NC		%	25
			1,1,2,2-Tetrachloroethane	2021/08/07	NC		%	25
			cis-1,3-Dichloropropene	2021/08/07	NC		%	25
			trans-1,3-Dichloropropene	2021/08/07	NC		%	25
			1,2-Dichloropropane	2021/08/07	NC		%	25
			Bromomethane	2021/08/07	NC		%	25
			Bromoform	2021/08/07	NC		%	25
			Bromodichloromethane	2021/08/07	NC		%	25
			Dibromochloromethane	2021/08/07	NC		%	25
			Trichloroethylene	2021/08/07	1.7		%	25
			Tetrachloroethylene	2021/08/07	0.0036		%	25
			Benzene	2021/08/07	NC		%	25
			Toluene	2021/08/07	1.5		%	25
			Ethylbenzene	2021/08/07	NC		%	25
			p+m-Xylene	2021/08/07	NC		%	25
			o-Xylene	2021/08/07	NC		%	25
			Styrene	2021/08/07	NC		%	25
			4-ethyltoluene	2021/08/07	NC		%	25
			1,3,5-Trimethylbenzene	2021/08/07	NC		%	25
			1,2,4-Trimethylbenzene	2021/08/07	NC		%	25
			Chlorobenzene	2021/08/07	NC		%	25
			Benzyl chloride	2021/08/07	NC		%	25
			1,3-Dichlorobenzene	2021/08/07	NC		%	25
			1,4-Dichlorobenzene	2021/08/07	NC		%	25
			1,2-Dichlorobenzene	2021/08/07	NC		%	25
			1,2,4-Trichlorobenzene	2021/08/07	NC		%	25
			Hexachlorobutadiene	2021/08/07	NC		%	25
			Hexane	2021/08/07	NC		%	25
			Heptane	2021/08/07	NC		%	25
			Cyclohexane	2021/08/07	NC		%	25
			Tetrahydrofuran	2021/08/07	NC		%	25
			1,4-Dioxane	2021/08/07	NC		%	25
			Naphthalene	2021/08/07	NC		%	25
			Total Xylenes	2021/08/07	NC		%	25
			1,1,1,2-Tetrachloroethane	2021/08/07	NC		%	25
			Vinyl Bromide	2021/08/07	NC		%	25
			Propene	2021/08/07	3.2		%	25

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			2,2,4-Trimethylpentane	2021/08/07	NC		%	25
			Carbon Disulfide	2021/08/07	NC		%	25
			Vinyl Acetate	2021/08/07	NC		%	25
7509705	DM2	RPD [QFA557-01]	F1-BTEX, C6-C10 (as Toluene)	2021/08/07	2.8		%	25
			F2, C10-C16 (as Decane)	2021/08/07	0.34		%	25
7507030	DM2	LCS	Bromochloromethane	2021/08/07		102	%	60 - 140
			D5-Chlorobenzene	2021/08/07		101	%	60 - 140
			Difluorobenzene	2021/08/07		102	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2021/08/07		96	%	70 - 130
			1,2-Dichlorotetrafluoroethane	2021/08/07		96	%	70 - 130
			Chloromethane	2021/08/07		85	%	70 - 130
			Vinyl Chloride	2021/08/07		94	%	70 - 130
			Chloroethane	2021/08/07		92	%	70 - 130
			1,3-Butadiene	2021/08/07		99	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2021/08/07		97	%	70 - 130
			Ethanol (ethyl alcohol)	2021/08/07		68 (1)	%	70 - 130
			Trichlorotrifluoroethane	2021/08/07		98	%	70 - 130
			2-propanol	2021/08/07		86	%	70 - 130
			2-Propanone	2021/08/07		97	%	70 - 130
			Methyl Ethyl Ketone (2-Butanone)	2021/08/07		104	%	70 - 130
			Methyl Isobutyl Ketone	2021/08/07		105	%	70 - 130
			Methyl Butyl Ketone (2-Hexanone)	2021/08/07		111	%	70 - 130
			Methyl t-butyl ether (MTBE)	2021/08/07		110	%	70 - 130
			Ethyl Acetate	2021/08/07		101	%	70 - 130
			1,1-Dichloroethylene	2021/08/07		97	%	70 - 130
			cis-1,2-Dichloroethylene	2021/08/07		96	%	70 - 130
			trans-1,2-Dichloroethylene	2021/08/07		98	%	70 - 130
			Methylene Chloride(Dichloromethane)	2021/08/07		92	%	70 - 130
			Chloroform	2021/08/07		96	%	70 - 130
			Carbon Tetrachloride	2021/08/07		104	%	70 - 130
			1,1-Dichloroethane	2021/08/07		96	%	70 - 130
			1,2-Dichloroethane	2021/08/07		97	%	70 - 130
			Ethylene Dibromide	2021/08/07		102	%	70 - 130
			1,1,1-Trichloroethane	2021/08/07		104	%	70 - 130
			1,1,2-Trichloroethane	2021/08/07		97	%	70 - 130
			1,1,2,2-Tetrachloroethane	2021/08/07		87	%	70 - 130
			cis-1,3-Dichloropropene	2021/08/07		105	%	70 - 130
			trans-1,3-Dichloropropene	2021/08/07		114	%	70 - 130
			1,2-Dichloropropane	2021/08/07		96	%	70 - 130
			Bromomethane	2021/08/07		97	%	70 - 130
			Bromoform	2021/08/07		102	%	70 - 130
			Bromodichloromethane	2021/08/07		103	%	70 - 130
			Dibromochloromethane	2021/08/07		108	%	70 - 130
			Trichloroethylene	2021/08/07		104	%	70 - 130
			Tetrachloroethylene	2021/08/07		105	%	70 - 130
			Benzene	2021/08/07		98	%	70 - 130
			Toluene	2021/08/07		103	%	70 - 130
			Ethylbenzene	2021/08/07		98	%	70 - 130
			p+m-Xylene	2021/08/07		98	%	70 - 130
			o-Xylene	2021/08/07		93	%	70 - 130

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Styrene	2021/08/07		100	%	70 - 130
			4-ethyltoluene	2021/08/07		111	%	70 - 130
			1,3,5-Trimethylbenzene	2021/08/07		106	%	70 - 130
			1,2,4-Trimethylbenzene	2021/08/07		119	%	70 - 130
			Chlorobenzene	2021/08/07		95	%	70 - 130
			Benzyl chloride	2021/08/07		123	%	70 - 130
			1,3-Dichlorobenzene	2021/08/07		112	%	70 - 130
			1,4-Dichlorobenzene	2021/08/07		111	%	70 - 130
			1,2-Dichlorobenzene	2021/08/07		106	%	70 - 130
			1,2,4-Trichlorobenzene	2021/08/07		129	%	70 - 130
			Hexachlorobutadiene	2021/08/07		109	%	70 - 130
			Hexane	2021/08/07		103	%	70 - 130
			Heptane	2021/08/07		102	%	70 - 130
			Cyclohexane	2021/08/07		102	%	70 - 130
			Tetrahydrofuran	2021/08/07		100	%	70 - 130
			1,4-Dioxane	2021/08/07		106	%	70 - 130
			Naphthalene	2021/08/07		140 (1)	%	70 - 130
			Total Xylenes	2021/08/07		96	%	70 - 130
			1,1,1,2-Tetrachloroethane	2021/08/07		97	%	70 - 130
			Vinyl Bromide	2021/08/07		108	%	70 - 130
			Propene	2021/08/07		96	%	70 - 130
			2,2,4-Trimethylpentane	2021/08/07		104	%	70 - 130
			Carbon Disulfide	2021/08/07		98	%	70 - 130
			Vinyl Acetate	2021/08/07		113	%	70 - 130

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

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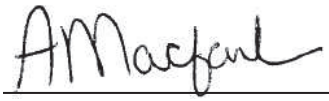
Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C1K9532
Report Date: 2021/08/10

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2123B

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



Anke Macfarlane, Laboratory Manager, VOC

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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6740 Campobello Road
Mississauga, ON L5N 2L8
www.bvlabs.com

Phone: (905) 817-5700
Fax: (905) 817-5779
Toll Free: 1-800-563-6266

EXXONMOBIL/IMPERIAL OIL - BUREAU VERITAS AIR CHAIN OF CUSTODY RECORD

C of C # 82384

INVOICE INFORMATION	REPORT INFORMATION
Company Name: ☒ Imperial Oil ☐ ExxonMobil	Company Name: Golder Associates Ltd.
Contact Name: IOL Accounts Payable	Contact Name: Ian Sosney
Address: 102, 2535-3rd Ave Calgary AB T2A7W5	Address: 110 Hannover Dr. #203A St. Catharines ON L2W1A4
Email: Canadaaccountspayable@golder.com	Email: isosney@golder.com
Ph: 403-299-5600	Ph: 647-522-7691
Sampler Name (Print): Leandra Mariani	Consultant Project #: 20447743-1155-2123B.

FIELD SAMPLE ID	Canister Serial #	Flow Regulator Serial #	Sample Collection DATE (YYYY/MM/DD)	Sample Collection TIME (24 HR)	Media Type (See Legend)	FLOW RATE (L/min)	LENGTH OF SAMPLING (minutes)	End Vacuum (inches of Hg)	BTEX	Aromatic/Aliphatic Hydrocarbon Fractionations	F1 (C6-C10) - F2 (C10-C16)	VOC (TO15)
1 SV16-01	2387	FX1623	2021/07/22	14:45	S	0.18	8	-2.5	X		X	X
2 SV16-02	3021	FX0299	↓	14:37	S	0.15	9	-3	X		X	X
3 DUPA	2493	FX0265	↓	14:37	S	0.18	8	-2.5	X		X	X
4												
5												
6												
7												
8												
9												
10												
11												

ANALYSIS REQUESTED

IOL SITE LOCATION: 1660 Merivale Rd Ottawa, ON

IOL PROJECT # (if applicable): NA

BUREAU VERITAS TASK ORDER # OR SERVICE ORDER # + LINE ITEM: 20447743-1155-7777

REGULATORY CRITERIA / DETECTION LIMITS: (PLEASE SPECIFY): NA

SPECIAL INSTRUCTIONS: IES A2601436 SAP 88001627 labels include canister serial numbers - not included in IDs

LEGEND: S - Summa Can; T - Tube; TB - Tedlar Bag; O - Other(Specify); *TEMP N/A for SUMMA CAN

TURNAROUND TIME: Standard (10 days) ☒; Rush (9 days) ☐; (6 days) ☐; (3 days) ☐; Date Required

	YES	NO	COOLER ID # 1	TEMP °C 1	2	3
SEAL PRESENT	✓					
SEAL INTACT	✓					
COOLING MEDIA PRESENT		✓				

	YES	NO	COOLER ID #	TEMP °C 1	2	3
SEAL PRESENT						
SEAL INTACT						
COOLING MEDIA PRESENT						

	YES	NO	COOLER ID #	TEMP °C 1	2	3
SEAL PRESENT						
SEAL INTACT						
COOLING MEDIA PRESENT						

LAB USE ONLY

BUREAU VERITAS JOB # C1K9532

RELINQUISHED BY:		DATE:	TIME (24 HR)	RECEIVED BY:		DATE:	TIME (24 HR)
1. signature	Leandra Mariani printed name	2021/07/22	16:26	1. signature	BANISHA SUMAN printed name	2021/07/27	09:30
2. signature	printed name	YYYY/MM/DD	HR/MM	2. signature	printed name	YYYY/MM/DD	HR/MM
3. signature	printed name	YYYY/MM/DD	HR/MM	3. signature	printed name	YYYY/MM/DD	HR/MM

SAMPLES: LABELED BY: BS; VERIFIED BY: LOR

IOL COC-AIR-(08/19)

White: Bureau Veritas Yellow: Client

Unless otherwise agreed to in writing, work submitted on this Chain of Custody is subject to Bureau Veritas Laboratories' standard Terms and Conditions. Signing of this Chain of Custody document is acknowledgment and acceptance of our terms available at http://www.bvlabs.com/terms-and-conditions

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: July 22, 2021

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Bureau Veritas Mississauga

Consultant Project Number: 20447743-1155

Sample Submission Number: C1K9532

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			Lab control sample recovery outside acceptance
Extraction Surrogate Recovery			X	range of 70-130% for ethanol (68%) and naphthalene
Method Blank Concentration	X			(140%). All remaining laboratory QC results are within
Matrix Duplicate RPD	X			acceptance criteria.
Matrix Spike Recovery			X	
Lab Control Sample Recovery		X		

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	Samples SV16-02 and DUP A exceed the alert limit for
Trip Blank Concentration			X	methyl ethyl ketone (60%). All remaining field QC
Field Duplicate RPD		X		samples are within alert limits.

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	n/a

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): Amanda Newberry

Date: August 12, 2021

Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: 1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2123B
Your C.O.C. #: 82383

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2021/08/09
Report #: R6756131
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1K9534
Received: 2021/07/27, 09:30

Sample Matrix: Air
Samples Received: 2

Analyses	Quantity	Laboratory Method	Analytical Method
BTEX and CCME Compounds in Air(TO-15mod)	2	BRL SOP-00304	EPA TO-15 m
Canister Pressure (TO-15)	2	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (ug/m3)	2	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (TO-15) (1)	2	BRL SOP-00304	EPA TO-15 m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard. All samples were analyzed within hold time unless otherwise flagged.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Air sampling canisters have been cleaned in accordance with U.S. EPA Method TO15. At the end of the cleaning, evacuation, and pressurization cycles, one canister was selected and was pressurized with Zero Air. This canister was then analyzed via TO15 on a GC/MS. The canister must have been found to contain <0.2 ppbv concentration of all target analytes in order for the batch to have been considered clean. Each canister also underwent a leak check prior to shipment.

Please Note: SUMMA® canister samples will be retained by Bureau Veritas Laboratories for a period of 5 calendar days or as contractually agreed from the date of this report, after which time they will be cleaned for reuse. If you require a longer sample storage period, please contact your service representative.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: 1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2123B
Your C.O.C. #: 82383

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2021/08/09
Report #: R6756131
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1K9534
Received: 2021/07/27, 09:30

Encryption Key



Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Gina Baybayan, Project Manager
Email: Gina.Baybayan@bureauveritas.com
Phone# (905)817-5766

==========

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C1K9534
Report Date: 2021/08/09

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: 1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2123B

RESULTS OF ANALYSES OF AIR

BV Labs ID		QFA576	QFA577	
Sampling Date		2021/07/22 14:50	2021/07/22 15:00	
COC Number		82383	82383	
	UNITS	**FIELD BLANK**	**TRIP BLANK**	**QC Batch**
Pressure on Receipt	psig	(-2.2)	(-14.3)	7504839

QC Batch = Quality Control Batch

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Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: 1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2123B

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		QFA576	QFA577		
Sampling Date		2021/07/22 14:50	2021/07/22 15:00		
COC Number		82383	82383		
	UNITS	**FIELD BLANK**	**TRIP BLANK**	**RDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ppbv	0.47	<0.20	0.20	7504841
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	<0.17	0.17	7504841
Chloromethane	ppbv	0.62	<0.30	0.30	7504841
Vinyl Chloride	ppbv	<0.10	<0.10	0.10	7504841
Chloroethane	ppbv	<0.30	<0.30	0.30	7504841
1,3-Butadiene	ppbv	<0.50	<0.50	0.50	7504841
Trichlorofluoromethane (FREON 11)	ppbv	0.20	<0.20	0.20	7504841
Ethanol (ethyl alcohol)	ppbv	1.5	<1.0	1.0	7504841
Trichlorotrifluoroethane	ppbv	<0.15	<0.15	0.15	7504841
2-propanol	ppbv	<1.0	<1.0	1.0	7504841
2-Propanone	ppbv	3.92	<0.60	0.60	7504841
Methyl Ethyl Ketone (2-Butanone)	ppbv	0.32	<0.20	0.20	7504841
Methyl Isobutyl Ketone	ppbv	<0.20	<0.20	0.20	7504841
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	<1.0	1.0	7504841
Methyl t-butyl ether (MTBE)	ppbv	<0.20	<0.20	0.20	7504841
Ethyl Acetate	ppbv	<1.0	<1.0	1.0	7504841
1,1-Dichloroethylene	ppbv	<0.10	<0.10	0.10	7504841
cis-1,2-Dichloroethylene	ppbv	<0.10	<0.10	0.10	7504841
trans-1,2-Dichloroethylene	ppbv	<0.10	<0.10	0.10	7504841
Methylene Chloride(Dichloromethane)	ppbv	<0.60	<0.60	0.60	7504841
Chloroform	ppbv	<0.10	<0.10	0.10	7504841
Carbon Tetrachloride	ppbv	<0.10	<0.10	0.10	7504841
1,1-Dichloroethane	ppbv	<0.10	<0.10	0.10	7504841
1,2-Dichloroethane	ppbv	<0.10	<0.10	0.10	7504841
Ethylene Dibromide	ppbv	<0.10	<0.10	0.10	7504841
1,1,1-Trichloroethane	ppbv	<0.10	<0.10	0.10	7504841
1,1,2-Trichloroethane	ppbv	<0.10	<0.10	0.10	7504841
1,1,2,2-Tetrachloroethane	ppbv	<0.10	<0.10	0.10	7504841
cis-1,3-Dichloropropene	ppbv	<0.10	<0.10	0.10	7504841
trans-1,3-Dichloropropene	ppbv	<0.10	<0.10	0.10	7504841
1,2-Dichloropropane	ppbv	<0.10	<0.10	0.10	7504841
Bromomethane	ppbv	<0.10	<0.10	0.10	7504841
Bromoform	ppbv	<0.20	<0.20	0.20	7504841
Bromodichloromethane	ppbv	<0.20	<0.20	0.20	7504841

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C1K9534
Report Date: 2021/08/09

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: 1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2123B

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		QFA576	QFA577		
Sampling Date		2021/07/22 14:50	2021/07/22 15:00		
COC Number		82383	82383		
	UNITS	**FIELD BLANK**	**TRIP BLANK**	**RDL**	**QC Batch**
Dibromochloromethane	ppbv	<0.20	<0.20	0.20	7504841
Trichloroethylene	ppbv	<0.10	<0.10	0.10	7504841
Tetrachloroethylene	ppbv	<0.10	<0.10	0.10	7504841
Benzene	ppbv	<0.10	<0.10	0.10	7504841
Toluene	ppbv	0.11	<0.10	0.10	7504841
Ethylbenzene	ppbv	<0.10	<0.10	0.10	7504841
p+m-Xylene	ppbv	<0.20	<0.20	0.20	7504841
o-Xylene	ppbv	<0.10	<0.10	0.10	7504841
Styrene	ppbv	<0.10	<0.10	0.10	7504841
4-ethyltoluene	ppbv	<0.50	<0.50	0.50	7504841
1,3,5-Trimethylbenzene	ppbv	<0.50	<0.50	0.50	7504841
1,2,4-Trimethylbenzene	ppbv	<0.50	<0.50	0.50	7504841
Chlorobenzene	ppbv	<0.10	<0.10	0.10	7504841
Benzyl chloride	ppbv	<0.50	<0.50	0.50	7504841
1,3-Dichlorobenzene	ppbv	<0.40	<0.40	0.40	7504841
1,4-Dichlorobenzene	ppbv	<0.10	<0.10	0.10	7504841
1,2-Dichlorobenzene	ppbv	<0.10	<0.10	0.10	7504841
1,2,4-Trichlorobenzene	ppbv	<0.50	<0.50	0.50	7504841
Hexachlorobutadiene	ppbv	<0.50	<0.50	0.50	7504841
Hexane	ppbv	<0.20	<0.20	0.20	7504841
Heptane	ppbv	<0.30	<0.30	0.30	7504841
Cyclohexane	ppbv	<0.20	<0.20	0.20	7504841
Tetrahydrofuran	ppbv	<0.40	<0.40	0.40	7504841
1,4-Dioxane	ppbv	<1.0	<1.0	1.0	7504841
Naphthalene	ppbv	<0.20	<0.20	0.20	7504841
Total Xylenes	ppbv	<0.30	<0.30	0.30	7504841
1,1,1,2-Tetrachloroethane	ppbv	<0.10	<0.10	0.10	7504841
Vinyl Bromide	ppbv	<0.20	<0.20	0.20	7504841
Propene	ppbv	<0.50	<0.50	0.50	7504841
2,2,4-Trimethylpentane	ppbv	<0.20	<0.20	0.20	7504841
Carbon Disulfide	ppbv	<0.50	<0.50	0.50	7504841
Vinyl Acetate	ppbv	<0.20	<0.20	0.20	7504841

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C1K9534
Report Date: 2021/08/09

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: 1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2123B

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		QFA576	QFA577		
Sampling Date		2021/07/22 14:50	2021/07/22 15:00		
COC Number		82383	82383		
	UNITS	**FIELD BLANK**	**TRIP BLANK**	**RDL**	**QC Batch**
Instrument Surrogate Recovery (%)					
Bromochloromethane	%	81	82		7504841
D5-Chlorobenzene	%	78	79		7504841
Difluorobenzene	%	82	85		7504841

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

CALCULATED VOLATILE ORGANICS (AIR)

BV Labs ID		QFA576	QFA577		
Sampling Date		2021/07/22 14:50	2021/07/22 15:00		
COC Number		82383	82383		
	UNITS	**FIELD BLANK**	**TRIP BLANK**	**RDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ug/m3	2.31	<0.99	0.99	7485951
1,2-Dichlorotetrafluoroethane	ug/m3	<1.2	<1.2	1.2	7485951
Chloromethane	ug/m3	1.28	<0.62	0.62	7485951
Vinyl Chloride	ug/m3	<0.26	<0.26	0.26	7485951
Chloroethane	ug/m3	<0.79	<0.79	0.79	7485951
1,3-Butadiene	ug/m3	<1.1	<1.1	1.1	7485951
Trichlorofluoromethane (FREON 11)	ug/m3	1.1	<1.1	1.1	7485951
Ethanol (ethyl alcohol)	ug/m3	2.9	<1.9	1.9	7485951
Trichlorotrifluoroethane	ug/m3	<1.2	<1.2	1.2	7485951
2-propanol	ug/m3	<2.5	<2.5	2.5	7485951
2-Propanone	ug/m3	9.3	<1.4	1.4	7485951
Methyl Ethyl Ketone (2-Butanone)	ug/m3	0.93	<0.59	0.59	7485951
Methyl Isobutyl Ketone	ug/m3	<0.82	<0.82	0.82	7485951
Methyl Butyl Ketone (2-Hexanone)	ug/m3	<4.1	<4.1	4.1	7485951
Methyl t-butyl ether (MTBE)	ug/m3	<0.72	<0.72	0.72	7485951
Ethyl Acetate	ug/m3	<3.6	<3.6	3.6	7485951
1,1-Dichloroethylene	ug/m3	<0.40	<0.40	0.40	7485951
cis-1,2-Dichloroethylene	ug/m3	<0.40	<0.40	0.40	7485951
trans-1,2-Dichloroethylene	ug/m3	<0.40	<0.40	0.40	7485951
Methylene Chloride(Dichloromethane)	ug/m3	<2.1	<2.1	2.1	7485951
Chloroform	ug/m3	<0.49	<0.49	0.49	7485951
Carbon Tetrachloride	ug/m3	<0.63	<0.63	0.63	7485951
1,1-Dichloroethane	ug/m3	<0.40	<0.40	0.40	7485951
1,2-Dichloroethane	ug/m3	<0.40	<0.40	0.40	7485951
Ethylene Dibromide	ug/m3	<0.77	<0.77	0.77	7485951
1,1,1-Trichloroethane	ug/m3	<0.55	<0.55	0.55	7485951
1,1,2-Trichloroethane	ug/m3	<0.55	<0.55	0.55	7485951
1,1,2,2-Tetrachloroethane	ug/m3	<0.69	<0.69	0.69	7485951
cis-1,3-Dichloropropene	ug/m3	<0.45	<0.45	0.45	7485951
trans-1,3-Dichloropropene	ug/m3	<0.45	<0.45	0.45	7485951
1,2-Dichloropropane	ug/m3	<0.46	<0.46	0.46	7485951
Bromomethane	ug/m3	<0.39	<0.39	0.39	7485951
Bromoform	ug/m3	<2.1	<2.1	2.1	7485951
Bromodichloromethane	ug/m3	<1.3	<1.3	1.3	7485951

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: 1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2123B

CALCULATED VOLATILE ORGANICS (AIR)

BV Labs ID		QFA576	QFA577		
Sampling Date		2021/07/22 14:50	2021/07/22 15:00		
COC Number		82383	82383		
	UNITS	**FIELD BLANK**	**TRIP BLANK**	**RDL**	**QC Batch**
Dibromochloromethane	ug/m3	<1.7	<1.7	1.7	7485951
Trichloroethylene	ug/m3	<0.54	<0.54	0.54	7485951
Tetrachloroethylene	ug/m3	<0.68	<0.68	0.68	7485951
Benzene	ug/m3	<0.32	<0.32	0.32	7485951
Toluene	ug/m3	0.42	<0.38	0.38	7485951
Ethylbenzene	ug/m3	<0.43	<0.43	0.43	7485951
p+m-Xylene	ug/m3	<0.87	<0.87	0.87	7485951
o-Xylene	ug/m3	<0.43	<0.43	0.43	7485951
Styrene	ug/m3	<0.43	<0.43	0.43	7485951
4-ethyltoluene	ug/m3	<2.5	<2.5	2.5	7485951
1,3,5-Trimethylbenzene	ug/m3	<2.5	<2.5	2.5	7485951
1,2,4-Trimethylbenzene	ug/m3	<2.5	<2.5	2.5	7485951
Chlorobenzene	ug/m3	<0.46	<0.46	0.46	7485951
Benzyl chloride	ug/m3	<2.6	<2.6	2.6	7485951
1,3-Dichlorobenzene	ug/m3	<2.4	<2.4	2.4	7485951
1,4-Dichlorobenzene	ug/m3	<0.60	<0.60	0.60	7485951
1,2-Dichlorobenzene	ug/m3	<0.60	<0.60	0.60	7485951
1,2,4-Trichlorobenzene	ug/m3	<3.7	<3.7	3.7	7485951
Hexachlorobutadiene	ug/m3	<5.3	<5.3	5.3	7485951
Hexane	ug/m3	<0.70	<0.70	0.70	7485951
Heptane	ug/m3	<1.2	<1.2	1.2	7485951
Cyclohexane	ug/m3	<0.69	<0.69	0.69	7485951
Tetrahydrofuran	ug/m3	<1.2	<1.2	1.2	7485951
1,4-Dioxane	ug/m3	<3.6	<3.6	3.6	7485951
Naphthalene	ug/m3	<1.0	<1.0	1.0	7485951
Total Xylenes	ug/m3	<1.3	<1.3	1.3	7485951
1,1,1,2-Tetrachloroethane	ug/m3	<0.69	<0.69	0.69	7485951
Vinyl Bromide	ug/m3	<0.87	<0.87	0.87	7485951
Propene	ug/m3	<0.86	<0.86	0.86	7485951
2,2,4-Trimethylpentane	ug/m3	<0.93	<0.93	0.93	7485951
Carbon Disulfide	ug/m3	<1.6	<1.6	1.6	7485951
Vinyl Acetate	ug/m3	<0.70	<0.70	0.70	7485951

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C1K9534
Report Date: 2021/08/09

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: 1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2123B

VOLATILE ORGANIC HYDROCARBONS BY GC/MS (AIR)

BV Labs ID		QFA576	QFA577		
Sampling Date		2021/07/22 14:50	2021/07/22 15:00		
COC Number		82383	82383		
	UNITS	**FIELD BLANK**	**TRIP BLANK**	**RDL**	**QC Batch**
F1-BTEX, C6-C10 (as Toluene)	ug/m3	23.4	<5.0	5.0	7507033
F2, C10-C16 (as Decane)	ug/m3	38.6	<5.0	5.0	7507033

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C1K9534
Report Date: 2021/08/09

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: 1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2123B

TEST SUMMARY

BV Labs ID: QFA576
Sample ID: FIELD BLANK
Matrix: Air

Collected: 2021/07/22
Relinquished: 2021/07/22
Received: 2021/07/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	7507033	N/A	2021/08/06	Dany Marqass
Canister Pressure (TO-15)	PRES	7504839	N/A	2021/08/06	Dany Marqass
Volatile Organics in Air (ug/m3)	GC/MS	7485951	N/A	2021/08/07	Automated Statchk
Volatile Organics in Air (TO-15)	GC/MS	7504841	N/A	2021/08/06	Dany Marqass

BV Labs ID: QFA577
Sample ID: TRIP BLANK
Matrix: Air

Collected: 2021/07/22
Relinquished: 2021/07/22
Received: 2021/07/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	7507033	N/A	2021/08/06	Dany Marqass
Canister Pressure (TO-15)	PRES	7504839	N/A	2021/08/06	Dany Marqass
Volatile Organics in Air (ug/m3)	GC/MS	7485951	N/A	2021/08/07	Automated Statchk
Volatile Organics in Air (TO-15)	GC/MS	7504841	N/A	2021/08/06	Dany Marqass

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C1K9534
Report Date: 2021/08/09

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: 1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2123B

GENERAL COMMENTS

WS# 7504841: Naphthalene and 1,2,4-Trichlorobenzene exceeded 140% recovery in the reference standard. There were no positives found for these compounds therefore the data should not be affected.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7504841	DM2	Method Blank	Bromochloromethane	2021/08/06		96	%	60 - 140
			D5-Chlorobenzene	2021/08/06		92	%	60 - 140
			Difluorobenzene	2021/08/06		96	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2021/08/06	<0.20		ppbv	
			1,2-Dichlorotetrafluoroethane	2021/08/06	<0.17		ppbv	
			Chloromethane	2021/08/06	<0.30		ppbv	
			Vinyl Chloride	2021/08/06	<0.10		ppbv	
			Chloroethane	2021/08/06	<0.30		ppbv	
			1,3-Butadiene	2021/08/06	<0.50		ppbv	
			Trichlorofluoromethane (FREON 11)	2021/08/06	<0.20		ppbv	
			Ethanol (ethyl alcohol)	2021/08/06	<1.0		ppbv	
			Trichlorotrifluoroethane	2021/08/06	<0.15		ppbv	
			2-propanol	2021/08/06	<1.0		ppbv	
			2-Propanone	2021/08/06	<0.60		ppbv	
			Methyl Ethyl Ketone (2-Butanone)	2021/08/06	<0.20		ppbv	
			Methyl Isobutyl Ketone	2021/08/06	<0.20		ppbv	
			Methyl Butyl Ketone (2-Hexanone)	2021/08/06	<1.0		ppbv	
			Methyl t-butyl ether (MTBE)	2021/08/06	<0.20		ppbv	
			Ethyl Acetate	2021/08/06	<1.0		ppbv	
			1,1-Dichloroethylene	2021/08/06	<0.10		ppbv	
			cis-1,2-Dichloroethylene	2021/08/06	<0.10		ppbv	
			trans-1,2-Dichloroethylene	2021/08/06	<0.10		ppbv	
			Methylene Chloride(Dichloromethane)	2021/08/06	<0.60		ppbv	
			Chloroform	2021/08/06	<0.10		ppbv	
			Carbon Tetrachloride	2021/08/06	<0.10		ppbv	
			1,1-Dichloroethane	2021/08/06	<0.10		ppbv	
			1,2-Dichloroethane	2021/08/06	<0.10		ppbv	
			Ethylene Dibromide	2021/08/06	<0.10		ppbv	
			1,1,1-Trichloroethane	2021/08/06	<0.10		ppbv	
			1,1,2-Trichloroethane	2021/08/06	<0.10		ppbv	
			1,1,2,2-Tetrachloroethane	2021/08/06	<0.10		ppbv	
			cis-1,3-Dichloropropene	2021/08/06	<0.10		ppbv	
			trans-1,3-Dichloropropene	2021/08/06	<0.10		ppbv	
			1,2-Dichloropropane	2021/08/06	<0.10		ppbv	
			Bromomethane	2021/08/06	<0.10		ppbv	
			Bromoform	2021/08/06	<0.20		ppbv	
			Bromodichloromethane	2021/08/06	<0.20		ppbv	
			Dibromochloromethane	2021/08/06	<0.20		ppbv	
			Trichloroethylene	2021/08/06	<0.10		ppbv	
			Tetrachloroethylene	2021/08/06	<0.10		ppbv	
			Benzene	2021/08/06	<0.10		ppbv	
			Toluene	2021/08/06	<0.10		ppbv	
			Ethylbenzene	2021/08/06	<0.10		ppbv	
			p+m-Xylene	2021/08/06	<0.20		ppbv	
			o-Xylene	2021/08/06	<0.10		ppbv	
			Styrene	2021/08/06	<0.10		ppbv	
			4-ethyltoluene	2021/08/06	<0.50		ppbv	
			1,3,5-Trimethylbenzene	2021/08/06	<0.50		ppbv	
			1,2,4-Trimethylbenzene	2021/08/06	<0.50		ppbv	
			Chlorobenzene	2021/08/06	<0.10		ppbv	

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Benzyl chloride	2021/08/06	<0.50		ppbv	
			1,3-Dichlorobenzene	2021/08/06	<0.40		ppbv	
			1,4-Dichlorobenzene	2021/08/06	<0.10		ppbv	
			1,2-Dichlorobenzene	2021/08/06	<0.10		ppbv	
			1,2,4-Trichlorobenzene	2021/08/06	<0.50		ppbv	
			Hexachlorobutadiene	2021/08/06	<0.50		ppbv	
			Hexane	2021/08/06	<0.20		ppbv	
			Heptane	2021/08/06	<0.30		ppbv	
			Cyclohexane	2021/08/06	<0.20		ppbv	
			Tetrahydrofuran	2021/08/06	<0.40		ppbv	
			1,4-Dioxane	2021/08/06	<1.0		ppbv	
			Naphthalene	2021/08/06	<0.20		ppbv	
			Total Xylenes	2021/08/06	<0.30		ppbv	
			1,1,1,2-Tetrachloroethane	2021/08/06	<0.10		ppbv	
			Vinyl Bromide	2021/08/06	<0.20		ppbv	
			Propene	2021/08/06	<0.50		ppbv	
			2,2,4-Trimethylpentane	2021/08/06	<0.20		ppbv	
			Carbon Disulfide	2021/08/06	<0.50		ppbv	
			Vinyl Acetate	2021/08/06	<0.20		ppbv	
7507033	DM2	Method Blank	F1-BTEX, C6-C10 (as Toluene)	2021/08/06	<5.0		ug/m3	
			F2, C10-C16 (as Decane)	2021/08/06	<5.0		ug/m3	
7504841	DM2	LCS	Bromochloromethane	2021/08/06		103	%	60 - 140
			D5-Chlorobenzene	2021/08/06		104	%	60 - 140
			Difluorobenzene	2021/08/06		103	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2021/08/06		95	%	70 - 130
			1,2-Dichlorotetrafluoroethane	2021/08/06		94	%	70 - 130
			Chloromethane	2021/08/06		82	%	70 - 130
			Vinyl Chloride	2021/08/06		92	%	70 - 130
			Chloroethane	2021/08/06		89	%	70 - 130
			1,3-Butadiene	2021/08/06		95	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2021/08/06		96	%	70 - 130
			Ethanol (ethyl alcohol)	2021/08/06		71	%	70 - 130
			Trichlorotrifluoroethane	2021/08/06		95	%	70 - 130
			2-propanol	2021/08/06		78	%	70 - 130
			2-Propanone	2021/08/06		94	%	70 - 130
			Methyl Ethyl Ketone (2-Butanone)	2021/08/06		100	%	70 - 130
			Methyl Isobutyl Ketone	2021/08/06		102	%	70 - 130
			Methyl Butyl Ketone (2-Hexanone)	2021/08/06		110	%	70 - 130
			Methyl t-butyl ether (MTBE)	2021/08/06		108	%	70 - 130
			Ethyl Acetate	2021/08/06		96	%	70 - 130
			1,1-Dichloroethylene	2021/08/06		95	%	70 - 130
			cis-1,2-Dichloroethylene	2021/08/06		92	%	70 - 130
			trans-1,2-Dichloroethylene	2021/08/06		95	%	70 - 130
			Methylene Chloride(Dichloromethane)	2021/08/06		88	%	70 - 130
			Chloroform	2021/08/06		95	%	70 - 130
			Carbon Tetrachloride	2021/08/06		104	%	70 - 130
			1,1-Dichloroethane	2021/08/06		93	%	70 - 130
			1,2-Dichloroethane	2021/08/06		95	%	70 - 130
			Ethylene Dibromide	2021/08/06		101	%	70 - 130
			1,1,1-Trichloroethane	2021/08/06		103	%	70 - 130

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,1,2-Trichloroethane	2021/08/06		95	%	70 - 130
			1,1,2,2-Tetrachloroethane	2021/08/06		87	%	70 - 130
			cis-1,3-Dichloropropene	2021/08/06		101	%	70 - 130
			trans-1,3-Dichloropropene	2021/08/06		112	%	70 - 130
			1,2-Dichloropropane	2021/08/06		93	%	70 - 130
			Bromomethane	2021/08/06		95	%	70 - 130
			Bromoform	2021/08/06		102	%	70 - 130
			Bromodichloromethane	2021/08/06		101	%	70 - 130
			Dibromochloromethane	2021/08/06		107	%	70 - 130
			Trichloroethylene	2021/08/06		102	%	70 - 130
			Tetrachloroethylene	2021/08/06		104	%	70 - 130
			Benzene	2021/08/06		94	%	70 - 130
			Toluene	2021/08/06		101	%	70 - 130
			Ethylbenzene	2021/08/06		95	%	70 - 130
			p+m-Xylene	2021/08/06		96	%	70 - 130
			o-Xylene	2021/08/06		92	%	70 - 130
			Styrene	2021/08/06		99	%	70 - 130
			4-ethyltoluene	2021/08/06		111	%	70 - 130
			1,3,5-Trimethylbenzene	2021/08/06		107	%	70 - 130
			1,2,4-Trimethylbenzene	2021/08/06		119	%	70 - 130
			Chlorobenzene	2021/08/06		93	%	70 - 130
			Benzyl chloride	2021/08/06		125	%	70 - 130
			1,3-Dichlorobenzene	2021/08/06		114	%	70 - 130
			1,4-Dichlorobenzene	2021/08/06		114	%	70 - 130
			1,2-Dichlorobenzene	2021/08/06		109	%	70 - 130
			1,2,4-Trichlorobenzene	2021/08/06		143 (1)	%	70 - 130
			Hexachlorobutadiene	2021/08/06		120	%	70 - 130
			Hexane	2021/08/06		99	%	70 - 130
			Heptane	2021/08/06		98	%	70 - 130
			Cyclohexane	2021/08/06		98	%	70 - 130
			Tetrahydrofuran	2021/08/06		96	%	70 - 130
			1,4-Dioxane	2021/08/06		105	%	70 - 130
			Naphthalene	2021/08/06		160 (1)	%	70 - 130
			Total Xylenes	2021/08/06		95	%	70 - 130
			1,1,1,2-Tetrachloroethane	2021/08/06		96	%	70 - 130
			Vinyl Bromide	2021/08/06		108	%	70 - 130
			Propene	2021/08/06		92	%	70 - 130
			2,2,4-Trimethylpentane	2021/08/06		101	%	70 - 130
			Carbon Disulfide	2021/08/06		96	%	70 - 130
			Vinyl Acetate	2021/08/06		109	%	70 - 130

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C1K9534
Report Date: 2021/08/09

Golder Associates Ltd
Task Order#: 20447743-1155-7777
Site#: N/A
Site Location: 1660 MERIVALE ROAD, OTTAWA, ON
Project #: 20447743-1155-2123B

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Anke Macfarlane, Laboratory Manager, VOC

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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EXXONMOBIL/IMPERIAL OIL - BUREAU VERITAS AIR CHAIN OF CUSTODY RECORD

C of C # 82383

INVOICE INFORMATION	REPORT INFORMATION
Company Name: ☒ Imperial Oil ☐ ExxonMobil	Company Name: Golder Associates Ltd.
Contact Name: IOL Accounts Payable	Contact Name: Ian Sosney
Address: 102, 2535 - 3rd Ave Calgary, AB T2A 7W5	Address: 110 Hannover Dr. #203A St. Catharines, ON L2W1A4
Email: canadaaccountspayableinvoices@golder.com	Email: isosney@golder.com
Ph: 403 299 5600	Ph: [redacted] 647-522-4698
Sampler Name (Print): Leandra Mariani	Consultant Project #: 20447743-1155-2123B

FIELD SAMPLE ID	Canister Serial #	Flow Regulator Serial #	Sample Collection DATE (YYYY/MM/DD)	Sample Collection TIME (24 HR)	Media Type (See Legend)	FLOW RATE (mL/min)	LENGTH OF SAMPLING (minutes)	End Vacuum (inches of Hg)	BTEX	Aromatic/Aliphatic Hydrocarbon Fractionations	F1 (C6-C10) - F2 (C10-C16)	VOC (TO15)
1 Field Blank	9881	FX0839	2021/07/22	14:50	S	0.04	32	-5	X		X	X
2 Trip Blank	2517	NA	2021/07/22	15:00	S	NA	NA	NA	X		X	X
3												
4												
5												
6												
7												
8												
9												
10												
11												

IOL SITE LOCATION: 1660 Merivale Rd. Ottawa, ON

IOL PROJECT # (if applicable): NA

BUREAU VERITAS TASK ORDER # OR SERVICE ORDER # + LINE ITEM: 20447743-1155-7777

REGULATORY CRITERIA / DETECTION LIMITS: (PLEASE SPECIFY): NA

SPECIAL INSTRUCTIONS:
IES A2601436
SAP 58001627
labels include canister serial #s too - not included in IDs

LEGEND
S - Summa Can
T - Tube
TB - Tedlar Bag
O - Other(Specify)
TEMP N/A for SUMMA CAN

TURNAROUND TIME
Standard (10 days) ☒
Rush (9 days) ☐
(6 days) ☐
(3 days) ☐
Date Required

	YES	NO	COOLER ID # 1				YES	NO	COOLER ID #				YES	NO	COOLER ID #			
SEAL PRESENT	✓		TEMP °C	1	2	3	SEAL PRESENT		TEMP °C	1	2	3	SEAL PRESENT		TEMP °C	1	2	3
SEAL INTACT	✓						SEAL INTACT						SEAL INTACT					
COOLING MEDIA PRESENT		✓					COOLING MEDIA PRESENT						COOLING MEDIA PRESENT					

RELINQUISHED BY:		DATE:	TIME (24 HR)	RECEIVED BY:		DATE:	TIME (24 HR)
1.	Leandra Mariani	2021/07/22	16:35	1.	BANISHA SUMAN	2021/07/27	09:30
2.	signature / printed name	YYYY/MM/DD	HH:MM	2.	signature / printed name	YYYY/MM/DD	HH:MM
3.	signature / printed name	YYYY/MM/DD	HH:MM	3.	signature / printed name	YYYY/MM/DD	HH:MM

LAB USE ONLY
BUREAU VERITAS JOB # C1K9534

SAMPLES
LABELED BY: BS
VERIFIED BY: LOR

IOL COC-AIR-(08/19) White: Bureau Veritas Yellow: Client

Unless otherwise agreed to in writing, work submitted on this Chain of Custody is subject to Bureau Veritas Laboratories' standard Terms and Conditions. Signing of this Chain of Custody document is acknowledgment and acceptance of our terms available at http://www.bvlabs.com/terms-and-conditions

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: July 22, 2021

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Bureau Veritas Mississauga

Consultant Project Number: 20447743-1155

Sample Submission Number: C1K9534

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			Lab control sample recovery outside acceptance range
Extraction Surrogate Recovery			X	of 70-130% for 1,2,4-trichlorobenzene (143%) and
Method Blank Concentration	X			naphthalene (160%). All remaining laboratory QC
Matrix Duplicate RPD			X	results are within acceptance criteria.
Matrix Spike Recovery			X	
Lab Control Sample Recovery		X		

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration		X		Field blank sample exceeded alert limits for 2-
Trip Blank Concentration	X			propanone and F2. All remaining field QC samples are
Field Duplicate RPD			X	within alert limits.

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	n/a

Is data considered to be reliable (Yes/No/Suspect)?: Suspect

If answer is "No", describe and provide rationale: Please see QA/QC appendix.

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): Amanda Newberry

Date: August 12, 2021

APPENDIX B

Quality Control/Quality Assurance

QUALITY ASSURANCE/QUALITY CONTROL

In conjunction with the field investigations completed to date, a quality assurance/quality control (QA/QC) program was implemented to ensure the integrity of the groundwater sampling and analytical testing results.

1.0 FIELD PROGRAM

All sampling activities were completed in accordance with Golder's Technical Field Procedures by trained Golder personnel. All field activities were documented in field notes and results were recorded on standard field forms. All field equipment involved in the sampling and monitoring of groundwater were decontaminated in accordance with Golder's Technical Procedures. Groundwater samples were collected using appropriate handling protocols and were placed in sample containers provided by Bureau Veritas Laboratories (BVL).

All re-useable field equipment involved in collecting samples was decontaminated between each sampling location. Groundwater samples were not directly contacted by hand. To help prevent cross-contamination, a new pair of clean nitrile gloves was used for the collection of each sample.

Samples were given unique identification numbers and the sampling containers were preserved in ice-filled coolers. Samples were logged onto formal chain-of-custody documents and transported to BVL's Mississauga Environmental Laboratory for chemical analysis. BVL is accredited by the Standards Council of Canada (SCC).

Two blind field duplicate groundwater samples were submitted for analysis of benzene, toluene, ethylbenzene, xylenes (BTEX), petroleum hydrocarbon (PHC) Fractions F1 to F4 and lead. Two blind field duplicate soil vapour samples were submitted for analysis of BTEX, PHC Fractions F1 and F2, and volatile organic compounds. Trip and field blanks were submitted as necessary, to evaluate the potential for cross-contamination during the sampling and transportation of the samples.

2.0 LABORATORY PROGRAM

The laboratory QA/QC program included adherence to laboratory sampling and analysis protocols (e.g., hold times, sample containers, preservatives, detection limits and approved methodology) and the analysis of laboratory method blanks, laboratory sample duplicates, surrogate recovery and chemical spikes.

The laboratory method blank analysis results were used to detect interferences or impurities introduced by the laboratory equipment, reagents, or solvents. Surrogate recovery is analyzed by spiking samples with known quantities of surrogate chemicals which have similar chemical properties to the parameters being analyzed. The reported recovery provides an indication of the analytical method accuracy for that sample. Matrix spikes were conducted by adding known concentrations of the analyte of interest to a sample to evaluate the effects of the sample matrix on the test method. The analysis of selected samples in duplicate is used to evaluate the reproducibility of the test method.

3.0 DATA RECEPTION

Once laboratory analytical results were received, Golder completed a review of field and laboratory quality. This included review of laboratory QC performance to confirm results are within acceptance criteria, as well as evaluation of field duplicate and blank results to confirm they were within alert limits. Upon receipt of the analytical

results, relative percent difference (RPD) values between the original samples and their blind field duplicates were calculated as follows:

$$\text{RPD\%} = \frac{|S - D|}{\frac{1}{2}(S + D)} \times 100$$

Where: RPD = relative percent difference
S = sample value
D = blind field duplicate or replicate value.

Since analytical error increases near the reportable detection limit (RDL), the RPD was only calculated where the concentrations of both the original and blind field duplicate samples were greater than five times the RDL. The calculated RPDs were then compared to parameter specific alert limits.

Exceedances of the QC acceptance or alert criteria were investigated with the laboratory and, if warranted, a corrective action report was requested from the laboratory.

4.0 DATA QUALITY REVIEW RESULTS

Results of the data quality review are summarized in Table B1. The RPD calculations and blank sample results are presented in Tables B2 to B6.

Two field duplicates, one field blank and one trip blank were submitted to the laboratory as part of the groundwater QC program.

Two field duplicates, two field blanks and one trip blank were submitted to the laboratory as part of the soil vapour QC program.

Based on the data quality review, 13 data quality issues were identified. These issues are considered unlikely to have a material effect on the quality of the data presented in this report. The issues are discussed in detail in Table B1. All duplicated parameters were within acceptable RPD alert limits.

5.0 SUMMARY OF RESULTS

Based on the review of the QA/QC results, the data presented in this report are considered to be reliable.

Table B1
Summary of Quality Control Sample Results
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

BVL Job Number	Matrix	BVL Sample ID Affected	Test Affected	Data Quality Issue	Comments
C1J7368	Groundwater	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
C1J7455	Groundwater	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
C1J7459	Water	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
C123966	Soil Vapour	OSE272, OSE273 and OSE274	Benzyl chloride	Lab control sample recovery (140%) outside acceptance range of 70-130% for benzyl chloride for batch 7175213.	This data quality issue may represent a potential high bias for this sample. Benzyl chloride concentrations in all of the samples and the lab/field duplicates were below the regulatory guideline and below the detection limit, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the benzyl chloride data reported can be considered reliable.
			Vinyl Acetate	Lab control sample recovery (194%) outside acceptance range of 70-130% for vinyl acetate for batch 7175213.	This data quality issue may represent a potential high bias for this sample. Vinyl acetate concentrations in all of the samples and the lab/field duplicates were below the regulatory guideline and below the detection limit, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the vinyl acetate data reported can be considered reliable.
C123972	Soil Vapour	OSE289	Ethanol (ethyl alcohol)	Lab control sample recovery (64%) outside acceptance range of 70-130% for ethanol (ethyl alcohol) for batch 7176542.	This data quality issue may represent a potential low bias for this sample. Ethanol concentrations in the field blank was below the regulatory guideline, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the ethanol data reported can be considered reliable.
			F1-BTEX, C6-C10 (as Toluene)	Field blank sample exceeded alert limits for F1.	The field blank sample was prepared from ambient air present on-site. Concentrations are likely present from variables associated with the Site. All samples associated with this field blank may be biased high for F1. However, following additional data review, it is inferred that the high bias does not have a material effect on the interpretation of the results of this parameter as the F1 concentrations were below the SVSL criteria. Therefore, the data can be considered reliable.
			Benzyl chloride	Lab control sample recovery (134%) outside acceptance range of 70-130% for benzyl chloride for batch 7176542.	This data quality issue may represent a potential high bias for this sample. Benzyl chloride concentrations in field blank sample was below the regulatory guideline and below the detection limit, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the benzyl chloride data reported can be considered reliable.
			Vinyl Acetate	Lab control sample recovery (166%) outside acceptance range of 70-130% for vinyl acetate for batch 7176542.	This data quality issue may represent a potential high bias for this sample. Vinyl acetate concentrations in field blank sample was below the regulatory guideline and below the detection limit, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the vinyl acetate data reported can be considered reliable.

Notes:

BVL - Bureau Veritas Laboratories

n/a - not applicable

Table B1
Summary of Quality Control Sample Results
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

BVL Job Number	Matrix	BVL Sample ID Affected	Test Affected	Data Quality Issue	Comments
C1K9532	Soil Vapour	QFA556, QFA557 and QFA558	Ethanol (ethyl alcohol)	Lab control sample recovery (68%) outside acceptance range of 70-130% for ethanol for batch 7507030.	This data quality issue may represent a potential low bias for these samples. Ethanol concentrations in all of the samples and the lab/field duplicates were below the regulatory guideline and/or below the detection limit, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the ethanol data reported can be considered reliable.
			Naphthalene	Lab control sample recovery (140%) outside acceptance range of 70-130% for naphthalene for batch 7507030.	This data quality issue may represent a potential high bias for these samples. Naphthalene concentrations in all of the samples and the lab/field duplicates were below the regulatory guideline and below the detection limit, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the naphthalene data reported can be considered reliable.
		QFA557	Methyl Ethyl Ketone (2-Butanone)	Field duplicate samples SV16-02 and DUP A exceed the alert limit for methyl ethyl ketone (60%).	A quality check of the data yielded similar results. Sample non-homogeneity is believed to be the root cause. Methyl ethyl ketone concentrations in both the sample and the field duplicate were below the regulatory guideline, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the methyl ethyl ketone data reported can be considered reliable.
C1K9534	Soil Vapour	QFA576 and QFA577	1,2,4-Trichlorobenzene	Lab control sample recovery (143%) outside acceptance range of 70-130% for 1,2,4-trichlorobenzene for batch 7504841.	This data quality issue may represent a potential high bias for this sample. 1,2,4-Trichlorobenzene concentrations in both of the samples were below the regulatory guideline and below the detection limit, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the 1,2,4-trichlorobenzene data reported can be considered reliable.
			Naphthalene	Lab control sample recovery (160%) outside acceptance range of 70-130% for naphthalene for batch 7504841.	This data quality issue may represent a potential high bias for this sample. Naphthalene concentrations in both of the samples were below the regulatory guideline and below the detection limit, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the naphthalene data reported can be considered reliable.
		QFA576	2-Propanone	Field blank sample exceeded alert limits for 2-propanone.	The field blank sample was prepared from ambient air present on-site. Concentrations are likely present from variables associated with the Site. All samples associated with this field blank may be biased high for 2-propanone. However, following additional data review, it is inferred that the high bias does not have a material effect on the interpretation of the results of this parameter as the 2-propanone concentrations were below the SVSL criteria. Therefore, the data can be considered reliable.
			F2, C10-C16 (as Decane)	Field blank sample exceeded alert limits for F2.	The field blank sample was prepared from ambient air present on-site. Concentrations are likely present from variables associated with the Site. All samples associated with this field blank may be biased high for F2. However, following additional data review, it is inferred that the high bias does not have a material effect on the interpretation of the results of this parameter as the F2 concentrations were below the SVSL criteria. Therefore, the data can be considered reliable.

Notes:
BVL - Bureau Veritas Laboratories
n/a - not applicable

Table B2
Summary of Field Duplicate Sample Results - Petroleum Hydrocarbons and Dissolved Lead
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location	Units	Alert Limit	RDL	TH101	DUP A	RPD %	TH5	DUP B	RPD %
Sample Collection Date				14-Jul-21	14-Jul-21		13-Jul-21	13-Jul-21	
BVL Sample ID				QCM606	QCM609		QCN102	QCN107	
Benzene	µg/L	>80%	1	61	59	3	210	270	25
Toluene	µg/L	>80%	1	8.9	8.3	n/c	19	26	31
Ethylbenzene	µg/L	>80%	1	1,300	1,200	8	720	930	25
Total Xylenes	µg/L	>80%	2	1,700	1,700	0	1,700	2,100	21
F1 (C_6-C_{10}) - BTEX	µg/L	>80%	130	5,300	5,200	2	6,300	6,300	0
F2 (C_{10}-C_{16})	µg/L	>80%	100	1,900	1,800	5	14,000	13,000	7
F3 (C_{16}-C_{34})	µg/L	>80%	200	280	260	n/c	1,000	910	n/c
F4 (C_{34}-C_{50})	µg/L	>80%	200	<200	<200	n/c	590	550	n/c
Dissolved Lead	µg/L	>50%	0.5	4.2	6.2	38	37	39	5

Notes:

Bold/Underlined - value exceeds alert limit

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3 and 4

n/c - not calculated

RDL - reportable detection limit

RPD - relative percent difference

> - greater than

< - less than

µg/L - micrograms per litre

RPD is not calculated if either the original or field duplicate sample has a result of less than 5X the RDL

Table B3
Summary of Field Blank and Trip Blank Results - Petroleum Hydrocarbons
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Parameter	Units	Alert Limit	RDL	Field Blank	Do the results exceed the Alert Limit?	Trip Blank	Do the results exceed the Alert Limit?
Sample Collection Date				15-Jul-21		15-Jul-21	
BVL Sample ID				QCN133		QCN132	
Benzene	µg/L	>5X RDL	0.2	<0.20	no	<0.20	no
Toluene	µg/L	>5X RDL	0.2	<0.20	no	<0.20	no
Ethylbenzene	µg/L	>5X RDL	0.2	<0.20	no	<0.20	no
Total Xylenes	µg/L	>5X RDL	0.4	<0.40	no	<0.40	no
F1 (C_6-C_{10}) - BTEX	µg/L	>2X RDL	25	<25	no	<25	no
F2 (C_{10}-C_{16})	µg/L	>2X RDL	100	<100	no	<100	no
F3 (C_{16}-C_{34})	µg/L	>2X RDL	200	<200	no	<200	no
F4 (C_{34}-C_{50})	µg/L	>2X RDL	200	<200	no	<200	no

Notes:

Bold/Underlined - value exceeds alert limit

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3 and 4

n/c - not calculated

RDL - reportable detection limit

> - greater than

< - less than

µg/L - micrograms per litre

Table B4
Summary of Soil Vapour Field Duplicate Sample Results - Petroleum Hydrocarbons
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location	Units	Alert Limit	RDL	SV16-02	DUP A	RPD %	SV16-02	DUP A	RPD %
Sample Collection Date				27-Jan-21	27-Jan-21		22-Jul-21	22-Jul-21	
BVL Sample ID				OSE273	OSE274		QFA557	QFA558	
Benzene	µg/m^3	>50%	0.32	<0.32	0.33	n/c	<0.32	<0.32	n/c
Toluene	µg/m^3	>50%	0.38	<0.38	1.44	n/c	0.64	<0.38	n/c
Ethylbenzene	µg/m^3	>50%	0.43	<0.43	<0.43	n/c	<0.43	<0.43	n/c
Xylenes, Total	µg/m^3	>50%	1.3	<1.3	1.5	n/c	<1.3	<1.3	n/c
F1-BTEX, C_6-C_{10} (as Toluene)	µg/m^3	>50%	5.0	32.1	45.1	34	93.1	70.2	28
F2, C_{10}-C_{16} (as Decane)	µg/m^3	>50%	5.0	89.6	84.7	6	435	445	2

Notes:

Bold/Underlined - value exceeds alert limit

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2 - petroleum hydrocarbon fractions 1 and 2

n/c - not calculated

RDL - reportable detection limit

RPD - relative percent difference

> - greater than

< - less than

µg/m^3 - micrograms per cubic metre

RPD is not calculated if either the original or field duplicate sample has a result of less than 5X the RDL

Table B5
Summary of Soil Vapour Field Duplicate Sample Results - Volatile Organic Compounds
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location	Units	Alert Limit	RDL	SV16-02	DUP A	RPD %	SV16-02	DUP A	RPD %
Sample Collection Date				27-Jan-21	27-Jan-21		22-Jul-21	22-Jul-21	
BVL Sample ID				OSE273	OSE274		QFA557	QFA558	
Benzyl chloride	µg/m^3	>50%	2.6	<2.6	<2.6	n/c	<2.6	<2.6	n/c
Bromodichloromethane	µg/m^3	>50%	1.3	<1.3	<1.3	n/c	<1.3	<1.3	n/c
Bromoform	µg/m^3	>50%	2.1	<2.1	<2.1	n/c	<2.1	<2.1	n/c
Bromomethane	µg/m^3	>50%	0.39	<0.39	<0.39	n/c	<0.39	<0.39	n/c
1,3-Butadiene	µg/m^3	>50%	1.1	<1.1	<1.1	n/c	<1.1	<1.1	n/c
Carbon Disulfide	µg/m^3	>50%	1.6	<1.6	2.9	n/c	<1.6	<1.6	n/c
Carbon Tetrachloride	µg/m^3	>50%	0.63	<0.63	<0.63	n/c	<0.63	<0.63	n/c
Chlorobenzene	µg/m^3	>50%	0.46	<0.46	<0.46	n/c	<0.46	<0.46	n/c
Chloroethane	µg/m^3	>50%	0.79	<0.79	<0.79	n/c	<0.79	<0.79	n/c
Chloroform	µg/m^3	>50%	0.49	<0.49	<0.49	n/c	0.5	0.61	n/c
Chloromethane	µg/m^3	>50%	0.62	<0.62	0.87	n/c	0.99	<0.62	n/c
Cyclohexane	µg/m^3	>50%	0.69	<0.69	<0.69	n/c	<0.69	<0.69	n/c
Dibromochloromethane	µg/m^3	>50%	1.7	<1.7	<1.7	n/c	<1.7	<1.7	n/c
1,2-Dibromoethane (Ethylene Dibromide)	µg/m^3	>50%	0.77	<0.77	<0.77	n/c	<0.77	<0.77	n/c
1,2-Dichlorobenzene	µg/m^3	>50%	0.60	<0.60	<0.60	n/c	<0.60	<0.60	n/c
1,3-Dichlorobenzene	µg/m^3	>50%	2.4	<2.4	<2.4	n/c	<2.4	<2.4	n/c
1,4-Dichlorobenzene	µg/m^3	>50%	0.60	<0.60	<0.60	n/c	<0.60	<0.60	n/c
Dichlorodifluoromethane (FREON 12)	µg/m^3	>50%	0.99	8.77	8.41	4	49	49.6	1
1,1-Dichloroethane	µg/m^3	>50%	0.40	<0.40	<0.40	n/c	<0.40	<0.40	n/c
1,2-Dichloroethane	µg/m^3	>50%	0.40	<0.40	<0.40	n/c	<0.40	<0.40	n/c
1,1-Dichloroethylene	µg/m^3	>50%	0.40	<0.40	<0.40	n/c	<0.40	<0.40	n/c
cis-1,2-Dichloroethylene	µg/m^3	>50%	0.40	<0.40	<0.40	n/c	<0.40	<0.40	n/c
trans-1,2-Dichloroethylene	µg/m^3	>50%	0.40	<0.40	<0.40	n/c	<0.40	<0.40	n/c
1,2-Dichloropropane	µg/m^3	>50%	0.46	<0.46	<0.46	n/c	<0.46	<0.46	n/c
cis-1,3-Dichloropropene	µg/m^3	>50%	0.45	<0.45	<0.45	n/c	<0.45	<0.45	n/c
trans-1,3-Dichloropropene	µg/m^3	>50%	0.45	<0.45	<0.45	n/c	<0.45	<0.45	n/c
1,2-Dichlorotetrafluoroethane	µg/m^3	>50%	1.2	<1.2	<1.2	n/c	<1.2	<1.2	n/c
1,4-Dioxane	µg/m^3	>50%	3.6	<3.6	8.7	n/c	<3.6	<3.6	n/c
Ethanol (ethyl alcohol)	µg/m^3	>50%	1.9	2.9	10.5	n/c	<1.9	<1.9	n/c
Ethyl Acetate	µg/m^3	>50%	3.6	<3.6	<3.6	n/c	<3.6	<3.6	n/c
4-ethyltoluene	µg/m^3	>50%	2.5	<2.5	<2.5	n/c	<2.5	<2.5	n/c
Heptane	µg/m^3	>50%	1.2	<1.2	<1.2	n/c	<1.2	<1.2	n/c
Hexachlorobutadiene	µg/m^3	>50%	5.3	<5.3	<5.3	n/c	<5.3	<5.3	n/c
Hexane	µg/m^3	>50%	0.70	<0.70	2.62	n/c	<0.70	<0.70	n/c

Notes:

Bold/Underlined - value exceeds alert limit

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2 - petroleum hydrocarbon fractions 1 and 2

n/c - not calculated

RDL - reportable detection limit

RPD - relative percent difference

> - greater than

< - less than

µg/m^3 - micrograms per cubic metre

RPD is not calculated if either the original or field duplicate sample has a result of less than 5X the RDL

Table B5
Summary of Soil Vapour Field Duplicate Sample Results - Volatile Organic Compounds
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location	Units	Alert Limit	RDL	SV16-02	DUP A	RPD %	SV16-02	DUP A	RPD %
Sample Collection Date				27-Jan-21	27-Jan-21		22-Jul-21	22-Jul-21	
BVL Sample ID				OSE273	OSE274		QFA557	QFA558	
Methyl Butyl Ketone (2-Hexanone)	µg/m^3	>50%	4.1	<4.1	<4.1	n/c	<4.1	<4.1	n/c
Methyl Ethyl Ketone (2-Butanone)	µg/m^3	>50%	0.59	<0.59	0.63	n/c	6.77	3.63	**60**
Methyl Isobutyl Ketone	µg/m^3	>50%	0.82	<0.82	<0.82	n/c	<0.82	<0.82	n/c
Methyl t-butyl ether (MTBE)	µg/m^3	>50%	0.72	<0.72	<0.72	n/c	<0.72	<0.72	n/c
Methylene Chloride(Dichloromethane)	µg/m^3	>50%	2.1	<2.1	<2.1	n/c	<2.1	<2.1	n/c
Naphthalene	µg/m^4	>50%	1	<1.0	<1.0	n/c	<1.0	<1.0	n/c
2-propanol (Isopropanol)	µg/m^3	>50%	2.5	<2.5	<2.5	n/c	<2.5	<2.5	n/c
2-Propanone (Acetone)	µg/m^3	>50%	1.4	4.7	20.1	n/c	66.3	61.1	8
Propene (Propylene)	µg/m^3	>50%	0.86	<0.86	<0.86	n/c	1.75	0.99	n/c
Styrene	µg/m^3	>50%	0.43	<0.43	<0.43	n/c	<0.43	<0.43	n/c
1,1,1,2-Tetrachloroethane	µg/m^3	>50%	0.69	<0.69	<0.69	n/c	<0.69	<0.69	n/c
1,1,2,2-Tetrachloroethane	µg/m^3	>50%	0.69	<0.69	<0.69	n/c	<0.69	<0.69	n/c
Tetrachloroethylene	µg/m^3	>50%	0.68	<0.68	<0.68	n/c	1.87	1.87	n/c
Tetrahydrofuran	µg/m^3	>50%	1.2	<1.2	<1.2	n/c	<1.2	<1.2	n/c
1,2,4-Trichlorobenzene	µg/m^3	>50%	3.7	<3.7	<3.7	n/c	<3.7	<3.7	n/c
1,2,4-Trimethylbenzene	µg/m^3	>50%	2.5	<2.5	<2.5	n/c	<2.5	<2.5	n/c
1,1,1-Trichloroethane	µg/m^3	>50%	0.55	<0.55	<0.55	n/c	<0.55	<0.55	n/c
1,1,2-Trichloroethane	µg/m^3	>50%	0.55	<0.55	<0.55	n/c	<0.55	<0.55	n/c
Trichloroethylene	µg/m^3	>50%	0.54	7.33	6.92	5.75	15.5	17	9.23
Trichlorofluoromethane (FREON 11)	µg/m^3	>50%	1.1	<1.1	<1.1	n/c	1.4	1.4	n/c
Trichlorotrifluoroethane (FREON 113)	µg/m^3	>50%	1.2	<1.2	<1.2	n/c	<1.2	<1.2	n/c
1,3,5-Trimethylbenzene	µg/m^3	>50%	2.5	<2.5	<2.5	n/c	<2.5	<2.5	n/c
2,2,4-Trimethylpentane	µg/m^3	>50%	0.93	<0.93	<0.93	n/c	<0.93	<0.93	n/c
Vinyl Acetate	µg/m^3	>50%	0.70	<0.70	<0.70	n/c	<0.70	<0.70	n/c
Vinyl Bromide	µg/m^3	>50%	0.87	<0.87	<0.87	n/c	<0.87	<0.87	n/c
Vinyl Chloride	µg/m^3	>50%	0.26	<0.26	<0.26	n/c	<0.26	<0.26	n/c

Notes:

Bold/Underlined - value exceeds alert limit

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2 - petroleum hydrocarbon fractions 1 and 2

n/c - not calculated

RDL - reportable detection limit

RPD - relative percent difference

> - greater than

< - less than

µg/m^3 - micrograms per cubic metre

RPD is not calculated if either the original or field duplicate sample has a result of less than 5X the RDL

Table B6
Summary of Soil Vapour Field Blank Sample Results
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Parameter	Units	Alert Limit	RDL	Field Blank	Do the results exceed the Alert Limit?	Field Blank	Do the results exceed the Alert Limit?	Trip Blank	Do the results exceed the Alert Limit?
Sample Collection Date				27-Jan-21		22-Jul-21		22-Jul-21	
BVL Sample ID				OSE289		QFA576		QFA577	
Benzene	µg/m^3	>5X RDL	0.32	<0.32	no	<0.32	no	<0.32	no
Benzyl chloride	µg/m^3	>5X RDL	2.6	<2.6	no	<2.6	no	<2.6	no
Bromodichloromethane	µg/m^3	>5X RDL	1.3	<1.3	no	<1.3	no	<1.3	no
Bromoform	µg/m^3	>5X RDL	2.1	<2.1	no	<2.1	no	<2.1	no
Bromomethane	µg/m^3	>5X RDL	0.39	<0.39	no	<0.39	no	<0.39	no
1,3-Butadiene	µg/m^3	>5X RDL	1.1	<1.1	no	<1.1	no	<1.1	no
Carbon Disulfide	µg/m^3	>5X RDL	1.6	<1.6	no	<1.6	no	<1.6	no
Carbon Tetrachloride	µg/m^3	>5X RDL	0.63	<0.63	no	<0.63	no	<0.63	no
Chlorobenzene	µg/m^3	>5X RDL	0.46	<0.46	no	<0.46	no	<0.46	no
Chloroethane	µg/m^3	>5X RDL	0.79	<0.79	no	<0.79	no	<0.79	no
Chloroform	µg/m^3	>5X RDL	0.49	<0.49	no	<0.49	no	<0.49	no
Chloromethane	µg/m^3	>5X RDL	0.62	0.88	no	1.28	no	<0.62	no
Cyclohexane	µg/m^3	>5X RDL	0.69	<0.69	no	<0.69	no	<0.69	no
1,2-Dichlorobenzene	µg/m^3	>5X RDL	0.60	<0.60	no	<0.60	no	<0.60	no
1,3-Dichlorobenzene	µg/m^3	>5X RDL	2.4	<2.4	no	<2.4	no	<2.4	no
1,4-Dichlorobenzene	µg/m^3	>5X RDL	0.60	<0.60	no	<0.60	no	<0.60	no
Dibromochloromethane	µg/m^3	>5X RDL	1.7	<1.7	no	<1.7	no	<1.7	no
Dichlorodifluoromethane (FREON 12)	µg/m^3	>5X RDL	0.99	2.17	no	2.31	no	<0.99	no
1,1-Dichloroethane	µg/m^3	>5X RDL	0.40	<0.40	no	<0.40	no	<0.40	no
1,2-Dichloroethane	µg/m^3	>5X RDL	0.40	<0.40	no	<0.40	no	<0.40	no
1,1-Dichloroethylene	µg/m^3	>5X RDL	0.40	<0.40	no	<0.40	no	<0.40	no
cis-1,2-Dichloroethylene	µg/m^3	>5X RDL	0.40	<0.40	no	<0.40	no	<0.40	no
trans-1,2-Dichloroethylene	µg/m^3	>5X RDL	0.40	<0.40	no	<0.40	no	<0.40	no
1,2-Dichloropropane	µg/m^3	>5X RDL	0.46	<0.46	no	<0.46	no	<0.46	no
cis-1,3-Dichloropropene	µg/m^3	>5X RDL	0.45	<0.45	no	<0.45	no	<0.45	no
trans-1,3-Dichloropropene	µg/m^3	>5X RDL	0.45	<0.45	no	<0.45	no	<0.45	no
1,2-Dichlorotetrafluoroethane	µg/m^3	>5X RDL	1.2	<1.2	no	<1.2	no	<1.2	no
1,4-Dioxane	µg/m^3	>5X RDL	3.6	<3.6	no	<3.6	no	<3.6	no
Ethanol (ethyl alcohol)	µg/m^3	>5X RDL	1.9	8.3	no	2.9	no	<1.9	no
Ethyl Acetate	µg/m^3	>5X RDL	3.6	<3.6	no	<3.6	no	<3.6	no
Ethylbenzene	µg/m^3	>5X RDL	0.43	<0.43	no	<0.43	no	<0.43	no
Ethylene Dibromide	µg/m^3	>5X RDL	0.77	<0.77	no	<0.77	no	<0.77	no
4-ethyltoluene	µg/m^3	>5X RDL	2.5	<2.5	no	<2.5	no	<2.5	no
F1-BTEX, C6-C10 (as Toluene)	µg/m^3	>5X RDL	5.0	46.3	**yes**	23.4	no	<5.0	no
F2, C10-C16 (as Decane)	µg/m^3	>5X RDL	5.0	17.7	no	38.6	**yes**	<5.0	no
Heptane	µg/m^3	>5X RDL	1.2	<1.2	no	<1.2	no	<1.2	no
Hexachlorobutadiene	µg/m^3	>5X RDL	5.3	<5.3	no	<5.3	no	<5.3	no
Hexane	µg/m^3	>5X RDL	0.70	<0.70	no	<0.70	no	<0.70	no

Notes:

Bold/Underlined - value exceeds alert limit

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2 - petroleum hydrocarbon fractions 1 and 2

RDL - reportable detection limit

RPD - relative percent difference

µg/m^3 - micrograms per cubic metre

> - greater than

< - less than

RPD is not calculated if either the original or field duplicate sample has a result of less than 5X the RDL

Table B6
Summary of Soil Vapour Field Blank Sample Results
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Parameter	Units	Alert Limit	RDL	Field Blank	Do the results exceed the Alert Limit?	Field Blank 22-Jul-21 QFA576	Do the results exceed the Alert Limit?	Trip Blank 22-Jul-21 QFA577	Do the results exceed the Alert Limit?
Sample Collection Date				27-Jan-21					
BVL Sample ID				OSE289					
Methyl Butyl Ketone (2-Hexanone)	µg/m^3	>5X RDL	4.1	<4.1	no	<4.1	no	<4.1	no
Methyl Ethyl Ketone (2-Butanone)	µg/m^3	>5X RDL	0.59	0.67	no	0.93	no	<0.59	no
Methyl Isobutyl Ketone	µg/m^3	>5X RDL	0.82	<0.82	no	<0.82	no	<0.82	no
Methyl t-butyl ether (MTBE)	µg/m^3	>5X RDL	0.72	<0.72	no	<0.72	no	<0.72	no
Methylene Chloride(Dichloromethane)	µg/m^3	>5X RDL	2.1	<2.1	no	<2.1	no	<2.1	no
Naphthalene	µg/m^3	>5X RDL	1.0	<1.0	no	<1.0	no	<1.0	no
2-propanol	µg/m^3	>5X RDL	2.5	<2.5	no	<2.5	no	<2.5	no
2-Propanone	µg/m^3	>5X RDL	1.4	2.1	no	9.3	**yes**	<1.4	no
Propene	µg/m^3	>5X RDL	0.86	<0.86	no	<0.86	no	<0.86	no
Styrene	µg/m^3	>5X RDL	0.43	<0.43	no	<0.43	no	<0.43	no
1,1,1,2-Tetrachloroethane	µg/m^3	>5X RDL	0.69	<0.69	no	<0.69	no	<0.69	no
1,1,2,2-Tetrachloroethane	µg/m^3	>5X RDL	0.69	<0.69	no	<0.69	no	<0.69	no
Tetrachloroethylene	µg/m^3	>5X RDL	0.68	<0.68	no	<0.68	no	<0.68	no
Tetrahydrofuran	µg/m^3	>5X RDL	1.2	<1.2	no	<1.2	no	<1.2	no
Toluene	µg/m^3	>5X RDL	0.38	<0.38	no	0.42	no	<0.38	no
Total Xylenes	µg/m^3	>5X RDL	1.3	<1.3	no	<1.3	no	<1.3	no
1,2,4-Trichlorobenzene	µg/m^3	>5X RDL	3.7	<3.7	no	<3.7	no	<3.7	no
1,1,1-Trichloroethane	µg/m^3	>5X RDL	0.55	<0.55	no	<0.55	no	<0.55	no
1,1,2-Trichloroethane	µg/m^3	>5X RDL	0.55	<0.55	no	<0.55	no	<0.55	no
Trichloroethylene	µg/m^3	>5X RDL	0.54	<0.54	no	<0.54	no	<0.54	no
Trichlorofluoromethane (FREON 11)	µg/m^3	>5X RDL	1.1	1.2	no	1.1	no	<1.1	no
Trichlorotrifluoroethane	µg/m^3	>5X RDL	1.2	<1.2	no	<1.2	no	<1.2	no
1,2,4-Trimethylbenzene	µg/m^3	>5X RDL	2.5	<2.5	no	<2.5	no	<2.5	no
1,3,5-Trimethylbenzene	µg/m^3	>5X RDL	2.5	<2.5	no	<2.5	no	<2.5	no
2,2,4-Trimethylpentane	µg/m^3	>5X RDL	0.93	<0.93	no	<0.93	no	<0.93	no
Vinyl Acetate	µg/m^3	>5X RDL	0.70	<0.70	no	<0.70	no	<0.70	no
Vinyl Bromide	µg/m^3	>5X RDL	0.87	<0.87	no	<0.87	no	<0.87	no
Vinyl Chloride	µg/m^3	>5X RDL	0.26	<0.26	no	<0.26	no	<0.26	no

Notes:
Bold/Underlined - value exceeds alert limit
BTEX - benzene, toluene, ethylbenzene, xylenes
BVL - Bureau Veritas Laboratories
RDL - reportable detection limit
RPD - relative percent difference
µg/m^3 - micrograms per cubic metre
> - greater than
< - less than
RPD is not calculated if either the original or field duplicate sample has a result of less than 5X the RDL

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August 10, 2021

Sabreen Sherwani
Project Manager, Execution
Environmental Services, Imperial Oil Limited
505 Quarry Park Blvd S.E.
Calgary, Alberta
T2C 5N1

Groundwater Monitoring Program – 1660 Merivale Road, Ottawa, Ontario
TSSA Service Request # 791084

Dear Ms. Sherwani,

Thank you for submitting the following groundwater monitoring and sampling report for the above captioned property:

- *"2020 Groundwater and Soil Vapour Probe Monitoring and Sampling Report, 1660 Merivale Road, Ottawa, Ontario",* prepared by Golder Associates Ltd. (Golder), dated December 18, 2020.

The 2020 groundwater monitoring report provides the following information:

- Seventeen (17) monitoring wells (TH1 through TH9, TH11, TH12, TH100 to TH102, MW15-01, MW15-02, MW16-01) were monitored for depth to groundwater, petroleum vapour concentrations and presence or absence of liquid petroleum hydrocarbon (LPH) on February 28, July 27-29, August 31 and October 13-14, 2020.
- The depth to groundwater measured in the monitoring wells ranged from 2.44 metres below ground surface (mbgs) (in MW15-01) to 4.02 mbgs (in TH7). The inferred groundwater flow direction is to the south.
- The headspace organic vapour concentrations measured in the monitoring wells ranged from non-detect to 389 parts per billion by volume (ppbv).
- LPH was not detected in any monitoring wells except 0.002 m LPH was observed in monitoring well TH4.
- Golder selected the Ontario Ministry of the Environment Conservation and Parks (MECP) Table 3 full depth generic Site Condition Standards (SCS) for all types of property use in a non-potable groundwater condition, and medium to fine textured soils as being applicable for use at this site.
- Groundwater samples were collected from sixteen (16) monitoring wells (TH1 to TH3, TH5 through TH9, TH11, TH12, TH100 to TH102, MW15-01, MW15-02, MW16-01) during one or both the sampling events on July 27-29, 2020 and October 14, 2020. The groundwater samples were submitted to Bureau Veritas Laboratories (BV Labs), an accredited laboratory by the Canadian Association for Laboratory Accreditation Inc. (CALA). Groundwater samples were submitted for laboratory analysis of benzene, toluene, ethylbenzene, xylenes (BTEX), petroleum hydrocarbon fractions F1 to F4 (PHC F1-F4) and lead.
- The analytical results of the submitted groundwater samples were reported by Golder to be below the selected MECP Table 3 SCS for all analyzed parameters with the exceptions of the groundwater samples collected from the following monitoring wells which exceeded for concentrations of one or more of benzene, PHC F1-F4 and lead during one or both the sampling events:
    - TH1 – PHC F2-F4 (July 2020)
    - TH5 – PHC F1-F3, lead (July 2020)
    - TH8 – PHC F3 (July 2020)

- TH9 – PHC F1-F4 (July, October 2020)
- TH11 – PHC F1-F4 (July, October 2020)
- TH12 – PHC F1-F2 (October 2020)
- TH100 – PHC F3-F4 (July 2020)
- TH101 – PHC F1-F2 (July 2020)

- Approximately 200 litres (L) of purged groundwater was removed from the site on August 8, 2020 and on October 15, 2020. The liquid waste was disposed of at an MECP approved facility.
- A hydro-vac truck was used to clean five off-site monitoring wells (TH8, TH9, TH11, TH12 and TH100), The liquid waste was disposed of at an MECP approved facility.

Our review of the report indicates that the petroleum hydrocarbon (PHC) impacts have been identified in groundwater both onsite (TH1, TH5 and TH4) and offsite (TH8, TH9, TH11, TH12 and TH101). The identified impacts have not been completely delineated. Based on the information provided to date, TSSA requires the following:

- The identified petroleum hydrocarbon impacts in groundwater must be completely delineated, both on-site and where practical, off-site. We note that the delineation of the identified impacts was requested via our letters dated February 28, 2018 and July 30, 2020.

- The City of Ottawa (the City) must be made aware of the identified impacts on the City's roadway allowances of Viewmount Drive and Merivale Road. TSSA must be copied and/or provided with copies of all correspondences between the City and Imperial Oil Limited.

- Following the complete delineation, TSSA requires the submission of a formal Contaminant Management Plan (CMP) if further remedial work is not carried out to remove the impacted soil and/or groundwater.

Please submit an action plan to this office by September 14, 2021 addressing the above issues.

Please note, the soil vapour intrusion assessment guidance document titled "*Draft Technical Guidance: Soil Vapour Intrusion Assessment, September 2013*" has not been finalized by the MRCP. It also has not been made available to public for use and is not in effect to date. As such, TSSA cannot provide comments on the soil vapour monitoring and sampling results.

Should you have any further questions, please do not hesitate to contact me directly. For general enquiries, please contact a Customer Service Advisor at 1.877.682.TSSA (8772) or e-mail customerservices@tssa.org. When contacting TSSA regarding this file, please refer to the Service Request number provided above.

Yours truly,



Farzana Islam, P. Eng.
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July 30, 2020

Justin Ly
Imperial Oil Limited
505 Quarry Park Blvd S.E.
Calgary, Alberta
T2C 5N1

Groundwater Monitoring Program – 1660 Merivale Road, Ottawa, Ontario
TSSA Service Request # 791084

Dear Mr. Ly,

Thank you for submitting the following reports for the above captioned property:

- *"2018 Groundwater and Soil Vapour Probe Monitoring and Sampling Report, 1660 Merivale Road, Ottawa, Ontario",* prepared by Golder Associates Ltd. (Golder), dated December 14, 2018; and
- *"2019 Groundwater and Soil Vapour Probe Monitoring and Sampling Report, 1660 Merivale Road, Ottawa, Ontario",* prepared by Golder, dated January 31, 2020.

The 2018 groundwater monitoring report provides the following information:

- Seventeen (17) monitoring wells (TH1 through TH9, TH11, TH12, TH100 to TH102, MW15-01, MW15-02, MW16-01) were monitored on August 14-16, 2018 for depth to groundwater, petroleum vapour concentrations and presence or absence of liquid petroleum hydrocarbon (LPH). The monitoring well TH10 was decommissioned on August 24, 2016 and was replaced with monitoring well MW16-01.
- The depth to groundwater measured in the monitoring wells ranged from 2.44 metres below ground surface (mbgs) (in MW15-02) to 3.83 mbgs (in TH7). The inferred groundwater flow direction is to the south.
- The headspace organic vapour concentrations measured in the monitoring wells ranged from 2,537 parts per billion by volume (ppbv) to 8,102 ppbv during the July 3, 2018 monitoring event. During October 29, 2018 monitoring event, the headspace vapour readings measured in the monitoring wells ranged from 14 ppbv to 308 ppbv.
- LPH was not detected in any monitoring wells.
- Golder selected the Ontario Ministry of the Environment Conservation and Parks (MECP) Table 3 full depth generic Site Condition Standards (SCS) for all types of property use in a non-potable groundwater condition, and medium to fine textured soils as being applicable for use at this site.
- Groundwater samples were collected from seventeen (17) monitoring wells (TH1 through TH9, TH11, TH12, TH100 to TH102, MW15-01, MW15-02, MW16-01) on August 14-16, 2018. The groundwater samples were submitted to Maxxam Analytics Inc. (Maxxam), an accredited laboratory by the Canadian Association for Laboratory Accreditation Inc. (CALA). Groundwater samples were submitted for laboratory analysis of benzene, toluene, ethylbenzene, xylenes (BTEX), petroleum hydrocarbon fractions F1 to F4 (PHC F1-F4) and lead.
- The analytical results of the submitted groundwater samples were reported by Golder to be below the selected MECP Table 3 SCS for all analyzed parameters with the exceptions of the groundwater samples collected from TH4, TH5, TH9, TH12, TH101, TH102 and MW16-01, which exceeded for concentrations of one or more of benzene, PHC F1-F4 and lead.
- Golder also reports that the samples collected from two soil vapour probes (SV16-01 and SV16-02) did not exhibit any exceedances.

The 2019 groundwater monitoring report provides the following information:

- Seventeen (17) monitoring wells (TH1 through TH9, TH11, TH12, TH100 to TH102, MW15-01, MW15-02, MW16-01) were monitored on July 29-31, 2019 for depth to groundwater, petroleum vapour concentrations and presence or absence of LPH.
- The depth to groundwater measured in the monitoring wells ranged from 2.49 mbgs (in MW15-01) to 3.98 mbgs (in TH7). The inferred groundwater flow direction is to the south.
- The headspace organic vapour concentrations measured in the monitoring wells ranged from 16 ppbv to 240 ppbv during the June 21, 2019 monitoring event. During November 12, 2019 monitoring event, the headspace vapour readings measured in the monitoring wells ranged from non-detect to 10 ppbv.
- LPH was not detected in any monitoring wells.
- Golder selected the MECP Table 3 full depth generic SCS for all types of property use in a non-potable groundwater condition, and medium to fine textured soils as being applicable for use at this site.
- Groundwater samples were collected from seventeen (17) monitoring wells (TH1 through TH9, TH11, TH12, TH100 to TH102, MW15-01, MW15-02, MW16-01) on July 29-31, 2019. The groundwater samples were submitted to Bureau Veritas (BV), an accredited laboratory by the CALA. Groundwater samples were submitted for laboratory analysis of BTEX, PHC F1-F4 and lead.
- The analytical results of the submitted groundwater samples were reported by Golder to be below the selected MECP Table 3 SCS for all analyzed parameters with the exceptions of the groundwater samples collected from TH1, TH4, TH5, TH8, TH9, TH11, TH100, TH101 and TH102 and MW16-01, which exceeded for concentrations of one or more of PHC F1-F4.
- Golder also reports that the samples collected from two soil vapour probes (SV16-01 and SV16-02) did not exhibit any exceedances.

Our review of the 2018 and 2019 groundwater monitoring/sampling report indicates that the petroleum hydrocarbon (PHC) impacts were identified in groundwater both onsite (TH1, TH5 and TH4) and offsite (TH8, TH9, TH11, TH12, TH100, TH102, TH101), and the identified impacts have not been completely delineated. Based on the information provided to date, TSSA requires the following:

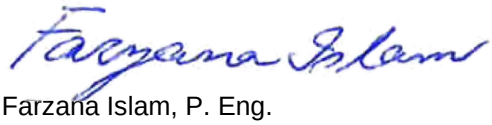
- The identified petroleum hydrocarbon impacts in groundwater must be completely delineated, both on-site and where practical, off-site;
- The City of Ottawa (the City) must be made aware of the identified impacts on the City's roadway allowances of Viewmount Drive and Merivale Road. TSSA must be copied and/or provided with copies of all correspondences between the City and Imperial Oil;
- Following the complete delineation, TSSA requires the submission of a formal Contaminant Management Plan (CMP) if further remedial work is not carried out to remove the impacted soil and/or groundwater;

Please submit an action plan to this office by September 14, 2020 addressing the above issues.

Please note, the soil vapour intrusion assessment guidance document titled "*Draft Technical Guidance: Soil Vapour Intrusion Assessment, September 2013*" has not been finalized by the Ministry of the Environment (MOE). It also has not been made available to public for use and is not in effect to date. As such, TSSA cannot provide comments on the soil vapour monitoring and sampling results.

Should you have any further questions, please do not hesitate to contact me directly. For general enquiries, please contact a Customer Service Advisor at 1.877.682.TSSA (8772) or e-mail customerservices@tssa.org. When contacting TSSA regarding this file, please refer to the Service Request number provided above.

Yours truly,



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TECHNICAL STANDARDS and SAFETY AUTHORITY

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FS Inspection Report

Service Request #	**3045902**
Inspection Report #	**8969836**

Inspection Address: **1660 MERIVALE RD** **NEPEAN;ON** **CA K2G 3K4**	Reference Number(s): **000203342**	Inspection Completion Date: **JUN 09, 2021**
	Facility Type: **FS Gasoline Station - Self Serve**	Equipment Type:
Customer Name and Address: **CANADIAN TIRE CORPORATION, LIMITED** **2180 YONGE ST PO BOX 770 STN K** **TORONTO;ON** **CA M4P 2V8**	Task Type: FS-Periodic LF Inspection **The facility/equipment is inspected in accordance with Ontario's Technical Standards & Safety Act and the appropriate regulations and codes. When an Inspector's order is issued, time limits for compliance reflect the severity of the violation and serve to avoid disruption of service.**	

Orders Issued To: CANADIAN TIRE CORPORATION, LIMITED:

Line	Reference and Order(s)	Compliance Date
911586-1	Liquid Fuels Handling Code 2017 Clause 4.6.9 - Shear valves and leak detection systems shall be maintained and tested at least once per year or in accordance with the manufacturer's instructions and a written record of the maintenance and testing shall be retained. During the facility inspection a copy of the annual report regarding the maintenance and testing of the shear valve and leak detection system was not available for review by this Inspector. Latest copy available was from 2019. You are hereby ordered to comply with clause 4.6.9 of the Liquid Fuels Handling Code 2017 and provide a written record of the maintenance and testing of the shear valves and leak detection system.	SEP 08, 2021
911586-2	ONTARIO REGULATION 212/01. (GASEOUS FUELS) 15 - Duty to maintain in safe operating condition. An owner or user of an appliance, equipment, a work or any other thing employed in the handling or use of gas shall ensure that the appliance, equipment, work or thing employed in the handling or use of gas is maintained in a safe operating condition. O. Reg. 212/01, s. 15. During the facility inspection a copy of the annual report regarding the maintenance of the natural gas appliances installed within the Car Wash mechanical room was not available for review by this Inspector. As an owner or user of an appliance, equipment or work, or any other thing employed in the handling or use of gas, you are hereby ordered to comply with section 15 of O. Reg. 212/01 and ensure that it is maintained in a safe operating condition.	SEP 08, 2021
911586-3	Liquid Fuels Handling Code 2017 Clause 6.2.1 - At every dispensing facility there shall be installed signage that is visible to all persons as they approach the dispensing location. The signage shall**(a) be not less than 20 cm × 28 cm in size; and**(b) display**(i) NO SMOKING - TURN IGNITION OFF in black letters at least 25 mm in height on a yellow background; or**(ii) the international no smoking and ignition off symbols in red and black at least 10 cm in diameter on a white background. TSSA Inspection has determined this facility does not comply with this code (No Smoking - Ignition Off signage is faded and no longer legible at dispenser #6). You are hereby ordered to ensure the dispensing location has 'no smoking' and 'turn ignition off' signage in accordance with clause 6.2.1 of the Liquid Fuels Handling Code 2017.	SEP 08, 2021
911586-4	Liquid Fuels Handling Code 2017 Clause 1.3.4 - Every retail outlet, marina, private outlet, bulk plant, and highway tank shall be maintained in a safe operating condition by the authorization holder and shall be operated safely. Any defective equipment or component shall be repaired or replaced. TSSA Inspection has determined this facility does not comply with this code (Veederoot system in alarm, L4 high liquid alarm indicated on display). Utilizing the key for accessing the STP sumps I was unable to remove all four lids, have your petroleum contractor remove all four lids and capture legible pictures inside of the sumps and	SEP 08, 2021

Customer Signature & Position / Date:		**Inspector Name:** Barclay, David	**Inspector Contact Number:** 613-808-2727
Report Received By: John Lastoria via: john.lastoria@cantire.com	**Customer Contact Number:** 416-480-9780	**Inspector Email**: dbarclay@tssa.org	**Inspector Fax**: 647-789-2129

As a not-for-profit regulatory authority, TSSA operates on a cost recovery basis. An Invoice will be issued for the Total Charges Incurred.
(Note: This is not an invoice)

TECHNICAL STANDARDS and SAFETY AUTHORITY

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FS Inspection Report

Service Request #	**3045902**
Inspection Report #	**8969836**

Inspection Address: **1660 MERIVALE RD** **NEPEAN;ON** **CA K2G 3K4**	Reference Number(s): **000203342**	Inspection Completion Date: **JUN 09, 2021**
	Facility Type: **FS Gasoline Station - Self Serve**	Equipment Type:
Customer Name and Address: **CANADIAN TIRE CORPORATION, LIMITED** **2180 YONGE ST PO BOX 770 STN K** **TORONTO;ON** **CA M4P 2V8**	Task Type: FS-Periodic LF Inspection **The facility/equipment is inspected in accordance with Ontario's Technical Standards & Safety Act and the appropriate regulations and codes. When an Inspector's order is issued, time limits for compliance reflect the severity of the violation and serve to avoid disruption of service.**	

	provide these pictures to this Inspector). You are hereby ordered to comply with clause 1.3.4 of the Liquid Fuels Handling Code 2017 and replace or repair any defective equipment or components.	
911586-5	Liquid Fuels Handling Code 2017 Clause 5.2.4 - The monitor shall be dedicated to the dispensers and may also monitor the car wash, but it shall not monitor images of the store. TSSA Inspection has determined this facility does not comply with this code (video monitor displays petroleum dispensers and an image of the convenience store). You are hereby ordered to comply with clause 5.2.4 of the Liquid Fuels Handling Code 2017 and ensure the monitor dedicated to the dispensers does not also monitor images of the store.	SEP 08, 2021

Task Notes

TSSA Inspector David Barclay travelled to 1660 Merivale Rd; Ottawa (Canadian Tire) on June 9, 2021 to conduct a petroleum facility periodic inspection.

Consulted with gas attendant on site during inspection of the petroleum facility licence, emergency stop, camera system, Veederoot, testing of the intercom, spill kit, fire extinguishers, signage, vehicular protection, dispensing equipment, STP and dispenser sumps, fill and vent pipes, and discovered the following deficiencies:

*Copies of the annual report regarding the maintenance and testing of the shear valve and leak detection systems, and the maintenance of the natural gas appliances installed within the Car Wash mechanical room were not available for review by this Inspector.

*No Smoking/Ignition Off signage posted at the dispenser #6 is faded.

*Approved container signage posted at the dispensers #4 and #6
are not visible due to other signage posted in front of the approved container signage.

*Veederoot discovered in alarm, display panel indicates "L4 high liquid alarm".

*Video monitor displays petroleum dispensers and an image of the convenience store.

*Unable to access all four STP sumps, key was utilized during removal but lids found seized in place. Have petroleum contractor provide pictures inside of these sumps.

A compliance date of September 8, 2021 has been issued.

Customer Signature & Position / Date:		**Inspector Name:** Barclay, David	**Inspector Contact Number:** 613-808-2727
Report Received By: John Lastoria via: john.lastoria@cantire.com	**Customer Contact Number:** 416-480-9780	**Inspector Email**: dbarclay@tssa.org	**Inspector Fax**: 647-789-2129

As a not-for-profit regulatory authority, TSSA operates on a cost recovery basis. An Invoice will be issued for the Total Charges Incurred.
(Note: This is not an invoice)

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FS Inspection Report

Service Request #	**3045902**
Inspection Report #	**8969836**

Inspection Address: **1660 MERIVALE RD** **NEPEAN;ON** **CA K2G 3K4**	Reference Number(s): **000203342**	Inspection Completion Date: **JUN 09, 2021**
	Facility Type: **FS Gasoline Station - Self Serve**	Equipment Type:
Customer Name and Address: **CANADIAN TIRE CORPORATION, LIMITED** **2180 YONGE ST PO BOX 770 STN K** **TORONTO;ON** **CA M4P 2V8**	Task Type: FS-Periodic LF Inspection **The facility/equipment is inspected in accordance with Ontario's Technical Standards & Safety Act and the appropriate regulations and codes. When an Inspector's order is issued, time limits for compliance reflect the severity of the violation and serve to avoid disruption of service.**	

Reviewed and confirmed tank and piping configuration file regarding this facility.

Cost recovery fees will be billed to the above named client by Authority of Section 19 of the TSSAct, 2011 and according to TSSA billing policy.

Pursuant to my Authority under Section 21(1) of the Technical Standards and Safety Act, 2000, s.o. 2000, I order you to comply with the above Orders.

Customer Signature & Position / Date:		**Inspector Name:** Barclay, David	**Inspector Contact Number:** 613-808-2727
Report Received By: John Lastoria via: john.lastoria@cantire.com	**Customer Contact Number:** 416-480-9780	**Inspector Email**: dbarclay@tssa.org	**Inspector Fax**: 647-789-2129

As a not-for-profit regulatory authority, TSSA operates on a cost recovery basis. An Invoice will be issued for the Total Charges Incurred.
(Note: This is not an invoice)

December 18, 2020 Project No. 1791706-1155

THIS REPORT CONTAINS PROVISIONS LIMITING LIABILITY, THE SCOPE OF THE REPORT AND THIRD PARTY RELIANCE

These documents and the information contained therein are confidential property of Imperial Oil and any disclosure of same is governed by the provisions of each of the applicable provincial and territorial freedom of information legislation, the Privacy Act (Canada) 1980-81-82-83, c.111, Sch. II "1", and the Access to Information Act (Canada) 1980-81-82-83, c.111, Sch. I "1", and, as such, legislation may be amended from time to time.

Imperial Oil Limited
505 Quarry Park Blvd SE
Calgary, Alberta T2C 5N1

2020 GROUNDWATER AND SOIL VAPOUR PROBE MONITORING AND SAMPLING REPORT
1660 MERIVALE ROAD, OTTAWA, ONTARIO
SAP 88001627

INTRODUCTION

Golder Associates Ltd. was retained by Imperial Oil Limited to conduct a groundwater and soil vapour probe monitoring and sampling program at the former retail fuel outlet and active Canadian Tire station, at 1660 Merivale Road, Ottawa, Ontario (the Site) (Figures 1 and 2). The fieldwork was conducted on February 28, July 27 to 29, August 31, and October 13 to 14, 2020.

SCOPE OF WORK

Groundwater

- Annual monitoring of nine on-site (TH1 to TH7, MW15-01 and MW15-02) and eight off-site (TH8, TH9, TH11, TH12, TH100 to TH102 and MW16-01) groundwater monitoring wells for depth to groundwater and the thickness, if present, of light non-aqueous phase liquid (LNAPL);
- Collecting annual groundwater samples from nine on-site (TH1 to TH7, MW15-01, and MW15-02) and eight off-site (TH8, TH9, TH11, TH12, TH100 to TH102, and MW16-01) monitoring wells using the low-flow sampling method for laboratory analysis of benzene, toluene, ethylbenzene, xylenes (BTEX), petroleum hydrocarbon (PHC) fractions F1 to F4 and dissolved lead.
- Cleaning out five off-site (TH8, TH9, TH11, TH12 and TH100) monitoring wells using a hydro-vac truck, operated by Badger Daylighting Ltd., from Ottawa, Ontario;
- Collecting groundwater samples from five off-site (TH8, TH9, TH11, TH12 and TH100) monitoring wells using the low-flow sampling method for laboratory analysis of BTEX, PHC fractions F1 to F4 and dissolved lead;
- Comparing the groundwater analytical results to the following standards:
  - Ministry of the Environment, Conservation and Parks' (MECP) Table 3 Full Depth Generic Site Condition Standards for groundwater in medium and fine textured soil in a non-potable groundwater from the

document titled “Soil, Ground Water, and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act,” dated April 15, 2011 (hereafter referred to as the Table 3 Standards).

Soil Vapour

- Collecting winter and summer soil vapour samples from two on-site soil vapour probes (SV16-01 and SV16-02) for laboratory analysis of BTEX, PHC Fractions F1 and F2, and volatile organic compounds (VOCs);
- Comparing the soil vapour analytical results to the following guidelines:
  - Health-Based Indoor Air Criteria provided by MECP Modified Generic Risk Assessment (Tier 2) Spreadsheet Model (November 1, 2016) for residential land use.
  - Soil vapour screening levels generated for residential buildings with a basement (probe depth 0 to 30 centimetres below base of the building foundation) calculated by dividing Health-Based Indoor Air Criteria by an attenuation factor of 0.02.

METHODOLOGY

Groundwater

Depth to Groundwater and LNAPL Thickness

- Depth to groundwater was measured and, if present, the thickness of LNAPL using an oil/water interface probe. If LNAPL is detected, then its presence is confirmed visually using a bailer. Prior to use in each well, the interface probe was cleaned using a phosphate-free detergent and water solution and rinsed with deionized water to minimize the potential for cross-contamination. Depth to groundwater measurements were taken from the top of casing.

Low-Flow Sampling

- Groundwater samples were collected using the low-flow sampling method. Water was pumped from each well, at a rate of 0.1 to 1 litres per minute (L/min), using low density polyethylene tubing connected to a peristaltic pump with a portion of silicon tubing. Routine water quality indicator parameters were measured during pumping using a multi-parameter water quality meter and flow through cell. The parameters measured included electrical conductivity, pH, temperature, dissolved oxygen and reduction potential. Calibration of the meter was completed as per the manufacturer’s instructions. Purged water was retained on-site in barrels for future off-site disposal.
- Thirteen samples, including two duplicates and eleven groundwater samples, were collected via the low-flow sampling method between July 27 and 29, 2020. A field blank and trip blank were also collected. Monitoring well TH12 contained debris above the water table on July 28, 2020, and no groundwater sample was collected.
- Six samples, including one duplicate and five groundwater samples, were collected via the low-flow sampling method on October 14, 2020. A field blank and trip blank were also collected.

No-Purge Sampling

- Groundwater samples were collected via the no-purge technique as a result of insufficient recharge to complete low flow sampling. Sampling was completed using disposable bailers. Refer to Table 1 for a summary of groundwater field monitoring results.
- Groundwater samples from two monitoring wells (TH1, TH100) were collected via the no-purge sampling technique between July 27 and 29, 2020, due to insufficient recharge for low-flow sampling.

Laboratory Analysis of Groundwater Samples

- Samples were submitted under chain-of-custody to Maxxam Analytics Inc. (now Bureau Veritas Laboratories [BVL]) in Mississauga, Ontario, a Standards Council of Canada accredited laboratory, for analysis of BTEX, PHC Fractions F1 to F4 and dissolved lead.
- Groundwater samples for BTEX and PHC Fraction F1 analysis were placed in 40-millilitre (mL) clear glass vials provided by the laboratory and preserved with sodium bisulphate as a microbial inhibitor. The groundwater samples for PHC Fractions F2 to F4 analysis were placed in 250-mL amber glass bottles and preserved with sodium bisulphate. Groundwater samples for dissolved lead analysis were placed in 120-mL high-density polyethylene bottles, field filtered and preserved with nitric acid.
- All sampling containers were placed in an ice-filled cooler immediately following sampling and transported to BVL for chemical analysis.

Waste Purge Water Removal

- Badger Daylighting of Ottawa, Ontario, an MECP-licensed waste hauler, was used to recover approximately 200 litres (L) of waste purged groundwater from the Site on August 8, 2020, and 15 L on October 15, 2020. The liquid was disposed of at an MECP-approved waste receiver.

Well Cleaning

- Badger Daylighting of Ottawa, Ontario, used a hydro-vac truck to clean five off-site (TH8, TH9, TH11, TH12 and TH100) monitoring wells. Screens were cleaned with pressurized potable city water and vacuumed for approximately 30 minutes each. The liquid was disposed of at an MECP-approved waste receiver.

Soil Vapour

Weather Conditions during Sampling

- Weather conditions[1] on February 28, 2020 were partly cloudy. Outdoor air temperatures were between -10.4 and -9.3 degrees Celsius (°C), relative humidity was between 69 and 77%, and barometric pressure was measured between 98.82 and 98.84 kilopascals (kPa) (Environmental Canada 2020, internet site).

[1] Weather information was taken from the meteorological station (*2020 Hourly Data Report. Ottawa INTL A, Ontario*) closest to the Site. Environment Canada 2020, internet site.

- Weather conditions[2] on August 31, 2020 were clear and sunny. Outdoor air temperatures were between 8.9 and 21.8 °C, relative humidity was between 51 to 99%, and barometric pressure was measured between 100.17 t 100.53 kPa.

Probe Leak Testing

- The soil vapour probes (SV16-01 and SV16-02) were leak tested on February 28 and August 31, 2020, to assess whether ambient air was penetrating the ground surface (e.g., along the outside of the tubing) and mixing with soil vapours during sampling.
- Prior to sample collection, three probe volumes were purged from the soil vapour probe using a sampling pump connected to the probe using dedicated Teflon tubing. Purging was conducted at a nominal flow rate of 200 millilitres per minute (mL/min). During purging, the flow rate and vacuum were measured using an inline flow calibrator and manometer.
- After purging each of the three probe volumes, a soil gas screening sample was indirectly collected into a 1-L Tedlar bag using a vacuum chamber to eliminate cross-contamination from the sampling pump. The concentrations of methane, carbon dioxide, oxygen and combustible gases in the screening sample were measured using a GEM 5000 and RKI GX-6000. The integrity of each vapour sampling probe and its connection to the sampling equipment was evaluated using helium leak testing. A plastic shroud was placed over the sample probe and was continuously filled with helium. The soil gas screening sample was tested for helium. Sample acceptance was based upon obtaining a helium concentration in the screening sample that was less than 1% of the shroud concentration.

Soil Vapour Sampling

- Soil vapour samples were collected following procedures outlined in the United States Environmental Protection Agency Method TO-15. A flow regulator supplied by BVL was used to regulate the volumetric soil vapour flow rate into the Summa canister at a flow rate of between 155 and 175 mL/min during an 8- to 9-minute sampling period during the February sampling event, and between 140 to 155 mL/min during a 9- to 10-minute sampling period during the August sampling event.
- A 1.4-L Summa canister, batch certified by BVL to be free of contaminants, was fitted with a flow regulator for sample collection. Prior to use, the initial Summa canister pressure was confirmed, with a vacuum gauge, to be less than or equal to -29 inches of mercury during the February sampling event, and -27 inches of mercury during the August sampling event, when gauged.

Laboratory Analysis of Soil Vapour Samples

- Soil vapour samples were collected and submitted to the BVL Mississauga facility, for analysis of BTEX, PHC Fractions F1 and F2, and VOCs. During the February sampling event, four samples, including one field duplicate, one field blank and two soil vapour probe samples, were submitted to BVL for analysis. During the August sampling event, four samples, including one field duplicate, one field blank and two soil vapour probe samples, were submitted to BVL for analysis.

[2] Weather information was taken from the meteorological station (*2020 Hourly Data Report. Ottawa INTL A, Ontario*) closest to the Site. Environment Canada 2020, internet site.

RESULTS

Groundwater

LNAPL Occurrence (Date; Observations)

- July 27 to 29, 2020; detected in one monitoring well (TH4); 0.002 m (Table 1).
- October 15, 2020; not detected (Table 1).

Groundwater Monitoring (Date; Depth to Groundwater Range; Groundwater Direction)

- July 27 to 29, 2020; depth to groundwater ranged from 2.44 to 4.02 metres below ground surface (mbgs) (Table 1); inferred to the south (Figure 3, Table 1).
- October 15, 2020; depth to groundwater ranged from 2.87 to 3.80 mbgs (Table 1); inferred to the south (Figure 4, Table 1).

Groundwater Analytical Results (Date; Parameters; No. of wells)

- July 27 to 29, 2020; BTEX and PHC Fractions F1 to F4; exceedances of one or more parameters listed were identified at seven locations (Figure 5, Table 2).
- July 27 to 29, 2020; dissolved lead; an exceedance was identified at one location (Figure 5, Table 2).
- October 14, 2020; BTEX and PHC Fractions F1 to G4; exceedances of one or more parameters listed were identified at three locations (Figure 6, Table 2).
- October 14, 2020; dissolved lead; No exceedance was identified (Figure 6, Table 2).

Soil Vapour

Probe Leak Test Results (Date; Probe; Result expressed as % helium)

- February 28, 2020; SV16-01 and SV16-02; 0% (Table 3).
- August 31, 2020; SV16-01 and SV16-02; 0% (Table 3).

Field Organic Vapour Results (Date; Range)

- February 28, 2020; not detected to 21 parts per billion by volume (ppbv) (Table 3).
- August 31, 2020; 161 to 389 ppbv (Table 3).

Soil Vapour Analytical Results (Date; Parameters; No. of probes)

- February 28, 2020; BTEX, PHC Fractions F1 and F2; No exceedances were identified (Figure 7, Table 4).
- February 28, 2020; VOCs; No exceedances were identified (Figure 8, Table 5).
- August 31, 2020; BTEX, PHC Fractions F1 and F2; No exceedances were identified (Figure 7, Table 4).
- August 31, 2020; VOCs; Exceedances of one or more parameters listed were identified at one location (Figure 8, Table 5).

FIELD AND LABORATORY QUALITY ASSURANCE / QUALITY CONTROL

- Copies of the associated laboratory certificates of analysis are provided in Appendix A.
- A quality assurance/quality control (QA/QC) program was followed to minimize and quantify impacts introduced during sample collection, handling, shipping, and analysis. As part of the QA/QC program, sampling protocols included minimizing sample handling, submitting field QA/QC samples, using dedicated non-contaminating sampling equipment, using sample-specific identification and labelling procedures, and using chain-of-custody records. A discussion of the QA/QC program is included in Appendix B.
- Based on the data quality review, no groundwater data quality issues were identified. Seven soil vapour data quality issues were identified. These issues are considered unlikely to have a material effect on the quality of the data presented in this report.

CLOSURE

We trust the information provided herein meets your requirements. If you have any questions about the contents of the letter, please contact the undersigned.

Golder Associates Ltd.



Leandra Mariani, H.B.Sc.

Environmental Scientist

Roopnarine Mungal, B.Sc., M.Phil.(Chem.; Chem.Eng.); LEL, QPESA C.Chem.

Associate, Senior Environmental Consultant

LM/RM/hf

Attachments: Limitations of Liability, Scope of Report and Third Party Reliance
Figures
Tables
Appendix A: Laboratory Certificates of Analysis and Data Quality Review Checklists
Appendix B: Quality Assurance/Quality Control

LIMITATIONS OF LIABILITY, SCOPE OF REPORT AND THIRD PARTY RELIANCE

This report has been prepared and the work referred to in this report has been undertaken by Golder Associates Ltd. for Imperial Oil Limited. It is intended for the sole and exclusive use of Imperial Oil Limited, its affiliated companies and partners and their respective insurers, agents, employees and advisors (collectively, “Imperial Oil”). Any use, reliance on or decision made by any person other than Imperial Oil based on this report is the sole responsibility of such other person. Imperial Oil and Golder Associates Ltd. make no representation or warranty to any other person with regard to this report and the work referred to in this report, and they accept no duty of care to any other person or any liability or responsibility whatsoever for any losses, expenses, damages, fines, penalties or other harm that may be suffered or incurred by any other person as a result of the use of, or reliance on, any decision made or any action taken based on this report or the work referred to in this report.

The investigation undertaken by Golder Associates Ltd. with respect to this report and any conclusions or recommendations made in this report reflect Golder Associates Ltd.’s judgement based on the site conditions observed at the time of the site inspection on the date(s) set out in this report, and on information available at the time of preparation of this report. This report has been prepared for specific application to this site and it is based, in part, upon visual observation of the site, subsurface investigation at discrete locations and depths, and specific analysis of specific chemical parameters and materials during a specific time interval, all as described in this report.

Unless otherwise stated, the findings cannot be extended to previous or future site conditions, portions of the site which were unavailable for direct investigation, subsurface locations which were not investigated directly, or chemical parameters, materials or analysis which were not addressed. Substances other than those addressed by the investigation described in this report may exist within the site, substances addressed by the investigation may exist in areas of the site not investigated and concentrations of substances addressed which are different than those reported may exist in areas other than the locations from which samples were taken.

If site conditions or applicable standards change or if any additional information becomes available at a future date, modifications to the findings, conclusions and recommendations in this report may be necessary.

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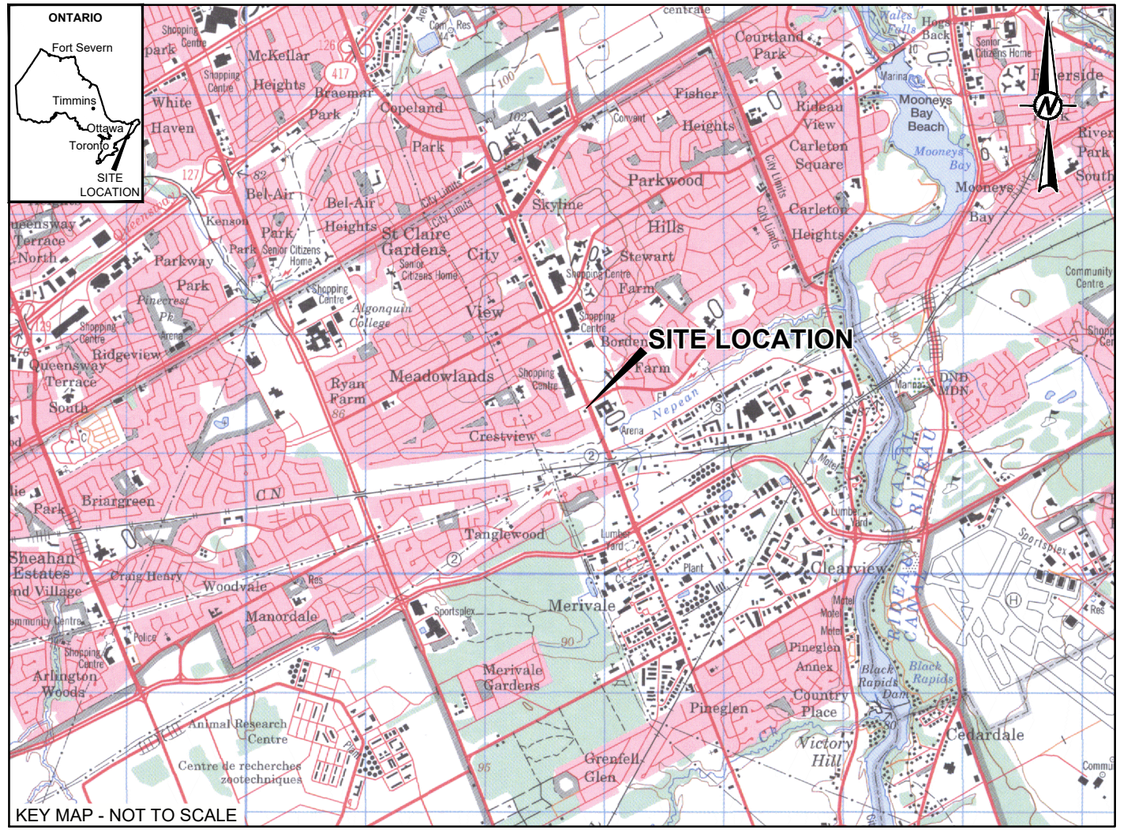

LEGEND

PROPERTY BOUNDARY

REFERENCE

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BING IMAGERY SUPPLIED BY AUTODESK AND MICROSOFT © 2020 MICROSOFT CORPORATION AND ITS DATA SUPPLIERS.

TOPOGRAPHIC MAP 31G/05 OBTAINED FROM Canmatrix. © 1998 HER MAJESTY THE QUEEN IN RIGHT OF CANADA. DEPARTMENT OF NATURAL RESOURCES.
PROJECTION: TRANSVERSE MERCATOR; DATUM: NAD83; COORDINATE SYSTEM: UTM ZONE 18.

0 50 100
(APPROX.) METRES

CLIENT
IMPERIAL OIL LIMITED

CONSULTANT
GOLDER

YYYY-MM-DD	2020-12-14
DESIGNED	SMoloughney
PREPARED	SSun
REVIEWED	CVettorazzo
APPROVED	RMungal

PROJECT
FORMER RETAIL FUEL OUTLET
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
SITE LOCATION PLAN

PROJECT NO.	PHASE-TASK	REV.	FIGURE
1791706	1155-2016B	0	1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25 mm

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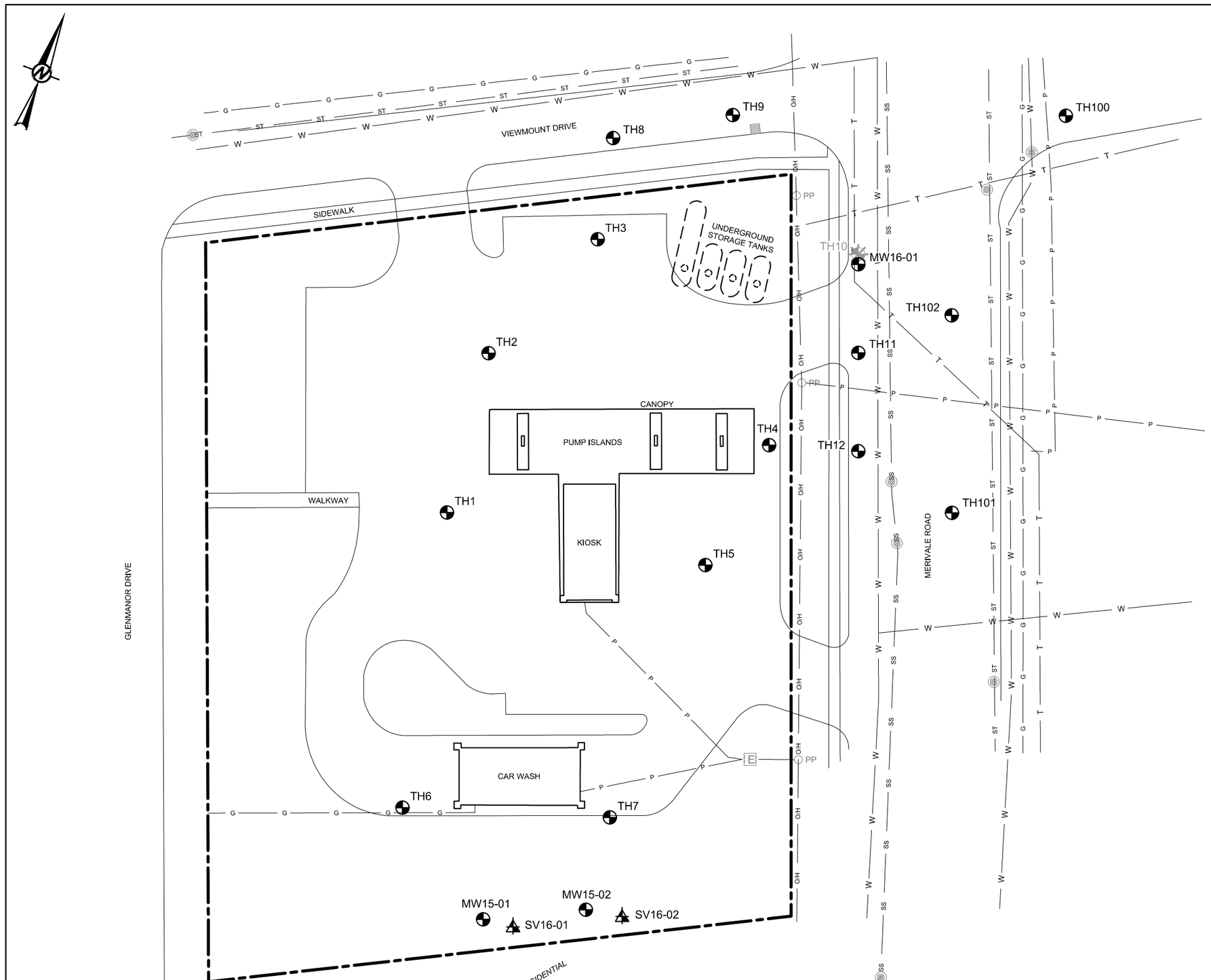

LEGEND

- PROPERTY BOUNDARY
- O/H — OVERHEAD POWER LINE
- G — UNDERGROUND GAS LINE
- P — UNDERGROUND POWER LINE
- SS — UNDERGROUND SANITARY LINE
- ST — UNDERGROUND STORM SEWER LINE
- T — UNDERGROUND TELEPHONE LINE
- W — UNDERGROUND WATERLINE
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL (DECOMMISSIONED)
- SOIL VAPOUR PROBE LOCATION
- CATCH BASIN
- E — ELECTRICAL PEDESTAL
- MANHOLE
- PP — POWER POLE

REFERENCE

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No.: 11010-SITE PLAN ONSITE-JUN14; SCALE: UNKNOWN; DATE: JUNE 2014.

0 10 20
1:500 METRES

CLIENT
IMPERIAL OIL LIMITED

PROJECT
FORMER RETAIL FUEL OUTLET
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
SITE PLAN WITH MONITORING WELL AND SOIL VAPOUR LOCATIONS

CONSULTANT
GOLDER

YYYY-MM-DD	2020-12-14
DESIGNED	SMoloughney
PREPARED	SSun
REVIEWED	CVettorazzo
APPROVED	RMungal

PROJECT NO.	PHASE-TASK	REV.	FIGURE
1791706	1155-2016B	0	2

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25 mm

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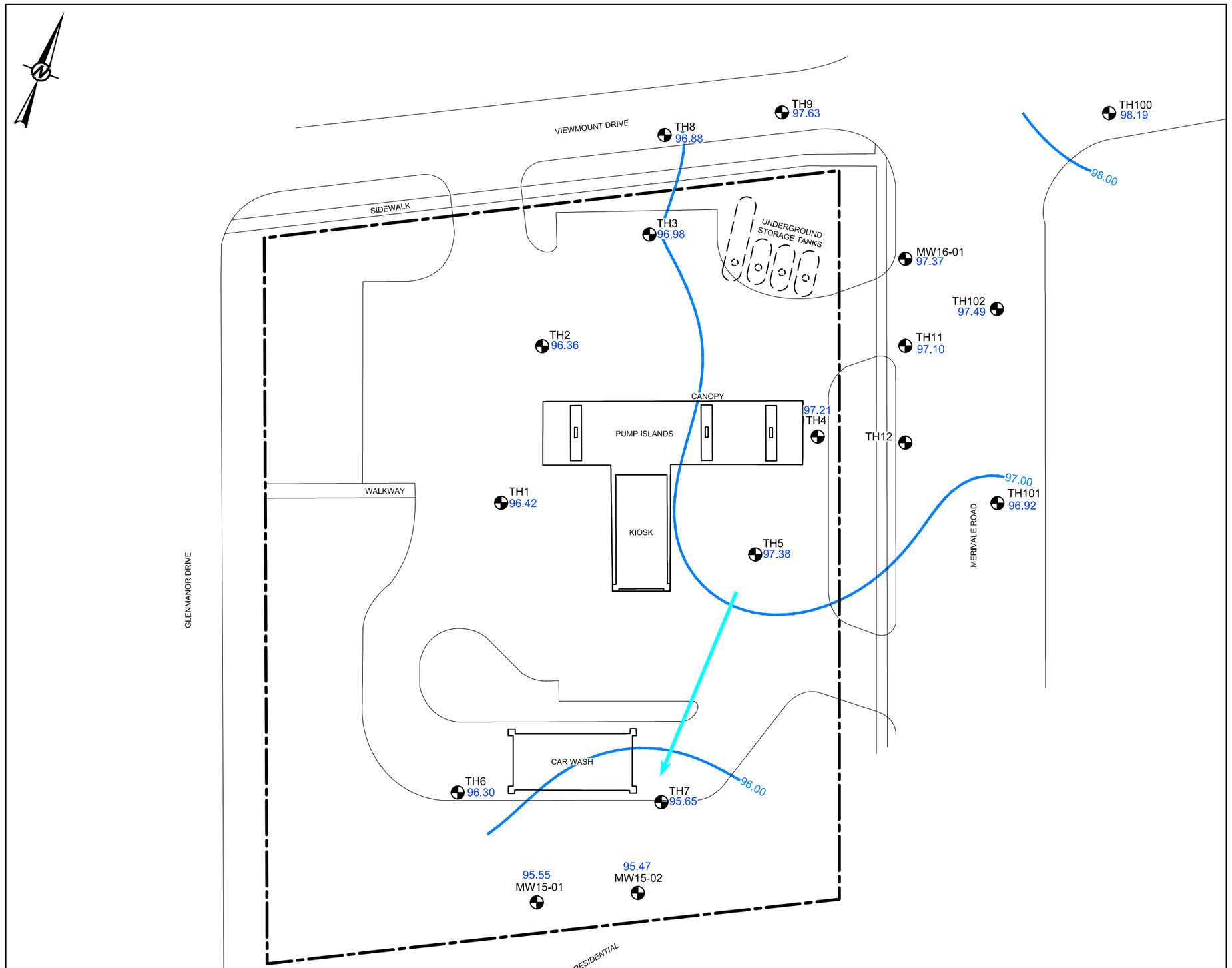

LEGEND

- PROPERTY BOUNDARY
- 98.00 GROUNDWATER CONTOUR (m)
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL
- 98.19 GROUNDWATER ELEVATION (m)
- DIRECTION OF GROUNDWATER FLOW

LIST OF APPLICABLE ABBREVIATIONS

m	METRE

NOTE

ELEVATIONS ARE RELATIVE TO A LOCAL BENCHMARK (CENTRE OF STORM SEWER CATCH BASIN LOCATED APPROXIMATELY 5 m WEST OF KIOSK), WITH AN ASSIGNED ELEVATION OF 100.00 m (EXP. 2013).

REFERENCE

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No.: 11010-SITE PLAN ONSITE-JUN14; SCALE: UNKNOWN; DATE: JUNE 2014.

0 10 20
1:500 METRES

CLIENT
IMPERIAL OIL LIMITED

PROJECT
FORMER RETAIL FUEL OUTLET
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
GROUNDWATER ELEVATIONS
July 27 to 29, 2020

CONSULTANT
GOLDER

YYYY-MM-DD	2020-12-14
DESIGNED	SMoloughney
PREPARED	SSun
REVIEWED	CVettorazzo
APPROVED	RMungal

PROJECT NO.	PHASE-TASK	REV.	FIGURE
1791706	1155-2016B	0	3

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B

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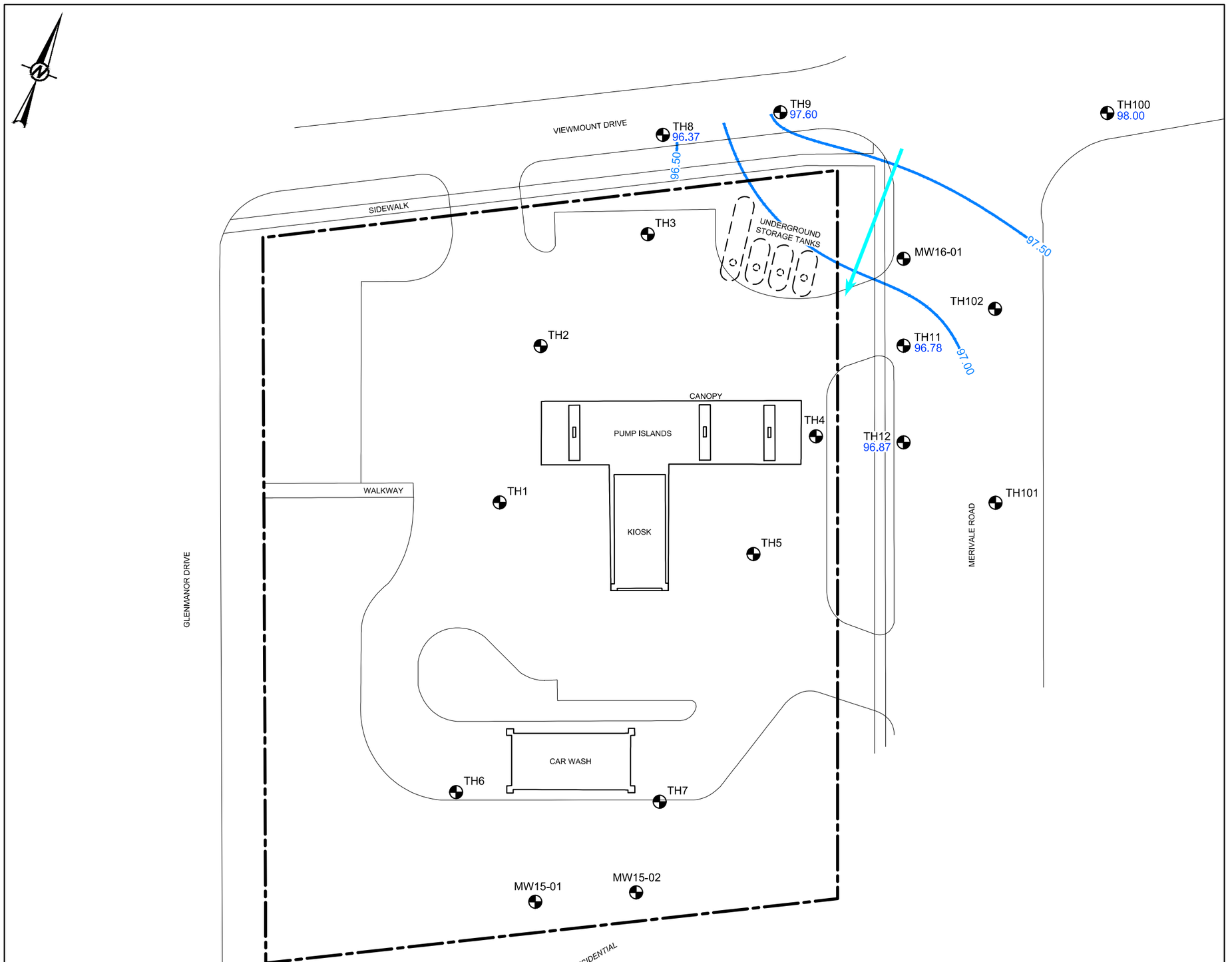

LEGEND

- PROPERTY BOUNDARY
- 97.50 — GROUNDWATER CONTOUR (m)
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL
- 98.00 — GROUNDWATER ELEVATION (m)
- DIRECTION OF GROUNDWATER FLOW

LIST OF APPLICABLE ABBREVIATIONS

m	METRE

NOTE

ELEVATIONS ARE RELATIVE TO A LOCAL BENCHMARK (CENTRE OF STORM SEWER CATCH BASIN LOCATED APPROXIMATELY 5 m WEST OF KIOSK), WITH AN ASSIGNED ELEVATION OF 100.00 m (EXP. 2013).

REFERENCE

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No.: 11010-SITE PLAN ONSITE-JUN14; SCALE: UNKNOWN; DATE: JUNE 2014.

0 10 20
1:500 METRES

CLIENT
IMPERIAL OIL LIMITED

PROJECT
FORMER RETAIL FUEL OUTLET
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
GROUNDWATER ELEVATIONS
October 14, 2020

CONSULTANT
GOLDER

YYYY-MM-DD	2020-12-14
DESIGNED	LMariani
PREPARED	SLebedeff
REVIEWED	CVettorazzo
APPROVED	RMungal

PROJECT NO.	PHASE-TASK	REV.	FIGURE
1791706	1155-2016B	0	4

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

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TH1 — Screen Interval: 2.6 to 5.6 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-11	<0.20	<0.20	<0.20	<0.40	<25	<100	<100	<100	<5.0	<0.50
13-Jun-13	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	0.53
26-Aug-14	<0.20	0.75	<0.20	1.2	<25	<100	<200	<200	<5.0	<0.50
17-Nov-15	<0.20	0.27	0.28	<0.40	<25	<100	<200	<200	<5.0	<0.50
10-Aug-16	<0.20	<0.20	<0.20	<0.40	<25	<100	300	1,200[b]	<5.0	<0.50
5-Dec-16	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
21-Jun-17	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
16-Aug-18	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
30-Jul-19	<0.20	<0.20	<0.20	<0.40	<25	<100	350	1,400[b]	<5.0	<0.50
29-Jul-20	<0.20	<0.20	<0.20	<0.40	<25	400	24,000	160,000[b]	na	1.5

TH2 — Screen Interval: 3.2 to 4.7 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-11	0.77	<0.20	1.3	0.48	<25	<100	<100	<100	<5.0	<0.50
13-Jun-13	0.62	<0.20	2.2	<0.40	<25	<100	<200	<200	<5.0	<0.50
27-Aug-14	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
17-Nov-15	<0.20	0.29	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
17-Nov-15 (DUP)	<0.20	0.28	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
9-Aug-16	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
21-Jun-17	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
15-Aug-18	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
31-Jul-19	<0.20	<0.20	<0.20	<0.40	<25	<100	250	<200	na	<0.50
28-Jul-20	0.44	<0.20	<0.20	3.6	<25	<100	<200	<200	na	<0.50

TH3 — Screen Interval: 3.2 to 4.7 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-11	27	2.4	79	150	1,100	430	<100	130	20	3.8
31-Aug-11 (DUP)	23	2.1	69	130	1,100	380	<100	110	17	3.9
13-Jun-13	11	0.61	66	85	900	350	<200	<200	<5.0	3.1
26-Aug-14	14	0.28	19	5.2	520	180	<200	<200	<5.0	2.2
28-Oct-15	25	<0.20	15	0.89	450	<100	<200	<200	<5.0	2.0
10-Aug-16	42	<0.20	26	1.5	560	110	<200	<200	<5.0	0.98
21-Jun-17	19	0.29	77	20	630	140	<200	<200	na	<0.50
15-Aug-18	7.4	<0.20	7.2	3.3	310	<100	<200	<200	na	0.76
31-Jul-19	18	<0.20	26	2.1	380	120	<200	<200	na	2.2
29-Jul-20	9.8	<0.20	6.4	0.58	310	<100	<200	<200	na	3.7

TH4 — Screen Interval: 3.4 to 4.9 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-11	610	610	3,400	19,000	26,000	17,000	360	170	540	2.6
13-Jun-13	200	35	1200	4,300	6,200	19,000	580	430	<100	5.8
26-Aug-14	500	37	1400	2600	4,700	1,400	<200	<200	58	3.0
26-Aug-14 (DUP)	540	40	1600	2700	400	1,400	<200	<200	62	1.9
17-Nov-15	180	18	560	930	1,900	940	240	230	<100	3.1
10-Aug-16	210	11	550	1,500	1,800	370	<200	<200	31	1.1
10-Aug-16 (DUP)	190	9.7	490	1,400	1,600	400	210	<200	27	1.7
21-Jun-17	210	28	470	1,500	2,000	930	<200	<200	na	0.78
16-Aug-18	400	14	860	3,400	3,100	1,300	250	<200	na	30
16-Aug-18 (DUP)	420	14	890	3,500	2,800	1,200	260	210	na	32
31-Jul-19	36	1.9	41	270	1,500	1,400	280	<200	na	12
27-Jul-20	LNAPL THICKNESS: 0.002 m									

TH5 — Screen Interval: 3.5 to 5.0 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-11	750	140	3,000	13,000	85,000	20,000	690	620	1,400	5.5
13-Jun-13	530	44	1600	3800	9,900	160,000	12,000	6,800	<100	8.3
13-Jun-13 (DUP)	550	44	1600	3800	9,200	110,000	7,000	4,300	<100	8
27-Aug-14	450	46	1600	3100	11,000	2,800	<200	<200	210	4.1
17-Nov-15	360	26	930	1,300	3,300	2,900	320	240	<100	3.7
10-Aug-16	420	43	1,500	3,700	13,000	11,000	1,100	810	240	0.81
21-Jun-17	210	25	690	1,800	4,400	3,600	420	350	na	1.8
21-Jun-17 (DUP)	190	23	640	1,600	4,400	3,200	490	450	na	2.2
16-Aug-18	510	37	1,400	2,600	6,700	3,300	300	<200	na	2.6
31-Jul-19	380	24	910	2,800	5,600	5,400	350	<200	na	8.4
31-Jul-19 (DUP)	380	26	940	2,900	5,700	4,100	290	<200	na	8.3
29-Jul-20	200	12	830	1,400	6,000	8,500	570	<200	na	26
29-Jul-20 (DUP)	200	12	790	1,300	5,900	8,500	470	<200	na	25

TH6 — Screen Interval: 3.6 to 5.1 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
20-Oct-11	<0.20	<0.20	<0.20	<0.40	<25	<100	<100	<100	<5.0	<0.50
20-Oct-11 (DUP)	<0.20	<0.20	<0.20	<0.40	<25	<100	<100	<100	<5.0	<0.50
13-Jun-13	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	0.6
27-Aug-14	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
28-Oct-15	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
28-Oct-15 (DUP)	<0.20	0.38	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
9-Aug-16	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
22-Jun-17	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
14-Aug-18	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
29-Jul-19	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
27-Jul-20	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50

TH7 — Screen Interval: 4.4 to 5.8 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
14-Nov-11	31	5.4	160	340	430	<100	<100	<100	<30	<0.5
13-Jun-13	37	2.8	140	130	550	460	<200	<200	<5.0	3.2
27-Aug-14	150	18	610	730	1,900	540	<200	<200	22	2.1
28-Oct-15	93	8.4	270	300	1,000	280	<200	<200	<5.0	1.2
9-Aug-16	62	5.8	120	140	500	150	<200	<200	<5.0	<0.50
22-Jun-17	93	8.7	240	190	800	190	<200	<200	na	0.54
14-Aug-18	22	0.53	8.8	0.60	68	<100	<200	<200	na	<0.50
29-Jul-19	46	1.4	43	2.5	400	110	<200	<200	na	<0.50
27-Jul-20	27	1.3	35	3.1	270	<100	<200	<200	na	<0.50

TH8 — Screen Interval: 3.3 to 4.9 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
13-Jun-13	3.9	<0.20	4.1	0.61	48	<100	<200	<200	<0.5	1.1
27-Oct-15	4.4	<0.20	0.51	0.41	<25	<100	<200	<200	<5.0	0.82
10-Aug-16	3.0	<0.20	0.66	<0.40	70	<100	<200	<200	<5.0	0.77
15-Aug-18	0.99	<0.20	0.80	<0.40	<25	<100	<200	<200	na	<2.5
15-Aug-18 (DUP)	1.0	<0.20	0.78	<0.40	<25	<100	<200	<200	na	<2.5
30-Jul-19	3.7	<0.20	1.0	<0.40	220	<100	440	1,500[b]	na	1.2
28-Jul-20	4.5	<0.20	5.4	0.75	170	130	780	500	na	1.2

TH9 — Screen Interval: 3.4 to 4.9 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
6-Oct-14	31	3	230	290	1,000	570	610	420	15	1.1
27-Oct-15	51	7.2	390	350	2,500	1,100	220	360	35	2.6
10-Aug-16	23	1.8	250	70	1,600	350	<200	<200	11	1.1
20-Jun-17	36	5.5	460	370	4,200	1,200	<200	<200	na	2.3
15-Aug-18	12	0.69	78	49	740	190	350	1,600[b]	na	<0.50
30-Jul-19	0.81	<0.20	2.5	0.47	50	<100	540	1,900[b]	na	<0.50
30-Jul-19 (DUP)	0.84	<0.20	2.6	0.51	63	<100	1,200	3,000[b]	na	<0.50
28-Jul-20	4.4	<0.20	7.8	<0.40	51	<100	700	520	na	<0.50

TH10 — Screen Interval: 3.3 to 4.9 mbgs

Date	B	T	E	X	F1	F2	F3	F4	H	Pb
11-Jun-13	73	58	52	200	1,400	560	<200	<200	35	1.2

TH11 — Screen Interval: 3.3 to 4.9 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
11-Jun-13	370	34	2,200	3,400	11,000	1,400	<200	<200	130	2.6
28-Oct-15	96	8.1	710	120	4,400	2,500	1,300	820	72	4.6
11-Aug-16	100	6.3	590	160	5,000	6,700	2,200	1,300	37	6.0
11-Aug-16 (DUP)	110	7.1	610	170	4,900	7,100	2,400	1,400	43	3.3
28-Jul-20	5.9	0.36	8.8	3.4	490	12,000	36,000	150,000[b]	na	<0.50

TH12 — Screen Interval: 3.3 to 4.9 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
11-Jun-13	380	35	2,300	3,500	11,000	3,100	<200	<200	<100	6.8
11-Jun-13 (DUP)	360	34	2,300	3,500	11,000	2,800	<200	<200	<100	6.9
28-Oct-15	95	14	620	400	4,500	1,600	540	320	140	4.5
11-Aug-16	130	17	1,100	630	6,800	1,800	900	510	120	2.1
20-Jun-17	160	11	1,200	170	7,900	2,800	750	460	na	3.8
20-Jun-17 (DUP)	150	11	1,200	160	7,300	2,600	700	430	na	4.5

TH100 — Screen Interval: 3.0 to 4.9 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
6-Oct-14	<0.20	<0.20	0.31	0.91	<25	<100	<200	<200	<5.0	<0.50
27-Oct-15	<0.20	<0.20	0.94	1.1	<25	<100	<200	<200	<5.0	<0.50
27-Oct-15 (DUP)	<0.20	<0.20	0.24	<0.40	<25	<100	<200	<200	<5.0	<0.50
10-Aug-16	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
20-Jun-17	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
15-Aug-18	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<2.5
31-Jul-19	<0.20	<0.20	1.3	<0.40	<25	<100	460	1,400[b]	na	<0.50
29-Jul-20	<0.20	<0.20	<0.20	<0.40	<25	<100	1,100	820	na	<0.50

TH101 — Screen Interval: 3.0 to 4.9 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
6-Oct-14	85	12	580	500	4,100	830	<200	<200	44	2.9
06-Oct-14 (DUP)	84	12	580	510	4,100	910	<200	<200	54	4.2
28-Oct-15	110	16	740	590	3,400	830	<200	<200	64	4.6
11-Aug-16	49	8.6	580	390	2,200	590	<200	<200	23	0.63
20-Jun-17	76	14	870	410	4,800	1,100	<200	<200	na	0.84
15-Aug-18	110	9.2	1,200	130	5,900	1,700	<200	<200	na	3.8
31-Jul-19	73	7.5	870	130	5,100	1,500	<200	<200	na	3.2
28-Jul-20	86	7.1	1,000	69	5,700	1,400	<200	<200	na	6.6
28-Jul-20 (DUP)	76	6.5	900	61	4,900	1,500	<200	<200	na	6.4

TH102 — Screen Interval: 3.0 to 4.9 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
6-Oct-14	0.72	0.52	16	42	360	360	<200	<200	7.2	3.9
28-Oct-15	42	1.6	100	140	970	350	<200	<200	23	1.5
11-Aug-16	8.3	<0.20	33	21	510	180	<200	<200	18	1.4
20-Jun-17	19	3.1	190	120	1,800	500	<200	<200	na	<0.50
31-Jul-19	4.5	1.5	33	27	500	270	<200	<200	na	2.8
29-Jul-20	0.26	<0.20	0.71	0.55	66	<100	<200	<200	na	0.71

MW15-01 — Screen Interval: 3.0 to 6.0 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
17-Nov-15	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
9-Aug-16	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
22-Jun-17	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
15-Aug-18	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
29-Jul-19	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
27-Jul-20	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50

MW15-02 — Screen Interval: 2.7 to 4.9 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
17-Nov-15	44	5.9	180	170	2,300	750	<200	<200	35	2.2
9-Aug-16	78	4.7	73	25	800	450	<200	<200	5.5	<0.50
22-Jun-17	20	1.0	1.5	2.3	190	110	<200	<200	na	1.1
14-Aug-18	2.0	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
29-Jul-19	1.7	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
27-Jul-20	0.79	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50

MW16-01 — Screen Interval: 3.3 - 4.8 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-16	18	3.8	41	59	250	<100	<200	<200	na	0.53
21-Jun-17	46	3.7	170	79	820	260	<200	<200	na	1.2
16-Aug-18	15	0.39	30	0.81	88	<100	260	<200	na	0.53
30-Jul-19	110	0.57	41	0.79	470	140	<200	<200	na	0.71
28-Jul-20	38	0.63	20	1.3	260	<100	<200	<200	na	<0.50

ONTARIO STANDARDS

PARAMETERS	B	T	E	X	F1	F2	F3	F4	HA	Pb
CRITERIA[a]	430	18,000	2,300	4,200	750[c]	150	500	500	520	25
RDL	0.20	0.20	0.20	0.40	100	100	200	200	10	0.50
UNITS	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L

(a) O.REG 153 (MOECC 2011) TABLE 3 FULL DEPTH GENERIC SITE CONDITION STANDARDS FOR ALL TYPES OF PROPERTY USE FOR GROUNDWATER IN MEDIUM AND FINE TEXTURED SOIL IN A NON-POTABLE GROUNDWATER CONDITION.

(b) BASELINE WAS NOT REACHED AT CARBON 50. VALUE PRESENTED CORRESPONDS TO THE GREATER OF THE F4 AND F4G VALUES.

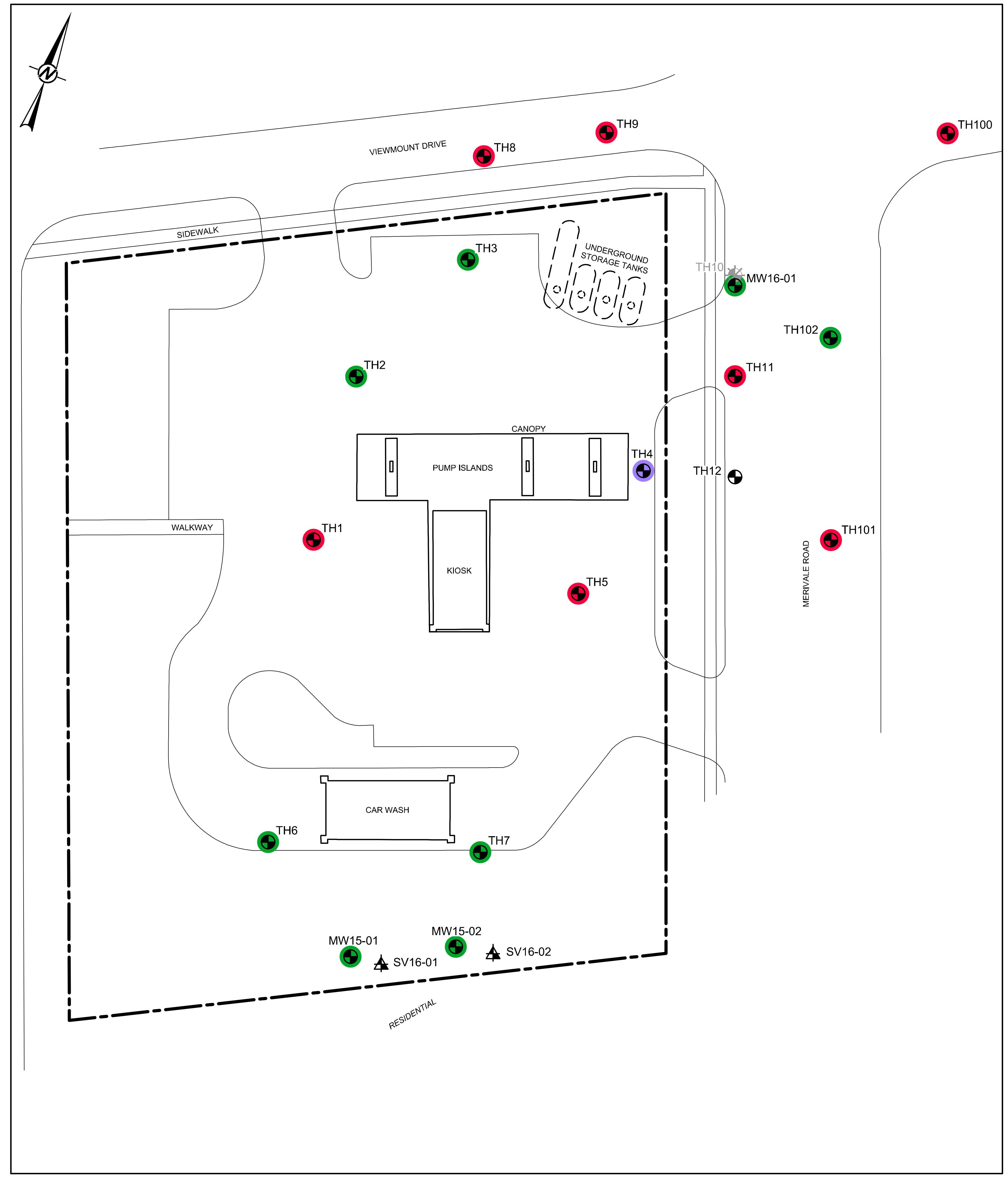
(c) F1 FRACTION DOES NOT INCLUDE BTEX; HOWEVER, THE PROPONENT HAS THE CHOICE AS TO WHETHER OR NOT TO SUBTRACT BTEX FROM THE ANALYTICAL RESULT.

LEGEND

- PROPERTY BOUNDARY
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL (DECOMMISSIONED)
- SOIL VAPOUR PROBE LOCATION

LIST OF APPLICABLE ABBREVIATIONS

<	LESS THAN
µg/L	MICROGRAMS PER LITRE
B	BENZENE
T	TOLUENE
E	ETHYLBENZENE
X	XYLENES
F1	PETROLEUM HYDROCARBON FRACTION 1 (C_6-C_{10}) LESS BTEX
F2	PETROLEUM HYDROCARBON FRACTION 2 (C_{10}-C_{16})
F3	PETROLEUM HYDROCARBON FRACTION 3 (C_{16}-C_{34})
F4	PETROLEUM HYDROCARBON FRACTION 4 (C_{34}-C_{50})
F4G	PETROLEUM HYDROCARBON 4 GRAVIMETRIC
HA	n-HEXANE
LNAPL	LIGHT NON-AQUEOUS PHASE LIQUID
mbgs	METRES BELOW GROUND SURFACE
MOECC	MINISTRY OF THE ENVIRONMENT AND CLIMATE CHANGE
na	NOT ANALYZED
O.REG	ONTARIO REGULATION
Pb	DISSOLVED LEAD
RDL	REPORTABLE DETECTION LIMIT



NOTES

1. LOCATIONS WHERE CURRENT GROUNDWATER SAMPLE MEETS APPLICABLE GUIDELINES/STANDARDS FOR ALL PARAMETERS ANALYZED SHOWN IN **GREEN.**
2. LOCATIONS WHERE CURRENT GROUNDWATER SAMPLE EXCEEDS APPLICABLE GUIDELINES/STANDARDS FOR AT LEAST ONE OF THE PARAMETERS ANALYZED SHOWN IN **RED.**
3. LOCATIONS WHERE LNAPL WAS ENCOUNTERED SHOWN IN **PURPLE.**
4. EXCEEDANCES OF APPLICABLE GUIDELINES/STANDARDS IN TEXT ARE SHOWN IN **RED.**
5. LIGHT NON-AQUEOUS PHASE LIQUID (LNAPL) THICKNESSES IN TEXT SHOWN IN **PURPLE.**
6. LOCATION WHERE NO SAMPLES WERE TAKEN IN THE CURRENT SAMPLING EVENT SHOWN IN **BLACK**.
7. LNAPL REPORTED IN METRES (m).

REFERENCE

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No.: 11010-SITE PLAN ONSITE-JUN14; SCALE: UNKNOWN; DATE: JUNE 2014.

0 10 20
1:500 METRES

CLIENT
IMPERIAL OIL LIMITED

CONSULTANT
GOLDER

YYYY-MM-DD	2020-12-14
DESIGNED	LMariani
PREPARED	SSun
REVIEWED	CVettorazzo
APPROVED	RMungal

PROJECT
FORMER RETAIL FUEL OUTLET
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
GROUNDWATER ANALYTICAL RESULTS - BTEX, PHC FRACTIONS F1-F4, n-HEXANE AND DISSOLVED LEAD (July 27 to 29, 2020)

PROJECT NO.	PHASE-TASK	REV.	FIGURE
1791706	1155-2016B	0	5

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI C
0 25 mm

Path: \\golder.gds\gal\calgary\CAD\IMPERIAL_OIL\DOWNSTREAM\OTTAWA_ON_1660_MERIVALE_ROAD\99_PROJECTS\1791706\02_PRODUCTION\1155-2016B_2020\ONSITE\DWG\ | File Name: 1791706-1155-HS-0005.dwg | Last Edited By: ssun Date: 2020-12-09 Time:5:46:51 PM | Printed By: SSun Date: 2020-12-16 Time:8:56:42 AM

TH1 — Screen Interval: 2.6 to 5.6 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-11	<0.20	<0.20	<0.20	<0.40	<25	<100	<100	<100	<5.0	<0.50
13-Jun-13	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	0.53
26-Aug-14	<0.20	0.75	<0.20	1.2	<25	<100	<200	<200	<5.0	<0.50
17-Nov-15	<0.20	0.27	0.28	<0.40	<25	<100	<200	<200	<5.0	<0.50
10-Aug-16	<0.20	<0.20	<0.20	<0.40	<25	<100	300	1,200[b]	<5.0	<0.50
5-Dec-16	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
21-Jun-17	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
16-Aug-18	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
30-Jul-19	<0.20	<0.20	<0.20	<0.40	<25	<100	350	1,400[b]	<5.0	<0.50
29-Jul-20	<0.20	<0.20	<0.20	<0.40	<25	400	24,000	160,000[b]	na	1.5

TH2 — Screen Interval: 3.2 to 4.7 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-11	0.77	<0.20	1.3	0.48	<25	<100	<100	<100	<5.0	<0.50
13-Jun-13	0.62	<0.20	2.2	<0.40	<25	<100	<200	<200	<5.0	<0.50
27-Aug-14	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
17-Nov-15	<0.20	0.29	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
17-Nov-15 (DUP)	<0.20	0.28	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
9-Aug-16	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
21-Jun-17	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
15-Aug-18	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
31-Jul-19	<0.20	<0.20	<0.20	<0.40	<25	<100	250	<200	na	<0.50
28-Jul-20	0.44	<0.20	<0.20	3.6	<25	<100	<200	<200	na	<0.50

TH3 — Screen Interval: 3.2 to 4.7 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-11	27	2.4	79	150	1,100	430	<100	130	20	3.8
31-Aug-11 (DUP)	23	2.1	69	130	1,100	380	<100	110	17	3.9
13-Jun-13	11	0.61	66	85	900	350	<200	<200	<5.0	3.1
26-Aug-14	14	0.28	19	5.2	520	180	<200	<200	<5.0	2.2
28-Oct-15	25	<0.20	15	0.89	450	<100	<200	<200	<5.0	2.0
10-Aug-16	42	<0.20	26	1.5	560	110	<200	<200	<5.0	0.98
21-Jun-17	19	0.29	77	20	630	140	<200	<200	na	<0.50
15-Aug-18	7.4	<0.20	7.2	3.3	310	<100	<200	<200	na	0.76
31-Jul-19	18	<0.20	26	2.1	380	120	<200	<200	na	2.2
29-Jul-20	9.8	<0.20	6.4	0.58	310	<100	<200	<200	na	3.7

TH4 — Screen Interval: 3.4 to 4.9 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-11	610	610	3,400	19,000	26,000	17,000	360	170	540	2.6
13-Jun-13	200	35	1200	4,300	6,200	19,000	580	430	<100	5.8
26-Aug-14	500	37	1400	2600	4,700	1,400	<200	<200	58	3.0
26-Aug-14 (DUP)	540	40	1600	2700	400	1,400	<200	<200	62	1.9
17-Nov-15	180	18	560	930	1,900	940	240	230	<100	3.1
10-Aug-16	210	11	550	1,500	1,800	370	<200	<200	31	1.1
10-Aug-16 (DUP)	190	9.7	490	1,400	1,600	400	210	<200	27	1.7
21-Jun-17	210	28	470	1,500	2,000	930	<200	<200	na	0.78
16-Aug-18	400	14	860	3,400	3,100	1,300	250	<200	na	30
16-Aug-18 (DUP)	420	14	890	3,500	2,800	1,200	260	210	na	32
31-Jul-19	36	1.9	41	270	1,500	1,400	280	<200	na	12
27-Jul-20	LNAPL THICKNESS: 0.002 m									

TH5 — Screen Interval: 3.5 to 5.0 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-11	750	140	3,000	13,000	85,000	20,000	690	620	1,400	5.5
13-Jun-13	530	44	1600	3800	9,900	160,000	12,000	6,800	<100	8.3
13-Jun-13 (DUP)	550	44	1600	3800	9,200	110,000	7,000	4,300	<100	8
27-Aug-14	450	46	1600	3100	11,000	2,800	<200	<200	210	4.1
17-Nov-15	360	26	930	1,300	3,300	2,900	320	240	<100	3.7
10-Aug-16	420	43	1,500	3,700	13,000	11,000	1,100	810	240	0.81
21-Jun-17	210	25	690	1,800	4,400	3,600	420	350	na	1.8
21-Jun-17 (DUP)	190	23	640	1,600	4,400	3,200	490	450	na	2.2
16-Aug-18	510	37	1,400	2,600	6,700	3,300	300	<200	na	2.6
31-Jul-19	380	24	910	2,800	5,600	5,400	350	<200	na	8.4
31-Jul-19 (DUP)	380	26	940	2,900	5,700	4,100	290	<200	na	8.3
29-Jul-20	200	12	830	1,400	6,000	8,500	570	<200	na	26
29-Jul-20 (DUP)	200	12	790	1,300	5,900	8,500	470	<200	na	25

TH6 — Screen Interval: 3.6 to 5.1 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
20-Oct-11	<0.20	<0.20	<0.20	<0.40	<25	<100	<100	<100	<5.0	<0.50
20-Oct-11 (DUP)	<0.20	<0.20	<0.20	<0.40	<25	<100	<100	<100	<5.0	<0.50
13-Jun-13	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	0.6
27-Aug-14	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
28-Oct-15	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
28-Oct-15 (DUP)	<0.20	0.38	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
9-Aug-16	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
22-Jun-17	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
14-Aug-18	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
29-Jul-19	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
27-Jul-20	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50

TH7 — Screen Interval: 4.4 to 5.8 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
14-Nov-11	31	5.4	160	340	430	<100	<100	<100	<30	<0.5
13-Jun-13	37	2.8	140	130	550	460	<200	<200	<5.0	3.2
27-Aug-14	150	18	610	730	1,900	540	<200	<200	22	2.1
28-Oct-15	93	8.4	270	300	1,000	280	<200	<200	<5.0	1.2
9-Aug-16	62	5.8	120	140	500	150	<200	<200	<5.0	<0.50
22-Jun-17	93	8.7	240	190	800	190	<200	<200	na	0.54
14-Aug-18	22	0.53	8.8	0.60	68	<100	<200	<200	na	<0.50
29-Jul-19	46	1.4	43	2.5	400	110	<200	<200	na	<0.50
27-Jul-20	27	1.3	35	3.1	270	<100	<200	<200	na	<0.50

TH8 — Screen Interval: 3.3 to 4.9 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
13-Jun-13	3.9	<0.20	4.1	0.61	48	<100	<200	<200	<0.5	1.1
27-Oct-15	4.4	<0.20	0.51	0.41	<25	<100	<200	<200	<5.0	0.82
10-Aug-16	3.0	<0.20	0.66	<0.40	70	<100	<200	<200	<5.0	0.77
15-Aug-18	0.99	<0.20	0.80	<0.40	<25	<100	<200	<200	na	<2.5
15-Aug-18 (DUP)	1.0	<0.20	0.78	<0.40	<25	<100	<200	<200	na	<2.5
30-Jul-19	3.7	<0.20	1.0	<0.40	220	<100	440	1,500[b]	na	1.2
28-Jul-20	4.5	<0.20	5.4	0.75	170	130	780	500	na	1.2
14-Oct-20	0.96	<0.20	1.2	<0.40	29	<100	<200	<200	na	0.61

TH9 — Screen Interval: 3.4 to 4.9 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
6-Oct-14	31	3	230	290	1,000	570	610	420	15	1.1
27-Oct-15	51	7.2	390	350	2,500	1,100	220	360	35	2.6
10-Aug-16	23	1.8	250	70	1,600	350	<200	<200	11	1.1
20-Jun-17	36	5.5	460	370	4,200	1,200	<200	<200	na	2.3
15-Aug-18	12	0.69	78	49	740	190	350	1,600[b]	na	<0.50
30-Jul-19	0.81	<0.20	2.5	0.47	50	<100	540	1,900[b]	na	<0.50
30-Jul-19 (DUP)	0.84	<0.20	2.6	0.51	63	<100	1,200	3,000[b]	na	<0.50
28-Jul-20	4.4	<0.20	7.8	<0.40	51	<100	700	520	na	<0.50
14-Oct-20	54	6.3	420	210	1,500	480	<200	<200	na	<0.50

TH10 — Screen Interval: 3.3 to 4.9 mbgs

Date	B	T	E	X	F1	F2	F3	F4	H	Pb
11-Jun-13	73	58	52	200	1,400	560	<200	<200	35	1.2

TH11 — Screen Interval: 3.3 to 4.9 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
11-Jun-13	370	34	2,200	3,400	11,000	1,400	<200	<200	130	2.6
28-Oct-15	96	8.1	710	120	4,400	2,500	1,300	820	72	4.6
11-Aug-16	100	6.3	590	160	5,000	6,700	2,200	1,300	37	6.0
11-Aug-16 (DUP)	110	7.1	610	170	4,900	7,100	2,400	1,400	43	3.3
28-Jul-20	5.9	0.36	8.8	3.4	490	12,000	36,000	150,000[b]	na	<0.50
14-Oct-20	170	19	820	640	3,300	1,000	300	<200	na	<0.50

TH12 — Screen Interval: 3.3 to 4.9 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
11-Jun-13	380	35	2,300	3,500	11,000	3,100	<200	<200	<100	6.8
11-Jun-13 (DUP)	360	34	2,300	3,500	11,000	2,800	<200	<200	<100	6.9
28-Oct-15	95	14	620	400	4,500	1,600	540	320	140	4.5
11-Aug-16	130	17	1,100	630	6,800	1,800	900	510	120	2.1
20-Jun-17	160	11	1,200	170	7,900	2,800	750	460	na	3.8
20-Jun-17 (DUP)	150	11	1,200	160	7,300	2,600	700	430	na	4.5
14-Oct-20	37	4.7	240	69	4,100	1,900	270	<200	na	0.90

TH100 — Screen Interval: 3.0 to 4.9 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
6-Oct-14	<0.20	<0.20	0.31	0.91	<25	<100	<200	<200	<5.0	<0.50
27-Oct-15	<0.20	<0.20	0.94	1.1	<25	<100	<200	<200	<5.0	<0.50
27-Oct-15 (DUP)	<0.20	<0.20	0.24	<0.40	<25	<100	<200	<200	<5.0	<0.50
10-Aug-16	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
20-Jun-17	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
15-Aug-18	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<2.5
31-Jul-19	<0.20	<0.20	1.3	<0.40	<25	<100	460	1,400[b]	na	<0.50
29-Jul-20	<0.20	<0.20	<0.20	<0.40	<25	<100	1,100	820	na	<0.50
14-Oct-20	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
14-Oct-20 (DUP)	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50

TH101 — Screen Interval: 3.0 to 4.9 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
6-Oct-14	85	12	580	500	4,100	830	<200	<200	44	2.9
06-Oct-14 (DUP)	84	12	580	510	4,100	910	<200	<200	54	4.2
28-Oct-15	110	16	740	590	3,400	830	<200	<200	64	4.6
11-Aug-16	49	8.6	580	390	2,200	590	<200	<200	23	0.63
20-Jun-17	76	14	870	410	4,800	1,100	<200	<200	na	0.84
15-Aug-18	110	9.2	1,200	130	5,900	1,700	<200	<200	na	3.8
31-Jul-19	73	7.5	870	130	5,100	1,500	<200	<200	na	3.2
28-Jul-20	86	7.1	1,000	69	5,700	1,400	<200	<200	na	6.6
28-Jul-20 (DUP)	76	6.5	900	61	4,900	1,500	<200	<200	na	6.4

TH102 — Screen Interval: 3.0 to 4.9 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
6-Oct-14	0.72	0.52	16	42	360	360	<200	<200	7.2	3.9
28-Oct-15	42	1.6	100	140	970	350	<200	<200	23	1.5
11-Aug-16	8.3	<0.20	33	21	510	180	<200	<200	18	1.4
20-Jun-17	19	3.1	190	120	1,800	500	<200	<200	na	<0.50
31-Jul-19	4.5	1.5	33	27	500	270	<200	<200	na	2.8
29-Jul-20	0.26	<0.20	0.71	0.55	66	<100	<200	<200	na	0.71

MW15-01 — Screen Interval: 3.0 to 6.0 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
17-Nov-15	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
9-Aug-16	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
22-Jun-17	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
15-Aug-18	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
29-Jul-19	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
27-Jul-20	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50

MW15-02 — Screen Interval: 2.7 to 4.9 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
17-Nov-15	44	5.9	180	170	2,300	750	<200	<200	35	2.2
9-Aug-16	78	4.7	73	25	800	450	<200	<200	5.5	<0.50
22-Jun-17	20	1.0	1.5	2.3	190	110	<200	<200	na	1.1
14-Aug-18	2.0	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
29-Jul-19	1.7	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
27-Jul-20	0.79	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50

MW16-01 — Screen Interval: 3.3 - 4.8 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-16	18	3.8	41	59	250	<100	<200	<200	na	0.53
21-Jun-17	46	3.7	170	79	820	260	<200	<200	na	1.2
16-Aug-18	15	0.39	30	0.81	88	<100	260	<200	na	0.53
30-Jul-19	110	0.57	41	0.79	470	140	<200	<200	na	0.71
28-Jul-20	38	0.63	20	1.3	260	<100	<200	<200	na	<0.50

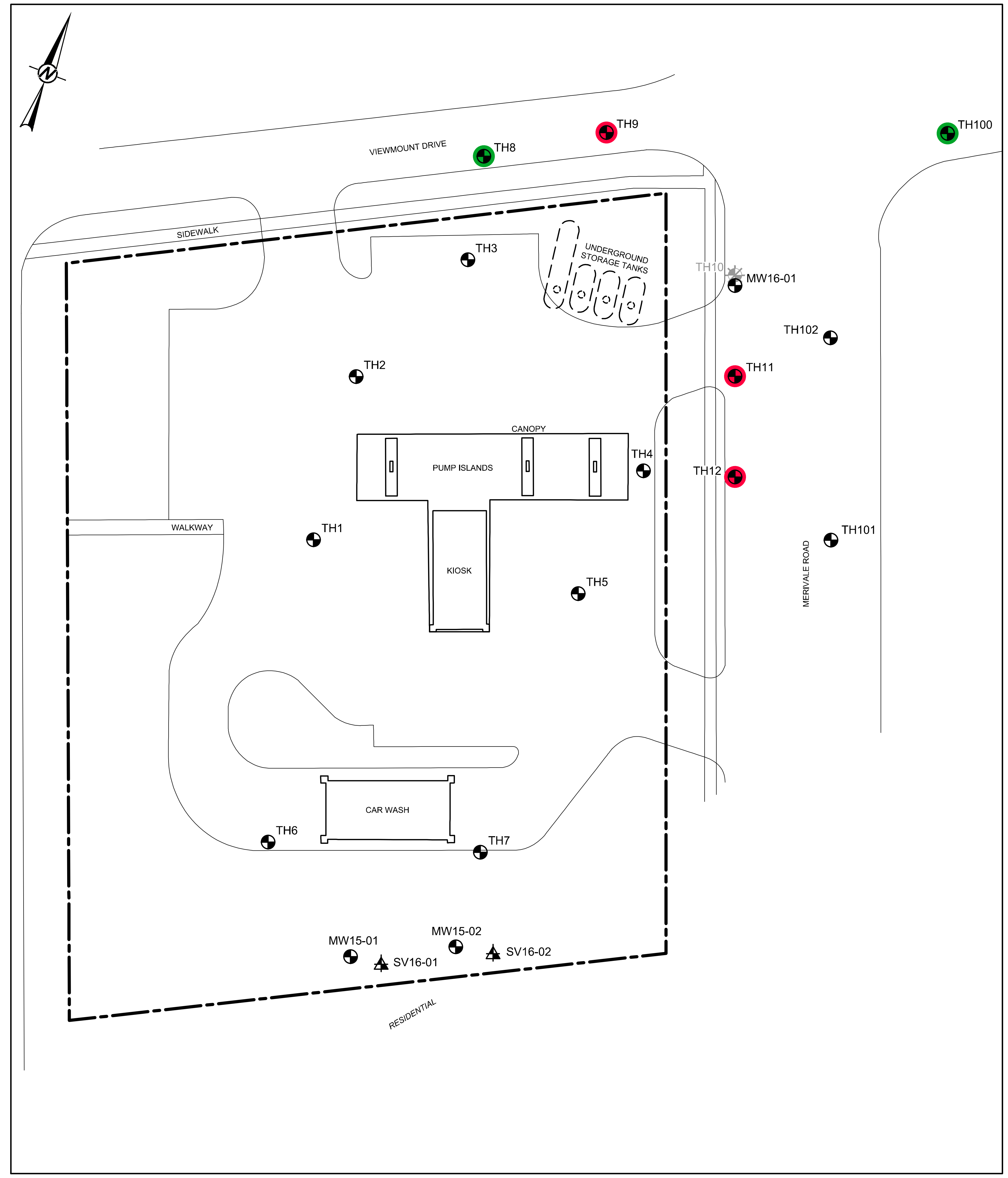
ONTARIO STANDARDS

PARAMETERS	B	T	E	X	F1	F2	F3	F4	HA	Pb
CRITERIA[a]	430	18,000	2,300	4,200	750[c]	150	500	500	520	25
RDL	0.20	0.20	0.20	0.40	100	100	200	200	10	0.50
UNITS	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L

(a) O.REG 153 (MOECC 2011) TABLE 3 FULL DEPTH GENERIC SITE CONDITION STANDARDS FOR ALL TYPES OF PROPERTY USE FOR GROUNDWATER IN MEDIUM AND FINE TEXTURED SOIL IN A NON-POTABLE GROUNDWATER CONDITION.

(b) BASELINE WAS NOT REACHED AT CARBON 50. VALUE PRESENTED CORRESPONDS TO THE GREATER OF THE F4 AND F4G VALUES.

(c) F1 FRACTION DOES NOT INCLUDE BTEX; HOWEVER, THE PROPONENT HAS THE CHOICE AS TO WHETHER OR NOT TO SUBTRACT BTEX FROM THE ANALYTICAL RESULT.



LEGEND

- PROPERTY BOUNDARY
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL (DECOMMISSIONED)
- SOIL VAPOUR PROBE LOCATION

NOTES

1. LOCATIONS WHERE CURRENT GROUNDWATER SAMPLE MEETS APPLICABLE GUIDELINES/STANDARDS FOR ALL PARAMETERS ANALYZED SHOWN IN **GREEN.**
2. LOCATIONS WHERE CURRENT GROUNDWATER SAMPLE EXCEEDS APPLICABLE GUIDELINES/STANDARDS FOR AT LEAST ONE OF THE PARAMETERS ANALYZED SHOWN IN **RED.**
3. LOCATIONS WHERE LNAPL WAS ENCOUNTERED SHOWN IN **PURPLE.**
4. EXCEEDANCES OF APPLICABLE GUIDELINES/STANDARDS IN TEXT ARE SHOWN IN **RED.**
5. LIGHT NON-AQUEOUS PHASE LIQUID (LNAPL) THICKNESSES IN TEXT SHOWN IN **PURPLE.**
6. LOCATION WHERE NO SAMPLES WERE TAKEN IN THE CURRENT SAMPLING EVENT SHOWN IN **BLACK**.
7. LNAPL REPORTED IN METRES (m).

LIST OF APPLICABLE ABBREVIATIONS

<	LESS THAN
µg/L	MICROGRAMS PER LITRE
B	BENZENE
T	TOLUENE
E	ETHYLBENZENE
X	XYLENES
F1	PETROLEUM HYDROCARBON FRACTION 1 (C_6-C_{10}) LESS BTEX
F2	PETROLEUM HYDROCARBON FRACTION 2 (C_{10}-C_{16})
F3	PETROLEUM HYDROCARBON FRACTION 3 (C_{16}-C_{34})
F4	PETROLEUM HYDROCARBON FRACTION 4 (C_{34}-C_{50})
F4G	PETROLEUM HYDROCARBON 4 GRAVIMETRIC
HA	n-HEXANE
LNAPL	LIGHT NON-AQUEOUS PHASE LIQUID
mbgs	METRES BELOW GROUND SURFACE
MOECC	MINISTRY OF THE ENVIRONMENT AND CLIMATE CHANGE
na	NOT ANALYZED
O.REG	ONTARIO REGULATION
Pb	DISSOLVED LEAD
RDL	REPORTABLE DETECTION LIMIT

REFERENCE

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No.: 11010-SITE PLAN ONSITE-JUN14; SCALE: UNKNOWN; DATE: JUNE 2014.

0 10 20
1:500 METRES

CLIENT
IMPERIAL OIL LIMITED

CONSULTANT
GOLDER

YYYY-MM-DD	2020-12-14
DESIGNED	LMariani
PREPARED	SSun
REVIEWED	CVettorazzo
APPROVED	RMungal

PROJECT
FORMER RETAIL FUEL OUTLET
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
GROUNDWATER ANALYTICAL RESULTS - BTEX, PHC FRACTIONS F1-F4, n-HEXANE AND DISSOLVED LEAD (October 14, 2020)

PROJECT NO.	PHASE-TASK	REV.	FIGURE
1791706	1155-2016B	0	6

25 mm IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI C

Path: \\golder.gds\gal\calgary\CAD\IMPERIAL_OIL\DOWNSTREAM\OTTAWA_ON_1660_MERIVALE_ROAD\99_PROJECTS\1791706\02_PRODUCTION\1155-2016B_2020\ONSITE\DWG\ | File Name: 1791706-1155-HS-0006.dwg | Last Edited By: ssun Date: 2020-12-03 Time:3:11:49 PM | Printed By: SSun Date: 2020-12-16 Time:8:56:21 AM

LEGEND

- PROPERTY BOUNDARY
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL (DECOMMISSIONED)
- SOIL VAPOUR PROBE LOCATION

LIST OF APPLICABLE ABBREVIATIONS

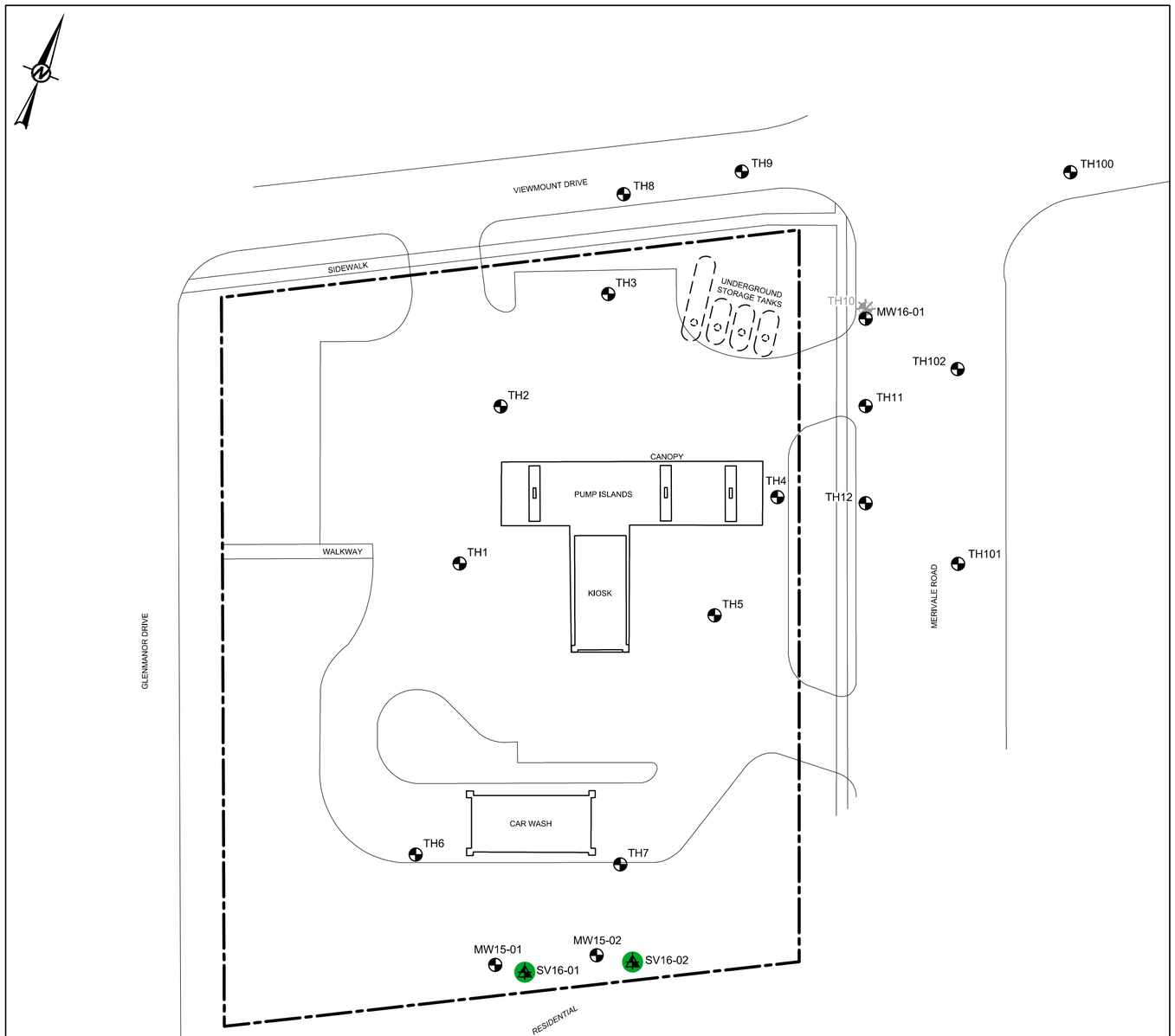
>	GREATER THAN	B	BENZENE
<	LESS THAN	T	TOLUENE
µg/m³	MICROGRAMS PER METRE CUBE	E	ETHYLBENZENE
Ali >C_{10}-C_{12}	ALIPHATICS >C_{10}-C_{12}	X	XYLENES
Ali >C_{12}-C_{16}	ALIPHATICS >C_{12}-C_{16}	F1	PETROLEUM HYDROCARBON FRACTION 1 (C_6-C_{10}) LESS BTEX
Ali >C_6-C_8	ALIPHATICS >C_6-C_8	F2	PETROLEUM HYDROCARBON FRACTION 2 (C/10-C/16)
Ali >C_8-C_8	ALIPHATICS >C_8-C_8	m	METRE
Ali >C_8-C_{10}	ALIPHATICS >C_8-C_{10}	mbgs	METRES BELOW GROUND SURFACE
Aro >C_{10}-C_{12}	AROMATIC >C_{10}-C_{12}	n/s	NO STANDARD
Aro >C_{12}-C_{16}	AROMATIC >C_{12}-C_{16}	na	NOT ANALYZED
Aro >C_7-C_8	AROMATIC >C_7-C_8	RDL	REPORTABLE DETECTION LIMIT
Aro >C_8-C_{10}	AROMATIC >C_8-C_{10}	SVSL	SOIL VAPOUR SCREENING LEVELS

NOTES

1. LOCATIONS WHERE CURRENT SOIL VAPOUR SAMPLE MEETS APPLICABLE GUIDELINES/STANDARDS FOR ALL PARAMETERS ANALYZED SHOWN IN **GREEN**.
2. LOCATIONS WHERE CURRENT SOIL VAPOUR SAMPLE EXCEEDS APPLICABLE GUIDELINES/STANDARDS FOR AT LEAST ONE OF THE PARAMETERS ANALYZED SHOWN IN **RED**.
3. EXCEEDANCES OF APPLICABLE GUIDELINES/STANDARDS IN TEXT ARE SHOWN IN **RED.**

REFERENCE

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No.: 11010-SITE PLAN ONSITE-JUN14; SCALE: UNKNOWN; DATE: JUNE 2014.



SV16-01 — **Screen Interval: 1.35 - 1.50 mbgs**

Date	B	T	E	X	F1	F2	Ali >C_6-C_8	Ali >C_8-C_8	Ali >C_8-C_{10}	Ali >C_{10}-C_{12}	Ali >C_{12}-C_{16}	Aro >C_7-C_8	Aro >C_8-C_{10}	Aro >C_{10}-C_{12}	Aro >C_{12}-C_{16}
13-Dec-16	2.13	11.3	4.30	15.4	449	862	na	na	na	na	na	na	na	na	na
21-Jul-17	<0.32	3.93	4.56	21.7	424	6,090	na	na	na	na	na	na	na	na	na
21-Jul-17 (DUP)	<0.32	5.28	4.43	21.1	389	5,610	na	na	na	na	na	na	na	na	na
21-Nov-17	<0.32	1.28	1.41	5.2	145	501	na	na	na	na	na	na	na	na	na
03-Jul-18	<0.32	1.59	1.92	7.6	715	2,880	na	na	na	na	na	na	na	na	na
03-Jul-18 (DUP)	<0.32	1.71	2.35	9.4	832	3,400	na	na	na	na	na	na	na	na	na
30-Oct-18	<0.32	1.31	1.45	4.6	224	1,220	<5.0	<5.0	61.7	666	9.4	<5.0	<5.0	<5.0	<5.0
30-Oct-18 (DUP)	<0.32	1.33	1.27	4.1	188	1,040	<5.0	<5.0	52.6	551	13.9	<5.0	<5.0	<5.0	<5.0
21-Jun-19	<0.32	1.56	1.63	6.3	243	1,470	na	na	na	na	na	na	na	na	na
21-Jun-19 (DUP)	<0.32	0.52	<0.43	<0.30	165	360	na	na	na	na	na	na	na	na	na
12-Nov-19	<0.32	0.83	1.10	3.7	148	233	na	na	na	na	na	na	na	na	na
12-Nov-19 (DUP)	<0.32	0.65	<0.43	<1.3	110	166	na	na	na	na	na	na	na	na	na
28-Feb-20	<0.32	<0.38	0.47	1.8	102	227	na	na	na	na	na	na	na	na	na
28-Feb-20 (DUP)	<0.32	0.49	<0.43	1.7	134	197	na	na	na	na	na	na	na	na	na
31-Aug-20	<0.32	0.73	0.72	3.0	285	761	na	na	na	na	na	na	na	na	na
31-Aug-20 (DUP)	<0.32	0.65	0.80	3.1	217	760	na	na	na	na	na	na	na	na	na

SV16-02 — **Screen Interval: 1.45 - 1.6 mbgs**

Date	B	T	E	X	F1	F2	Ali >C_6-C_8	Ali >C_8-C_8	Ali >C_8-C_{10}	Ali >C_{10}-C_{12}	Ali >C_{12}-C_{16}	Aro >C_7-C_8	Aro >C_8-C_{10}	Aro >C_{10}-C_{12}	Aro >C_{12}-C_{16}
13-Dec-16	1.38	8.57	2.75	9.6	439	563	na	na	na	na	na	na	na	na	na
13-Dec-16 (DUP)	1.45	8.70	2.76	10.1	448	559	na	na	na	na	na	na	na	na	na
21-Jul-17	<0.32	2.14	2.33	10.1	157	2,310	na	na	na	na	na	na	na	na	na
21-Nov-17	<0.32	0.68	0.67	2.5	98.3	281	na	na	na	na	na	na	na	na	na
21-Nov-17 (DUP)	<0.32	0.58	0.69	2.5	64.6	292	na	na	na	na	na	na	na	na	na
03-Jul-18	0.38	1.54	0.59	2.1	689	678	na	na	na	na	na	na	na	na	na
30-Oct-18	<0.32	<0.38	<0.43	<1.3	36.4	400	<5.0	<5.0	16.6	229	9.3	<5.0	<5.0	<5.0	<5.0
21-Jun-19	<0.32	0.39	<0.43	<1.3	70.6	331	na	na	na	na	na	na	na	na	na
12-Nov-19	<0.32	1.30	<0.43	<1.3	113	131	na	na	na	na	na	na	na	na	na
28-Feb-20	<0.32	<0.38	<0.43	<1.3	98.0	118	na	na	na	na	na	na	na	na	na
31-Aug-20	<0.32	0.42	<0.43	<1.3	95.9	353	na	na	na	na	na	na	na	na	na

ONTARIO STANDARDS

PARAMETERS	B	T	E	X	F1	F2	Ali >C_6-C_8	Ali >C_8-C_8	Ali >C_8-C_{10}	Ali >C_{10}-C_{12}	Ali >C_{12}-C_{16}	Aro >C_7-C_8	Aro >C_8-C_{10}	Aro >C_{10}-C_{12}	Aro >C_{12}-C_{16}
Health-Based Indoor Air Criteria[a]	0.51	1,043	209	146	2,491	471	n/s	9,594	521	521	521	n/s	104	104	104
SVSL[b]	25	52,143	10,429	7,300	124,530	23,530	n/s	479,714	26,071	26,071	26,071	n/s	5,214	5,214	5,214
RDL	0.32	0.38	0.43	1.3	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
UNITS	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m3	µg/m³

(a) HEALTH-BASED INDOOR AIR CRITERIA PROVIDED BY MOECC MODIFIED GENERIC RISK ASSESSMENT (TIER 2) SPREADSHEET MODEL (NOVEMBER 1, 2016).

(b) SOIL VAPOUR SCREENING LEVELS (SVSL) FOR A RESIDENTIAL BUILDING WITH BASEMENT (PROBE DEPTH 0 - 0.30 m bELOW BASE OF THE BUILDING FOUNDATION) CALCULATED BY DIVIDING HEALTH-BASED INDOOR AIR CRITERIA BY AN ATTENUATION FACTOR OF 0.02.

(c) RDL GREATER THAN SVSL.

0 10 20
1:500 METRES

CLIENT
IMPERIAL OIL LIMITED

CONSULTANT
GOLDER

YYYY-MM-DD	2020-12-14
DESIGNED	LMariani
PREPARED	SLebedeff
REVIEWED	CVettorazzo
APPROVED	RMungal

PROJECT
FORMER RETAIL FUEL OUTLET
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
SOIL VAPOUR ANALYTICAL RESULTS - PETROLEUM HYDROCARBONS

PROJECT NO.	PHASE-TASK	REV.	FIGURE
1791706	1155-2016B	0	7

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI C
25 mm
0

Path: \\golder.gds\gal\calgary\CAL\MCAD\IMPERIAL_OIL\DOWNSTREAM\OTTAWA_ON_1660_MERIVALE_ROAD\99_PROJECTS\1791706\02_PRODUCTION\1155-2016B_2020\ONSITE\DWG\ | File Name: 1791706-1155-HS-0007.dwg | Last Edited By: ssun Date: 2020-12-02 Time:9:54:06 PM | Printed By: SSun Date: 2020-12-16 Time:8:56:01 AM

LEGEND

PROPERTY BOUNDARY

BOREHOLE LOCATION COMPLETED AS A MONITORING WELL

BOREHOLE LOCATION COMPLETED AS A MONITORING WELL (DECOMMISSIONED)

SOIL VAPOUR PROBE LOCATION

LIST OF APPLICABLE ABBREVIATIONS

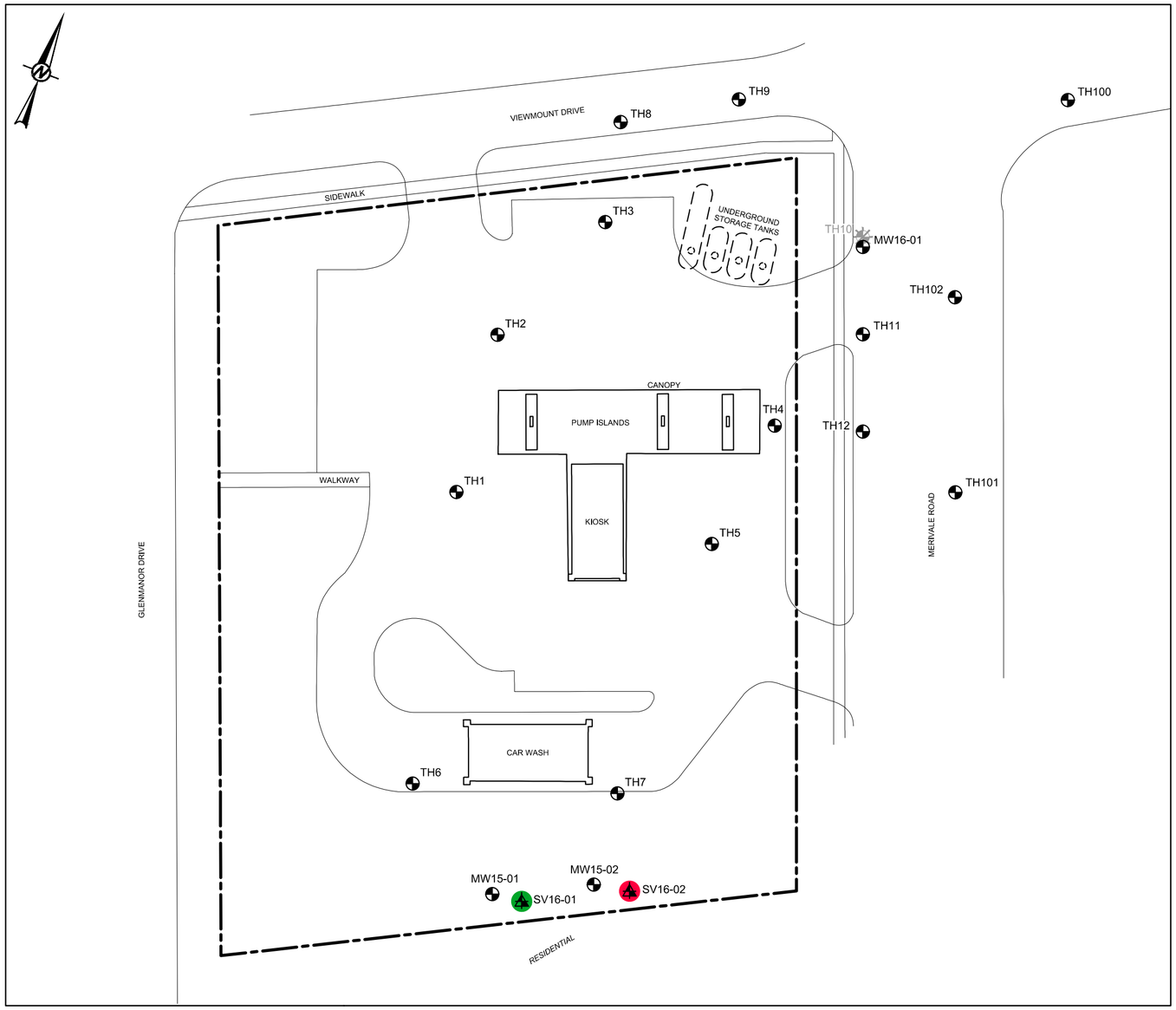
<	LESS THAN	DBCM	DIBROMOCHLOROMETHANE
µg/m³	MICROGRAMS PER METRE CUBE	DCDFMA	DICHLORODIFLUOROMETHANE
1,1,1,2-PCA	1,1,1,2-TETRACHLOROETHANE	DCM	DICHLOROMETHANE
1,1,1-TCA	1,1,1-TRICHLOROETHANE	EAC	ETHYL ACETATE
1,1,2,2-PCA	1,1,2,2-TETRACHLOROETHANE	ETOH	ETHANOL
1,1,2-TCA	1,1,2-TRICHLOROETHANE	F113	TRICHLOROTRIFLUOROETHANE (FREON 113)
1,1-DCA	1,1-DICHLOROETHANE	HA	n-HEXANE
1,1-DCE	1,1-DICHLOROETHENE	HPA	HEPTANE OR n-HELPTANE
1,2,4-TCB	1,2,4-TRICHLOROBENZENE	HXCBDE	HEXACHLOROBUTADIENE
1,2,4-TMB	1,2,4-TRIMETHYLBENZENE	IPA	ISOPROPANOL OR 2-PROPANOL
1,2-DBA	1,2-DIBROMOETHANE OR ETHYLENE DIBROMIDE	mbgs	METRES BELOW GROUND SURFACE
1,2-DCA	1,2-DICHLOROETHANE	MBK	METHYL BUTYL KETONE (2-HEXANONE)
1,2-DCB	1,2-DICHLOROBENZENE	MCB	CHLOROBENZENE
1,2-DCPA	1,2-DICHLOROPROPANE	MEK	METHYL ETHYL KETONE (2-BUTANONE)
1,2-DCTFA	1,2-DICHLOROTETRAFLUOROETHANE	MIBK	4-METHYL-2-PENTANONE OR METHYL ISOBUTYL KETONE
1,3,5-TMB	1,3,5-TRIMETHYLBENZENE	MTBE	METHYL TERTIARY BUTYL ETHER
1,3-BDE	1,3-BUTADIENE	n/s	NO STANDARD
1,3-DCB	1,3-DICHLOROBENZENE	na	NOT ANALYZED
1,4-DCB	1,4-DICHLOROBENZENE	NPT	NAPHTHALENE
1,4-DOX	1,4-DIOXANE	PCE	TETRACHLOROETHENE
2,2,4-TMP	2,2,4-TRIMETHYLPENTANE	PE	PROPENE OR PROPYLENE
4-ETT	4-ETHYLTOLUENE	RDL	REPORTABLE DETECTION LIMIT
ACTN	ACETONE	ST	STYRENE
BDCMA	BROMODICHLOROMETHANE	SVSL	SOIL VAPOUR SCREENING LEVELS
BF	BROMOFORM	t-1,2-DCE	TRANS-1,2-DICHLOROETHENE
BMA	BROMOMETHANE	t-1,3-DCPE	TRANS-1,3-DICHLOROPROPENE
BZLC	BENZYL CHLORIDE	TCE	TRICHLOROETHENE
c-1,2-DCE	CIS-1,2-DICHLOROETHENE	TCFMA	TRICHLOROFLUOROMETHANE
c-1,3-DCPE	CIS-1,3-DICHLOROPROPENE	TCM	CHLOROFORM
CA	CHLOROETHANE	THF	TETRAHYDROFURAN
CDS	CARBON DISULFIDE	VAC	VINYL ACETATE
CMA	CHLOROMETHANE	VBr	VINYL BROMIDE
CT	CARBON TETRACHLORIDE	VC	VINYL CHLORIDE
CYHA	CYCLOHEXANE		

NOTES

1. LOCATIONS WHERE CURRENT SOIL VAPOUR SAMPLE MEETS APPLICABLE GUIDELINES/STANDARDS FOR ALL PARAMETERS ANALYZED SHOWN IN **GREEN**.
2. LOCATIONS WHERE CURRENT SOIL VAPOUR SAMPLE EXCEEDS APPLICABLE GUIDELINES/STANDARDS FOR AT LEAST ONE OF THE PARAMETERS ANALYZED SHOWN IN **RED**.
3. EXCEEDANCES OF APPLICABLE GUIDELINES/STANDARDS IN TEXT ARE SHOWN IN **RED.**

REFERENCE

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No.: 11010-SITE PLAN ONSITE-JUN14; SCALE: UNKNOWN; DATE: JUNE 2014.



SV16-01 — Screen Interval: 1.35 - 1.50 mbgs

Date	ACTN	BZLC	BDCMA	BF	BMA	1,3-BDE	CDS	CT	MCB	CA	TCM	CMA	CYHA	DBCM	1,2-DBA	1,2-DCB	1,3-DCB	1,4-DCB	DCDFMA	1,1-DCA	1,2-DCA	1,1-DCE	c-1,2-DCE	t-1,2-DCE	1,2-DCPA	c-1,3-DCPE	t-1,3-DCPE	1,2-DCTFA	1,4-DOX	ETOH	EAC	4-ETT	HPA	HXCBDE	HA	MBK	MEK	MIBK	MTBE	DCM	NPT	IPA	PE	ST	1,1,1,2-PCA	1,1,2,2-PCA	PCE	THF	1,2,4-TCB	1,2,4-TMB	1,1,1-TCA	1,1,2-TCA	TCE	TCFMA	F113	1,3,5-TMB	2,2,4-TMP	VAC	VBr	VC
13-Dec-16	29.3	<2.6	<1.3	<2.1	<0.39	<1.1	61.2	0.72	<0.46	<0.79	8.72	<0.62	0.86	<1.7	<0.77	<0.60	<2.4	<0.60	4.93	<0.40	<0.40	<0.40	0.97	47.5	<0.46	<0.45	<0.45	<1.2	<3.6	<1.9	<3.6	<2.5	3.7	<5.3[b]	15.9	<4.1	11.7	<4.1	<0.72	<2.8	na	3.3	<19	<0.43	<0.69	<0.69	5.98	5.5	<3.7	3.1	<0.55	<0.55	<0.54	2.5	1.5	<2.5	1.72	1.42	<0.87	<0.26
21-Jul-17	76.5	<2.6	<1.3	<2.1	<0.39	<1.1	26.8	<0.63	<0.46	<0.79	2.95	<0.62	<0.69	<1.7	<0.77	<0.60	4.6	1.31	12.9	<0.40	<0.40	<0.40	<0.40	1.33	<0.46	<0.45	<0.45	<1.2	<3.6	2.2	<3.6	2.8	<1.2	<5.3[b]	2.4	<4.1	4.0	<4.1	<0.72	3.2	na	<2.5	<2.6	<0.43	<0.69	<0.69	7.03	<1.2	<3.7	11.4	<0.55	<0.55	1.09	2.7	<1.2	3.5	<0.93	<0.70	<0.87	<0.26
21-Jul-17 (DUP)	78.5	<2.6	<1.3	<2.1	<0.39	<1.1	26.3	<0.63	<0.46	<0.79	2.78	<0.62	<0.69	<1.7	<0.77	<0.60	2.8	1.20	13.5	<0.40	<0.40	<0.40	<0.40	1.34	<0.46	<0.45	<0.45	<1.2	<3.6	2.3	<3.6	2.8	<1.6	<5.3[b]	2.0	<4.1	3.8	<4.1	<0.72	3.6	na	8.3	<1.7	<0.43	<0.69	<0.69	7.21	<1.2	<3.7	12.1	<0.55	<0.55	<0.54	2.7	<1.2	3.6	<0.93	<0.70	<0.87	<0.26
21-Nov-17	2.9	<2.6	<1.3	<2.1	<0.39	<1.1	3.8	<0.63	<0.46	<0.79	1.68	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	6.05	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	<1.9	<3.6	<2.5	<1.2	<5.3[b]	<1.1	<4.1	<2.9	<4.1	<0.72	<2.8	na	<2.5	<0.86	<0.43	<0.69	<0.69	66.1	<1.2	<3.7	<2.5	<0.55	<0.55	<0.54	1.3	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
3-Jul-18	89.5	<2.6	<1.3	<2.1	<0.39	<1.1	27.0	<0.63	<0.46	<0.79	0.74	<0.62	1.90	<1.7	<0.77	<0.60	<2.4	0.67	8.19	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	6.7	<3.6	<2.5	2.7	<5.3[b]	9.1	<4.1	7.6	<4.1	<0.72	<2.8	na	<2.5	0.95	<0.43	<0.69	<0.69	3.98	<1.2	<3.7	6.3	<0.55	<0.55	<0.54	1.6	<1.2	<2.5	2.26	<0.70	<0.87	<0.26
3-Jul-18 (DUP)	103	<2.6	<1.3	<2.1	<0.39	<1.1	41.6	<0.63	<0.46	<0.79	0.93	<0.62	2.44	<1.7	<0.77	<0.60	<2.4	0.83	9.31	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	6.9	<3.6	<2.5	4.7	<5.3[b]	10.4	<4.1	9.0	<4.1	<0.72	<2.8	na	<2.5	1.27	<0.43	<0.69	<0.69	4.90	<1.2	<3.7	7.7	<0.55	<0.55	<0.54	1.7	<1.2	<2.5	2.32	<0.70	<0.87	<0.26
30-Oct-18	7.5	<2.6	<1.3	<2.1	<0.39	<1.1	2.0	<0.63	<0.46	<0.79	182	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	4.85	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	5.4	<3.6	<2.5	<1.2	<5.3[b]	<1.1	<4.1	<2.9	<4.1	<0.72	<2.8	na	<2.5	<0.86	<0.43	<0.69	<0.69	3.07	<1.2	<3.7	<2.5	<0.55	<0.55	<0.54	1.2	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
30-Oct-18 (DUP)	7.8	<2.6	<1.3	<2.1	<0.39	<1.1	1.8	<0.63	<0.46	<0.79	159	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	4.54	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	2.5	<3.6	<2.5	<1.2	<5.3[b]	1.2	<4.1	<2.9	<4.1	<0.72	<2.8	na	<2.5	<0.86	<0.43	<0.69	<0.69	2.66	<1.2	<3.7	<2.5	<0.55	<0.55	<0.54	1.2	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
21-Jun-19	148	<2.6	<1.3	<2.1	<0.39	<1.1	3.0	<0.63	<0.46	<0.79	76.7	0.68	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	17.2	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	<2.5	<1.2	<5.3	1.22	<4.1[b]	7.82	<0.82	<0.72	<2.1	<0.20	<1.0	na	<2.5	<1.6	<0.43	<0.69	<0.69	9.95	<1.2	<3.7	<2.5	<0.55	<0.55	<0.54	1.6	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
21-Jun-19 (DUP)	155	<2.6	<1.3	<2.1	<0.39	<1.1	<1.6	<0.63	<0.46	<0.79	87.6	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	22.0	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	<2.5	<1.2	<5.3	<0.70	<4.1[b]	4.58	<0.82	<0.72	<2.1	<0.20	<1.0	na	<2.5	<1.6	<0.43	<0.69	<0.69	7.89	<1.2	<3.7	<2.5	<0.55	<0.55	<0.54	2.1	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
12-Nov-19	4.7	<2.6	<1.3	<2.1	<0.39	<1.1	<1.6	<0.63	<0.46	<0.79	52.9	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	6.13	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	2.3	<3.6	<2.5	<1.2	<5.3[b]	<0.70	<4.1	<0.59	<0.82	<0.72	<2.1	na	<2.5	<0.86	<0.43	<0.69	<0.69	3.36	<1.2	<3.7	<2.5	<0.55	<0.55	<0.54	<1.1	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
28-Feb-20	13.4	<2.6	<1.3	<2.1	<0.39	<1.1	<1.6	<0.63	<0.46	<0.79	12.9	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	8.60	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	5.6	<3.6	<2.5	<1.2	<5.3	<0.70	<4.1	1.29	<0.82	<0.72	<2.1	<1.0	<2.5	<0.86	<0.43	<0.69	<0.69	1.80	<1.2	<3.7	<2.5	<0.55	<0.55	<0.54	<1.1	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
28-Feb-20 (DUP)	12.6	<2.6	<1.3	<2.1	<0.39	<1.1	<1.6	<0.63	<0.46	<0.79	12.7	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	7.80	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	3.6	<3.6	<2.5	<1.2	<5.3	0.70	<4.1	1.19	<0.82	<0.72	<2.1	<1.0	<2.5	<0.86	<0.43	<0.69	<0.69	1.60	<1.2	<3.7	<2.5	<0.55	<0.55	<0.54	<1.1	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
31-Aug-20	34.3	<2.6	<1.3	<2.1	<0.39	<1.1	<1.6	<0.63	<0.46	<0.79	44.2	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	0.81	21.1	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	3.7	<3.6	<2.5	<1.2	<5.3	<0.70	<4.1	3.07	<0.82	<0.72	<2.1	<1.0	<2.5	<0.86	<0.43	<0.69	<0.69	7.23	<1.2	<3.7	3.0	<0.55	<0.55	<0.54	2.0	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
31-Aug-20 (DUP)	34.5	<2.6	<1.3	<2.1	<0.39	<1.1	<1.6	<0.63	<0.46	<0.79	44.9	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	0.83	21.1	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	12.7	<3.6	<2.5	<1.2	<5.3	<0.70	<4.1	3.19	<0.82	<0.72	<2.1	<1.0	<2.5	<0.86	<0.43	<0.69	<0.69	7.38	<1.2	<3.7	3.0	<0.55	<0.55	<0.54	2.1	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26

SV16-02 — Screen Interval: 1.45 - 1.60 mbgs

Date	ACTN	BZLC	BDCMA	BF	BMA	1,3-BDE	CDS	CT	MCB	CA	TCM	CMA	CYHA	DBCM	1,2-DBA	1,2-DCB	1,3-DCB	1,4-DCB	DCDFMA	1,1-DCA	1,2-DCA	1,1-DCE	c-1,2-DCE	t-1,2-DCE	1,2-DCPA	c-1,3-DCPE	t-1,3-DCPE	1,2-DCTFA	1,4-DOX	ETOH	EAC	4-ETT	HPA	HXCBDE	HA	MBK	MEK	MIBK	MTBE	DCM	NPT	IPA	PE	ST	1,1,1,2-PCA	1,1,2,2-PCA	PCE	THF	1,2,4-TCB	1,2,4-TMB	1,1,1-TCA	1,1,2-TCA	TCE	TCFMA	F113	1,3,5-TMB	2,2,4-TMP	VAC	VBr	VC
13-Dec-16	13.0	<2.6	<1.3	<2.1	<0.39	<1.1	13.5	<0.63	<0.46	<0.79	10.8	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	6.46	<0.40	<0.40	<0.40	<0.40	12.6	<0.46	<0.45	<0.45	<1.2	<3.6	1.9	<3.6	<2.5	1.4	<5.3[b]	3.4	<4.1	5.9	<4.1	<0.72	<2.8	na	<2.5	<1.5	<0.43	<0.69	<0.68	<1.2	<3.7	2.6	<0.55	<0.55	4.55	1.5	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
13-Dec-16 (DUP)	14.0	<2.6	<1.3	<2.1	<0.39	<1.1	13.9	<0.63	<0.46	<0.79	11.1	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	6.55	<0.40	<0.40	<0.40	<0.40	13.1	<0.46	<0.45	<0.45	<1.2	<3.6	1.9	<3.6	<2.5	1.5	<5.3[b]	3.7	<4.1	6.3	<4.1	<0.72	<2.8	na	<2.5	<1.5	<0.43	<0.69	<0.68	<1.2	<3.7	2.7	<0.55	<0.55	4.94	1.4	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
21-Jul-17	17.6	<2.6	<1.3	<2.1	<0.39	<1.1	15.8	<0.63	<0.46	<0.79	2.56	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	36.0	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	1.9	<3.6	<2.5	<1.2	<5.3[b]	<1.1	<4.1	<2.9	<4.1	<0.72	4.2	na	<2.5	<0.86	<0.43	<0.69	<0.69	1.38	<1.2	<3.7	3.4	<0.55	<0.55	5.04	2.4	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
21-Nov-17	<1.9	<2.6	<1.3	<2.1	<0.39	<1.1	3.3	<0.63	<0.46	<0.79	1.38	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	13.1	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	1.9	<3.6	<2.5	<1.2	<5.3[b]	<1.1	<4.1	<2.9	<4.1	<0.72	<2.8	na	<2.5	<0.86	<0.43	<0.69	<0.69	81.9	<1.2	<3.7	<2.5	<0.55	<0.55	4.27	1.2	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
21-Nov-17 (DUP)	2.4	<2.6	<1.3	<2.1	<0.39	<1.1	3.3	<0.63	<0.46	<0.79	1.38	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	13.0	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	1.9	<3.6	<2.5	<1.2	<5.3[b]	<1.1	<4.1	<2.9	<4.1	<0.72	<2.8	na	<2.5	<0.86	<0.43	<0.69	<0.69	41.4	<1.2	<3.7	<2.5	<0.55	<0.55	4.42	1.2	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
3-Jul-18	97.1	<2.6	<1.3	<2.1	<0.39	<1.1	12.8	<0.63	<0.46	<0.79	0.51	<0.62	2.09	<1.7	<0.77	<0.60	<2.4	<0.60	11.9	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	6.5	<3.6	<2.5	2.6	<5.3[b]	9.3	<4.1	7.9	<4.1	<0.72	<2.8	na	<2.5	0.99	0.54	<0.69	<0.69	<0.68	<1.2	<3.7	<2.5	<0.55	<0.55	0.95	1.4	<1.2	<2.5	2.29	<0.70	<0.87	<0.26
30-Oct-18	5.5	<2.6	<1.3	<2.1	<0.39	<1.1	<1.6	<0.63	<0.46	<0.79	<0.49	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	4.19	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	1.9	<3.6	<2.5	<1.2	<5.3[b]	<1.1	<4.1	<2.9	<4.1	<0.72	<2.8	na	<2.5	<0.86	<0.43	<0.69	<0.69	<0.68	<1.2	<3.7	<2.5	<0.55	<0.55	2.12	<1.1	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
21-Jun-19	28.0	<2.6	<1.3	<2.1	<0.39	<1.1	3.1	<0.63	<0.46	<0.79	1.17	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	29.2	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	1.9	<3.6	<2.5	<1.2	<5.3[b]	<0.70	<4.1	1.18	<0.82	<0.72	<2.1	na	<2.5	<0.86	<0.43	<0.69	<0.69	0.75	<1.2	<3.7	<2.5	<0.55	<0.55	2.82	2.0	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
12-Nov-19	6.1	<2.6	<1.3	<2.1	<0.39	<1.1	<1.6	<0.63	<0.46	<0.79	0.52	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	15.6	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	6.2	<3.6	<2.5	<1.2	<5.3[b]	0.84	<4.1	0.66	<0.82	<0.72	<2.1	na	<2.5	<0.86	<0.43	<0.69	<0.68	<1.2	<3.7	<2.5	<0.55	<0.55	**14.9**	1.3	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
12-Nov-19 (DUP)	5.1	<2.6	<1.3	<2.1	<0.39	<1.1	<1.6	<0.63	<0.46	<0.79	0.58	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	16.4	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	2.4	<3.6	<2.5	<1.2	<5.3[b]	<0.70	<4.1	<0.59	<0.82	<0.72	<2.1	na	<2.5	<0.86	<0.43	<0.69	0.79	<1.2	<3.7	<2.5	<0.55	<0.55	**17.3**	1.3	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
28-Feb-20	23.8	<2.6	<1.3	<2.1	<0.39	<1.1	<1.6	<0.63	<0.46	<0.79	<0.49	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	22.9	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	8.3	<3.6	<2.5	<1.2	<5.3	<0.70	<4.1	1.58	<0.82	<0.72	<2.1	<1.0	<2.5	<1.1	<0.43	<0.69	<0.68	<1.2	<3.7	<2.5	<0.55	<0.55	4.33	<1.1	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
31-Aug-20	34.3	<2.6	<1.3	<2.1	<0.39	<1.1	2.2	<0.63	<0.46	<0.79	0.73	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	49.4	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	6.2	<3.6	<2.5	<1.2	<5.3	<0.70	<4.1	1.66	<0.82	<0.72	<2.1	<1.0	<2.5	<0.86	<0.43	<0.69	1.21	<1.2	<3.7	<2.5	<0.55	<0.55	**15.9**	1.6	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26

ONTARIO STANDARDS

PARAMETERS	ACTN	BZLC	BDCMA	BF	BMA	1,3-BDE	CDS	CT	MCB	CA	TCM	CMA	CYHA	DBCM	1,2-DBA	1,2-DCB	1,3-DCB	1,4-DCB	DCDFMA	1,1-DCA	1,2-DCA	1,1-DCE	c-1,2-DCE	t-1,2-DCE	1,2-DCPA	c-1,3-DCPE	t-1,3-DCPE	1,2-DCTFA	1,4-DOX	ETOH	EAC	4-ETT	HPA	HXCBDE	HA	MBK	MEK	MIBK	MTBE	DCM	NPT	IPA	PE	ST	1,1,1,2-PCA	1,1,2,2-PCA	PCE	THF	1,2,4-TCB	1,2,4-TMB	1,1,1-TCA	1,1,2-TCA	TCE	TCFMA	F113	1,3,5-TMB	2,2,4-TMP	VAC	VBr	VC
Health-Based Indoor Air Criteria[a]	2502.86	n/s	n/s	n/s	1.04	n/s	n/s	0.42	208.57	n/s	20.86	n/s	n/s	n/s	0.17	125.14	n/s	0.28	n/s	34.41	0.04	14.60	31.29	12.51	0.83	0.28	0.28	n/s	750.86	n/s	n/s	n/s	n/s	0.05	521.43	n/s	1002.75	601.65	4.28	48.36	39	n/s	n/s	54.23	0.15	0.02	4.28	n/s	1.67	n/s	208.57	0.07	0.27	n/s	n/s	n/s	n/s	n/s	n/s	0.13
SVSL[b]	125,143	n/s	n/s	n/s	52	n/s	n/s	21	10,429	n/s	1,043	n/s	n/s	n/s	8	6,257	n/s	14	n/s	1,721	2	730	1,564	626	42	14	14	n/s	37,543	n/s	n/s	n/s	n/s	3	26,071	n/s	50,137	30,082	214	2,418	1.0	n/s	n/s	2,711	8	1	214	n/s	83	n/s	10,429	3	14	n/s	n/s	n/s	n/s	n/s	6.3
RDL	1.9	2.6	1.3	2.1	0.39	1.1	1.6	0.63	0.46	0.79	0.49	0.62	0.69	1.7	0.77	0.60	2.4	0.60	0.99	0.40	0.40	0.40	0.40	0.40	0.46	0.45	0.45	1.2	3.6	1.9	3.6	2.5	1.2	5.3	1.1	4.1	2.9	4.1	0.72	2.8	0.77	2.5	0.86	0.43	0.69	0.69	0.68	1.2	3.7	2.5	0.55	0.55	0.54	1.1	1.2	2.5	0.93	0.70	0.87	0.26
UNITS	µg/m³	µg/m³	µg/m³

Table 1
Summary of Groundwater Field Monitoring Results
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Well Name	Screen Interval (mbgs)	Top of Casing Elevation[(a)] (m)	Ground Elevation[(a)] (m)	Monitoring Date	Depth to Groundwater (mbtoc)	Depth to Groundwater (mbgs)	Groundwater Elevation[(a)] (m)	LNAPL Thickness (mm)	Headspace Vapours (ppmv)
TH1	2.6 - 5.6	99.99	100.08	5-Dec-16	3.69	3.78	96.31	n/d	n/m
				21-Jun-17	3.23	3.32	96.76	n/d	n/d
				14-Aug-18	3.71	3.80	96.28	n/d	30
				29-Jul-19	3.61	3.70	96.39	n/d	n/m
				27-Jul-20	3.57	3.66	96.42	n/d	n/m
TH2	3.2 - 4.7	100.04	100.14	9-Aug-16	3.62	3.71	96.43	n/d	n/d
				21-Jun-17	3.58	3.67	96.47	n/d	n/d
				14-Aug-18	3.66	3.76	96.38	n/d	230
				29-Jul-19	3.56	3.65	96.49	n/d	n/m
				27-Jul-20	3.68	3.78	96.36	n/d	n/m
TH3	3.2 - 4.7	100.28	100.41	9-Aug-16	3.36	3.49	96.92	n/d	85
				21-Jun-17	3.10	3.23	97.18	n/d	180
				14-Aug-18	3.29	3.42	97.00	n/d	25% LEL
				29-Jul-19	3.17	3.30	97.11	n/d	n/m
				27-Jul-20	3.30	3.43	96.98	n/d	n/m
TH4	3.4 - 4.9	100.27	100.35	9-Aug-16	3.15	3.23	97.12	n/d	75
				21-Jun-17	3.08	3.16	97.19	n/d	n/d
				14-Aug-18	3.10	3.18	97.17	n/d	100% LEL
				29-Jul-19	3.10	3.18	97.17	n/d	n/m
				27-Jul-20	3.06	3.14	97.21	0.002	n/m
TH5	3.5 - 5.0	100.12	100.23	9-Aug-16	2.97	3.08	97.15	n/d	5
				21-Jun-17	2.82	2.93	97.30	n/d	n/d
				14-Aug-18	2.87	2.98	97.25	n/d	n/d
				29-Jul-19	2.82	2.93	97.31	n/d	n/m
				27-Jul-20	2.74	2.85	97.38	n/d	n/m
TH6	3.6 - 5.1	99.99	99.54	9-Aug-16	3.82	3.92	95.62	n/d	45
				21-Jun-17	3.58	3.68	95.86	n/d	n/d
				14-Aug-18	3.61	3.16	96.38	n/d	n/d
				29-Jul-19	3.70	3.25	96.29	n/d	n/m
				27-Jul-20	3.69	3.24	96.30	n/d	n/m
TH7	4.4 - 5.8	100.50	99.66	9-Aug-16	5.01	4.17	95.49	n/d	15
				21-Jun-17	4.78	3.94	95.72	n/d	n/d
				14-Aug-18	4.67	3.83	95.83	n/d	n/d
				29-Jul-19	4.82	3.98	95.68	n/d	n/m
				27-Jul-20	4.86	4.02	95.65	n/d	n/m
TH8	3.3 - 4.9	100.03	100.16	20-Jun-17	n/m	n/a	n/a	n/m	n/m
				15-Aug-18	3.36	3.49	96.68	n/d	n/d
				30-Jul-19	2.98	3.11	97.06	n/d	n/m
				28-Jul-20	3.15	3.28	96.88	n/d	n/m
				14-Oct-20	3.67	3.80	96.37	n/d	n/m

Notes:
[(a)] Elevations are relative to a local benchmark (centre of storm sewer catch basin approximately 5 m west of kiosk), with an assigned elevation of 100.00 m (exp. 2013).
LEL - lower explosive limit
LNAPL - light non-aqueous phase liquid
m - metres
mbgs - metres below ground surface
mbtoc - metres below top of casing
mm - millimetres
n/a - not applicable
n/d - not detected
n/m - not measured
ppmv - parts per million by volume

Table 1
Summary of Groundwater Field Monitoring Results
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Well Name	Screen Interval (mbgs)	Top of Casing Elevation[(a)] (m)	Ground Elevation[(a)] (m)	Monitoring Date	Depth to Groundwater (mbtoc)	Depth to Groundwater (mbgs)	Groundwater Elevation[(a)] (m)	LNAPL Thickness (mm)	Headspace Vapours (ppmv)
TH9	3.4 - 4.9	100.46	100.59	20-Jun-17	3.46	3.59	97.00	n/d	100% LEL
				15-Aug-18	2.74	2.87	97.72	n/d	84% LEL
				30-Jul-19	2.74	2.87	97.72	n/d	n/m
				28-Jul-20	2.83	2.96	97.63	n/d	n/m
				14-Oct-20	2.86	2.99	97.60	n/d	n/m
TH10	3.3 - 4.9	100.17	100.26	10-Jun-13	n/m	3.03	97.24	n/d	170
				6-Oct-14	n/m	n/a	n/a	n/m	n/m
				27-Oct-15	Destroyed				
				TH10 decommissioned on August 24, 2016					
TH11	3.3 - 4.9	99.90	100.04	20-Jun-17	n/m	n/a	n/a	n/m	n/m
				15-Aug-18	n/m	n/a	n/a	n/m	n/m
				31-Jul-19	2.81	2.95	97.09	n/d	n/m
				28-Jul-20	2.80	2.94	97.10	n/d	n/m
				14-Oct-20	3.12	3.26	96.78	n/d	n/m
TH12	3.3 - 4.9	99.60	99.74	20-Jun-17	2.61	2.75	97.00	n/d	880
				15-Aug-18	n/m	n/a	n/a	n/m	n/m
				31-Jul-19	n/m	n/a	n/a	n/m	n/m
				28-Jul-20	n/m	n/a	n/a	n/m	n/m
				14-Oct-20	2.73	2.87	96.87	n/d	n/m
TH100	3.0 - 4.9	101.40	101.52	20-Jun-17	3.33	3.47	98.07	n/d	n/d
				15-Aug-18	3.39	3.50	98.02	n/d	n/d
				30-Jul-19	3.44	3.56	97.96	n/d	n/m
				29-Jul-20	3.21	3.33	98.19	n/d	n/m
				14-Oct-20	3.41	3.52	98.00	n/d	n/m
TH101	3.0 - 4.9	99.94	100.06	10-Aug-16	3.05	3.17	96.89	n/d	9,450
				20-Jun-17	2.94	3.06	97.00	n/d	100% LEL
				15-Aug-18	2.91	3.03	97.03	n/d	100% LEL
				30-Jul-19	2.94	3.06	97.01	n/d	n/m
				28-Jul-20	3.02	3.14	96.92	n/d	n/m
TH102	3.0 - 4.9	100.59	100.69	10-Aug-16	3.11	3.21	97.48	n/d	430
				20-Jun-17	3.06	3.16	97.53	n/d	420
				15-Aug-18	n/m	n/a	n/a	n/m	n/m
				30-Jul-19	3.08	3.18	97.51	n/d	n/m
				29-Jul-20	3.10	3.20	97.49	n/d	n/m
MW15-01	3.0 - 6.0	97.84	97.99	9-Aug-16	2.35	2.50	95.49	n/d	n/d
				21-Jun-17	2.16	2.31	95.68	n/d	n/d
				14-Aug-18	3.16	3.31	94.68	n/d	n/d
				29-Jul-19	2.35	2.49	95.50	n/d	n/m
				27-Jul-20	2.29	2.44	95.55	n/d	n/m
MW15-02	2.7 - 4.9	98.01	98.08	9-Aug-16	2.63	2.69	95.39	n/d	20
				21-Jun-17	2.52	2.58	95.50	n/d	n/d
				14-Aug-18	2.38	2.44	95.64	n/d	n/d
				29-Jul-19	2.50	2.57	95.51	n/d	n/m
				27-Jul-20	2.54	2.61	95.47	n/d	n/m
MW16-01	3.3 - 4.8	100.19	100.30	31-Aug-16	2.87	2.97	97.32	n/d	185
				21-Jun-17	2.89	3.00	97.30	n/d	145
				15-Aug-18	2.82	2.93	97.37	n/d	n/d
				30-Jul-19	2.88	2.99	97.31	n/d	n/m
				28-Jul-20	2.82	2.93	97.37	n/d	n/m

Notes:

[(a)] Elevations are relative to a local benchmark (centre of storm sewer catch basin approximately 5 m west of kiosk), with an assigned elevation of 100.00 m (exp. 2013).

LEL - lower explosive limit

LNAPL - light non-aqueous phase liquid

m - metres

mbgs - metres below ground surface

mbtoc - metres below top of casing

mm - millimetres

n/a - not applicable

n/d - not detected

n/m - not measured

ppmv - parts per million by volume

Table 2
Summary of Groundwater Analytical Results - Petroleum Hydrocarbons
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

			Sample Location	MW15-01	MW15-02	MW16-01	TH1	TH2	TH3	TH5		TH6	TH7	TH8	
			Sample ID	MW15-01	MW15-02	MW16-01	TH1	TH2	TH3	TH5	DUP A	TH6	TH7	TH8	TH8
			BVL Sample ID	NGI859	NGI860	NGI729	NGI853	NGI854	NGI855	NGI856	NGI861	NGI857	NGI858	NGI723	NXK477
			BVL Job Number	C0J3875	C0J3875	C0J3841	C0J3875	C0J3875	C0J3875	C0J3875	C0J3875	C0J3875	C0J3875	C0J3841	C0R2950
			Sample Date	27-Jul-20	27-Jul-20	28-Jul-20	29-Jul-20	28-Jul-20	29-Jul-20	29-Jul-20	29-Jul-20	27-Jul-20	27-Jul-20	28-Jul-20	14-Oct-20
Parameters	**Units**	**RDL**	**Criteria[a]**												
Benzene	µg/L	0.20	430	<0.20	0.79	38	<0.20	0.44	9.8	200	200	<0.20	27	4.5	0.96
Toluene	µg/L	0.20	18,000	<0.20	<0.20	0.63	<0.20	<0.20	<0.20	12	12	<0.20	1.3	<0.20	<0.20
Ethylbenzene	µg/L	0.20	2,300	<0.20	<0.20	20	<0.20	<0.20	6.4	830	790	<0.20	35	5.4	1.2
Xylenes	µg/L	0.40	4,200	<0.40	<0.40	1.3	<0.40	3.6	0.58	1,400	1,300	<0.40	3.1	0.75	<0.40
F1 (C_6-C_{10}) - BTEX	µg/L	130	750[c]	<25	<25	260	<25	<25	310	**6,000**	**5,900**	<25	270	170	29
F2 (C_{10}-C_{16})	µg/L	100	150	<100	<100	<100	**400**	<100	<100	**8,500**	**8,500**	<100	<100	130	<100
F3 (C_{16}-C_{34})	µg/L	200	500	<200	<200	<200	**24,000**	<200	<200	**570**	470	<200	<200	**780**	<200
F4 (C_{34}-C_{50})	µg/L	200	500	<200	<200	<200	**160,000[b]**	<200	<200	<200	<200	<200	<200	500	<200
Lead	µg/L	0.50	25	<0.50	<0.50	<0.50	1.5	<0.50	3.7	**26**	25	<0.50	<0.50	1.2	0.61

Notes:

[a] O.Reg 153 (2011) Table 3 Full Depth Generic Site Condition Standards for all types of property use for groundwater in medium and fine textured soil in in a non-potable ground water condition

[b] Baseline was not reached at Carbon 50. Value presented corresponds to the greater of the F4 and F4G values.

[c] F1 fraction does not include BTEX; however, the proponent has the choice as to whether or not to subtract BTEX from the analytical result.

Bold/Underlined - value exceeds criteria/standard

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3 and 4

F4G - petroleum hydrocarbon 4 gravimetric

RDL - reportable detection limit

µg/L - micrograms per litre

< - less than

Table 2
Summary of Groundwater Analytical Results - Petroleum Hydrocarbons
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

			Sample Location	TH9		TH11		TH12	TH100			TH101		TH102
			Sample ID	TH9	TH9	TH11	TH11	TH12	TH100	TH100	DUP A	TH101	DUP B	TH102
			BVL Sample ID	NGI724	NXK478	NGI725	NXK479	NXK480	NGI726	NXK481	NXK482	NGI727	NGI730	NGI728
			BVL Job Number	C0J3841	C0R2950	C0J3841	C0R2950	C0R2950	C0J3841	C0R2950	C0R2950	C0J3841	C0J3841	C0J3841
			Sample Date	28-Jul-20	14-Oct-20	28-Jul-20	14-Oct-20	14-Oct-20	29-Jul-20	14-Oct-20	14-Oct-20	28-Jul-20	28-Jul-20	29-Jul-20
Parameters	**Units**	**RDL**	**Criteria[a]**											
Benzene	µg/L	0.20	430	4.4	54	5.9	170	37	<0.20	<0.20	<0.20	86	76	0.26
Toluene	µg/L	0.20	18,000	<0.20	6.3	0.36	19	4.7	<0.20	<0.20	<0.20	7.1	6.5	<0.20
Ethylbenzene	µg/L	0.20	2,300	7.8	420	8.8	820	240	<0.20	<0.20	<0.20	1,000	900	0.71
Xylenes	µg/L	0.40	4,200	<0.40	210	3.4	640	69	<0.40	<0.40	<0.40	69	61	0.55
F1 (C_6-C_{10}) - BTEX	µg/L	130	750[c]	51	**1,500**	490	**3,300**	**4,100**	<25	<25	<25	**5,700**	**4,900**	66
F2 (C_{10}-C_{16})	µg/L	100	150	<100	**480**	**12,000**	**1,000**	**1,900**	<100	<100	<100	**1,400**	**1,500**	<100
F3 (C_{16}-C_{34})	µg/L	200	500	**700**	<200	**36,000**	300	270	**1,100**	<200	<200	<200	<200	<200
F4 (C_{34}-C_{50})	µg/L	200	500	**520**	<200	**150,000[b]**	<200	<200	**820**	<200	<200	<200	<200	<200
Lead	µg/L	0.50	25	<0.50	<0.50	<0.50	<0.50	0.90	<0.50	<0.50	<0.50	6.6	6.4	0.71

Notes:

[a] O.Reg 153 (2011) Table 3 Full Depth Generic Site Condition Standards for all types of property use for groundwater in medium and fine textured soil in in a non-potable ground water condition

[b] Baseline was not reached at Carbon 50. Value presented corresponds to the greater of the F4 and F4G values.

[c] F1 fraction does not include BTEX; however, the proponent has the choice as to whether or not to subtract BTEX from the analytical result.

Bold/Underlined - value exceeds criteria/standard

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3 and 4

F4G - petroleum hydrocarbon 4 gravimetric

RDL - reportable detection limit

µg/L - micrograms per litre

< - less than

Table 3
Field Screening and Leak Test Measurements
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Sampling Location	Sampling Date	Organic Vapour Concentration (ppbv)	Methane Concentration (%)	Carbon dioxide Concentration (%)	Oxygen Concentration (%)	Helium Concentration - Shroud (ppmv)	Helium Concentration - Screening Sample (ppmv)	Helium Ratio of Below Grade/Shroud Concentration (%)	Pass Leak Test[(a)] (Y/N)
SV16-01	28-Feb-20	0	0.0	2.5	16.7	120,000	200	0.17	Y
		21	0.0	2.6	16.4	n/m	n/m	n/a	n/a
		9	0.0	2.6	16.2	n/m	n/m	n/a	n/a
	31-Aug-20	250	0.0	5.3	12.4	500,000	0	0.00	Y
		207	0.0	5.2	12.2	n/m	n/m	n/a	n/a
		184	0.0	5	12.2	n/m	n/m	n/a	n/a
SV16-02	28-Feb-20	0	0.0	3.1	13.8	400,000	0	0.00	Y
		16	0.0	3.3	13.1	n/m	n/m	n/a	n/a
		15	0.0	3.4	12.5	n/m	n/m	n/a	n/a
	31-Aug-20	389	0.0	5.4	15.5	500,000	0	0.00	Y
		209	0.0	5.5	15.4	n/m	n/m	n/a	n/a
		161	0.0	5.4	15.4	n/m	n/m	n/a	n/a

Notes:

[(a)] A leak test passes if the helium ratio of below grade to shroud concentration is less than 1%

n/a - not applicable

n/c - not calculated

n/m - not measured

ppbv - parts per billion by volume

ppmv - parts per million by volume

> - greater than

< - less than

Table 4
Summary of Soil Vapour Analytical Results - Petroleum Hydrocarbons
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

		Sample Location	**SV16-01**				**SV16-02**		**Health-Based Indoor Air Criteria[a]**	**SVSL[b]**
		Sample ID	SV16-01	DUP A	SV16-01	DUP A	SV16-02	SV16-02		
		BVL Sample ID	MDF611	MDF613	NNC428	NNC429	MDF612	NNC430		
		BVL Job Number	C055481	C055481	C0M4970	C0M4970	C055481	C0M4970		
		Sample Date	28-Feb-20	28-Feb-20	31-Aug-20	31-Aug-20	28-Feb-20	31-Aug-20		
Parameters	**Units**	**RDL**								
Benzene	µg/m^3	0.32	<0.32	<0.32	<0.32	<0.32	<0.32	<0.32	0.51	25
Toluene	µg/m^3	0.38	<0.38	0.49	0.73	0.65	<0.38	0.42	1,043	52,143
Ethylbenzene	µg/m^3	0.43	0.47	<0.43	0.72	0.80	<0.43	<0.43	209	10,429
Xylenes, Total	µg/m^3	1.3	1.8	1.7	3.0	3.1	<1.3	<1.3	146	7,300
F1-BTEX, C_6-C_{10} (as Toluene)	µg/m^3	5.0	102	134	285	217	98.0	95.9	2,491	124,530
F2, C_{10}-C_{16} (as Decane)	µg/m^3	5.0	227	197	761	760	118	353	471	23,530

Notes:

[a] Health-Based Indoor Air Criteria - Residential, provided by MOECC Modified Generic Risk Assessment, Approved Model (November 2016)

[b] SVSLs for a residential building with basement (probe depth 0 - 30 centimetres below base of the building foundation) calculated by dividing Health-Based Indoor Air Criteria by an attenuation factor of

Bold/Underlined - value exceeds SVSL criteria

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3 and 4

RDL - reportable detection limit

SVSL - soil vapour screening level

µg/m^3 - micrograms per cubic metre

< - less than

Table 5
Summary of Soil Vapour Analytical Results - Volatile Organic Compounds
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

			Sample Location	SV16-01				SV16-02		Health-Based Indoor Air Criteria[a]	SVSL[b]
			Sample ID	SV16-01	DUP A	SV16-01	DUP A	SV16-02	SV16-02		
			BVL Sample ID	MDF611	MDF613	NNC428	NNC429	MDF612	NNC430		
			BVL Job Number	C055481	C055481	C0M4970	C0M4970	C055481	C0M4970		
			Sample Date	28-Feb-20	28-Feb-20	31-Aug-20	31-Aug-20	28-Feb-20	31-Aug-20		
Parameters	**Units**	**RDL**									
Benzyl chloride	µg/m³	2.6	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6	n/s	n/s
Bromodichloromethane	µg/m³	1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	n/s	n/s
Bromoform	µg/m³	2.1	<2.1	<2.1	<2.1	<2.1	<2.1	<2.1	n/s	n/s
Bromomethane	µg/m³	0.39	<0.39	<0.39	<0.39	<0.39	<0.39	<0.39	1.04	52.14
1,3-Butadiene	µg/m³	1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	n/s	n/s
Carbon Disulfide	µg/m³	1.6	<1.6	<1.6	<1.6	<1.6	<1.6	2.2	n/s	n/s
Carbon Tetrachloride	µg/m³	0.63	<0.63	<0.63	<0.63	<0.63	<0.63	<0.63	0.42	20.86
Chlorobenzene	µg/m³	0.46	<0.46	<0.46	<0.46	<0.46	<0.46	<0.46	209	10,429
Chloroethane	µg/m³	0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	n/s	n/s
Chloroform	µg/m³	0.49	12.9	12.7	44.2	44.9	<0.49	0.73	20.86	1,043
Chloromethane	µg/m³	0.62	<0.62	<0.62	<0.62	<0.62	<0.62	<0.62	n/s	n/s
Cyclohexane	µg/m³	0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	n/s	n/s
Dibromochloromethane	µg/m³	1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	n/s	n/s
1,2-Dibromoethane (Ethylene Dibromide)	µg/m³	0.77	<0.77	<0.77	<0.77	<0.77	<0.77	<0.77	0.17	8.34
1,2-Dichlorobenzene	µg/m³	0.60	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60	125	6,257
1,3-Dichlorobenzene	µg/m³	2.4	<2.4	<2.4	<2.4	<2.4	<2.4	<2.4	n/s	n/s
1,4-Dichlorobenzene	µg/m³	0.60	<0.60	<0.60	0.81	0.83	<0.60	<0.60	0.28	13.90
Dichlorodifluoromethane (FREON 12)	µg/m³	0.99	8.60	7.80	21.1	21.1	22.9	49.4	n/s	n/s
1,1-Dichloroethane	µg/m³	0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	34.41	1,721
1,2-Dichloroethane	µg/m³	0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	0.04	2.14
1,1-Dichloroethylene	µg/m³	0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	14.60	730
cis-1,2-Dichloroethylene	µg/m³	0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	31.29	1,564
trans-1,2-Dichloroethylene	µg/m³	0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	12.51	626
1,2-Dichloropropane	µg/m³	0.46	<0.46	<0.46	<0.46	<0.46	<0.46	<0.46	0.83	41.71
cis-1,3-Dichloropropene	µg/m³	0.45	<0.45	<0.45	<0.45	<0.45	<0.45	<0.45	0.28	13.90
trans-1,3-Dichloropropene	µg/m³	0.45	<0.45	<0.45	<0.45	<0.45	<0.45	<0.45	0.28	13.90
1,2-Dichlorotetrafluoroethane	µg/m³	1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	n/s	n/s
1,4-Dioxane	µg/m³	3.6	<3.6	<3.6	<3.6	<3.6	<3.6	<3.6	751	37,543
Ethanol (ethyl alcohol)	µg/m³	1.9	5.6	3.6	3.7	12.7	8.3	6.2	n/s	n/s
Ethyl Acetate	µg/m³	3.6	<3.6	<3.6	<3.6	<3.6	<3.6	<3.6	n/s	n/s
4-ethyltoluene	µg/m³	2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	n/s	n/s
Heptane	µg/m³	1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	n/s	n/s
Hexachlorobutadiene	µg/m³	5.3	<5.3[c]	<5.3[c]	<5.3[c]	<5.3[c]	<5.3[c]	<5.3[c]	0.05	2.53
Hexane	µg/m³	1.1	<0.70	<0.70	<0.70	<0.70	<0.70	<0.70	521	26,071

Notes:

[a] Health-Based Indoor Air Criteria - Residential, provided by MOECC Modified Generic Risk Assessment, Approved Model (November 1, 2016)

[b] SVSLs for a residential building with basement (probe depth 0 - 30 centimetres below base of the building foundation) calculated by dividing Health-Based Indoor Air Criteria by an attenuation factor of 0.02.

[c] RDL greater than SVSL

Bold/Underlined - value exceeds SVSL criteria

BVL - Bureau Veritas Laboratories

n/s - no standard

RDL - reportable detection limit

SVSL - soil vapour screening level

µg/m³ - micrograms per cubic metre

< - less than

Table to be read in conjunction with Laboratory Certificate of Analysis

Table 5
Summary of Soil Vapour Analytical Results - Volatile Organic Compounds
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

		Sample Location	**SV16-01**				**SV16-02**		**Health-Based Indoor Air Criteria[a]**	**SVSL[b]**
		Sample ID	SV16-01	DUP A	SV16-01	DUP A	SV16-02	SV16-02		
		BVL Sample ID	MDF611	MDF613	NNC428	NNC429	MDF612	NNC430		
		BVL Job Number	C055481	C055481	C0M4970	C0M4970	C055481	C0M4970		
		Sample Date	28-Feb-20	28-Feb-20	31-Aug-20	31-Aug-20	28-Feb-20	31-Aug-20		
Parameters	**Units**	**RDL**								
Methyl Butyl Ketone (2-Hexanone)	µg/m^3	4.1	<4.1	<4.1	<4.1	<4.1	<4.1	<4.1	n/s	n/s
Methyl Ethyl Ketone (2-Butanone)	µg/m^3	2.9	1.29	1.19	3.07	3.19	1.58	1.66	1,003	50,137
Methyl Isobutyl Ketone	µg/m^3	4.1	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	602	30,082
Methyl t-butyl ether (MTBE)	µg/m^3	0.72	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72	4.28	214
Methylene Chloride(Dichloromethane)	µg/m^3	2.8	<2.1	<2.1	<2.1	<2.1	<2.1	<2.1	48.36	2,418
Naphthalene	µg/m^3	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.77	38.60
2-propanol (Isopropanol)	µg/m^3	2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	n/s	n/s
2-Propanone (Acetone)	µg/m^3	1.9	13.4	12.6	34.3	34.5	23.8	34.3	2,503	125,143
Propene (Propylene)	µg/m^3	0.86	<0.86	<0.86	<0.86	<0.86	<1.1	<0.86	n/s	n/s
Styrene	µg/m^3	0.43	<0.43	<0.43	<0.43	<0.43	<0.43	<0.43	54.23	2,711
1,1,1,2-Tetrachloroethane	µg/m^3	0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	0.15	7.51
1,1,2,2-Tetrachloroethane	µg/m^3	0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	0.02	0.96
Tetrachloroethylene	µg/m^3	0.68	1.80	1.60	7.23	7.38	<0.68	1.21	4.28	214
Tetrahydrofuran	µg/m^3	1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	n/s	n/s
1,2,4-Trichlorobenzene	µg/m^3	3.7	<3.7	<3.7	<3.7	<3.7	<3.7	<3.7	1.67	83.43
1,2,4-Trimethylbenzene	µg/m^3	2.5	<2.5	<2.5	3.0	3.0	<2.5	<2.5	n/s	n/s
1,1,1-Trichloroethane	µg/m^3	0.55	<0.55	<0.55	<0.55	<0.55	<0.55	<0.55	209	10,429
1,1,2-Trichloroethane	µg/m^3	0.55	<0.55	<0.55	<0.55	<0.55	<0.55	<0.55	0.07	3.48
Trichloroethylene	µg/m^3	0.54	<0.54	<0.54	<0.54	<0.54	4.33	**15.9**	0.27	13.56
Trichlorofluoromethane (FREON 11)	µg/m^3	1.1	<1.1	<1.1	2.0	2.1	<1.1	1.6	n/s	n/s
Trichlorotrifluoroethane (FREON 113)	µg/m^3	1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	n/s	n/s
1,3,5-Trimethylbenzene	µg/m^3	2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	n/s	n/s
2,2,4-Trimethylpentane	µg/m^3	0.93	<0.93	<0.93	<0.93	<0.93	<0.93	<0.93	n/s	n/s
Vinyl Acetate	µg/m^3	0.70	<0.70	<0.70	<0.70	<0.70	<0.70	<0.70	n/s	n/s
Vinyl Bromide	µg/m^3	0.87	<0.87	<0.87	<0.87	<0.87	<0.87	<0.87	n/s	n/s
Vinyl Chloride	µg/m^3	0.26	<0.26	<0.26	<0.26	<0.26	<0.26	<0.26	0.13	6.32

Notes:

[a] Health-Based Indoor Air Criteria - Residential, provided by MOECC Modified Generic Risk Assessment, Approved Model (November 1, 2016)

[b] SVSLs for a residential building with basement (probe depth 0 - 30 centimetres below base of the building foundation) calculated by dividing Health-Based Indoor Air Criteria by an attenuation factor of 0.02.

[c] RDL greater than SVSL

Bold/Underlined - value exceeds SVSL criteria

BVL - Bureau Veritas Laboratories

n/s - no standard

RDL - reportable detection limit

SVSL - soil vapour screening level

µg/m^3 - micrograms per cubic metre

< - less than

Table to be read in conjunction with Laboratory Certificate of Analysis

APPENDIX A

Laboratory Certificates of Analysis and Data Quality Review Checklists

Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2007A
Your C.O.C. #: 208138

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2020/08/07
Report #: R6283377
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C0J3841
Received: 2020/07/31, 10:15

Sample Matrix: Water
Samples Received: 8

Analyses	Quantity	Laboratory Method	Analytical Method
Petroleum Hydro. CCME F1 & BTEX in Water	8	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1)	8	CAM SOP-00316	CCME PHC-CWS m
F4G (CCME Hydrocarbons Gravimetric)	1	CAM SOP-00326	CCME PHC-CWS m
Dissolved Metals by ICPMS	8	CAM SOP-00447	EPA 6020B m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard. All samples were analyzed within hold time unless otherwise flagged.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas Laboratories conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following “Alberta Environment’s Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003”. Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2007A
Your C.O.C. #: 208138

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2020/08/07
Report #: R6283377
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C0J3841
Received: 2020/07/31, 10:15

Encryption Key

Kyle Reinhart
Project Manager
07 Aug 2020 17:12:31

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kyle Reinhart, Project Manager
Email: Kyle.Reinhart@bvlabs.com
Phone# (905)817-5802

==========

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

BV Labs Job #: C0J3841
Report Date: 2020/08/07

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2007A

LEAD (DISSOLVED) IN WATER

BV Labs ID		NGI723	NGI724	NGI725	NGI726	NGI727	NGI728	NGI729		
Sampling Date		2020/07/28 19:55	2020/07/28 20:37	2020/07/28 22:40	2020/07/29 01:32	2020/07/28 23:48	2020/07/29 00:29	2020/07/28 21:59		
COC Number		208138	208138	208138	208138	208138	208138	208138		
	UNITS	**TH8**	**TH9**	**TH11**	**TH100**	**TH101**	**TH102**	**MW16-01**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	1.2	<0.50	<0.50	<0.50	6.6	0.71	<0.50	0.50	6867251

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

BV Labs ID		NGI730		
Sampling Date		2020/07/28 23:48		
COC Number		208138		
	UNITS	**DUP B**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	6.4	0.50	6867251

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C0J3841
Report Date: 2020/08/07

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2007A

O.REG 153 PHCS IN WATER (WATER)

BV Labs ID		NGI723	NGI724	NGI725	NGI726		NGI727		
Sampling Date		2020/07/28 19:55	2020/07/28 20:37	2020/07/28 22:40	2020/07/29 01:32		2020/07/28 23:48		
COC Number		208138	208138	208138	208138		208138		
	UNITS	**TH8**	**TH9**	**TH11**	**TH100**	**RDL**	**TH101**	**RDL**	**QC Batch**
Benzene	ug/L	4.5	4.4	5.9	<0.20	0.20	86	1.0	6873234
Toluene	ug/L	<0.20	<0.20	0.36	<0.20	0.20	7.1	1.0	6873234
Ethylbenzene	ug/L	5.4	7.8	8.8	<0.20	0.20	1000	1.0	6873234
o-Xylene	ug/L	<0.20	<0.20	0.23	<0.20	0.20	13	1.0	6873234
p+m-Xylene	ug/L	0.75	<0.40	3.2	<0.40	0.40	56	2.0	6873234
Total Xylenes	ug/L	0.75	<0.40	3.4	<0.40	0.40	69	2.0	6873234
F1 (C6-C10)	ug/L	180	63	510	<25	25	6900	130	6873234
F1 (C6-C10) - BTEX	ug/L	170	51	490	<25	25	5700	130	6873234
F2 (C10-C16 Hydrocarbons)	ug/L	130	<100	12000	<100	100	1400	100	6872357
F3 (C16-C34 Hydrocarbons)	ug/L	780	700	36000	1100	200	<200	200	6872357
F4 (C34-C50 Hydrocarbons)	ug/L	500	520	31000	820	200	<200	200	6872357
Reached Baseline at C50	ug/L	Yes	Yes	No	Yes		Yes		6872357
Extraction Surrogate Recovery (%)									
D10-o-Xylene	%	77	84	81	85		81		6873234
o-Terphenyl	%	101	100	102	100		99		6872357
Instrument Surrogate Recovery (%)									
1,4-Difluorobenzene	%	103	100	100	101		100		6873234
4-Bromofluorobenzene	%	110	110	110	111		109		6873234
D4-1,2-Dichloroethane	%	111	108	103	110		103		6873234

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2007A

O.REG 153 PHCS IN WATER (WATER)

BV Labs ID		NGI727			NGI728	NGI729		NGI730		
Sampling Date		2020/07/28 23:48			2020/07/29 00:29	2020/07/28 21:59		2020/07/28 23:48		
COC Number		208138			208138	208138		208138		
	UNITS	**TH101 Lab-Dup**	**RDL**	**QC Batch**	**TH102**	**MW16-01**	**RDL**	**DUP B**	**RDL**	**QC Batch**
Benzene	ug/L	75	1.0	6873234	0.26	38	0.20	76	1.0	6873234
Toluene	ug/L	6.1	1.0	6873234	<0.20	0.63	0.20	6.5	1.0	6873234
Ethylbenzene	ug/L	880	1.0	6873234	0.71	20	0.20	900	1.0	6873234
o-Xylene	ug/L	12	1.0	6873234	<0.20	0.21	0.20	12	1.0	6873234
p+m-Xylene	ug/L	50	2.0	6873234	0.55	1.1	0.40	50	2.0	6873234
Total Xylenes	ug/L	62	2.0	6873234	0.55	1.3	0.40	61	2.0	6873234
F1 (C6-C10)	ug/L	5900	130	6873234	67	320	25	5900	130	6873234
F1 (C6-C10) - BTEX	ug/L	4800	130	6873234	66	260	25	4900	130	6873234
F2 (C10-C16 Hydrocarbons)	ug/L				<100	<100	100	1500	100	6872357
F3 (C16-C34 Hydrocarbons)	ug/L				<200	<200	200	<200	200	6872357
F4 (C34-C50 Hydrocarbons)	ug/L				<200	<200	200	<200	200	6872357
Reached Baseline at C50	ug/L				Yes	Yes		Yes		6872357
Extraction Surrogate Recovery (%)										
D10-o-Xylene	%	80		6873234	77	86		82		6873234
o-Terphenyl	%				98	100		100		6872357
Instrument Surrogate Recovery (%)										
1,4-Difluorobenzene	%	99		6873234	100	102		100		6873234
4-Bromofluorobenzene	%	109		6873234	110	111		110		6873234
D4-1,2-Dichloroethane	%	103		6873234	108	106		104		6873234

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2007A

PETROLEUM HYDROCARBONS (CCME)

BV Labs ID		NGI725		
Sampling Date		2020/07/28 22:40		
COC Number		208138		
	UNITS	**TH11**	**RDL**	**QC Batch**
F4G-sg (Grav. Heavy Hydrocarbons)	ug/L	150000	500	6874638

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C0J3841
Report Date: 2020/08/07

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2007A

TEST SUMMARY

BV Labs ID: NGI723
Sample ID: TH8
Matrix: Water

Collected: 2020/07/28
Relinquished: 2020/07/30
Received: 2020/07/31

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6873234	N/A	2020/08/06	Haibin Wu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6872357	2020/08/05	2020/08/05	Jeevaraj Jeevaratrnam
Dissolved Metals by ICPMS	ICP/MS	6867251	N/A	2020/08/04	Daniel Teclu

BV Labs ID: NGI724
Sample ID: TH9
Matrix: Water

Collected: 2020/07/28
Relinquished: 2020/07/30
Received: 2020/07/31

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6873234	N/A	2020/08/06	Haibin Wu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6872357	2020/08/05	2020/08/06	Jeevaraj Jeevaratrnam
Dissolved Metals by ICPMS	ICP/MS	6867251	N/A	2020/08/04	Daniel Teclu

BV Labs ID: NGI725
Sample ID: TH11
Matrix: Water

Collected: 2020/07/28
Relinquished: 2020/07/30
Received: 2020/07/31

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6873234	N/A	2020/08/06	Haibin Wu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6872357	2020/08/05	2020/08/06	Jeevaraj Jeevaratrnam
F4G (CCME Hydrocarbons Gravimetric)	BAL	6874638	2020/08/06	2020/08/06	Gurseerat singh gill
Dissolved Metals by ICPMS	ICP/MS	6867251	N/A	2020/08/04	Daniel Teclu

BV Labs ID: NGI726
Sample ID: TH100
Matrix: Water

Collected: 2020/07/29
Relinquished: 2020/07/30
Received: 2020/07/31

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6873234	N/A	2020/08/06	Haibin Wu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6872357	2020/08/05	2020/08/06	Jeevaraj Jeevaratrnam
Dissolved Metals by ICPMS	ICP/MS	6867251	N/A	2020/08/04	Daniel Teclu

BV Labs ID: NGI727
Sample ID: TH101
Matrix: Water

Collected: 2020/07/28
Relinquished: 2020/07/30
Received: 2020/07/31

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6873234	N/A	2020/08/06	Haibin Wu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6872357	2020/08/05	2020/08/06	Jeevaraj Jeevaratrnam
Dissolved Metals by ICPMS	ICP/MS	6867251	N/A	2020/08/04	Daniel Teclu

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C0J3841
Report Date: 2020/08/07

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2007A

TEST SUMMARY

BV Labs ID: NGI727 Dup
Sample ID: TH101
Matrix: Water

Collected: 2020/07/28
Relinquished: 2020/07/30
Received: 2020/07/31

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6873234	N/A	2020/08/06	Haibin Wu

BV Labs ID: NGI728
Sample ID: TH102
Matrix: Water

Collected: 2020/07/29
Relinquished: 2020/07/30
Received: 2020/07/31

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6873234	N/A	2020/08/06	Haibin Wu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6872357	2020/08/05	2020/08/06	Jeevaraj Jeevaratrnam
Dissolved Metals by ICPMS	ICP/MS	6867251	N/A	2020/08/04	Daniel Teclu

BV Labs ID: NGI729
Sample ID: MW16-01
Matrix: Water

Collected: 2020/07/28
Relinquished: 2020/07/30
Received: 2020/07/31

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6873234	N/A	2020/08/06	Haibin Wu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6872357	2020/08/05	2020/08/06	Jeevaraj Jeevaratrnam
Dissolved Metals by ICPMS	ICP/MS	6867251	N/A	2020/08/04	Daniel Teclu

BV Labs ID: NGI730
Sample ID: DUP B
Matrix: Water

Collected: 2020/07/28
Relinquished: 2020/07/30
Received: 2020/07/31

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6873234	N/A	2020/08/06	Haibin Wu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6872357	2020/08/05	2020/08/06	Jeevaraj Jeevaratrnam
Dissolved Metals by ICPMS	ICP/MS	6867251	N/A	2020/08/04	Daniel Teclu

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	3.0°C

Results relate only to the items tested.

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6867251	DT1	Method Blank	Dissolved Lead (Pb)	2020/08/04	<0.50		ug/L	
6872357	JJE	Method Blank	o-Terphenyl	2020/08/05		101	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2020/08/05	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2020/08/05	<200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2020/08/05	<200		ug/L	
6873234	H_W	Method Blank	1,4-Difluorobenzene	2020/08/06		103	%	70 - 130
			4-Bromofluorobenzene	2020/08/06		107	%	70 - 130
			D10-o-Xylene	2020/08/06		83	%	70 - 130
			D4-1,2-Dichloroethane	2020/08/06		105	%	70 - 130
			Benzene	2020/08/06	<0.20		ug/L	
			Toluene	2020/08/06	<0.20		ug/L	
			Ethylbenzene	2020/08/06	<0.20		ug/L	
			o-Xylene	2020/08/06	<0.20		ug/L	
			p+m-Xylene	2020/08/06	<0.40		ug/L	
			Total Xylenes	2020/08/06	<0.40		ug/L	
			F1 (C6-C10)	2020/08/06	<25		ug/L	
			F1 (C6-C10) - BTEX	2020/08/06	<25		ug/L	
6874638	GSG	Method Blank	F4G-sg (Grav. Heavy Hydrocarbons)	2020/08/06	<500		ug/L	
6874638	GSG	RPD	F4G-sg (Grav. Heavy Hydrocarbons)	2020/08/06	0		%	20
6873234	H_W	RPD [NGI727-01]	Benzene	2020/08/06	14		%	30
			Toluene	2020/08/06	16		%	30
			Ethylbenzene	2020/08/06	14		%	30
			o-Xylene	2020/08/06	11		%	30
			p+m-Xylene	2020/08/06	11		%	30
			Total Xylenes	2020/08/06	11		%	30
			F1 (C6-C10)	2020/08/06	16		%	30
			F1 (C6-C10) - BTEX	2020/08/06	16		%	30
6873234	H_W	Matrix Spike [NGI727-01]	1,4-Difluorobenzene	2020/08/06		96	%	70 - 130
			4-Bromofluorobenzene	2020/08/06		110	%	70 - 130
			D10-o-Xylene	2020/08/06		90	%	70 - 130
			D4-1,2-Dichloroethane	2020/08/06		103	%	70 - 130
			Benzene	2020/08/06		92	%	70 - 130
			Toluene	2020/08/06		97	%	70 - 130
			Ethylbenzene	2020/08/06		NC	%	70 - 130
			o-Xylene	2020/08/06		111	%	70 - 130
			p+m-Xylene	2020/08/06		108	%	70 - 130
			F1 (C6-C10)	2020/08/06		92	%	70 - 130
6867251	DT1	LCS	Dissolved Lead (Pb)	2020/08/04		95	%	80 - 120
6872357	JJE	LCS	o-Terphenyl	2020/08/05		103	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2020/08/05		107	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2020/08/05		116	%	60 - 130
			F4 (C34-C50 Hydrocarbons)	2020/08/05		112	%	60 - 130
6873234	H_W	LCS	1,4-Difluorobenzene	2020/08/06		100	%	70 - 130
			4-Bromofluorobenzene	2020/08/06		110	%	70 - 130
			D10-o-Xylene	2020/08/06		112	%	70 - 130
			D4-1,2-Dichloroethane	2020/08/06		100	%	70 - 130
			Benzene	2020/08/06		99	%	70 - 130
			Toluene	2020/08/06		96	%	70 - 130
			Ethylbenzene	2020/08/06		113	%	70 - 130
			o-Xylene	2020/08/06		109	%	70 - 130

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			p+m-Xylene	2020/08/06		109	%	70 - 130
			F1 (C6-C10)	2020/08/06		98	%	70 - 130
6874638	GSG	LCS	F4G-sg (Grav. Heavy Hydrocarbons)	2020/08/06		91	%	65 - 135

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C0J3841
Report Date: 2020/08/07

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2007A

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Service Specialist

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

eCOC: T208138

Project Information:	C0J3841
Job Received:	2020/07/31 10:15
Results Required By:	2020/08/10 12:00
Expected Arrival:	2020/07/31 12:00
Submitted By:	Jeremy Eckert
Submitted To:	Mississauga, ON (Env. Lab)

Invoice Information

Attn: Imperial Accounts Payable
Imperial Oil Ltd - Golder Associates Ltd
102, 2535-3rd Avenue SE
Calgary , AB , T2A 7W5
Email to:
canadaaccountspayableinvoices@golder.com

Report Information

Attn: Ian Sosney
Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines , ON , L2W 1A4
Email to:
ian_sosney@golder.com
iol_1390@golder.com
iol_equis@golder.com
michelle_burger@golder.com

Project Information

Quote #:	B73682
PO/AFE#:	A2601436
Project #:	1791706-1155-2007A
Site Location:	N/A; 1660 Merivale Road, Ottawa, ON
Site #:	N/A
Task Order:	1791706-1155-7777

Analytical Summary

A: 2020/08/10 12:00

Client Sample ID	Clnt Ref	Sampling Date/Time	Matrix	#Cont	Lead (Dissolved) in Water	O.Reg 153 PHCs in Water
TH8	1	2020/07/28 19:55	GROUND WATER	7	A	A
TH9	2	2020/07/28 20:37	GROUND WATER	7	A	A
TH11	3	2020/07/28 22:40	GROUND WATER	7	A	A
TH100	4	2020/07/29 01:32	GROUND WATER	7	A	A
TH101	5	2020/07/28 23:48	GROUND WATER	7	A	A
TH102	6	2020/07/29 00:29	GROUND WATER	7	A	A
MW16-01	7	2020/07/28 21:59	GROUND WATER	7	A	A
DUP B	8	2020/07/28 23:48	GROUND WATER	7	A	A

Deadlines are estimates only and are subject to change. Please refer to your Job Confirmation report for final due dates.
Criteria : Reg153/04 T3-GW-F/M

eCOC: T208138

Project Information:	C0J3841
Job Received:	2020/07/31 10:15
Results Required By:	2020/08/10 12:00
Expected Arrival:	2020/07/31 12:00
Submitted By:	Jeremy Eckert
Submitted To:	Mississauga, ON (Env. Lab)

Submission Information

# of Samples: 8

Details: IES A2601436
SAP 88001627

samples may contain headspace and/or sediment
TH11 is a limited sample

off site

Custody Tracking Form

eCOC Number
T208138

Please use this form for custody tracking when submitting the work instructions via eCOC (electronic Chain of Custody). Please ensure your form **has a barcode or a Bureau Veritas Laboratories eCOC confirmation number** in the top right hand side. This number links your electronic submission to your samples. This form should be **placed in the cooler with your samples**.

Relinquished By				Received By			
Jeremy Eckert		Date	2020/07/30			Date	2020/07/31
		Time (24 HR)	1300			Time (24 HR)	1015
		Date				Date	
		Time (24 HR)				Time (24 HR)	
		Date				Date	
		Time (24 HR)				Time (24 HR)	

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Triage Information

Sampled By (Print)	# of Coolers/Pkgs				
Jeremy Eckert	1	Rush ☐	Micro ☐	Immediate Test ☐	Food Residue ☐ Food Chemistry ☐

***** Laboratory Use Only *****

Received At: 6740 Campobello

Labeled By: DSG

Verified By: GKI

Lab Comments: COJ3841

Custody Seal		Cooling Media	Temperature °C		
Present (Y/N)	Intact (Y/N)	Present (Y/N)	1	2	3
Y	Y	Y	1	Y	Y

COR FCD-00340 / 3
PAGE 1 of 1

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: July 28 and 29, 2020

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Bureau Veritas Mississauga

Consultant Project Number: 1791706-1155

Sample Submission Number: C0J3841

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within
Extraction Surrogate Recovery	X			acceptance criteria.
Method Blank Concentration	X			
Matrix Duplicate RPD	X			
Matrix Spike Recovery	X			
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	All field QC samples are within
Trip Blank Concentration			X	alert limits.
Field Duplicate RPD	X			

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): Amanda Newberry

Date: August 17, 2020

Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2007A
Your C.O.C. #: 208133

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2020/08/07
Report #: R6282636
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C0J3843
Received: 2020/07/31, 10:15

Sample Matrix: Water
Samples Received: 2

Analyses	Quantity	Laboratory Method	Analytical Method
Petroleum Hydro. CCME F1 & BTEX in Water	2	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1)	2	CAM SOP-00316	CCME PHC-CWS m
Dissolved Metals by ICPMS	2	CAM SOP-00447	EPA 6020B m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard. All samples were analyzed within hold time unless otherwise flagged.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.
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Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas Laboratories conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following "Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003". Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2007A
Your C.O.C. #: 208133

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2020/08/07
Report #: R6282636
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C0J3843
Received: 2020/07/31, 10:15

Encryption Key

Kyle Reinhart
Project Manager
07 Aug 2020 09:17:29

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kyle Reinhart, Project Manager
Email: Kyle.Reinhart@bvlabs.com
Phone# (905)817-5802

==========

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C0J3843
Report Date: 2020/08/07

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2007A

LEAD (DISSOLVED) IN WATER

BV Labs ID		NGI731	NGI732		
Sampling Date		2020/07/29 16:00	2020/07/29 16:05		
COC Number		208133	208133		
	UNITS	**Field Blank**	**Trip Blank**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	<0.50	<0.50	0.50	6867251

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C0J3843
Report Date: 2020/08/07

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2007A

O.REG 153 PHCS IN WATER (WATER)

BV Labs ID		NGI731	NGI732		
Sampling Date		2020/07/29 16:00	2020/07/29 16:05		
COC Number		208133	208133		
	UNITS	**Field Blank**	**Trip Blank**	**RDL**	**QC Batch**
Benzene	ug/L	<0.20	<0.20	0.20	6871758
Toluene	ug/L	<0.20	<0.20	0.20	6871758
Ethylbenzene	ug/L	<0.20	<0.20	0.20	6871758
o-Xylene	ug/L	<0.20	<0.20	0.20	6871758
p+m-Xylene	ug/L	<0.40	<0.40	0.40	6871758
Total Xylenes	ug/L	<0.40	<0.40	0.40	6871758
F1 (C6-C10)	ug/L	<25	<25	25	6871758
F1 (C6-C10) - BTEX	ug/L	<25	<25	25	6871758
F2 (C10-C16 Hydrocarbons)	ug/L	<100	<100	100	6872583
F3 (C16-C34 Hydrocarbons)	ug/L	<200	<200	200	6872583
F4 (C34-C50 Hydrocarbons)	ug/L	<200	<200	200	6872583
Reached Baseline at C50	ug/L	Yes	Yes		6872583
Extraction Surrogate Recovery (%)					
D10-o-Xylene	%	94	97		6871758
o-Terphenyl	%	101	100		6872583
Instrument Surrogate Recovery (%)					
1,4-Difluorobenzene	%	102	107		6871758
4-Bromofluorobenzene	%	99	97		6871758
D4-1,2-Dichloroethane	%	107	106		6871758

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C0J3843
Report Date: 2020/08/07

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2007A

TEST SUMMARY

BV Labs ID: NGI731
Sample ID: Field Blank
Matrix: Water

Collected: 2020/07/29
Relinquished: 2020/07/30
Received: 2020/07/31

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6871758	N/A	2020/08/05	Haibin Wu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6872583	2020/08/05	2020/08/06	Ksenia Trofimova
Dissolved Metals by ICPMS	ICP/MS	6867251	N/A	2020/08/04	Daniel Teclu

BV Labs ID: NGI732
Sample ID: Trip Blank
Matrix: Water

Collected: 2020/07/29
Relinquished: 2020/07/30
Received: 2020/07/31

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6871758	N/A	2020/08/05	Haibin Wu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6872583	2020/08/05	2020/08/06	Ksenia Trofimova
Dissolved Metals by ICPMS	ICP/MS	6867251	N/A	2020/08/04	Daniel Teclu

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	3.0°C

Results relate only to the items tested.

BV Labs Job #: C0J3843
Report Date: 2020/08/07

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2007A

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6867251	DT1	Method Blank	Dissolved Lead (Pb)	2020/08/04	<0.50		ug/L	
6871758	H_W	Method Blank	1,4-Difluorobenzene	2020/08/05		105	%	70 - 130
			4-Bromofluorobenzene	2020/08/05		97	%	70 - 130
			D10-o-Xylene	2020/08/05		95	%	70 - 130
			D4-1,2-Dichloroethane	2020/08/05		102	%	70 - 130
			Benzene	2020/08/05	<0.20		ug/L	
			Toluene	2020/08/05	<0.20		ug/L	
			Ethylbenzene	2020/08/05	<0.20		ug/L	
			o-Xylene	2020/08/05	<0.20		ug/L	
			p+m-Xylene	2020/08/05	<0.40		ug/L	
			Total Xylenes	2020/08/05	<0.40		ug/L	
			F1 (C6-C10)	2020/08/05	<25		ug/L	
			F1 (C6-C10) - BTEX	2020/08/05	<25		ug/L	
6872583	KTR	Method Blank	o-Terphenyl	2020/08/06		101	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2020/08/06	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2020/08/06	<200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2020/08/06	<200		ug/L	
6867251	DT1	LCS	Dissolved Lead (Pb)	2020/08/04		95	%	80 - 120
6871758	H_W	LCS	1,4-Difluorobenzene	2020/08/05		100	%	70 - 130
			4-Bromofluorobenzene	2020/08/05		97	%	70 - 130
			D10-o-Xylene	2020/08/05		92	%	70 - 130
			D4-1,2-Dichloroethane	2020/08/05		98	%	70 - 130
			Benzene	2020/08/05		107	%	70 - 130
			Toluene	2020/08/05		102	%	70 - 130
			Ethylbenzene	2020/08/05		113	%	70 - 130
			o-Xylene	2020/08/05		105	%	70 - 130
			p+m-Xylene	2020/08/05		104	%	70 - 130
			F1 (C6-C10)	2020/08/05		92	%	70 - 130
6872583	KTR	LCS	o-Terphenyl	2020/08/06		103	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2020/08/06		94	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2020/08/06		111	%	60 - 130
			F4 (C34-C50 Hydrocarbons)	2020/08/06		107	%	60 - 130

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C0J3843
Report Date: 2020/08/07

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2007A

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Service Specialist

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

eCOC: T208133

Project Information:	C0J3843
Job Received:	2020/07/31 10:15
Results Required By:	2020/08/10 12:00
Expected Arrival:	2020/07/31 12:00
Submitted By:	Jeremy Eckert
Submitted To:	Mississauga, ON (Env. Lab)

Invoice Information

Attn: Imperial Accounts Payable
Imperial Oil Ltd - Golder Associates Ltd
102, 2535-3rd Avenue SE
Calgary , AB , T2A 7W5
Email to:
canadaaccountspayableinvoices@golder.com

Report Information

Attn: Ian Sosney
Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines , ON , L2W 1A4
Email to:
ian_sosney@golder.com
iol_1390@golder.com
iol_equis@golder.com
michelle_burger@golder.com

Project Information

Quote #:	B73682
PO/AFE#:	A2601436
Project #:	1791706-1155-2007A
Site Location:	N/A; 1660 Merivale Road, Ottawa, ON
Site #:	N/A
Task Order:	1791706-1155-7777

Analytical Summary

A: 2020/08/10 12:00

Client Sample ID	Clnt Ref	Sampling Date/Time	Matrix	#Cont	Lead (Dissolved) in Water	O.Reg 153 PHCs in Water
Field Blank	1	2020/07/29 16:00	WATER	7	A	A
Trip Blank	2	2020/07/29 16:05	WATER	4	A	A

Deadlines are estimates only and are subject to change. Please refer to your Job Confirmation report for final due dates.
Criteria : Reg153/04 T3-GW-F/M

Submission Information

# of Samples:	2
Details:	IES A2601436 SAP 88001627

QAQC

Custody Tracking Form

eCOC Number
[redacted] T2·08133

Please use this form for custody tracking when submitting the work instructions via eCOC (electronic Chain of Custody). Please ensure your form **has a barcode or a Bureau Veritas Laboratories eCOC confirmation number** in the top right hand side. This number links your electronic submission to your samples. This form should be **placed in the cooler with your samples**.

Relinquished By				Received By			
Jeremy Eckert		Date	2020/07/30			Date	2020/07/31
		Time (24 HR)	1300			Time (24 HR)	10:15
		Date				Date	
		Time (24 HR)				Time (24 HR)	
		Date				Date	
		Time (24 HR)				Time (24 HR)	

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Triage Information

Sampled By (Print)	# of Coolers/Pkgs				
Jeremy Eckert	1	Rush ☐	Immediate Test ☐	Food Residue ☐	
		Micro ☐		Food Chemistry ☐	

***** Laboratory Use Only *****

Received At	6740 Campobello
Labeled By	DSG
Verified By	GKI

Lab Comments: COJ3843

Custody Seal		Cooling Media	Temperature °C		
Present (Y/N)	Intact (Y/N)	Present (Y/N)	1	2	3
Y	Y	Y	1	4	4

COR FCD-00340 / 3
PAGE 1 of 1

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: July 29, 2020

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Bureau Veritas Mississauga

Consultant Project Number: 1791706-1155

Sample Submission Number: C0J3843

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within
Extraction Surrogate Recovery	X			acceptance criteria.
Method Blank Concentration	X			
Matrix Duplicate RPD			X	
Matrix Spike Recovery			X	
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration	X			All field QC samples are within
Trip Blank Concentration	X			alert limits.
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): Amanda Newberry

Date: August 17, 2020

Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2007A
Your C.O.C. #: 208135

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2020/08/10
Report #: R6285574
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C0J3875
Received: 2020/07/31, 10:15

Sample Matrix: Water
Samples Received: 9

Analyses	Quantity	Laboratory Method	Analytical Method
Petroleum Hydro. CCME F1 & BTEX in Water	9	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1)	9	CAM SOP-00316	CCME PHC-CWS m
F4G (CCME Hydrocarbons Gravimetric)	1	CAM SOP-00326	CCME PHC-CWS m
Dissolved Metals by ICPMS	9	CAM SOP-00447	EPA 6020B m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard. All samples were analyzed within hold time unless otherwise flagged.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.
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Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas Laboratories conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following “Alberta Environment’s Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003”. Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2007A
Your C.O.C. #: 208135

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2020/08/10
Report #: R6285574
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C0J3875
Received: 2020/07/31, 10:15

Encryption Key

Kyle Reinhart
Project Manager
10 Aug 2020 09:56:31

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kyle Reinhart, Project Manager
Email: Kyle.Reinhart@bvlabs.com
Phone# (905)817-5802

==========

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C0J3875
Report Date: 2020/08/10

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2007A

LEAD (DISSOLVED) IN WATER

BV Labs ID		NGI853	NGI854	NGI855		NGI856		NGI857	NGI858		
Sampling Date		2020/07/29 15:45	2020/07/28 17:18	2020/07/29 14:30		2020/07/29 15:10		2020/07/27 15:30	2020/07/27 14:45		
COC Number		208135	208135	208135		208135		208135	208135		
	UNITS	**TH1**	**TH2**	**TH3**	**RDL**	**TH5**	**RDL**	**TH6**	**TH7**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	1.5	<0.50	3.7	0.50	26	2.5	<0.50	<0.50	0.50	6870147

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

BV Labs ID		NGI859	NGI860	NGI861		
Sampling Date		2020/07/27 12:50	2020/07/27 13:40	2020/07/29 15:10		
COC Number		208135	208135	208135		
	UNITS	**MW15-01**	**MW15-02**	**DUP A**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	<0.50	<0.50	25	0.50	6870147

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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BV Labs Job #: C0J3875
Report Date: 2020/08/10

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2007A

O.REG 153 PHCS IN WATER (WATER)

BV Labs ID		NGI853	NGI854	NGI855		NGI856		NGI857	NGI858		
Sampling Date		2020/07/29 15:45	2020/07/28 17:18	2020/07/29 14:30		2020/07/29 15:10		2020/07/27 15:30	2020/07/27 14:45		
COC Number		208135	208135	208135		208135		208135	208135		
	UNITS	**TH1**	**TH2**	**TH3**	**RDL**	**TH5**	**RDL**	**TH6**	**TH7**	**RDL**	**QC Batch**
Benzene	ug/L	<0.20	0.44	9.8	0.20	200	1.0	<0.20	27	0.20	6873234
Toluene	ug/L	<0.20	<0.20	<0.20	0.20	12	1.0	<0.20	1.3	0.20	6873234
Ethylbenzene	ug/L	<0.20	<0.20	6.4	0.20	830	1.0	<0.20	35	0.20	6873234
o-Xylene	ug/L	<0.20	0.24	<0.20	0.20	25	1.0	<0.20	0.56	0.20	6873234
p+m-Xylene	ug/L	<0.40	3.3	0.58	0.40	1400	2.0	<0.40	2.6	0.40	6873234
Total Xylenes	ug/L	<0.40	3.6	0.58	0.40	1400	2.0	<0.40	3.1	0.40	6873234
F1 (C6-C10)	ug/L	<25	<25	330	25	8500	130	<25	340	25	6873234
F1 (C6-C10) - BTEX	ug/L	<25	<25	310	25	6000	130	<25	270	25	6873234
F2 (C10-C16 Hydrocarbons)	ug/L	400	<100	<100	100	8500	100	<100	<100	100	6872357
F3 (C16-C34 Hydrocarbons)	ug/L	24000	<200	<200	200	570	200	<200	<200	200	6872357
F4 (C34-C50 Hydrocarbons)	ug/L	34000	<200	<200	200	<200	200	<200	<200	200	6872357
Reached Baseline at C50	ug/L	No	Yes	Yes		Yes		Yes	Yes		6872357
Extraction Surrogate Recovery (%)											
D10-o-Xylene	%	87	88	82		75		77	88		6873234
o-Terphenyl	%	102	99	100		99		100	99		6872357
Instrument Surrogate Recovery (%)											
1,4-Difluorobenzene	%	104	103	102		98		102	101		6873234
4-Bromofluorobenzene	%	109	112	112		111		110	111		6873234
D4-1,2-Dichloroethane	%	109	112	108		103		109	102		6873234

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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BV Labs Job #: C0J3875
Report Date: 2020/08/10

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2007A

O.REG 153 PHCS IN WATER (WATER)

BV Labs ID		NGI859	NGI860		NGI861		
Sampling Date		2020/07/27 12:50	2020/07/27 13:40		2020/07/29 15:10		
COC Number		208135	208135		208135		
	UNITS	**MW15-01**	**MW15-02**	**RDL**	**DUP A**	**RDL**	**QC Batch**
Benzene	ug/L	<0.20	0.79	0.20	200	1.0	6873234
Toluene	ug/L	<0.20	<0.20	0.20	12	1.0	6873234
Ethylbenzene	ug/L	<0.20	<0.20	0.20	790	1.0	6873234
o-Xylene	ug/L	<0.20	<0.20	0.20	23	1.0	6873234
p+m-Xylene	ug/L	<0.40	<0.40	0.40	1300	2.0	6873234
Total Xylenes	ug/L	<0.40	<0.40	0.40	1300	2.0	6873234
F1 (C6-C10)	ug/L	<25	<25	25	8200	130	6873234
F1 (C6-C10) - BTEX	ug/L	<25	<25	25	5900	130	6873234
F2 (C10-C16 Hydrocarbons)	ug/L	<100	<100	100	8500	100	6872357
F3 (C16-C34 Hydrocarbons)	ug/L	<200	<200	200	470	200	6872357
F4 (C34-C50 Hydrocarbons)	ug/L	<200	<200	200	<200	200	6872357
Reached Baseline at C50	ug/L	Yes	Yes		Yes		6872357
Extraction Surrogate Recovery (%)							
D10-o-Xylene	%	86	88		81		6873234
o-Terphenyl	%	100	100		100		6872357
Instrument Surrogate Recovery (%)							
1,4-Difluorobenzene	%	104	102		99		6873234
4-Bromofluorobenzene	%	109	109		111		6873234
D4-1,2-Dichloroethane	%	110	109		103		6873234

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2007A

PETROLEUM HYDROCARBONS (CCME)

BV Labs ID		NGI853		
Sampling Date		2020/07/29 15:45		
COC Number		208135		
	UNITS	**TH1**	**RDL**	**QC Batch**
F4G-sg (Grav. Heavy Hydrocarbons)	ug/L	160000	500	6874638

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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BV Labs Job #: C0J3875
Report Date: 2020/08/10

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2007A

TEST SUMMARY

BV Labs ID: NGI853
Sample ID: TH1
Matrix: Water

Collected: 2020/07/29
Relinquished: 2020/07/30
Received: 2020/07/31

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6873234	N/A	2020/08/06	Haibin Wu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6872357	2020/08/05	2020/08/06	Jeevaraj Jeevaratrnam
F4G (CCME Hydrocarbons Gravimetric)	BAL	6874638	2020/08/06	2020/08/06	Gurseerat singh gill
Dissolved Metals by ICPMS	ICP/MS	6870147	N/A	2020/08/05	Daniel Teclu

BV Labs ID: NGI854
Sample ID: TH2
Matrix: Water

Collected: 2020/07/28
Relinquished: 2020/07/30
Received: 2020/07/31

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6873234	N/A	2020/08/06	Haibin Wu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6872357	2020/08/05	2020/08/06	Jeevaraj Jeevaratrnam
Dissolved Metals by ICPMS	ICP/MS	6870147	N/A	2020/08/05	Daniel Teclu

BV Labs ID: NGI855
Sample ID: TH3
Matrix: Water

Collected: 2020/07/29
Relinquished: 2020/07/30
Received: 2020/07/31

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6873234	N/A	2020/08/06	Haibin Wu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6872357	2020/08/05	2020/08/06	Jeevaraj Jeevaratrnam
Dissolved Metals by ICPMS	ICP/MS	6870147	N/A	2020/08/05	Daniel Teclu

BV Labs ID: NGI856
Sample ID: TH5
Matrix: Water

Collected: 2020/07/29
Relinquished: 2020/07/30
Received: 2020/07/31

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6873234	N/A	2020/08/06	Haibin Wu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6872357	2020/08/05	2020/08/06	Jeevaraj Jeevaratrnam
Dissolved Metals by ICPMS	ICP/MS	6870147	N/A	2020/08/06	Daniel Teclu

BV Labs ID: NGI857
Sample ID: TH6
Matrix: Water

Collected: 2020/07/27
Relinquished: 2020/07/30
Received: 2020/07/31

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6873234	N/A	2020/08/06	Haibin Wu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6872357	2020/08/05	2020/08/06	Jeevaraj Jeevaratrnam
Dissolved Metals by ICPMS	ICP/MS	6870147	N/A	2020/08/06	Daniel Teclu

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C0J3875
Report Date: 2020/08/10

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2007A

TEST SUMMARY

BV Labs ID: NGI858
Sample ID: TH7
Matrix: Water

Collected: 2020/07/27
Relinquished: 2020/07/30
Received: 2020/07/31

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6873234	N/A	2020/08/06	Haibin Wu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6872357	2020/08/05	2020/08/06	Jeevaraj Jeevaratrnam
Dissolved Metals by ICPMS	ICP/MS	6870147	N/A	2020/08/05	Daniel Teclu

BV Labs ID: NGI859
Sample ID: MW15-01
Matrix: Water

Collected: 2020/07/27
Relinquished: 2020/07/30
Received: 2020/07/31

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6873234	N/A	2020/08/06	Haibin Wu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6872357	2020/08/05	2020/08/06	Jeevaraj Jeevaratrnam
Dissolved Metals by ICPMS	ICP/MS	6870147	N/A	2020/08/05	Daniel Teclu

BV Labs ID: NGI860
Sample ID: MW15-02
Matrix: Water

Collected: 2020/07/27
Relinquished: 2020/07/30
Received: 2020/07/31

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6873234	N/A	2020/08/06	Haibin Wu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6872357	2020/08/05	2020/08/06	Jeevaraj Jeevaratrnam
Dissolved Metals by ICPMS	ICP/MS	6870147	N/A	2020/08/05	Daniel Teclu

BV Labs ID: NGI861
Sample ID: DUP A
Matrix: Water

Collected: 2020/07/29
Relinquished: 2020/07/30
Received: 2020/07/31

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6873234	N/A	2020/08/06	Haibin Wu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6872357	2020/08/05	2020/08/06	Jeevaraj Jeevaratrnam
Dissolved Metals by ICPMS	ICP/MS	6870147	N/A	2020/08/05	Daniel Teclu

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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	2.0°C

Sample NGI856 [TH5] : Metals Analysis: Due to the sample matrix, the sample required dilution. Detection limits were adjusted accordingly.

Results relate only to the items tested.

BV Labs Job #: C0J3875
Report Date: 2020/08/10

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2007A

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6870147	DT1	Method Blank	Dissolved Lead (Pb)	2020/08/05	<0.50		ug/L	
6872357	JJE	Method Blank	o-Terphenyl	2020/08/05		101	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2020/08/05	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2020/08/05	<200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2020/08/05	<200		ug/L	
6873234	H_W	Method Blank	1,4-Difluorobenzene	2020/08/06		103	%	70 - 130
			4-Bromofluorobenzene	2020/08/06		107	%	70 - 130
			D10-o-Xylene	2020/08/06		83	%	70 - 130
			D4-1,2-Dichloroethane	2020/08/06		105	%	70 - 130
			Benzene	2020/08/06	<0.20		ug/L	
			Toluene	2020/08/06	<0.20		ug/L	
			Ethylbenzene	2020/08/06	<0.20		ug/L	
			o-Xylene	2020/08/06	<0.20		ug/L	
			p+m-Xylene	2020/08/06	<0.40		ug/L	
			Total Xylenes	2020/08/06	<0.40		ug/L	
			F1 (C6-C10)	2020/08/06	<25		ug/L	
			F1 (C6-C10) - BTEX	2020/08/06	<25		ug/L	
6874638	GSG	Method Blank	F4G-sg (Grav. Heavy Hydrocarbons)	2020/08/06	<500		ug/L	
6874638	GSG	RPD	F4G-sg (Grav. Heavy Hydrocarbons)	2020/08/06	0		%	20
6870147	DT1	LCS	Dissolved Lead (Pb)	2020/08/05		93	%	80 - 120
6872357	JJE	LCS	o-Terphenyl	2020/08/05		103	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2020/08/05		107	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2020/08/05		116	%	60 - 130
			F4 (C34-C50 Hydrocarbons)	2020/08/05		112	%	60 - 130
6873234	H_W	LCS	1,4-Difluorobenzene	2020/08/06		100	%	70 - 130
			4-Bromofluorobenzene	2020/08/06		110	%	70 - 130
			D10-o-Xylene	2020/08/06		112	%	70 - 130
			D4-1,2-Dichloroethane	2020/08/06		100	%	70 - 130
			Benzene	2020/08/06		99	%	70 - 130
			Toluene	2020/08/06		96	%	70 - 130
			Ethylbenzene	2020/08/06		113	%	70 - 130
			o-Xylene	2020/08/06		109	%	70 - 130
			p+m-Xylene	2020/08/06		109	%	70 - 130
			F1 (C6-C10)	2020/08/06		98	%	70 - 130
6874638	GSG	LCS	F4G-sg (Grav. Heavy Hydrocarbons)	2020/08/06		91	%	65 - 135

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

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BV Labs Job #: C0J3875
Report Date: 2020/08/10

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2007A

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Service Specialist

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

eCOC: T208135

Project Information:	C0J3875
Job Received:	2020/07/31 10:15
Results Required By:	2020/08/10 12:00
Expected Arrival:	2020/07/31 12:00
Submitted By:	Jeremy Eckert
Submitted To:	Mississauga, ON (Env. Lab)

Invoice Information

Attn: Imperial Accounts Payable
Imperial Oil Ltd - Golder Associates Ltd
102, 2535-3rd Avenue SE
Calgary , AB , T2A 7W5
Email to:
canadaaccountspayableinvoices@golder.com

Report Information

Attn: Ian Sosney
Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines , ON , L2W 1A4
Email to:
ian_sosney@golder.com
iol_1390@golder.com
iol_equis@golder.com
michelle_burger@golder.com

Project Information

Quote #:	B73682
PO/AFE#:	A2601436
Project #:	1791706-1155-2007A
Site Location:	N/A; 1660 Merivale Road, Ottawa, ON
Site #:	N/A
Task Order:	1791706-1155-7777

Analytical Summary

A: 2020/08/10 12:00

Client Sample ID	Clnt Ref	Sampling Date/Time	Matrix	#Cont	Lead (Dissolved) in Water	O.Reg 153 PHCs in Water
TH1	1	2020/07/29 15:45	GROUND WATER	7	A	A
TH2	2	2020/07/28 17:18	GROUND WATER	7	A	A
TH3	3	2020/07/29 14:30	GROUND WATER	7	A	A
TH5	4	2020/07/29 15:10	GROUND WATER	7	A	A
TH6	5	2020/07/27 15:30	GROUND WATER	7	A	A
TH7	6	2020/07/27 14:45	GROUND WATER	7	A	A
MW15-01	7	2020/07/27 12:50	GROUND WATER	7	A	A
MW15-02	8	2020/07/27 13:40	GROUND WATER	7	A	A
DUP A	9	2020/07/29 15:10	GROUND WATER	7	A	A

Deadlines are estimates only and are subject to change. Please refer to your Job Confirmation report for final due dates.
Criteria : Reg153/04 T3-GW-F/M

eCOC: T208135

Project Information:	C0J3875
Job Received:	2020/07/31 10:15
Results Required By:	2020/08/10 12:00
Expected Arrival:	2020/07/31 12:00
Submitted By:	Jeremy Eckert
Submitted To:	Mississauga, ON (Env. Lab)

Submission Information

# of Samples: 9

Details: IES A2601436
SAP 88001627

samples may contain headspace and/or sediment

on-site

Custody Tracking Form

eCOC Number
T208135

Please use this form for custody tracking when submitting the work instructions via eCOC (electronic Chain of Custody). Please ensure your form **has a barcode or a Bureau Veritas Laboratories eCOC confirmation number** in the top right hand side. This number links your electronic submission to your samples. This form should be **placed in the cooler with your samples**.

Relinquished By				Received By			
Jeremy Eckert		Date	2020/07/30			Date	2020/07/31
		Time (24 HR)	1300			Time (24 HR)	10:15
		Date				Date	
		Time (24 HR)				Time (24 HR)	
		Date				Date	
		Time (24 HR)				Time (24 HR)	

Unless otherwise agreed to, submissions and use of services are governed by Bureau Veritas' standard terms and conditions which can be found at www.bvlabs.com.

Triage Information

Sampled By (Print)	# of Coolers/Pkgs				
Jeremy Eckert	1	Rush ☐	Immediate Test ☐	Food Residue ☐	
		Micro ☐		Food Chemistry ☐	

***** Laboratory Use Only *****

Received At	6740 Campobello
Labeled By	DSG
Verified By	

Lab Comments: COJ3875

Custody Seal		Cooling Media	Temperature °C		
Present (Y/N)	Intact (Y/N)	Present (Y/N)	1	2	3
Y	Y	Y	2	4	0

COR FCD-00340 / 3
PAGE 1 of 1

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: July 27 and 29, 2020

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Bureau Veritas Mississauga

Consultant Project Number: 1791706-1155

Sample Submission Number: C0J3875

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within
Extraction Surrogate Recovery	X			acceptance criteria.
Method Blank Concentration	X			
Matrix Duplicate RPD	X			
Matrix Spike Recovery			X	
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	All field QC samples are within
Trip Blank Concentration			X	alert limits.
Field Duplicate RPD	X			

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): Amanda Newberry

Date: August 17, 2020

Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2007C
Your C.O.C. #: 246782

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2020/10/22
Report #: R6379526
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C0R2947
Received: 2020/10/16, 09:43

Sample Matrix: Water
Samples Received: 2

Analyses	Quantity	Laboratory Method	Analytical Method
Petroleum Hydro. CCME F1 & BTEX in Water	2	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1)	2	CAM SOP-00316	CCME PHC-CWS m
Dissolved Metals by ICPMS	1	CAM SOP-00447	EPA 6020B m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard. All samples were analyzed within hold time unless otherwise flagged.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.
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Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas Laboratories conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following “Alberta Environment’s Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003”. Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2007C
Your C.O.C. #: 246782

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2020/10/22
Report #: R6379526
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C0R2947
Received: 2020/10/16, 09:43

Encryption Key

Kyle Reinhart
Project Manager
22 Oct 2020 11:15:36

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kyle Reinhart, Project Manager
Email: Kyle.Reinhart@bvlabs.com
Phone# (905)817-5802

==========

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C0R2947
Report Date: 2020/10/22

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2007C

LEAD (DISSOLVED) IN WATER

BV Labs ID		NXK454		
Sampling Date		2020/10/14 23:00		
COC Number		246782		
	UNITS	**F.BLK**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	<0.50	0.50	7009402

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2007C

O.REG 153 PHCS IN WATER (WATER)

BV Labs ID		NXK454	NXK455		
Sampling Date		2020/10/14 23:00	2020/10/14 23:10		
COC Number		246782	246782		
	UNITS	**F.BLK**	**Trip Blank**	**RDL**	**QC Batch**
Benzene	ug/L	<0.20	<0.20	0.20	7010076
Toluene	ug/L	<0.20	<0.20	0.20	7010076
Ethylbenzene	ug/L	<0.20	<0.20	0.20	7010076
o-Xylene	ug/L	<0.20	<0.20	0.20	7010076
p+m-Xylene	ug/L	<0.40	<0.40	0.40	7010076
Total Xylenes	ug/L	<0.40	<0.40	0.40	7010076
F1 (C6-C10)	ug/L	<25	<25	25	7010076
F1 (C6-C10) - BTEX	ug/L	<25	<25	25	7010076
F2 (C10-C16 Hydrocarbons)	ug/L	<100	<100	100	7008246
F3 (C16-C34 Hydrocarbons)	ug/L	<200	<200	200	7008246
F4 (C34-C50 Hydrocarbons)	ug/L	<200	<200	200	7008246
Reached Baseline at C50	ug/L	Yes	Yes		7008246
Extraction Surrogate Recovery (%)					
D10-o-Xylene	%	94	95		7010076
o-Terphenyl	%	97	96		7008246
Instrument Surrogate Recovery (%)					
1,4-Difluorobenzene	%	97	105		7010076
4-Bromofluorobenzene	%	93	94		7010076
D4-1,2-Dichloroethane	%	107	115		7010076

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C0R2947
Report Date: 2020/10/22

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2007C

TEST SUMMARY

BV Labs ID: NXK454
Sample ID: F.BLK
Matrix: Water

Collected: 2020/10/14
Relinquished: 2020/10/15
Received: 2020/10/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7010076	N/A	2020/10/20	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7008246	2020/10/19	2020/10/20	Prabhjot Gulati
Dissolved Metals by ICPMS	ICP/MS	7009402	N/A	2020/10/21	Arefa Dabhad

BV Labs ID: NXK455
Sample ID: Trip Blank
Matrix: Water

Collected: 2020/10/14
Relinquished: 2020/10/15
Received: 2020/10/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7010076	N/A	2020/10/20	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7008246	2020/10/19	2020/10/20	Prabhjot Gulati

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	2.3°C

Results relate only to the items tested.

BV Labs Job #: C0R2947
Report Date: 2020/10/22

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2007C

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7008246	GUL	Method Blank	o-Terphenyl	2020/10/20		95	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2020/10/20	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2020/10/20	<200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2020/10/20	<200		ug/L	
7009402	ADA	Method Blank	Dissolved Lead (Pb)	2020/10/21	<0.50		ug/L	
7010076	AAI	Method Blank	1,4-Difluorobenzene	2020/10/20		102	%	70 - 130
			4-Bromofluorobenzene	2020/10/20		95	%	70 - 130
			D10-o-Xylene	2020/10/20		91	%	70 - 130
			D4-1,2-Dichloroethane	2020/10/20		111	%	70 - 130
			Benzene	2020/10/20	<0.20		ug/L	
			Toluene	2020/10/20	<0.20		ug/L	
			Ethylbenzene	2020/10/20	<0.20		ug/L	
			o-Xylene	2020/10/20	<0.20		ug/L	
			p+m-Xylene	2020/10/20	<0.40		ug/L	
			Total Xylenes	2020/10/20	<0.40		ug/L	
			F1 (C6-C10)	2020/10/20	<25		ug/L	
			F1 (C6-C10) - BTEX	2020/10/20	<25		ug/L	
7008246	GUL	LCS	o-Terphenyl	2020/10/20		96	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2020/10/20		90	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2020/10/20		100	%	60 - 130
			F4 (C34-C50 Hydrocarbons)	2020/10/20		95	%	60 - 130
7009402	ADA	LCS	Dissolved Lead (Pb)	2020/10/21		96	%	80 - 120
7010076	AAI	LCS	1,4-Difluorobenzene	2020/10/20		104	%	70 - 130
			4-Bromofluorobenzene	2020/10/20		100	%	70 - 130
			D10-o-Xylene	2020/10/20		91	%	70 - 130
			D4-1,2-Dichloroethane	2020/10/20		114	%	70 - 130
			Benzene	2020/10/20		98	%	50 - 140
			Toluene	2020/10/20		89	%	50 - 140
			Ethylbenzene	2020/10/20		99	%	50 - 140
			o-Xylene	2020/10/20		98	%	50 - 140
			p+m-Xylene	2020/10/20		98	%	50 - 140
			F1 (C6-C10)	2020/10/20		84	%	70 - 130

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C0R2947
Report Date: 2020/10/22

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2007C

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, B.Sc., C.Chem., Scientific Service Specialist

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

eCOC: T246782

Project Information:	C0R2947
Job Received:	2020/10/16 09:43
Results Required By:	2020/10/23 17:00
Expected Arrival:	2020/10/16 17:00
Submitted By:	Jeremy Eckert
Submitted To:	Mississauga, ON (Env. Lab)

Invoice Information

Attn: Imperial Accounts Payable
Imperial Oil Ltd - Golder Associates Ltd
102, 2535-3rd Avenue SE
Calgary , AB , T2A 7W5
Email to:
canadaaccountspayableinvoices@golder.com

Report Information

Attn: Ian Sosney
Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines , ON , L2W 1A4
Email to:
ian_sosney@golder.com
iol_1390@golder.com
iol_equis@golder.com

Project Information

Quote #:	B73682
PO/AFE#:	A2601436
Project #:	1791706-1155-2007C
Site Location:	1660 Merivale Road, Ottawa, ON
Site #:	N/A
Task Order:	1791706-1155-7777

Analytical Summary

A: 2020/10/23 17:00

Client Sample ID	Clnt Ref	Sampling Date/Time	Matrix	#Cont	Lead (Dissolved) in Water	O.Reg 153 PHCs in Water	Set Number
F.BLK	1	2020/10/14 23:00	WATER	7	A	A	1
Trip Blank	2	2020/10/14 23:10	WATER	4		A	2

Deadlines are estimates only and are subject to change. Please refer to your Job Confirmation report for final due dates.

Submission Information

# of Samples: 2

Details: IES A2601436
SAP 88001627

Sample Set Listing

Set 1 (1 sample)	Set 2 (1 sample)
F.BLK	Trip Blank

Custody Tracking Form

eCOC Number
T246782

Please use this form for custody tracking when submitting the work instructions via eCOC (electronic Chain of Custody). Please ensure your form **has a barcode or a Bureau Veritas Laboratories eCOC confirmation number** in the top right hand side. This number links your electronic submission to your samples. This form should be **placed in the cooler with your samples.**

Relinquished By				Received By			
Jeremy Eckert		Date	2020/10/15			Date	2020/10/16
		Time (24 HR)	1500			Time (24 HR)	09:43
		Date				Date	
		Time (24 HR)				Time (24 HR)	
		Date				Date	
		Time (24 HR)				Time (24 HR)	

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Triage Information

Sampled By (Print)	# of Coolers/Pkgs				
Jeremy Eckert	1	Rush ☐	Immediate Test ☐	Food Residue ☐	
		Micro ☐		Food Chemistry ☐	

***** Laboratory Use Only *****

Received At	Lab Comments:
6740 Campobello	COR2947
Labeled By	
DSG	
Verified By	
MA	

Custody Seal		Cooling Media	Temperature °C		
Present (Y/N)	Intact (Y/N)	Present (Y/N)	1	2	3
Y	Y	Y	2	2	3

COR FCD-00340 / 3
PAGE 1 of 1

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: October 14, 2020

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Bureau Veritas Mississauga

Consultant Project Number: 1791706-1155

Sample Submission Number: C0R2947

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within
Extraction Surrogate Recovery	X			acceptance criteria.
Method Blank Concentration	X			
Matrix Duplicate RPD			X	
Matrix Spike Recovery			X	
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration	X			All field QC samples are within
Trip Blank Concentration	X			alert limits.
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): Amanda Newberry

Date: October 24, 2020

Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2007C
Your C.O.C. #: 246779

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2020/10/22
Report #: R6380197
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C0R2950
Received: 2020/10/16, 09:43

Sample Matrix: Water
Samples Received: 6

Analyses	Quantity	Laboratory Method	Analytical Method
Petroleum Hydro. CCME F1 & BTEX in Water	6	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1)	6	CAM SOP-00316	CCME PHC-CWS m
Dissolved Metals by ICPMS	6	CAM SOP-00447	EPA 6020B m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard. All samples were analyzed within hold time unless otherwise flagged.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.
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Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas Laboratories conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following “Alberta Environment’s Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003”. Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2007C
Your C.O.C. #: 246779

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2020/10/22
Report #: R6380197
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C0R2950
Received: 2020/10/16, 09:43

Encryption Key

Kyle Reinhart
Project Manager
22 Oct 2020 17:19:54

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kyle Reinhart, Project Manager
Email: Kyle.Reinhart@bvlabs.com
Phone# (905)817-5802

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C0R2950
Report Date: 2020/10/22

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2007C

LEAD (DISSOLVED) IN WATER

BV Labs ID		NXK477	NXK478	NXK479	NXK479	NXK480	NXK481	NXK482		
Sampling Date		2020/10/14 20:45	2020/10/14 21:30	2020/10/14 22:30	2020/10/14 22:30	2020/10/14 22:50	2020/10/14 19:45	2020/10/14 19:45		
COC Number		246779	246779	246779	246779	246779	246779	246779		
	UNITS	**TH8**	**TH9**	**TH11**	**TH11 Lab-Dup**	**TH12**	**TH100**	**DUP A**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	0.61	<0.50	<0.50	<0.50	0.90	<0.50	<0.50	0.50	7009402

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C0R2950
Report Date: 2020/10/22

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2007C

O.REG 153 PHCS IN WATER (WATER)

BV Labs ID		NXK477			NXK477			NXK478		
Sampling Date		2020/10/14 20:45			2020/10/14 20:45			2020/10/14 21:30		
COC Number		246779			246779			246779		
	UNITS	**TH8**	**RDL**	**QC Batch**	**TH8 Lab-Dup**	**RDL**	**QC Batch**	**TH9**	**RDL**	**QC Batch**
Benzene	ug/L	0.96	0.20	7010443	0.93	0.20	7010443	54	0.20	7010443
Toluene	ug/L	<0.20	0.20	7010443	<0.20	0.20	7010443	6.3	0.20	7010443
Ethylbenzene	ug/L	1.2	0.20	7010443	1.0	0.20	7010443	420	0.20	7010443
o-Xylene	ug/L	<0.20	0.20	7010443	<0.20	0.20	7010443	6.5	0.20	7010443
p+m-Xylene	ug/L	<0.40	0.40	7010443	<0.40	0.40	7010443	200	0.40	7010443
Total Xylenes	ug/L	<0.40	0.40	7010443	<0.40	0.40	7010443	210	0.40	7010443
F1 (C6-C10)	ug/L	31	25	7010443	37	25	7010443	2200	25	7010443
F1 (C6-C10) - BTEX	ug/L	29	25	7010443	35	25	7010443	1500	25	7010443
F2 (C10-C16 Hydrocarbons)	ug/L	<100	100	7008246				480	100	7008246
F3 (C16-C34 Hydrocarbons)	ug/L	<200	200	7008246				<200	200	7008246
F4 (C34-C50 Hydrocarbons)	ug/L	<200	200	7008246				<200	200	7008246
Reached Baseline at C50	ug/L	Yes		7008246				Yes		7008246
Extraction Surrogate Recovery (%)										
D10-o-Xylene	%	105		7010443	114		7010443	119		7010443
o-Terphenyl	%	96		7008246				96		7008246
Instrument Surrogate Recovery (%)										
1,4-Difluorobenzene	%	101		7010443	99		7010443	94		7010443
4-Bromofluorobenzene	%	101		7010443	104		7010443	93		7010443
D4-1,2-Dichloroethane	%	103		7010443	106		7010443	93		7010443

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C0R2950
Report Date: 2020/10/22

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2007C

O.REG 153 PHCS IN WATER (WATER)

BV Labs ID		NXK478			NXK479	NXK480		NXK481	NXK482		
Sampling Date		2020/10/14 21:30			2020/10/14 22:30	2020/10/14 22:50		2020/10/14 19:45	2020/10/14 19:45		
COC Number		246779			246779	246779		246779	246779		
	UNITS	**TH9 Lab-Dup**	**RDL**	**QC Batch**	**TH11**	**TH12**	**RDL**	**TH100**	**DUP A**	**RDL**	**QC Batch**
Benzene	ug/L				170 (1)	37 (1)	0.40	<0.20	<0.20	0.20	7010443
Toluene	ug/L				19 (1)	4.7 (1)	0.40	<0.20	<0.20	0.20	7010443
Ethylbenzene	ug/L				820 (1)	240 (1)	0.40	<0.20	<0.20	0.20	7010443
o-Xylene	ug/L				37 (1)	5.6 (1)	0.40	<0.20	<0.20	0.20	7010443
p+m-Xylene	ug/L				600 (1)	64 (1)	0.80	<0.40	<0.40	0.40	7010443
Total Xylenes	ug/L				640	69	0.80	<0.40	<0.40	0.40	7010443
F1 (C6-C10)	ug/L				5000 (1)	4400 (1)	50	<25	<25	25	7010443
F1 (C6-C10) - BTEX	ug/L				3300	4100	50	<25	<25	25	7010443
F2 (C10-C16 Hydrocarbons)	ug/L	410	100	7008246	1000	1900	100	<100	<100	100	7008246
F3 (C16-C34 Hydrocarbons)	ug/L	<200	200	7008246	300	270	200	<200	<200	200	7008246
F4 (C34-C50 Hydrocarbons)	ug/L	<200	200	7008246	<200	<200	200	<200	<200	200	7008246
Reached Baseline at C50	ug/L	Yes		7008246	Yes	Yes		Yes	Yes		7008246
Extraction Surrogate Recovery (%)											
D10-o-Xylene	%				92	104		105	99		7010443
o-Terphenyl	%	91		7008246	94	95		97	97		7008246
Instrument Surrogate Recovery (%)											
1,4-Difluorobenzene	%				87	88		101	101		7010443
4-Bromofluorobenzene	%				95	95		103	92		7010443
D4-1,2-Dichloroethane	%				83	85		106	105		7010443

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C0R2950
Report Date: 2020/10/22

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2007C

TEST SUMMARY

BV Labs ID: NXK477
Sample ID: TH8
Matrix: Water

Collected: 2020/10/14
Relinquished: 2020/10/15
Received: 2020/10/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7010443	N/A	2020/10/21	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7008246	2020/10/19	2020/10/20	Prabhjot Gulati
Dissolved Metals by ICPMS	ICP/MS	7009402	N/A	2020/10/21	Arefa Dabhad

BV Labs ID: NXK477 Dup
Sample ID: TH8
Matrix: Water

Collected: 2020/10/14
Relinquished: 2020/10/15
Received: 2020/10/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7010443	N/A	2020/10/21	Lincoln Ramdahin

BV Labs ID: NXK478
Sample ID: TH9
Matrix: Water

Collected: 2020/10/14
Relinquished: 2020/10/15
Received: 2020/10/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7010443	N/A	2020/10/21	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7008246	2020/10/19	2020/10/20	Prabhjot Gulati
Dissolved Metals by ICPMS	ICP/MS	7009402	N/A	2020/10/21	Arefa Dabhad

BV Labs ID: NXK478 Dup
Sample ID: TH9
Matrix: Water

Collected: 2020/10/14
Relinquished: 2020/10/15
Received: 2020/10/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7008246	2020/10/19	2020/10/20	Prabhjot Gulati

BV Labs ID: NXK479
Sample ID: TH11
Matrix: Water

Collected: 2020/10/14
Relinquished: 2020/10/15
Received: 2020/10/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7010443	N/A	2020/10/22	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7008246	2020/10/19	2020/10/20	Prabhjot Gulati
Dissolved Metals by ICPMS	ICP/MS	7009402	N/A	2020/10/21	Arefa Dabhad

BV Labs ID: NXK479 Dup
Sample ID: TH11
Matrix: Water

Collected: 2020/10/14
Relinquished: 2020/10/15
Received: 2020/10/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Metals by ICPMS	ICP/MS	7009402	N/A	2020/10/21	Arefa Dabhad

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C0R2950
Report Date: 2020/10/22

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2007C

TEST SUMMARY

BV Labs ID: NXK480
Sample ID: TH12
Matrix: Water

Collected: 2020/10/14
Relinquished: 2020/10/15
Received: 2020/10/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7010443	N/A	2020/10/22	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7008246	2020/10/19	2020/10/20	Prabhjot Gulati
Dissolved Metals by ICPMS	ICP/MS	7009402	N/A	2020/10/21	Arefa Dabhad

BV Labs ID: NXK481
Sample ID: TH100
Matrix: Water

Collected: 2020/10/14
Relinquished: 2020/10/15
Received: 2020/10/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7010443	N/A	2020/10/21	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7008246	2020/10/19	2020/10/20	Prabhjot Gulati
Dissolved Metals by ICPMS	ICP/MS	7009402	N/A	2020/10/21	Arefa Dabhad

BV Labs ID: NXK482
Sample ID: DUP A
Matrix: Water

Collected: 2020/10/14
Relinquished: 2020/10/15
Received: 2020/10/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7010443	N/A	2020/10/21	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7008246	2020/10/19	2020/10/20	Prabhjot Gulati
Dissolved Metals by ICPMS	ICP/MS	7009402	N/A	2020/10/21	Arefa Dabhad

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2007C

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	2.3°C

Results relate only to the items tested.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7008246	GUL	Method Blank	o-Terphenyl	2020/10/20		95	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2020/10/20	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2020/10/20	<200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2020/10/20	<200		ug/L	
7009402	ADA	Method Blank	Dissolved Lead (Pb)	2020/10/21	<0.50		ug/L	
7010443	LRA	Method Blank	1,4-Difluorobenzene	2020/10/21		93	%	70 - 130
			4-Bromofluorobenzene	2020/10/21		101	%	70 - 130
			D10-o-Xylene	2020/10/21		120	%	70 - 130
			D4-1,2-Dichloroethane	2020/10/21		95	%	70 - 130
			Benzene	2020/10/21	<0.20		ug/L	
			Toluene	2020/10/21	<0.20		ug/L	
			Ethylbenzene	2020/10/21	<0.20		ug/L	
			o-Xylene	2020/10/21	<0.20		ug/L	
			p+m-Xylene	2020/10/21	<0.40		ug/L	
			Total Xylenes	2020/10/21	<0.40		ug/L	
			F1 (C6-C10)	2020/10/21	<25		ug/L	
			F1 (C6-C10) - BTEX	2020/10/21	<25		ug/L	
7010443	LRA	RPD [NXK477-01]	Benzene	2020/10/21	2.5		%	30
			Toluene	2020/10/21	NC		%	30
			Ethylbenzene	2020/10/21	14		%	30
			o-Xylene	2020/10/21	NC		%	30
			p+m-Xylene	2020/10/21	NC		%	30
			Total Xylenes	2020/10/21	NC		%	30
			F1 (C6-C10)	2020/10/21	18		%	30
			F1 (C6-C10) - BTEX	2020/10/21	19		%	30
7008246	GUL	RPD [NXK478-02]	F2 (C10-C16 Hydrocarbons)	2020/10/20	15		%	30
			F3 (C16-C34 Hydrocarbons)	2020/10/20	NC		%	30
			F4 (C34-C50 Hydrocarbons)	2020/10/20	NC		%	30
7009402	ADA	RPD [NXK479-03]	Dissolved Lead (Pb)	2020/10/21	NC		%	20
7008246	GUL	Matrix Spike [NXK477-02]	o-Terphenyl	2020/10/20		98	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2020/10/20		92	%	50 - 130
			F3 (C16-C34 Hydrocarbons)	2020/10/20		100	%	50 - 130
			F4 (C34-C50 Hydrocarbons)	2020/10/20		96	%	50 - 130
7009402	ADA	Matrix Spike [NXK479-03]	Dissolved Lead (Pb)	2020/10/21		89	%	80 - 120
7010443	LRA	Matrix Spike [NXK477-01]	1,4-Difluorobenzene	2020/10/21		99	%	70 - 130
			4-Bromofluorobenzene	2020/10/21		106	%	70 - 130
			D10-o-Xylene	2020/10/21		130	%	70 - 130
			D4-1,2-Dichloroethane	2020/10/21		98	%	70 - 130
			Benzene	2020/10/21		100	%	50 - 140
			Toluene	2020/10/21		96	%	50 - 140
			Ethylbenzene	2020/10/21		102	%	50 - 140
			o-Xylene	2020/10/21		107	%	50 - 140
			p+m-Xylene	2020/10/21		103	%	50 - 140
			F1 (C6-C10)	2020/10/21		90	%	70 - 130
7008246	GUL	LCS	o-Terphenyl	2020/10/20		96	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2020/10/20		90	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2020/10/20		100	%	60 - 130
			F4 (C34-C50 Hydrocarbons)	2020/10/20		95	%	60 - 130
7009402	ADA	LCS	Dissolved Lead (Pb)	2020/10/21		96	%	80 - 120
7010443	LRA	LCS	1,4-Difluorobenzene	2020/10/21		93	%	70 - 130

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			4-Bromofluorobenzene	2020/10/21		100	%	70 - 130
			D10-o-Xylene	2020/10/21		119	%	70 - 130
			D4-1,2-Dichloroethane	2020/10/21		89	%	70 - 130
			Benzene	2020/10/21		90	%	50 - 140
			Toluene	2020/10/21		88	%	50 - 140
			Ethylbenzene	2020/10/21		106	%	50 - 140
			o-Xylene	2020/10/21		104	%	50 - 140
			p+m-Xylene	2020/10/21		114	%	50 - 140
			F1 (C6-C10)	2020/10/21		89	%	70 - 130

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C0R2950
Report Date: 2020/10/22

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2007C

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, B.Sc., C.Chem., Scientific Service Specialist

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

eCOC: T246779

Project Information:	C0R2950
Job Received:	2020/10/16 09:43
Results Required By:	2020/10/23 17:00
Expected Arrival:	2020/10/16 17:00
Submitted By:	Jeremy Eckert
Submitted To:	Mississauga, ON (Env. Lab)

Invoice Information

Attn: Imperial Accounts Payable
Imperial Oil Ltd - Golder Associates Ltd
102, 2535-3rd Avenue SE
Calgary , AB , T2A 7W5
Email to:
canadaaccountspayableinvoices@golder.com

Report Information

Attn: Ian Sosney
Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines , ON , L2W 1A4
Email to:
ian_sosney@golder.com
iol_1390@golder.com
iol_equis@golder.com

Project Information

Quote #:	B73682
PO/AFE#:	A2601436
Project #:	1791706-1155-2007C
Site Location:	1660 Merivale Road, Ottawa, ON
Site #:	N/A
Task Order:	1791706-1155-7777

Analytical Summary

A: 2020/10/23 17:00

Client Sample ID	Clnt Ref	Sampling Date/Time	Matrix	#Cont	Lead (Dissolved) in Water	O.Reg 153 PHCs in Water
TH8	1	2020/10/14 20:45	GROUND WATER	7	A	A
TH9	2	2020/10/14 21:30	GROUND WATER	7	A	A
TH11	3	2020/10/14 22:30	GROUND WATER	7	A	A
TH12	4	2020/10/14 22:50	GROUND WATER	7	A	A
TH100	5	2020/10/14 19:45	GROUND WATER	7	A	A
DUP A	6	2020/10/14 19:45	GROUND WATER	7	A	A

Deadlines are estimates only and are subject to change. Please refer to your Job Confirmation report for final due dates.

Submission Information

# of Samples:	6
Details:	IES A2601436 SAP 88001627 Samples may contain headspace and/or sediment

Custody Tracking Form

eCOC Number
T246779

Please use this form for custody tracking when submitting the work instructions via eCOC (electronic Chain of Custody). Please ensure your form **has a barcode or a Bureau Veritas Laboratories eCOC confirmation number** in the top right hand side. This number links your electronic submission to your samples. This form should be **placed in the cooler with your samples**.

Relinquished By				Received By			
Jeremy Eckert		Date	2020/10/15			Date	2020/10/16
		Time (24 HR)	1500			Time (24 HR)	09:43
		Date				Date	
		Time (24 HR)				Time (24 HR)	
		Date				Date	
		Time (24 HR)				Time (24 HR)	

Unless otherwise agreed to, submissions and use of services are governed by Bureau Veritas' standard terms and conditions which can be found at www.bvlabs.com.

Triage Information

Sampled By (Print)	# of Coolers/Pkgs				
Jeremy Eckert	1	Rush ☐	Immediate Test ☐	Food Residue ☐	
		Micro ☐		Food Chemistry ☐	

***** Laboratory Use Only *****

Received At	Lab Comments:
6740 Campobello	COR2950
Labeled By	
DSG	
Verified By	
MAF	

Custody Seal		Cooling Media	Temperature °C		
Present (Y/N)	Intact (Y/N)	Present (Y/N)	1	2	3
Y	Y	Y	2	2	3

COR FCD-00340 / 3
PAGE 1 of 1

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: October 14, 2020

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Bureau Veritas Mississauga

Consultant Project Number: 1791706-1155

Sample Submission Number: C0R2950

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within
Extraction Surrogate Recovery	X			acceptance criteria.
Method Blank Concentration	X			
Matrix Duplicate RPD	X			
Matrix Spike Recovery	X			
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	All field QC samples are within
Trip Blank Concentration			X	alert limits.
Field Duplicate RPD	X			

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): Amanda Newberry

Date: October 24, 2020

Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023A
Your C.O.C. #: 78164

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2020/03/13
Report #: R6108615
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C055468
Received: 2020/03/02, 07:58

Sample Matrix: Air
Samples Received: 1

Analyses	Quantity	Laboratory Method	Analytical Method
BTEX and CCME Compounds in Air(TO-15mod)	1	BRL SOP-00304	EPA TO-15 m
Canister Pressure (TO-15)	1	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (ug/m3)	1	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (TO-15) (1)	1	BRL SOP-00304	EPA TO-15 m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard. All samples were analyzed within hold time unless otherwise flagged.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Air sampling canisters have been cleaned in accordance with U.S. EPA Method TO15. At the end of the cleaning, evacuation, and pressurization cycles, one canister was selected and was pressurized with Zero Air. This canister was then analyzed via TO15 on a GC/MS. The canister must have been found to contain <0.2 ppbv concentration of all target analytes in order for the batch to have been considered clean. Each canister also underwent a leak check prior to shipment.

Please Note: SUMMA® canister samples will be retained by Bureau Veritas Laboratories for a period of 5 calendar days or as contractually agreed from the date of this report, after which time they will be cleaned for reuse. If you require a longer sample storage period, please contact your service representative.

Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023A
Your C.O.C. #: 78164

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2020/03/13
Report #: R6108615
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C055468
Received: 2020/03/02, 07:58

Encryption Key

Kyle Reinhart
Project Manager
13 Mar 2020 13:29:25

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kyle Reinhart, Project Manager
Email: Kyle.Reinhart@bvlabs.com
Phone# (905)817-5802

==========

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C055468
Report Date: 2020/03/13

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023A

RESULTS OF ANALYSES OF AIR

BV Labs ID		MDF527	
Sampling Date		2020/02/28 13:39	
COC Number		78164	
	UNITS	**FIELD BLANK**	**QC Batch**
Pressure on Receipt	psig	(-1.4)	6629869
QC Batch = Quality Control Batch			

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		MDF527		
Sampling Date		2020/02/28 13:39		
COC Number		78164		
	UNITS	**FIELD BLANK**	**RDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ppbv	0.46	0.20	6629871
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	0.17	6629871
Chloromethane	ppbv	0.48	0.30	6629871
Vinyl Chloride	ppbv	<0.10	0.10	6629871
Chloroethane	ppbv	<0.30	0.30	6629871
1,3-Butadiene	ppbv	<0.50	0.50	6629871
Trichlorofluoromethane (FREON 11)	ppbv	0.20	0.20	6629871
Ethanol (ethyl alcohol)	ppbv	2.1	1.0	6629871
Trichlorotrifluoroethane	ppbv	<0.15	0.15	6629871
2-propanol	ppbv	<1.0	1.0	6629871
2-Propanone	ppbv	0.93	0.60	6629871
Methyl Ethyl Ketone (2-Butanone)	ppbv	0.24	0.20	6629871
Methyl Isobutyl Ketone	ppbv	<0.20	0.20	6629871
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	1.0	6629871
Methyl t-butyl ether (MTBE)	ppbv	<0.20	0.20	6629871
Ethyl Acetate	ppbv	<1.0	1.0	6629871
1,1-Dichloroethylene	ppbv	<0.10	0.10	6629871
cis-1,2-Dichloroethylene	ppbv	<0.10	0.10	6629871
trans-1,2-Dichloroethylene	ppbv	<0.10	0.10	6629871
Methylene Chloride(Dichloromethane)	ppbv	<0.60	0.60	6629871
Chloroform	ppbv	<0.10	0.10	6629871
Carbon Tetrachloride	ppbv	<0.10	0.10	6629871
1,1-Dichloroethane	ppbv	<0.10	0.10	6629871
1,2-Dichloroethane	ppbv	<0.10	0.10	6629871
Ethylene Dibromide	ppbv	<0.10	0.10	6629871
1,1,1-Trichloroethane	ppbv	<0.10	0.10	6629871
1,1,2-Trichloroethane	ppbv	<0.10	0.10	6629871
1,1,2,2-Tetrachloroethane	ppbv	<0.10	0.10	6629871
cis-1,3-Dichloropropene	ppbv	<0.10	0.10	6629871
trans-1,3-Dichloropropene	ppbv	<0.10	0.10	6629871
1,2-Dichloropropane	ppbv	<0.10	0.10	6629871
Bromomethane	ppbv	<0.10	0.10	6629871
Bromoform	ppbv	<0.20	0.20	6629871
Bromodichloromethane	ppbv	<0.20	0.20	6629871

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023A

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		MDF527		
Sampling Date		2020/02/28 13:39		
COC Number		78164		
	UNITS	**FIELD BLANK**	**RDL**	**QC Batch**
Dibromochloromethane	ppbv	<0.20	0.20	6629871
Trichloroethylene	ppbv	<0.10	0.10	6629871
Tetrachloroethylene	ppbv	<0.10	0.10	6629871
Benzene	ppbv	0.14	0.10	6629871
Toluene	ppbv	0.11	0.10	6629871
Ethylbenzene	ppbv	<0.10	0.10	6629871
p+m-Xylene	ppbv	<0.20	0.20	6629871
o-Xylene	ppbv	<0.10	0.10	6629871
Styrene	ppbv	<0.10	0.10	6629871
4-ethyltoluene	ppbv	<0.50	0.50	6629871
1,3,5-Trimethylbenzene	ppbv	<0.50	0.50	6629871
1,2,4-Trimethylbenzene	ppbv	<0.50	0.50	6629871
Chlorobenzene	ppbv	<0.10	0.10	6629871
Benzyl chloride	ppbv	<0.50	0.50	6629871
1,3-Dichlorobenzene	ppbv	<0.40	0.40	6629871
1,4-Dichlorobenzene	ppbv	<0.10	0.10	6629871
1,2-Dichlorobenzene	ppbv	<0.10	0.10	6629871
1,2,4-Trichlorobenzene	ppbv	<0.50	0.50	6629871
Hexachlorobutadiene	ppbv	<0.50	0.50	6629871
Hexane	ppbv	<0.20	0.20	6629871
Heptane	ppbv	<0.30	0.30	6629871
Cyclohexane	ppbv	<0.20	0.20	6629871
Tetrahydrofuran	ppbv	<0.40	0.40	6629871
1,4-Dioxane	ppbv	<1.0	1.0	6629871
Naphthalene	ppbv	<0.20	0.20	6629871
Total Xylenes	ppbv	<0.30	0.30	6629871
1,1,1,2-Tetrachloroethane	ppbv	<0.10	0.10	6629871
Vinyl Bromide	ppbv	<0.20	0.20	6629871
Propene	ppbv	<0.50	0.50	6629871
2,2,4-Trimethylpentane	ppbv	<0.20	0.20	6629871
Carbon Disulfide	ppbv	<0.50	0.50	6629871
Vinyl Acetate	ppbv	<0.20	0.20	6629871

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023A

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		MDF527		
Sampling Date		2020/02/28 13:39		
COC Number		78164		
	UNITS	**FIELD BLANK**	**RDL**	**QC Batch**
Instrument Surrogate Recovery (%)				
Bromochloromethane	%	74		6629871
D5-Chlorobenzene	%	69		6629871
Difluorobenzene	%	73		6629871

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023A

CALCULATED VOLATILE ORGANICS (AIR)

BV Labs ID		MDF527		
Sampling Date		2020/02/28 13:39		
COC Number		78164		
	UNITS	**FIELD BLANK**	**RDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ug/m3	2.30	0.99	6614676
1,2-Dichlorotetrafluoroethane	ug/m3	<1.2	1.2	6614676
Chloromethane	ug/m3	0.99	0.62	6614676
Vinyl Chloride	ug/m3	<0.26	0.26	6614676
Chloroethane	ug/m3	<0.79	0.79	6614676
1,3-Butadiene	ug/m3	<1.1	1.1	6614676
Trichlorofluoromethane (FREON 11)	ug/m3	1.1	1.1	6614676
Ethanol (ethyl alcohol)	ug/m3	4.0	1.9	6614676
Trichlorotrifluoroethane	ug/m3	<1.2	1.2	6614676
2-propanol	ug/m3	<2.5	2.5	6614676
2-Propanone	ug/m3	2.2	1.4	6614676
Methyl Ethyl Ketone (2-Butanone)	ug/m3	0.70	0.59	6614676
Methyl Isobutyl Ketone	ug/m3	<0.82	0.82	6614676
Methyl Butyl Ketone (2-Hexanone)	ug/m3	<4.1	4.1	6614676
Methyl t-butyl ether (MTBE)	ug/m3	<0.72	0.72	6614676
Ethyl Acetate	ug/m3	<3.6	3.6	6614676
1,1-Dichloroethylene	ug/m3	<0.40	0.40	6614676
cis-1,2-Dichloroethylene	ug/m3	<0.40	0.40	6614676
trans-1,2-Dichloroethylene	ug/m3	<0.40	0.40	6614676
Methylene Chloride(Dichloromethane)	ug/m3	<2.1	2.1	6614676
Chloroform	ug/m3	<0.49	0.49	6614676
Carbon Tetrachloride	ug/m3	<0.63	0.63	6614676
1,1-Dichloroethane	ug/m3	<0.40	0.40	6614676
1,2-Dichloroethane	ug/m3	<0.40	0.40	6614676
Ethylene Dibromide	ug/m3	<0.77	0.77	6614676
1,1,1-Trichloroethane	ug/m3	<0.55	0.55	6614676
1,1,2-Trichloroethane	ug/m3	<0.55	0.55	6614676
1,1,2,2-Tetrachloroethane	ug/m3	<0.69	0.69	6614676
cis-1,3-Dichloropropene	ug/m3	<0.45	0.45	6614676
trans-1,3-Dichloropropene	ug/m3	<0.45	0.45	6614676
1,2-Dichloropropane	ug/m3	<0.46	0.46	6614676
Bromomethane	ug/m3	<0.39	0.39	6614676
Bromoform	ug/m3	<2.1	2.1	6614676
Bromodichloromethane	ug/m3	<1.3	1.3	6614676

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023A

CALCULATED VOLATILE ORGANICS (AIR)

BV Labs ID		MDF527		
Sampling Date		2020/02/28 13:39		
COC Number		78164		
	UNITS	**FIELD BLANK**	**RDL**	**QC Batch**
Dibromochloromethane	ug/m3	<1.7	1.7	6614676
Trichloroethylene	ug/m3	<0.54	0.54	6614676
Tetrachloroethylene	ug/m3	<0.68	0.68	6614676
Benzene	ug/m3	0.46	0.32	6614676
Toluene	ug/m3	0.42	0.38	6614676
Ethylbenzene	ug/m3	<0.43	0.43	6614676
p+m-Xylene	ug/m3	<0.87	0.87	6614676
o-Xylene	ug/m3	<0.43	0.43	6614676
Styrene	ug/m3	<0.43	0.43	6614676
4-ethyltoluene	ug/m3	<2.5	2.5	6614676
1,3,5-Trimethylbenzene	ug/m3	<2.5	2.5	6614676
1,2,4-Trimethylbenzene	ug/m3	<2.5	2.5	6614676
Chlorobenzene	ug/m3	<0.46	0.46	6614676
Benzyl chloride	ug/m3	<2.6	2.6	6614676
1,3-Dichlorobenzene	ug/m3	<2.4	2.4	6614676
1,4-Dichlorobenzene	ug/m3	<0.60	0.60	6614676
1,2-Dichlorobenzene	ug/m3	<0.60	0.60	6614676
1,2,4-Trichlorobenzene	ug/m3	<3.7	3.7	6614676
Hexachlorobutadiene	ug/m3	<5.3	5.3	6614676
Hexane	ug/m3	<0.70	0.70	6614676
Heptane	ug/m3	<1.2	1.2	6614676
Cyclohexane	ug/m3	<0.69	0.69	6614676
Tetrahydrofuran	ug/m3	<1.2	1.2	6614676
1,4-Dioxane	ug/m3	<3.6	3.6	6614676
Naphthalene	ug/m3	<1.0	1.0	6614676
Total Xylenes	ug/m3	<1.3	1.3	6614676
1,1,1,2-Tetrachloroethane	ug/m3	<0.69	0.69	6614676
Vinyl Bromide	ug/m3	<0.87	0.87	6614676
Propene	ug/m3	<0.86	0.86	6614676
2,2,4-Trimethylpentane	ug/m3	<0.93	0.93	6614676
Carbon Disulfide	ug/m3	<1.6	1.6	6614676
Vinyl Acetate	ug/m3	<0.70	0.70	6614676

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

VOLATILE ORGANIC HYDROCARBONS BY GC/MS (AIR)

BV Labs ID		MDF527		
Sampling Date		2020/02/28 13:39		
COC Number		78164		
	UNITS	**FIELD BLANK**	**RDL**	**QC Batch**
F1-BTEX, C6-C10 (as Toluene)	ug/m3	6.6	5.0	6632192
F2, C10-C16 (as Decane)	ug/m3	<5.0	5.0	6632192

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

BV Labs Job #: C055468
Report Date: 2020/03/13

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023A

TEST SUMMARY

BV Labs ID: MDF527
Sample ID: FIELD BLANK
Matrix: Air

Collected: 2020/02/28
Relinquished: 2020/02/28
Received: 2020/03/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	6632192	N/A	2020/03/11	Dany Marqass
Canister Pressure (TO-15)	PRES	6629869	N/A	2020/03/11	Dany Marqass
Volatile Organics in Air (ug/m3)	GC/MS	6614676	N/A	2020/03/12	Automated Statchk
Volatile Organics in Air (TO-15)	GC/MS	6629871	N/A	2020/03/11	Dany Marqass

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

GENERAL COMMENTS

WS# 6629871: Vinyl Acetate was less than 60% recovery in the reference standard. There were no positives found for Vinyl Acetate therefore there should be no effect on the data.

Results relate only to the items tested.

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6629871	DM2	Method Blank	Bromochloromethane	2020/03/11		92	%	60 - 140
			D5-Chlorobenzene	2020/03/11		84	%	60 - 140
			Difluorobenzene	2020/03/11		92	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2020/03/11	<0.20		ppbv	
			1,2-Dichlorotetrafluoroethane	2020/03/11	<0.17		ppbv	
			Chloromethane	2020/03/11	<0.30		ppbv	
			Vinyl Chloride	2020/03/11	<0.10		ppbv	
			Chloroethane	2020/03/11	<0.30		ppbv	
			1,3-Butadiene	2020/03/11	<0.50		ppbv	
			Trichlorofluoromethane (FREON 11)	2020/03/11	<0.20		ppbv	
			Ethanol (ethyl alcohol)	2020/03/11	<1.0		ppbv	
			Trichlorotrifluoroethane	2020/03/11	<0.15		ppbv	
			2-propanol	2020/03/11	<1.0		ppbv	
			2-Propanone	2020/03/11	<0.60		ppbv	
			Methyl Ethyl Ketone (2-Butanone)	2020/03/11	<0.20		ppbv	
			Methyl Isobutyl Ketone	2020/03/11	<0.20		ppbv	
			Methyl Butyl Ketone (2-Hexanone)	2020/03/11	<1.0		ppbv	
			Methyl t-butyl ether (MTBE)	2020/03/11	<0.20		ppbv	
			Ethyl Acetate	2020/03/11	<1.0		ppbv	
			1,1-Dichloroethylene	2020/03/11	<0.10		ppbv	
			cis-1,2-Dichloroethylene	2020/03/11	<0.10		ppbv	
			trans-1,2-Dichloroethylene	2020/03/11	<0.10		ppbv	
			Methylene Chloride(Dichloromethane)	2020/03/11	<0.60		ppbv	
			Chloroform	2020/03/11	<0.10		ppbv	
			Carbon Tetrachloride	2020/03/11	<0.10		ppbv	
			1,1-Dichloroethane	2020/03/11	<0.10		ppbv	
			1,2-Dichloroethane	2020/03/11	<0.10		ppbv	
			Ethylene Dibromide	2020/03/11	<0.10		ppbv	
			1,1,1-Trichloroethane	2020/03/11	<0.10		ppbv	
			1,1,2-Trichloroethane	2020/03/11	<0.10		ppbv	
			1,1,2,2-Tetrachloroethane	2020/03/11	<0.10		ppbv	
			cis-1,3-Dichloropropene	2020/03/11	<0.10		ppbv	
			trans-1,3-Dichloropropene	2020/03/11	<0.10		ppbv	
			1,2-Dichloropropane	2020/03/11	<0.10		ppbv	
			Bromomethane	2020/03/11	<0.10		ppbv	
			Bromoform	2020/03/11	<0.20		ppbv	
			Bromodichloromethane	2020/03/11	<0.20		ppbv	
			Dibromochloromethane	2020/03/11	<0.20		ppbv	
			Trichloroethylene	2020/03/11	<0.10		ppbv	
			Tetrachloroethylene	2020/03/11	<0.10		ppbv	
			Benzene	2020/03/11	<0.10		ppbv	
			Toluene	2020/03/11	<0.10		ppbv	
			Ethylbenzene	2020/03/11	<0.10		ppbv	
			p+m-Xylene	2020/03/11	<0.20		ppbv	
			o-Xylene	2020/03/11	<0.10		ppbv	
			Styrene	2020/03/11	<0.10		ppbv	
			4-ethyltoluene	2020/03/11	<0.50		ppbv	
			1,3,5-Trimethylbenzene	2020/03/11	<0.50		ppbv	
			1,2,4-Trimethylbenzene	2020/03/11	<0.50		ppbv	
			Chlorobenzene	2020/03/11	<0.10		ppbv	

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Benzyl chloride	2020/03/11	<0.50		ppbv	
			1,3-Dichlorobenzene	2020/03/11	<0.40		ppbv	
			1,4-Dichlorobenzene	2020/03/11	<0.10		ppbv	
			1,2-Dichlorobenzene	2020/03/11	<0.10		ppbv	
			1,2,4-Trichlorobenzene	2020/03/11	<0.50		ppbv	
			Hexachlorobutadiene	2020/03/11	<0.50		ppbv	
			Hexane	2020/03/11	<0.20		ppbv	
			Heptane	2020/03/11	<0.30		ppbv	
			Cyclohexane	2020/03/11	<0.20		ppbv	
			Tetrahydrofuran	2020/03/11	<0.40		ppbv	
			1,4-Dioxane	2020/03/11	<1.0		ppbv	
			Naphthalene	2020/03/11	<0.20		ppbv	
			Total Xylenes	2020/03/11	<0.30		ppbv	
			1,1,1,2-Tetrachloroethane	2020/03/11	<0.10		ppbv	
			Vinyl Bromide	2020/03/11	<0.20		ppbv	
			Propene	2020/03/11	<0.50		ppbv	
			2,2,4-Trimethylpentane	2020/03/11	<0.20		ppbv	
			Carbon Disulfide	2020/03/11	<0.50		ppbv	
			Vinyl Acetate	2020/03/11	<0.20		ppbv	
6632192	DM2	Method Blank	F1-BTEX, C6-C10 (as Toluene)	2020/03/11	<5.0		ug/m3	
			F2, C10-C16 (as Decane)	2020/03/11	<5.0		ug/m3	
6629871	DM2	LCS	Bromochloromethane	2020/03/11		100	%	60 - 140
			D5-Chlorobenzene	2020/03/11		99	%	60 - 140
			Difluorobenzene	2020/03/11		100	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2020/03/11		96	%	70 - 130
			1,2-Dichlorotetrafluoroethane	2020/03/11		99	%	70 - 130
			Chloromethane	2020/03/11		98	%	70 - 130
			Vinyl Chloride	2020/03/11		101	%	70 - 130
			Chloroethane	2020/03/11		95	%	70 - 130
			1,3-Butadiene	2020/03/11		101	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2020/03/11		97	%	70 - 130
			Ethanol (ethyl alcohol)	2020/03/11		112	%	70 - 130
			Trichlorotrifluoroethane	2020/03/11		99	%	70 - 130
			2-propanol	2020/03/11		77	%	70 - 130
			2-Propanone	2020/03/11		80	%	70 - 130
			Methyl Ethyl Ketone (2-Butanone)	2020/03/11		93	%	70 - 130
			Methyl Isobutyl Ketone	2020/03/11		93	%	70 - 130
			Methyl Butyl Ketone (2-Hexanone)	2020/03/11		87	%	70 - 130
			Methyl t-butyl ether (MTBE)	2020/03/11		99	%	70 - 130
			Ethyl Acetate	2020/03/11		115	%	70 - 130
			1,1-Dichloroethylene	2020/03/11		97	%	70 - 130
			cis-1,2-Dichloroethylene	2020/03/11		98	%	70 - 130
			trans-1,2-Dichloroethylene	2020/03/11		100	%	70 - 130
			Methylene Chloride(Dichloromethane)	2020/03/11		91	%	70 - 130
			Chloroform	2020/03/11		99	%	70 - 130
			Carbon Tetrachloride	2020/03/11		103	%	70 - 130
			1,1-Dichloroethane	2020/03/11		97	%	70 - 130
			1,2-Dichloroethane	2020/03/11		95	%	70 - 130
			Ethylene Dibromide	2020/03/11		99	%	70 - 130
			1,1,1-Trichloroethane	2020/03/11		100	%	70 - 130

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,1,2-Trichloroethane	2020/03/11		98	%	70 - 130
			1,1,2,2-Tetrachloroethane	2020/03/11		98	%	70 - 130
			cis-1,3-Dichloropropene	2020/03/11		100	%	70 - 130
			trans-1,3-Dichloropropene	2020/03/11		97	%	70 - 130
			1,2-Dichloropropane	2020/03/11		97	%	70 - 130
			Bromomethane	2020/03/11		98	%	70 - 130
			Bromoform	2020/03/11		104	%	70 - 130
			Bromodichloromethane	2020/03/11		105	%	70 - 130
			Dibromochloromethane	2020/03/11		107	%	70 - 130
			Trichloroethylene	2020/03/11		106	%	70 - 130
			Tetrachloroethylene	2020/03/11		101	%	70 - 130
			Benzene	2020/03/11		96	%	70 - 130
			Toluene	2020/03/11		100	%	70 - 130
			Ethylbenzene	2020/03/11		99	%	70 - 130
			p+m-Xylene	2020/03/11		98	%	70 - 130
			o-Xylene	2020/03/11		98	%	70 - 130
			Styrene	2020/03/11		103	%	70 - 130
			4-ethyltoluene	2020/03/11		102	%	70 - 130
			1,3,5-Trimethylbenzene	2020/03/11		98	%	70 - 130
			1,2,4-Trimethylbenzene	2020/03/11		99	%	70 - 130
			Chlorobenzene	2020/03/11		102	%	70 - 130
			Benzyl chloride	2020/03/11		82	%	70 - 130
			1,3-Dichlorobenzene	2020/03/11		103	%	70 - 130
			1,4-Dichlorobenzene	2020/03/11		99	%	70 - 130
			1,2-Dichlorobenzene	2020/03/11		101	%	70 - 130
			1,2,4-Trichlorobenzene	2020/03/11		115	%	70 - 130
			Hexachlorobutadiene	2020/03/11		110	%	70 - 130
			Hexane	2020/03/11		108	%	70 - 130
			Heptane	2020/03/11		99	%	70 - 130
			Cyclohexane	2020/03/11		103	%	70 - 130
			Tetrahydrofuran	2020/03/11		99	%	70 - 130
			1,4-Dioxane	2020/03/11		102	%	70 - 130
			Naphthalene	2020/03/11		117	%	70 - 130
			Total Xylenes	2020/03/11		98	%	70 - 130
			1,1,1,2-Tetrachloroethane	2020/03/11		108	%	70 - 130
			Vinyl Bromide	2020/03/11		108	%	70 - 130
			Propene	2020/03/11		99	%	70 - 130
			2,2,4-Trimethylpentane	2020/03/11		105	%	70 - 130
			Carbon Disulfide	2020/03/11		101	%	70 - 130
			Vinyl Acetate	2020/03/11		54 (1)	%	70 - 130

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C055468
Report Date: 2020/03/13

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023A

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Maureen Smith, Supervisor, Volatiles

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Maxxam
A Bureau Veritas Group Company

6740 Campobello Road
Mississauga, ON L5N 2L8
www.maxxam.ca

Phone: (905) 817-5700
Fax: (905) 817-5779
Toll Free: 1-800-563-6266

EXXONMOBIL/IMPERIAL OIL - MAXXAM AIR CHAIN OF CUSTODY RECORD

C of C # 78164

INVOICE INFORMATION	REPORT INFORMATION
Company Name: ☒ Imperial Oil ☐ ExxonMobil	Company Name: Golder Associates Ltd.
Contact Name: IOL Accounts Payable	Contact Name: Ian Sosney
Address: 102-2535 3rd Ave SE Calgary, AB T2A 7W5	Address: 110 Hanover Dr #203A St. Catharines, ON, L2W 1A4
Email: IOL_Accounts_Payable@golder.com	Email: ian_sosney@golder.com
Ph: 403-299-5600	Ph: 647-522-4698
Sampler Name (Print): Jeremy Eckert	Consultant Project #: 1791706-1155-2023A

	FIELD SAMPLE ID	Canister Serial #	Flow Regulator Serial #	Sample Collection DATE (YYYY/MM/DD)	Sample Collection TIME (24 HR)	Media Type (See Legend)	FLOW RATE (mL/min.)	LENGTH OF SAMPLING (minutes)	BTEX	Aromatic/Aliphatic Hydrocarbon Fractionations	F1 (C6-C10) - F2 (C10-C16)	VOC (TO15)	Do not analyze
1	Field Blank	1539	FX1453	2020/02/28	1339	S	155	9	X		X	X	
2	Unused	1444	na	na	na	na	na	na					X
3													
4													
5													
6													
7													
8													
9													
10													
11													

IOL SITE LOCATION: 1660 Merivale Rd, Ottawa, ON

IOL PROJECT # (if applicable): N/A

MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM: 1791706-1155-7777

REGULATORY CRITERIA / DETECTION LIMITS: (PLEASE SPECIFY): N/A

SPECIAL INSTRUCTIONS: IES: A2601436 SAP: 8800627

LEGEND: S - Summa Can; T - Tube; TB - Tedlar Bag; O - Other(Specify); *TEMP N/A for SUMMA CAN

TURNAROUND TIME: Standard (10 days) ☒; Rush (9 days) ☐; (6 days) ☐; (3 days) ☐; Date Required

	YES	NO	COOLER ID # 1				YES	NO	COOLER ID #				YES	NO	COOLER ID #			
SEAL PRESENT	✓		TEMP °C	1	2	3			TEMP °C	1	2	3			TEMP °C	1	2	3
SEAL INTACT	✓																	
COOLING MEDIA PRESENT		✓																

RELINQUISHED BY:		DATE:	TIME (24 HR)	RECEIVED BY:		DATE:	TIME (24 HR)
1.	Jeremy Eckert	2020/02/28	1600	1. Khushboo Kapoor	KHUSHBOO KAPOOR	2020/03/02	07:58
2.				2.			
3.				3.			

LAB USE ONLY
MAXXAM JOB # C055468
SAMPLES LABELED BY: KK4 VERIFIED BY: AKP

IOL COC-AIR-(04/2016) White: Maxxam Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: February 28, 2020

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Bureau Veritas Mississauga

Consultant Project Number: 1791706-1155

Sample Submission Number: C055468

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			Lab control sample recovery (54%) outside acceptance
Extraction Surrogate Recovery			X	range of 70-130% for vinyl acetate. All remaining QC
Method Blank Concentration	X			results are within acceptance criteria.
Matrix Duplicate RPD			X	
Matrix Spike Recovery			X	
Lab Control Sample Recovery		X		

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration	X			All field QC samples are within
Trip Blank Concentration			X	alert limits.
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	n/a

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): Amanda Newberry

Date: March 13, 2020

Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023A
Your C.O.C. #: 78163

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2020/03/13
Report #: R6108618
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C055481
Received: 2020/03/02, 07:58

Sample Matrix: Air
Samples Received: 3

Analyses	Quantity	Laboratory Method	Analytical Method
BTEX and CCME Compounds in Air(TO-15mod)	3	BRL SOP-00304	EPA TO-15 m
Canister Pressure (TO-15)	3	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (ug/m3)	3	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (TO-15) (1)	3	BRL SOP-00304	EPA TO-15 m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard. All samples were analyzed within hold time unless otherwise flagged.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Air sampling canisters have been cleaned in accordance with U.S. EPA Method TO15. At the end of the cleaning, evacuation, and pressurization cycles, one canister was selected and was pressurized with Zero Air. This canister was then analyzed via TO15 on a GC/MS. The canister must have been found to contain <0.2 ppbv concentration of all target analytes in order for the batch to have been considered clean. Each canister also underwent a leak check prior to shipment.

Please Note: SUMMA® canister samples will be retained by Bureau Veritas Laboratories for a period of 5 calendar days or as contractually agreed from the date of this report, after which time they will be cleaned for reuse. If you require a longer sample storage period, please contact your service representative.

Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023A
Your C.O.C. #: 78163

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2020/03/13
Report #: R6108618
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C055481
Received: 2020/03/02, 07:58

Encryption Key

Kyle Reinhart
Project Manager
13 Mar 2020 13:30:26

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kyle Reinhart, Project Manager
Email: Kyle.Reinhart@bvlabs.com
Phone# (905)817-5802

==========

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C055481
Report Date: 2020/03/13

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023A

RESULTS OF ANALYSES OF AIR

BV Labs ID		MDF611	MDF612	MDF613	
Sampling Date		2020/02/28 12:17	2020/02/28 13:39	2020/02/28 12:18	
COC Number		78163	78163	78163	
	UNITS	**SV16-01**	**SV16-02**	**DUP A**	**QC Batch**
Pressure on Receipt	psig	(-2.2)	(-0.8)	(-2.2)	6629869
QC Batch = Quality Control Batch					

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VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		MDF611		MDF612	MDF612		MDF613		
Sampling Date		2020/02/28 12:17		2020/02/28 13:39	2020/02/28 13:39		2020/02/28 12:18		
COC Number		78163		78163	78163		78163		
	UNITS	**SV16-01**	**RDL**	**SV16-02**	**SV16-02 Lab-Dup**	**RDL**	**DUP A**	**RDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ppbv	1.74	0.20	4.63	4.64	0.20	1.58	0.20	6629871
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	0.17	<0.17	<0.17	0.17	<0.17	0.17	6629871
Chloromethane	ppbv	<0.30	0.30	<0.30	<0.30	0.30	<0.30	0.30	6629871
Vinyl Chloride	ppbv	<0.10	0.10	<0.10	<0.10	0.10	<0.10	0.10	6629871
Chloroethane	ppbv	<0.30	0.30	<0.30	<0.30	0.30	<0.30	0.30	6629871
1,3-Butadiene	ppbv	<0.50	0.50	<0.50	<0.50	0.50	<0.50	0.50	6629871
Trichlorofluoromethane (FREON 11)	ppbv	<0.20	0.20	<0.20	<0.20	0.20	<0.20	0.20	6629871
Ethanol (ethyl alcohol)	ppbv	3.0	1.0	4.4	4.4	1.0	1.9	1.0	6629871
Trichlorotrifluoroethane	ppbv	<0.15	0.15	<0.15	<0.15	0.15	<0.15	0.15	6629871
2-propanol	ppbv	<1.0	1.0	<1.0	<1.0	1.0	<1.0	1.0	6629871
2-Propanone	ppbv	5.65	0.60	10.0	9.88	0.60	5.30	0.60	6629871
Methyl Ethyl Ketone (2-Butanone)	ppbv	0.44	0.20	0.53	0.46	0.20	0.40	0.20	6629871
Methyl Isobutyl Ketone	ppbv	<0.20	0.20	<0.20	<0.20	0.20	<0.20	0.20	6629871
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	1.0	<1.0	<1.0	1.0	<1.0	1.0	6629871
Methyl t-butyl ether (MTBE)	ppbv	<0.20	0.20	<0.20	<0.20	0.20	<0.20	0.20	6629871
Ethyl Acetate	ppbv	<1.0	1.0	<1.0	<1.0	1.0	<1.0	1.0	6629871
1,1-Dichloroethylene	ppbv	<0.10	0.10	<0.10	<0.10	0.10	<0.10	0.10	6629871
cis-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.10	<0.10	0.10	<0.10	0.10	6629871
trans-1,2-Dichloroethylene	ppbv	<0.10	0.10	<0.10	<0.10	0.10	<0.10	0.10	6629871
Methylene Chloride(Dichloromethane)	ppbv	<0.60	0.60	<0.60	<0.60	0.60	<0.60	0.60	6629871
Chloroform	ppbv	2.64	0.10	<0.10	<0.10	0.10	2.61	0.10	6629871
Carbon Tetrachloride	ppbv	<0.10	0.10	<0.10	<0.10	0.10	<0.10	0.10	6629871
1,1-Dichloroethane	ppbv	<0.10	0.10	<0.10	<0.10	0.10	<0.10	0.10	6629871
1,2-Dichloroethane	ppbv	<0.10	0.10	<0.10	<0.10	0.10	<0.10	0.10	6629871
Ethylene Dibromide	ppbv	<0.10	0.10	<0.10	<0.10	0.10	<0.10	0.10	6629871
1,1,1-Trichloroethane	ppbv	<0.10	0.10	<0.10	<0.10	0.10	<0.10	0.10	6629871
1,1,2-Trichloroethane	ppbv	<0.10	0.10	<0.10	<0.10	0.10	<0.10	0.10	6629871
1,1,2,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.10	<0.10	0.10	<0.10	0.10	6629871
cis-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.10	<0.10	0.10	<0.10	0.10	6629871
trans-1,3-Dichloropropene	ppbv	<0.10	0.10	<0.10	<0.10	0.10	<0.10	0.10	6629871
1,2-Dichloropropane	ppbv	<0.10	0.10	<0.10	<0.10	0.10	<0.10	0.10	6629871
Bromomethane	ppbv	<0.10	0.10	<0.10	<0.10	0.10	<0.10	0.10	6629871
Bromoform	ppbv	<0.20	0.20	<0.20	<0.20	0.20	<0.20	0.20	6629871

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		MDF611		MDF612	MDF612		MDF613		
Sampling Date		2020/02/28 12:17		2020/02/28 13:39	2020/02/28 13:39		2020/02/28 12:18		
COC Number		78163		78163	78163		78163		
	UNITS	**SV16-01**	**RDL**	**SV16-02**	**SV16-02 Lab-Dup**	**RDL**	**DUP A**	**RDL**	**QC Batch**
Bromodichloromethane	ppbv	<0.20	0.20	<0.20	<0.20	0.20	<0.20	0.20	6629871
Dibromochloromethane	ppbv	<0.20	0.20	<0.20	<0.20	0.20	<0.20	0.20	6629871
Trichloroethylene	ppbv	<0.10	0.10	0.81	0.79	0.10	<0.10	0.10	6629871
Tetrachloroethylene	ppbv	0.27	0.10	<0.10	<0.10	0.10	0.24	0.10	6629871
Benzene	ppbv	<0.10	0.10	<0.10	<0.10	0.10	<0.10	0.10	6629871
Toluene	ppbv	<0.10	0.10	<0.10	<0.10	0.10	0.13	0.10	6629871
Ethylbenzene	ppbv	0.11	0.10	<0.10	<0.10	0.10	<0.10	0.10	6629871
p+m-Xylene	ppbv	0.29	0.20	<0.20	<0.20	0.20	0.28	0.20	6629871
o-Xylene	ppbv	0.14	0.10	<0.10	<0.10	0.10	0.12	0.10	6629871
Styrene	ppbv	<0.10	0.10	<0.10	<0.10	0.10	<0.10	0.10	6629871
4-ethyltoluene	ppbv	<0.50	0.50	<0.50	<0.50	0.50	<0.50	0.50	6629871
1,3,5-Trimethylbenzene	ppbv	<0.50	0.50	<0.50	<0.50	0.50	<0.50	0.50	6629871
1,2,4-Trimethylbenzene	ppbv	<0.50	0.50	<0.50	<0.50	0.50	<0.50	0.50	6629871
Chlorobenzene	ppbv	<0.10	0.10	<0.10	<0.10	0.10	<0.10	0.10	6629871
Benzyl chloride	ppbv	<0.50	0.50	<0.50	<0.50	0.50	<0.50	0.50	6629871
1,3-Dichlorobenzene	ppbv	<0.40	0.40	<0.40	<0.40	0.40	<0.40	0.40	6629871
1,4-Dichlorobenzene	ppbv	<0.10	0.10	<0.10	<0.10	0.10	<0.10	0.10	6629871
1,2-Dichlorobenzene	ppbv	<0.10	0.10	<0.10	<0.10	0.10	<0.10	0.10	6629871
1,2,4-Trichlorobenzene	ppbv	<0.50	0.50	<0.50	<0.50	0.50	<0.50	0.50	6629871
Hexachlorobutadiene	ppbv	<0.50	0.50	<0.50	<0.50	0.50	<0.50	0.50	6629871
Hexane	ppbv	<0.20	0.20	<0.20	<0.20	0.20	<0.20	0.20	6629871
Heptane	ppbv	<0.30	0.30	<0.30	<0.30	0.30	<0.30	0.30	6629871
Cyclohexane	ppbv	<0.20	0.20	<0.20	<0.20	0.20	<0.20	0.20	6629871
Tetrahydrofuran	ppbv	<0.40	0.40	<0.40	<0.40	0.40	<0.40	0.40	6629871
1,4-Dioxane	ppbv	<1.0	1.0	<1.0	<1.0	1.0	<1.0	1.0	6629871
Naphthalene	ppbv	<0.20	0.20	<0.20	<0.20	0.20	<0.20	0.20	6629871
Total Xylenes	ppbv	0.43	0.30	<0.30	<0.30	0.30	0.40	0.30	6629871
1,1,1,2-Tetrachloroethane	ppbv	<0.10	0.10	<0.10	<0.10	0.10	<0.10	0.10	6629871
Vinyl Bromide	ppbv	<0.20	0.20	<0.20	<0.20	0.20	<0.20	0.20	6629871
Propene	ppbv	<0.50	0.50	<0.65	<0.65	0.65	<0.50	0.50	6629871
2,2,4-Trimethylpentane	ppbv	<0.20	0.20	<0.20	<0.20	0.20	<0.20	0.20	6629871
Carbon Disulfide	ppbv	<0.50	0.50	<0.50	<0.50	0.50	<0.50	0.50	6629871
Vinyl Acetate	ppbv	<0.20	0.20	<0.20	<0.20	0.20	<0.20	0.20	6629871

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023A

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		MDF611		MDF612	MDF612		MDF613		
Sampling Date		2020/02/28 12:17		2020/02/28 13:39	2020/02/28 13:39		2020/02/28 12:18		
COC Number		78163		78163	78163		78163		
	UNITS	**SV16-01**	**RDL**	**SV16-02**	**SV16-02 Lab-Dup**	**RDL**	**DUP A**	**RDL**	**QC Batch**
Instrument Surrogate Recovery (%)									
Bromochloromethane	%	79		81	79		79		6629871
D5-Chlorobenzene	%	74		75	74		74		6629871
Difluorobenzene	%	77		78	77		76		6629871

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QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C055481
Report Date: 2020/03/13

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023A

CALCULATED VOLATILE ORGANICS (AIR)

BV Labs ID		MDF611		MDF612	MDF612		MDF613		
Sampling Date		2020/02/28 12:17		2020/02/28 13:39	2020/02/28 13:39		2020/02/28 12:18		
COC Number		78163		78163	78163		78163		
	UNITS	**SV16-01**	**RDL**	**SV16-02**	**SV16-02 Lab-Dup**	**RDL**	**DUP A**	**RDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ug/m3	8.60	0.99	22.9	22.9	0.99	7.80	0.99	6614676
1,2-Dichlorotetrafluoroethane	ug/m3	<1.2	1.2	<1.2	<1.2	1.2	<1.2	1.2	6614676
Chloromethane	ug/m3	<0.62	0.62	<0.62	<0.62	0.62	<0.62	0.62	6614676
Vinyl Chloride	ug/m3	<0.26	0.26	<0.26	<0.26	0.26	<0.26	0.26	6614676
Chloroethane	ug/m3	<0.79	0.79	<0.79	<0.79	0.79	<0.79	0.79	6614676
1,3-Butadiene	ug/m3	<1.1	1.1	<1.1	<1.1	1.1	<1.1	1.1	6614676
Trichlorofluoromethane (FREON 11)	ug/m3	<1.1	1.1	<1.1	<1.1	1.1	<1.1	1.1	6614676
Ethanol (ethyl alcohol)	ug/m3	5.6	1.9	8.3	8.2	1.9	3.6	1.9	6614676
Trichlorotrifluoroethane	ug/m3	<1.2	1.2	<1.2	<1.2	1.2	<1.2	1.2	6614676
2-propanol	ug/m3	<2.5	2.5	<2.5	<2.5	2.5	<2.5	2.5	6614676
2-Propanone	ug/m3	13.4	1.4	23.8	23.5	1.4	12.6	1.4	6614676
Methyl Ethyl Ketone (2-Butanone)	ug/m3	1.29	0.59	1.58	1.34	0.59	1.19	0.59	6614676
Methyl Isobutyl Ketone	ug/m3	<0.82	0.82	<0.82	<0.82	0.82	<0.82	0.82	6614676
Methyl Butyl Ketone (2-Hexanone)	ug/m3	<4.1	4.1	<4.1	<4.1	4.1	<4.1	4.1	6614676
Methyl t-butyl ether (MTBE)	ug/m3	<0.72	0.72	<0.72	<0.72	0.72	<0.72	0.72	6614676
Ethyl Acetate	ug/m3	<3.6	3.6	<3.6	<3.6	3.6	<3.6	3.6	6614676
1,1-Dichloroethylene	ug/m3	<0.40	0.40	<0.40	<0.40	0.40	<0.40	0.40	6614676
cis-1,2-Dichloroethylene	ug/m3	<0.40	0.40	<0.40	<0.40	0.40	<0.40	0.40	6614676
trans-1,2-Dichloroethylene	ug/m3	<0.40	0.40	<0.40	<0.40	0.40	<0.40	0.40	6614676
Methylene Chloride(Dichloromethane)	ug/m3	<2.1	2.1	<2.1	<2.1	2.1	<2.1	2.1	6614676
Chloroform	ug/m3	12.9	0.49	<0.49	<0.49	0.49	12.7	0.49	6614676
Carbon Tetrachloride	ug/m3	<0.63	0.63	<0.63	<0.63	0.63	<0.63	0.63	6614676
1,1-Dichloroethane	ug/m3	<0.40	0.40	<0.40	<0.40	0.40	<0.40	0.40	6614676
1,2-Dichloroethane	ug/m3	<0.40	0.40	<0.40	<0.40	0.40	<0.40	0.40	6614676
Ethylene Dibromide	ug/m3	<0.77	0.77	<0.77	<0.77	0.77	<0.77	0.77	6614676
1,1,1-Trichloroethane	ug/m3	<0.55	0.55	<0.55	<0.55	0.55	<0.55	0.55	6614676
1,1,2-Trichloroethane	ug/m3	<0.55	0.55	<0.55	<0.55	0.55	<0.55	0.55	6614676
1,1,2,2-Tetrachloroethane	ug/m3	<0.69	0.69	<0.69	<0.69	0.69	<0.69	0.69	6614676
cis-1,3-Dichloropropene	ug/m3	<0.45	0.45	<0.45	<0.45	0.45	<0.45	0.45	6614676
trans-1,3-Dichloropropene	ug/m3	<0.45	0.45	<0.45	<0.45	0.45	<0.45	0.45	6614676
1,2-Dichloropropane	ug/m3	<0.46	0.46	<0.46	<0.46	0.46	<0.46	0.46	6614676
Bromomethane	ug/m3	<0.39	0.39	<0.39	<0.39	0.39	<0.39	0.39	6614676
Bromoform	ug/m3	<2.1	2.1	<2.1	<2.1	2.1	<2.1	2.1	6614676

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

CALCULATED VOLATILE ORGANICS (AIR)

BV Labs ID		MDF611		MDF612	MDF612		MDF613		
Sampling Date		2020/02/28 12:17		2020/02/28 13:39	2020/02/28 13:39		2020/02/28 12:18		
COC Number		78163		78163	78163		78163		
	UNITS	**SV16-01**	**RDL**	**SV16-02**	**SV16-02 Lab-Dup**	**RDL**	**DUP A**	**RDL**	**QC Batch**
Bromodichloromethane	ug/m3	<1.3	1.3	<1.3	<1.3	1.3	<1.3	1.3	6614676
Dibromochloromethane	ug/m3	<1.7	1.7	<1.7	<1.7	1.7	<1.7	1.7	6614676
Trichloroethylene	ug/m3	<0.54	0.54	4.33	4.22	0.54	<0.54	0.54	6614676
Tetrachloroethylene	ug/m3	1.80	0.68	<0.68	<0.68	0.68	1.60	0.68	6614676
Benzene	ug/m3	<0.32	0.32	<0.32	<0.32	0.32	<0.32	0.32	6614676
Toluene	ug/m3	<0.38	0.38	<0.38	<0.38	0.38	0.49	0.38	6614676
Ethylbenzene	ug/m3	0.47	0.43	<0.43	<0.43	0.43	<0.43	0.43	6614676
p+m-Xylene	ug/m3	1.24	0.87	<0.87	<0.87	0.87	1.21	0.87	6614676
o-Xylene	ug/m3	0.60	0.43	<0.43	<0.43	0.43	0.53	0.43	6614676
Styrene	ug/m3	<0.43	0.43	<0.43	<0.43	0.43	<0.43	0.43	6614676
4-ethyltoluene	ug/m3	<2.5	2.5	<2.5	<2.5	2.5	<2.5	2.5	6614676
1,3,5-Trimethylbenzene	ug/m3	<2.5	2.5	<2.5	<2.5	2.5	<2.5	2.5	6614676
1,2,4-Trimethylbenzene	ug/m3	<2.5	2.5	<2.5	<2.5	2.5	<2.5	2.5	6614676
Chlorobenzene	ug/m3	<0.46	0.46	<0.46	<0.46	0.46	<0.46	0.46	6614676
Benzyl chloride	ug/m3	<2.6	2.6	<2.6	<2.6	2.6	<2.6	2.6	6614676
1,3-Dichlorobenzene	ug/m3	<2.4	2.4	<2.4	<2.4	2.4	<2.4	2.4	6614676
1,4-Dichlorobenzene	ug/m3	<0.60	0.60	<0.60	<0.60	0.60	<0.60	0.60	6614676
1,2-Dichlorobenzene	ug/m3	<0.60	0.60	<0.60	<0.60	0.60	<0.60	0.60	6614676
1,2,4-Trichlorobenzene	ug/m3	<3.7	3.7	<3.7	<3.7	3.7	<3.7	3.7	6614676
Hexachlorobutadiene	ug/m3	<5.3	5.3	<5.3	<5.3	5.3	<5.3	5.3	6614676
Hexane	ug/m3	<0.70	0.70	<0.70	<0.70	0.70	<0.70	0.70	6614676
Heptane	ug/m3	<1.2	1.2	<1.2	<1.2	1.2	<1.2	1.2	6614676
Cyclohexane	ug/m3	<0.69	0.69	<0.69	<0.69	0.69	<0.69	0.69	6614676
Tetrahydrofuran	ug/m3	<1.2	1.2	<1.2	<1.2	1.2	<1.2	1.2	6614676
1,4-Dioxane	ug/m3	<3.6	3.6	<3.6	<3.6	3.6	<3.6	3.6	6614676
Naphthalene	ug/m3	<1.0	1.0	<1.0	<1.0	1.0	<1.0	1.0	6614676
Total Xylenes	ug/m3	1.8	1.3	<1.3	<1.3	1.3	1.7	1.3	6614676
1,1,1,2-Tetrachloroethane	ug/m3	<0.69	0.69	<0.69	<0.69	0.69	<0.69	0.69	6614676
Vinyl Bromide	ug/m3	<0.87	0.87	<0.87	<0.87	0.87	<0.87	0.87	6614676
Propene	ug/m3	<0.86	0.86	<1.1	<1.1	1.1	<0.86	0.86	6614676
2,2,4-Trimethylpentane	ug/m3	<0.93	0.93	<0.93	<0.93	0.93	<0.93	0.93	6614676
Carbon Disulfide	ug/m3	<1.6	1.6	<1.6	<1.6	1.6	<1.6	1.6	6614676
Vinyl Acetate	ug/m3	<0.70	0.70	<0.70	<0.70	0.70	<0.70	0.70	6614676

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

VOLATILE ORGANIC HYDROCARBONS BY GC/MS (AIR)

BV Labs ID		MDF611	MDF612	MDF612	MDF613		
Sampling Date		2020/02/28 12:17	2020/02/28 13:39	2020/02/28 13:39	2020/02/28 12:18		
COC Number		78163	78163	78163	78163		
	UNITS	**SV16-01**	**SV16-02**	**SV16-02 Lab-Dup**	**DUP A**	**RDL**	**QC Batch**
F1-BTEX, C6-C10 (as Toluene)	ug/m3	102	98.0	89.7	134	5.0	6632192
F2, C10-C16 (as Decane)	ug/m3	227	118	122	197	5.0	6632192

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

BV Labs Job #: C055481
Report Date: 2020/03/13

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023A

TEST SUMMARY

BV Labs ID: MDF611
Sample ID: SV16-01
Matrix: Air

Collected: 2020/02/28
Relinquished: 2020/02/28
Received: 2020/03/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	6632192	N/A	2020/03/11	Dany Marqass
Canister Pressure (TO-15)	PRES	6629869	N/A	2020/03/11	Dany Marqass
Volatile Organics in Air (ug/m3)	GC/MS	6614676	N/A	2020/03/12	Automated Statchk
Volatile Organics in Air (TO-15)	GC/MS	6629871	N/A	2020/03/11	Dany Marqass

BV Labs ID: MDF612
Sample ID: SV16-02
Matrix: Air

Collected: 2020/02/28
Relinquished: 2020/02/28
Received: 2020/03/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	6632192	N/A	2020/03/11	Dany Marqass
Canister Pressure (TO-15)	PRES	6629869	N/A	2020/03/11	Dany Marqass
Volatile Organics in Air (ug/m3)	GC/MS	6614676	N/A	2020/03/12	Automated Statchk
Volatile Organics in Air (TO-15)	GC/MS	6629871	N/A	2020/03/11	Dany Marqass

BV Labs ID: MDF612 Dup
Sample ID: SV16-02
Matrix: Air

Collected: 2020/02/28
Relinquished: 2020/02/28
Received: 2020/03/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	6632192	N/A	2020/03/11	Dany Marqass
Volatile Organics in Air (ug/m3)	GC/MS	6614676	N/A	2020/03/13	Automated Statchk
Volatile Organics in Air (TO-15)	GC/MS	6629871	N/A	2020/03/11	Dany Marqass

BV Labs ID: MDF613
Sample ID: DUP A
Matrix: Air

Collected: 2020/02/28
Relinquished: 2020/02/28
Received: 2020/03/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	6632192	N/A	2020/03/11	Dany Marqass
Canister Pressure (TO-15)	PRES	6629869	N/A	2020/03/11	Dany Marqass
Volatile Organics in Air (ug/m3)	GC/MS	6614676	N/A	2020/03/12	Automated Statchk
Volatile Organics in Air (TO-15)	GC/MS	6629871	N/A	2020/03/11	Dany Marqass

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023A

GENERAL COMMENTS

WS# 6629871: Vinyl Acetate was less than 60% recovery in the reference standard. There were no positives found for Vinyl Acetate therefore there should be no effect on the data.

Sample MDF612 [SV16-02] : Increased DL for propene due to propane interference.

Results relate only to the items tested.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6629871	DM2	Method Blank	Bromochloromethane	2020/03/11		92	%	60 - 140
			D5-Chlorobenzene	2020/03/11		84	%	60 - 140
			Difluorobenzene	2020/03/11		92	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2020/03/11	<0.20		ppbv	
			1,2-Dichlorotetrafluoroethane	2020/03/11	<0.17		ppbv	
			Chloromethane	2020/03/11	<0.30		ppbv	
			Vinyl Chloride	2020/03/11	<0.10		ppbv	
			Chloroethane	2020/03/11	<0.30		ppbv	
			1,3-Butadiene	2020/03/11	<0.50		ppbv	
			Trichlorofluoromethane (FREON 11)	2020/03/11	<0.20		ppbv	
			Ethanol (ethyl alcohol)	2020/03/11	<1.0		ppbv	
			Trichlorotrifluoroethane	2020/03/11	<0.15		ppbv	
			2-propanol	2020/03/11	<1.0		ppbv	
			2-Propanone	2020/03/11	<0.60		ppbv	
			Methyl Ethyl Ketone (2-Butanone)	2020/03/11	<0.20		ppbv	
			Methyl Isobutyl Ketone	2020/03/11	<0.20		ppbv	
			Methyl Butyl Ketone (2-Hexanone)	2020/03/11	<1.0		ppbv	
			Methyl t-butyl ether (MTBE)	2020/03/11	<0.20		ppbv	
			Ethyl Acetate	2020/03/11	<1.0		ppbv	
			1,1-Dichloroethylene	2020/03/11	<0.10		ppbv	
			cis-1,2-Dichloroethylene	2020/03/11	<0.10		ppbv	
			trans-1,2-Dichloroethylene	2020/03/11	<0.10		ppbv	
			Methylene Chloride(Dichloromethane)	2020/03/11	<0.60		ppbv	
			Chloroform	2020/03/11	<0.10		ppbv	
			Carbon Tetrachloride	2020/03/11	<0.10		ppbv	
			1,1-Dichloroethane	2020/03/11	<0.10		ppbv	
			1,2-Dichloroethane	2020/03/11	<0.10		ppbv	
			Ethylene Dibromide	2020/03/11	<0.10		ppbv	
			1,1,1-Trichloroethane	2020/03/11	<0.10		ppbv	
			1,1,2-Trichloroethane	2020/03/11	<0.10		ppbv	
			1,1,2,2-Tetrachloroethane	2020/03/11	<0.10		ppbv	
			cis-1,3-Dichloropropene	2020/03/11	<0.10		ppbv	
			trans-1,3-Dichloropropene	2020/03/11	<0.10		ppbv	
			1,2-Dichloropropane	2020/03/11	<0.10		ppbv	
			Bromomethane	2020/03/11	<0.10		ppbv	
			Bromoform	2020/03/11	<0.20		ppbv	
			Bromodichloromethane	2020/03/11	<0.20		ppbv	
			Dibromochloromethane	2020/03/11	<0.20		ppbv	
			Trichloroethylene	2020/03/11	<0.10		ppbv	
			Tetrachloroethylene	2020/03/11	<0.10		ppbv	
			Benzene	2020/03/11	<0.10		ppbv	
			Toluene	2020/03/11	<0.10		ppbv	
			Ethylbenzene	2020/03/11	<0.10		ppbv	
			p+m-Xylene	2020/03/11	<0.20		ppbv	
			o-Xylene	2020/03/11	<0.10		ppbv	
			Styrene	2020/03/11	<0.10		ppbv	
			4-ethyltoluene	2020/03/11	<0.50		ppbv	
			1,3,5-Trimethylbenzene	2020/03/11	<0.50		ppbv	
			1,2,4-Trimethylbenzene	2020/03/11	<0.50		ppbv	
			Chlorobenzene	2020/03/11	<0.10		ppbv	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Benzyl chloride	2020/03/11	<0.50		ppbv	
			1,3-Dichlorobenzene	2020/03/11	<0.40		ppbv	
			1,4-Dichlorobenzene	2020/03/11	<0.10		ppbv	
			1,2-Dichlorobenzene	2020/03/11	<0.10		ppbv	
			1,2,4-Trichlorobenzene	2020/03/11	<0.50		ppbv	
			Hexachlorobutadiene	2020/03/11	<0.50		ppbv	
			Hexane	2020/03/11	<0.20		ppbv	
			Heptane	2020/03/11	<0.30		ppbv	
			Cyclohexane	2020/03/11	<0.20		ppbv	
			Tetrahydrofuran	2020/03/11	<0.40		ppbv	
			1,4-Dioxane	2020/03/11	<1.0		ppbv	
			Naphthalene	2020/03/11	<0.20		ppbv	
			Total Xylenes	2020/03/11	<0.30		ppbv	
			1,1,1,2-Tetrachloroethane	2020/03/11	<0.10		ppbv	
			Vinyl Bromide	2020/03/11	<0.20		ppbv	
			Propene	2020/03/11	<0.50		ppbv	
			2,2,4-Trimethylpentane	2020/03/11	<0.20		ppbv	
			Carbon Disulfide	2020/03/11	<0.50		ppbv	
			Vinyl Acetate	2020/03/11	<0.20		ppbv	
6632192	DM2	Method Blank	F1-BTEX, C6-C10 (as Toluene)	2020/03/11	<5.0		ug/m3	
			F2, C10-C16 (as Decane)	2020/03/11	<5.0		ug/m3	
6614676	ASC	RPD [MDF612-01]	Dichlorodifluoromethane (FREON 12)	2020/03/13	0.32		%	25
			1,2-Dichlorotetrafluoroethane	2020/03/13	NC		%	25
			Chloromethane	2020/03/13	NC		%	25
			Vinyl Chloride	2020/03/13	NC		%	25
			Chloroethane	2020/03/13	NC		%	25
			1,3-Butadiene	2020/03/13	NC		%	25
			Trichlorofluoromethane (FREON 11)	2020/03/13	NC		%	25
			Ethanol (ethyl alcohol)	2020/03/13	1.4		%	25
			Trichlorotrifluoroethane	2020/03/13	NC		%	25
			2-propanol	2020/03/13	NC		%	25
			2-Propanone	2020/03/13	1.6		%	25
			Methyl Ethyl Ketone (2-Butanone)	2020/03/13	16		%	25
			Methyl Isobutyl Ketone	2020/03/13	NC		%	25
			Methyl Butyl Ketone (2-Hexanone)	2020/03/13	NC		%	25
			Methyl t-butyl ether (MTBE)	2020/03/13	NC		%	25
			Ethyl Acetate	2020/03/13	NC		%	25
			1,1-Dichloroethylene	2020/03/13	NC		%	25
			cis-1,2-Dichloroethylene	2020/03/13	NC		%	25
			trans-1,2-Dichloroethylene	2020/03/13	NC		%	25
			Methylene Chloride(Dichloromethane)	2020/03/13	NC		%	25
			Chloroform	2020/03/13	NC		%	25
			Carbon Tetrachloride	2020/03/13	NC		%	25
			1,1-Dichloroethane	2020/03/13	NC		%	25
			1,2-Dichloroethane	2020/03/13	NC		%	25
			Ethylene Dibromide	2020/03/13	NC		%	25
			1,1,1-Trichloroethane	2020/03/13	NC		%	25
			1,1,2-Trichloroethane	2020/03/13	NC		%	25
			1,1,2,2-Tetrachloroethane	2020/03/13	NC		%	25
			cis-1,3-Dichloropropene	2020/03/13	NC		%	25

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			trans-1,3-Dichloropropene	2020/03/13	NC		%	25
			1,2-Dichloropropane	2020/03/13	NC		%	25
			Bromomethane	2020/03/13	NC		%	25
			Bromoform	2020/03/13	NC		%	25
			Bromodichloromethane	2020/03/13	NC		%	25
			Dibromochloromethane	2020/03/13	NC		%	25
			Trichloroethylene	2020/03/13	2.5		%	25
			Tetrachloroethylene	2020/03/13	NC		%	25
			Benzene	2020/03/13	NC		%	25
			Toluene	2020/03/13	NC		%	25
			Ethylbenzene	2020/03/13	NC		%	25
			p+m-Xylene	2020/03/13	NC		%	25
			o-Xylene	2020/03/13	NC		%	25
			Styrene	2020/03/13	NC		%	25
			4-ethyltoluene	2020/03/13	NC		%	25
			1,3,5-Trimethylbenzene	2020/03/13	NC		%	25
			1,2,4-Trimethylbenzene	2020/03/13	NC		%	25
			Chlorobenzene	2020/03/13	NC		%	25
			Benzyl chloride	2020/03/13	NC		%	25
			1,3-Dichlorobenzene	2020/03/13	NC		%	25
			1,4-Dichlorobenzene	2020/03/13	NC		%	25
			1,2-Dichlorobenzene	2020/03/13	NC		%	25
			1,2,4-Trichlorobenzene	2020/03/13	NC		%	25
			Hexachlorobutadiene	2020/03/13	NC		%	25
			Hexane	2020/03/13	NC		%	25
			Heptane	2020/03/13	NC		%	25
			Cyclohexane	2020/03/13	NC		%	25
			Tetrahydrofuran	2020/03/13	NC		%	25
			1,4-Dioxane	2020/03/13	NC		%	25
			Naphthalene	2020/03/13	NC		%	25
			Total Xylenes	2020/03/13	NC		%	25
			1,1,1,2-Tetrachloroethane	2020/03/13	NC		%	25
			Vinyl Bromide	2020/03/13	NC		%	25
			Propene	2020/03/13	NC		%	25
			2,2,4-Trimethylpentane	2020/03/13	NC		%	25
			Carbon Disulfide	2020/03/13	NC		%	25
			Vinyl Acetate	2020/03/13	NC		%	25
6629871	DM2	RPD [MDF612-01]	Dichlorodifluoromethane (FREON 12)	2020/03/11	0.32		%	25
			1,2-Dichlorotetrafluoroethane	2020/03/11	NC		%	25
			Chloromethane	2020/03/11	NC		%	25
			Vinyl Chloride	2020/03/11	NC		%	25
			Chloroethane	2020/03/11	NC		%	25
			1,3-Butadiene	2020/03/11	NC		%	25
			Trichlorofluoromethane (FREON 11)	2020/03/11	NC		%	25
			Ethanol (ethyl alcohol)	2020/03/11	1.4		%	25
			Trichlorotrifluoroethane	2020/03/11	NC		%	25
			2-propanol	2020/03/11	NC		%	25
			2-Propanone	2020/03/11	1.6		%	25
			Methyl Ethyl Ketone (2-Butanone)	2020/03/11	16		%	25
			Methyl Isobutyl Ketone	2020/03/11	NC		%	25

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Methyl Butyl Ketone (2-Hexanone)	2020/03/11	NC		%	25
			Methyl t-butyl ether (MTBE)	2020/03/11	NC		%	25
			Ethyl Acetate	2020/03/11	NC		%	25
			1,1-Dichloroethylene	2020/03/11	NC		%	25
			cis-1,2-Dichloroethylene	2020/03/11	NC		%	25
			trans-1,2-Dichloroethylene	2020/03/11	NC		%	25
			Methylene Chloride(Dichloromethane)	2020/03/11	NC		%	25
			Chloroform	2020/03/11	NC		%	25
			Carbon Tetrachloride	2020/03/11	NC		%	25
			1,1-Dichloroethane	2020/03/11	NC		%	25
			1,2-Dichloroethane	2020/03/11	NC		%	25
			Ethylene Dibromide	2020/03/11	NC		%	25
			1,1,1-Trichloroethane	2020/03/11	NC		%	25
			1,1,2-Trichloroethane	2020/03/11	NC		%	25
			1,1,2,2-Tetrachloroethane	2020/03/11	NC		%	25
			cis-1,3-Dichloropropene	2020/03/11	NC		%	25
			trans-1,3-Dichloropropene	2020/03/11	NC		%	25
			1,2-Dichloropropane	2020/03/11	NC		%	25
			Bromomethane	2020/03/11	NC		%	25
			Bromoform	2020/03/11	NC		%	25
			Bromodichloromethane	2020/03/11	NC		%	25
			Dibromochloromethane	2020/03/11	NC		%	25
			Trichloroethylene	2020/03/11	2.5		%	25
			Tetrachloroethylene	2020/03/11	NC		%	25
			Benzene	2020/03/11	NC		%	25
			Toluene	2020/03/11	NC		%	25
			Ethylbenzene	2020/03/11	NC		%	25
			p+m-Xylene	2020/03/11	NC		%	25
			o-Xylene	2020/03/11	NC		%	25
			Styrene	2020/03/11	NC		%	25
			4-ethyltoluene	2020/03/11	NC		%	25
			1,3,5-Trimethylbenzene	2020/03/11	NC		%	25
			1,2,4-Trimethylbenzene	2020/03/11	NC		%	25
			Chlorobenzene	2020/03/11	NC		%	25
			Benzyl chloride	2020/03/11	NC		%	25
			1,3-Dichlorobenzene	2020/03/11	NC		%	25
			1,4-Dichlorobenzene	2020/03/11	NC		%	25
			1,2-Dichlorobenzene	2020/03/11	NC		%	25
			1,2,4-Trichlorobenzene	2020/03/11	NC		%	25
			Hexachlorobutadiene	2020/03/11	NC		%	25
			Hexane	2020/03/11	NC		%	25
			Heptane	2020/03/11	NC		%	25
			Cyclohexane	2020/03/11	NC		%	25
			Tetrahydrofuran	2020/03/11	NC		%	25
			1,4-Dioxane	2020/03/11	NC		%	25
			Naphthalene	2020/03/11	NC		%	25
			Total Xylenes	2020/03/11	NC		%	25
			1,1,1,2-Tetrachloroethane	2020/03/11	NC		%	25
			Vinyl Bromide	2020/03/11	NC		%	25
			Propene	2020/03/11	NC		%	25

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			2,2,4-Trimethylpentane	2020/03/11	NC		%	25
			Carbon Disulfide	2020/03/11	NC		%	25
			Vinyl Acetate	2020/03/11	NC		%	25
6632192	DM2	RPD [MDF612-01]	F1-BTEX, C6-C10 (as Toluene)	2020/03/11	8.9		%	25
			F2, C10-C16 (as Decane)	2020/03/11	3.8		%	25
6629871	DM2	LCS	Bromochloromethane	2020/03/11		100	%	60 - 140
			D5-Chlorobenzene	2020/03/11		99	%	60 - 140
			Difluorobenzene	2020/03/11		100	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2020/03/11		96	%	70 - 130
			1,2-Dichlorotetrafluoroethane	2020/03/11		99	%	70 - 130
			Chloromethane	2020/03/11		98	%	70 - 130
			Vinyl Chloride	2020/03/11		101	%	70 - 130
			Chloroethane	2020/03/11		95	%	70 - 130
			1,3-Butadiene	2020/03/11		101	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2020/03/11		97	%	70 - 130
			Ethanol (ethyl alcohol)	2020/03/11		112	%	70 - 130
			Trichlorotrifluoroethane	2020/03/11		99	%	70 - 130
			2-propanol	2020/03/11		77	%	70 - 130
			2-Propanone	2020/03/11		80	%	70 - 130
			Methyl Ethyl Ketone (2-Butanone)	2020/03/11		93	%	70 - 130
			Methyl Isobutyl Ketone	2020/03/11		93	%	70 - 130
			Methyl Butyl Ketone (2-Hexanone)	2020/03/11		87	%	70 - 130
			Methyl t-butyl ether (MTBE)	2020/03/11		99	%	70 - 130
			Ethyl Acetate	2020/03/11		115	%	70 - 130
			1,1-Dichloroethylene	2020/03/11		97	%	70 - 130
			cis-1,2-Dichloroethylene	2020/03/11		98	%	70 - 130
			trans-1,2-Dichloroethylene	2020/03/11		100	%	70 - 130
			Methylene Chloride(Dichloromethane)	2020/03/11		91	%	70 - 130
			Chloroform	2020/03/11		99	%	70 - 130
			Carbon Tetrachloride	2020/03/11		103	%	70 - 130
			1,1-Dichloroethane	2020/03/11		97	%	70 - 130
			1,2-Dichloroethane	2020/03/11		95	%	70 - 130
			Ethylene Dibromide	2020/03/11		99	%	70 - 130
			1,1,1-Trichloroethane	2020/03/11		100	%	70 - 130
			1,1,2-Trichloroethane	2020/03/11		98	%	70 - 130
			1,1,2,2-Tetrachloroethane	2020/03/11		98	%	70 - 130
			cis-1,3-Dichloropropene	2020/03/11		100	%	70 - 130
			trans-1,3-Dichloropropene	2020/03/11		97	%	70 - 130
			1,2-Dichloropropane	2020/03/11		97	%	70 - 130
			Bromomethane	2020/03/11		98	%	70 - 130
			Bromoform	2020/03/11		104	%	70 - 130
			Bromodichloromethane	2020/03/11		105	%	70 - 130
			Dibromochloromethane	2020/03/11		107	%	70 - 130
			Trichloroethylene	2020/03/11		106	%	70 - 130
			Tetrachloroethylene	2020/03/11		101	%	70 - 130
			Benzene	2020/03/11		96	%	70 - 130
			Toluene	2020/03/11		100	%	70 - 130
			Ethylbenzene	2020/03/11		99	%	70 - 130
			p+m-Xylene	2020/03/11		98	%	70 - 130
			o-Xylene	2020/03/11		98	%	70 - 130

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Styrene	2020/03/11		103	%	70 - 130
			4-ethyltoluene	2020/03/11		102	%	70 - 130
			1,3,5-Trimethylbenzene	2020/03/11		98	%	70 - 130
			1,2,4-Trimethylbenzene	2020/03/11		99	%	70 - 130
			Chlorobenzene	2020/03/11		102	%	70 - 130
			Benzyl chloride	2020/03/11		82	%	70 - 130
			1,3-Dichlorobenzene	2020/03/11		103	%	70 - 130
			1,4-Dichlorobenzene	2020/03/11		99	%	70 - 130
			1,2-Dichlorobenzene	2020/03/11		101	%	70 - 130
			1,2,4-Trichlorobenzene	2020/03/11		115	%	70 - 130
			Hexachlorobutadiene	2020/03/11		110	%	70 - 130
			Hexane	2020/03/11		108	%	70 - 130
			Heptane	2020/03/11		99	%	70 - 130
			Cyclohexane	2020/03/11		103	%	70 - 130
			Tetrahydrofuran	2020/03/11		99	%	70 - 130
			1,4-Dioxane	2020/03/11		102	%	70 - 130
			Naphthalene	2020/03/11		117	%	70 - 130
			Total Xylenes	2020/03/11		98	%	70 - 130
			1,1,1,2-Tetrachloroethane	2020/03/11		108	%	70 - 130
			Vinyl Bromide	2020/03/11		108	%	70 - 130
			Propene	2020/03/11		99	%	70 - 130
			2,2,4-Trimethylpentane	2020/03/11		105	%	70 - 130
			Carbon Disulfide	2020/03/11		101	%	70 - 130
			Vinyl Acetate	2020/03/11		54 (1)	%	70 - 130

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

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BV Labs Job #: C055481
Report Date: 2020/03/13

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023A

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Maureen Smith, Supervisor, Volatiles

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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INVOICE INFORMATION	REPORT INFORMATION
Company Name: ☒ Imperial Oil ☐ ExxonMobil	Company Name: Golder Associates Ltd.
Contact Name: IOL Accounts Payable	Contact Name: Ian Sosney
Address: 102-2535 3rd Ave SE Calgary, AB T2A 7W5	Address: 110 Hannover Dr #203A St. Catharines, ON L2W 1A4
Email: IOLAccounts_payable@golder.com	Email: ian_sosney@golder.com
Ph: 403-299-5600	Ph: 647-522-4698
Sampler Name (Print): Jeremy Eckert	Consultant Project #: 1791706-1155-2023A

	FIELD SAMPLE ID	Canister Serial #	Flow Regulator Serial #	Sample Collection DATE (YYYY/MM/DD)	Sample Collection TIME (24 HR)	Media Type (See Legend)	FLOW RATE (mL/min.)	LENGTH OF SAMPLING (minutes)	BTEX	Aromatic/Aliphatic Hydrocarbon Fractionations	F1 (C6-C10) - F2 (C10-C16)	VOC (TO15)
1	SV16-01	1333	FX1248	2020/02/28	1217	S	175	8	X		X	X
2	SV16-02	6903	FX1207	2020/02/28	1339	S	155	9	X		X	X
3	DUPA	6623	FX0844	2020/02/28	1218	S	155	9	X		X	X
4												
5												
6												
7												
8												
9												
10												
11												

ANALYSIS REQUESTED

IOL SITE LOCATION: 1660 Merivale Rd, Ottawa, ON

IOL PROJECT # (if applicable): N/A

MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM: 1791706-1155-7777

REGULATORY CRITERIA / DETECTION LIMITS (PLEASE SPECIFY): N/A

SPECIAL INSTRUCTIONS: IES: A2601436
SAP: 88001627

LEGEND
S - Summa Can
T - Tube
TB - Tedlar Bag
O - Other(Specify)
*TEMP N/A for SUMMA CAN

TURNAROUND TIME
Standard (10 days) ☒
Rush (9 days) ☐
(6 days) ☐
(3 days) ☐
Date Required

	YES	NO	COOLER ID # 1				YES	NO	COOLER ID #				YES	NO	COOLER ID #			
SEAL PRESENT	✓		TEMP °C	1	2	3	SEAL PRESENT			TEMP °C	1	2	3	SEAL PRESENT			TEMP °C	1	2	3
SEAL INTACT	✓						SEAL INTACT							SEAL INTACT						
COOLING MEDIA PRESENT		✓					COOLING MEDIA PRESENT							COOLING MEDIA PRESENT						

LAB USE ONLY
MAXXAM JOB # C055481

RELINQUISHED BY:		DATE:	TIME (24 HR)	RECEIVED BY:		DATE:	TIME (24 HR)
1.	Jeremy Eckert	2020/02/28	1600	1. Khushboo Kapoor	KHUSHBOO KAPOOR	2020/03/02	07:58
2.				2.			
3.				3.			

SAMPLES
LABELED BY: KKH
VERIFIED BY: AKP

IOL COC-AIR-(04/2016) White: Maxxam Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: February 28, 2020

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Bureau Veritas Mississauga

Consultant Project Number: 1791706-1155

Sample Submission Number: C055481

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			Lab control sample recovery (54%) outside acceptance
Extraction Surrogate Recovery			X	range of 70-130% for vinyl acetate. All remaining QC
Method Blank Concentration	X			results are within acceptance criteria.
Matrix Duplicate RPD	X			
Matrix Spike Recovery			X	
Lab Control Sample Recovery		X		

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	All field QC samples are within
Trip Blank Concentration			X	alert limits.
Field Duplicate RPD	X			

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	n/a

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): Amanda Newberry

Date: March 13, 2020

Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023B
Your C.O.C. #: 81761

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2020/09/14
Report #: R6330210
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C0M4970
Received: 2020/09/01, 13:30

Sample Matrix: Air
Samples Received: 3

Analyses	Quantity	Laboratory Method	Analytical Method
BTEX and CCME Compounds in Air(TO-15mod)	3	BRL SOP-00304	EPA TO-15 m
Canister Pressure (TO-15)	3	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (ug/m3)	3	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (TO-15) (1)	3	BRL SOP-00304	EPA TO-15 m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard. All samples were analyzed within hold time unless otherwise flagged.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Air sampling canisters have been cleaned in accordance with U.S. EPA Method TO15. At the end of the cleaning, evacuation, and pressurization cycles, one canister was selected and was pressurized with Zero Air. This canister was then analyzed via TO15 on a GC/MS. The canister must have been found to contain <0.2 ppbv concentration of all target analytes in order for the batch to have been considered clean. Each canister also underwent a leak check prior to shipment.

Please Note: SUMMA® canister samples will be retained by Bureau Veritas Laboratories for a period of 5 calendar days or as contractually agreed from the date of this report, after which time they will be cleaned for reuse. If you require a longer sample storage period, please contact your service representative.

Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023B
Your C.O.C. #: 81761

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2020/09/14
Report #: R6330210
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C0M4970
Received: 2020/09/01, 13:30

Encryption Key

Kyle Reinhart
Project Manager
14 Sep 2020 22:12:52

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kyle Reinhart, Project Manager
Email: Kyle.Reinhart@bvlabs.com
Phone# (905)817-5802

==========

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C0M4970
Report Date: 2020/09/14

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023B

RESULTS OF ANALYSES OF AIR

BV Labs ID		NNC428	NNC429	NNC430	
Sampling Date		2020/08/31 11:42	2020/08/31 11:42	2020/08/31	
COC Number		81761	81761	81761	
	UNITS	**SV16-01**	**DUP A**	**SV16-02**	**QC Batch**
Pressure on Receipt	psig	(-2.5)	(-2.7)	(-2.0)	6935877
QC Batch = Quality Control Batch					

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		NNC428	NNC429	NNC430	NNC430		
Sampling Date		2020/08/31 11:42	2020/08/31 11:42	2020/08/31	2020/08/31		
COC Number		81761	81761	81761	81761		
	UNITS	**SV16-01**	**DUP A**	**SV16-02**	**SV16-02 Lab-Dup**	**RDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ppbv	4.26	4.26	9.99	10.0	0.20	6935878
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	<0.17	<0.17	<0.17	0.17	6935878
Chloromethane	ppbv	<0.30	<0.30	<0.30	<0.30	0.30	6935878
Vinyl Chloride	ppbv	<0.10	<0.10	<0.10	<0.10	0.10	6935878
Chloroethane	ppbv	<0.30	<0.30	<0.30	<0.30	0.30	6935878
1,3-Butadiene	ppbv	<0.50	<0.50	<0.50	<0.50	0.50	6935878
Trichlorofluoromethane (FREON 11)	ppbv	0.36	0.37	0.28	0.30	0.20	6935878
Ethanol (ethyl alcohol)	ppbv	2.0	6.7	3.3	3.2	1.0	6935878
Trichlorotrifluoroethane	ppbv	<0.15	<0.15	<0.15	<0.15	0.15	6935878
2-propanol	ppbv	<1.0	<1.0	<1.0	<1.0	1.0	6935878
2-Propanone	ppbv	14.4	14.5	14.4	14.2	0.60	6935878
Methyl Ethyl Ketone (2-Butanone)	ppbv	1.04	1.08	0.56	0.58	0.20	6935878
Methyl Isobutyl Ketone	ppbv	<0.20	<0.20	<0.20	<0.20	0.20	6935878
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	<1.0	<1.0	<1.0	1.0	6935878
Methyl t-butyl ether (MTBE)	ppbv	<0.20	<0.20	<0.20	<0.20	0.20	6935878
Ethyl Acetate	ppbv	<1.0	<1.0	<1.0	<1.0	1.0	6935878
1,1-Dichloroethylene	ppbv	<0.10	<0.10	<0.10	<0.10	0.10	6935878
cis-1,2-Dichloroethylene	ppbv	<0.10	<0.10	<0.10	<0.10	0.10	6935878
trans-1,2-Dichloroethylene	ppbv	<0.10	<0.10	<0.10	<0.10	0.10	6935878
Methylene Chloride(Dichloromethane)	ppbv	<0.60	<0.60	<0.60	<0.60	0.60	6935878
Chloroform	ppbv	9.06	9.19	0.15	0.15	0.10	6935878
Carbon Tetrachloride	ppbv	<0.10	<0.10	<0.10	<0.10	0.10	6935878
1,1-Dichloroethane	ppbv	<0.10	<0.10	<0.10	<0.10	0.10	6935878
1,2-Dichloroethane	ppbv	<0.10	<0.10	<0.10	<0.10	0.10	6935878
Ethylene Dibromide	ppbv	<0.10	<0.10	<0.10	<0.10	0.10	6935878
1,1,1-Trichloroethane	ppbv	<0.10	<0.10	<0.10	<0.10	0.10	6935878
1,1,2-Trichloroethane	ppbv	<0.10	<0.10	<0.10	<0.10	0.10	6935878
1,1,2,2-Tetrachloroethane	ppbv	<0.10	<0.10	<0.10	<0.10	0.10	6935878
cis-1,3-Dichloropropene	ppbv	<0.10	<0.10	<0.10	<0.10	0.10	6935878
trans-1,3-Dichloropropene	ppbv	<0.10	<0.10	<0.10	<0.10	0.10	6935878
1,2-Dichloropropane	ppbv	<0.10	<0.10	<0.10	<0.10	0.10	6935878
Bromomethane	ppbv	<0.10	<0.10	<0.10	<0.10	0.10	6935878
Bromoform	ppbv	<0.20	<0.20	<0.20	<0.20	0.20	6935878

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		NNC428	NNC429	NNC430	NNC430		
Sampling Date		2020/08/31 11:42	2020/08/31 11:42	2020/08/31	2020/08/31		
COC Number		81761	81761	81761	81761		
	UNITS	**SV16-01**	**DUP A**	**SV16-02**	**SV16-02 Lab-Dup**	**RDL**	**QC Batch**
Bromodichloromethane	ppbv	<0.20	<0.20	<0.20	<0.20	0.20	6935878
Dibromochloromethane	ppbv	<0.20	<0.20	<0.20	<0.20	0.20	6935878
Trichloroethylene	ppbv	<0.10	<0.10	2.96	2.91	0.10	6935878
Tetrachloroethylene	ppbv	1.07	1.09	0.18	0.17	0.10	6935878
Benzene	ppbv	<0.10	<0.10	<0.10	<0.10	0.10	6935878
Toluene	ppbv	0.19	0.17	0.11	0.11	0.10	6935878
Ethylbenzene	ppbv	0.17	0.18	<0.10	<0.10	0.10	6935878
p+m-Xylene	ppbv	0.49	0.52	<0.20	<0.20	0.20	6935878
o-Xylene	ppbv	0.21	0.21	<0.10	<0.10	0.10	6935878
Styrene	ppbv	<0.10	<0.10	<0.10	<0.10	0.10	6935878
4-ethyltoluene	ppbv	<0.50	<0.50	<0.50	<0.50	0.50	6935878
1,3,5-Trimethylbenzene	ppbv	<0.50	<0.50	<0.50	<0.50	0.50	6935878
1,2,4-Trimethylbenzene	ppbv	0.62	0.62	<0.50	<0.50	0.50	6935878
Chlorobenzene	ppbv	<0.10	<0.10	<0.10	<0.10	0.10	6935878
Benzyl chloride	ppbv	<0.50	<0.50	<0.50	<0.50	0.50	6935878
1,3-Dichlorobenzene	ppbv	<0.40	<0.40	<0.40	<0.40	0.40	6935878
1,4-Dichlorobenzene	ppbv	0.14	0.14	<0.10	<0.10	0.10	6935878
1,2-Dichlorobenzene	ppbv	<0.10	<0.10	<0.10	<0.10	0.10	6935878
1,2,4-Trichlorobenzene	ppbv	<0.50	<0.50	<0.50	<0.50	0.50	6935878
Hexachlorobutadiene	ppbv	<0.50	<0.50	<0.50	<0.50	0.50	6935878
Hexane	ppbv	<0.20	<0.20	<0.20	<0.20	0.20	6935878
Heptane	ppbv	<0.30	<0.30	<0.30	<0.30	0.30	6935878
Cyclohexane	ppbv	<0.20	<0.20	<0.20	<0.20	0.20	6935878
Tetrahydrofuran	ppbv	<0.40	<0.40	<0.40	<0.40	0.40	6935878
1,4-Dioxane	ppbv	<1.0	<1.0	<1.0	<1.0	1.0	6935878
Naphthalene	ppbv	<0.20	<0.20	<0.20	<0.20	0.20	6935878
Total Xylenes	ppbv	0.70	0.72	<0.30	<0.30	0.30	6935878
1,1,1,2-Tetrachloroethane	ppbv	<0.10	<0.10	<0.10	<0.10	0.10	6935878
Vinyl Bromide	ppbv	<0.20	<0.20	<0.20	<0.20	0.20	6935878
Propene	ppbv	<0.50	<0.50	<0.50	<0.50	0.50	6935878
2,2,4-Trimethylpentane	ppbv	<0.20	<0.20	<0.20	<0.20	0.20	6935878
Carbon Disulfide	ppbv	<0.50	<0.50	0.70	0.70	0.50	6935878
Vinyl Acetate	ppbv	<0.20	<0.20	<0.20	<0.20	0.20	6935878

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023B

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		NNC428	NNC429	NNC430	NNC430		
Sampling Date		2020/08/31 11:42	2020/08/31 11:42	2020/08/31	2020/08/31		
COC Number		81761	81761	81761	81761		
	UNITS	**SV16-01**	**DUP A**	**SV16-02**	**SV16-02 Lab-Dup**	**RDL**	**QC Batch**
Instrument Surrogate Recovery (%)							
Bromochloromethane	%	86	88	87	87		6935878
D5-Chlorobenzene	%	85	84	81	83		6935878
Difluorobenzene	%	81	82	81	82		6935878

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

CALCULATED VOLATILE ORGANICS (AIR)

BV Labs ID		NNC428	NNC429	NNC430	NNC430		
Sampling Date		2020/08/31 11:42	2020/08/31 11:42	2020/08/31	2020/08/31		
COC Number		81761	81761	81761	81761		
	UNITS	**SV16-01**	**DUP A**	**SV16-02**	**SV16-02 Lab-Dup**	**RDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ug/m3	21.1	21.1	49.4	49.7	0.99	6921222
1,2-Dichlorotetrafluoroethane	ug/m3	<1.2	<1.2	<1.2	<1.2	1.2	6921222
Chloromethane	ug/m3	<0.62	<0.62	<0.62	<0.62	0.62	6921222
Vinyl Chloride	ug/m3	<0.26	<0.26	<0.26	<0.26	0.26	6921222
Chloroethane	ug/m3	<0.79	<0.79	<0.79	<0.79	0.79	6921222
1,3-Butadiene	ug/m3	<1.1	<1.1	<1.1	<1.1	1.1	6921222
Trichlorofluoromethane (FREON 11)	ug/m3	2.0	2.1	1.6	1.7	1.1	6921222
Ethanol (ethyl alcohol)	ug/m3	3.7	12.7	6.2	6.0	1.9	6921222
Trichlorotrifluoroethane	ug/m3	<1.2	<1.2	<1.2	<1.2	1.2	6921222
2-propanol	ug/m3	<2.5	<2.5	<2.5	<2.5	2.5	6921222
2-Propanone	ug/m3	34.3	34.5	34.3	33.8	1.4	6921222
Methyl Ethyl Ketone (2-Butanone)	ug/m3	3.07	3.19	1.66	1.70	0.59	6921222
Methyl Isobutyl Ketone	ug/m3	<0.82	<0.82	<0.82	<0.82	0.82	6921222
Methyl Butyl Ketone (2-Hexanone)	ug/m3	<4.1	<4.1	<4.1	<4.1	4.1	6921222
Methyl t-butyl ether (MTBE)	ug/m3	<0.72	<0.72	<0.72	<0.72	0.72	6921222
Ethyl Acetate	ug/m3	<3.6	<3.6	<3.6	<3.6	3.6	6921222
1,1-Dichloroethylene	ug/m3	<0.40	<0.40	<0.40	<0.40	0.40	6921222
cis-1,2-Dichloroethylene	ug/m3	<0.40	<0.40	<0.40	<0.40	0.40	6921222
trans-1,2-Dichloroethylene	ug/m3	<0.40	<0.40	<0.40	<0.40	0.40	6921222
Methylene Chloride(Dichloromethane)	ug/m3	<2.1	<2.1	<2.1	<2.1	2.1	6921222
Chloroform	ug/m3	44.2	44.9	0.73	0.71	0.49	6921222
Carbon Tetrachloride	ug/m3	<0.63	<0.63	<0.63	<0.63	0.63	6921222
1,1-Dichloroethane	ug/m3	<0.40	<0.40	<0.40	<0.40	0.40	6921222
1,2-Dichloroethane	ug/m3	<0.40	<0.40	<0.40	<0.40	0.40	6921222
Ethylene Dibromide	ug/m3	<0.77	<0.77	<0.77	<0.77	0.77	6921222
1,1,1-Trichloroethane	ug/m3	<0.55	<0.55	<0.55	<0.55	0.55	6921222
1,1,2-Trichloroethane	ug/m3	<0.55	<0.55	<0.55	<0.55	0.55	6921222
1,1,2,2-Tetrachloroethane	ug/m3	<0.69	<0.69	<0.69	<0.69	0.69	6921222
cis-1,3-Dichloropropene	ug/m3	<0.45	<0.45	<0.45	<0.45	0.45	6921222
trans-1,3-Dichloropropene	ug/m3	<0.45	<0.45	<0.45	<0.45	0.45	6921222
1,2-Dichloropropane	ug/m3	<0.46	<0.46	<0.46	<0.46	0.46	6921222
Bromomethane	ug/m3	<0.39	<0.39	<0.39	<0.39	0.39	6921222
Bromoform	ug/m3	<2.1	<2.1	<2.1	<2.1	2.1	6921222

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023B

CALCULATED VOLATILE ORGANICS (AIR)

BV Labs ID		NNC428	NNC429	NNC430	NNC430		
Sampling Date		2020/08/31 11:42	2020/08/31 11:42	2020/08/31	2020/08/31		
COC Number		81761	81761	81761	81761		
	UNITS	**SV16-01**	**DUP A**	**SV16-02**	**SV16-02 Lab-Dup**	**RDL**	**QC Batch**
Bromodichloromethane	ug/m3	<1.3	<1.3	<1.3	<1.3	1.3	6921222
Dibromochloromethane	ug/m3	<1.7	<1.7	<1.7	<1.7	1.7	6921222
Trichloroethylene	ug/m3	<0.54	<0.54	15.9	15.6	0.54	6921222
Tetrachloroethylene	ug/m3	7.23	7.38	1.21	1.14	0.68	6921222
Benzene	ug/m3	<0.32	<0.32	<0.32	<0.32	0.32	6921222
Toluene	ug/m3	0.73	0.65	0.42	0.42	0.38	6921222
Ethylbenzene	ug/m3	0.72	0.80	<0.43	<0.43	0.43	6921222
p+m-Xylene	ug/m3	2.12	2.24	<0.87	<0.87	0.87	6921222
o-Xylene	ug/m3	0.92	0.90	<0.43	<0.43	0.43	6921222
Styrene	ug/m3	<0.43	<0.43	<0.43	<0.43	0.43	6921222
4-ethyltoluene	ug/m3	<2.5	<2.5	<2.5	<2.5	2.5	6921222
1,3,5-Trimethylbenzene	ug/m3	<2.5	<2.5	<2.5	<2.5	2.5	6921222
1,2,4-Trimethylbenzene	ug/m3	3.0	3.0	<2.5	<2.5	2.5	6921222
Chlorobenzene	ug/m3	<0.46	<0.46	<0.46	<0.46	0.46	6921222
Benzyl chloride	ug/m3	<2.6	<2.6	<2.6	<2.6	2.6	6921222
1,3-Dichlorobenzene	ug/m3	<2.4	<2.4	<2.4	<2.4	2.4	6921222
1,4-Dichlorobenzene	ug/m3	0.81	0.83	<0.60	<0.60	0.60	6921222
1,2-Dichlorobenzene	ug/m3	<0.60	<0.60	<0.60	<0.60	0.60	6921222
1,2,4-Trichlorobenzene	ug/m3	<3.7	<3.7	<3.7	<3.7	3.7	6921222
Hexachlorobutadiene	ug/m3	<5.3	<5.3	<5.3	<5.3	5.3	6921222
Hexane	ug/m3	<0.70	<0.70	<0.70	<0.70	0.70	6921222
Heptane	ug/m3	<1.2	<1.2	<1.2	<1.2	1.2	6921222
Cyclohexane	ug/m3	<0.69	<0.69	<0.69	<0.69	0.69	6921222
Tetrahydrofuran	ug/m3	<1.2	<1.2	<1.2	<1.2	1.2	6921222
1,4-Dioxane	ug/m3	<3.6	<3.6	<3.6	<3.6	3.6	6921222
Naphthalene	ug/m3	<1.0	<1.0	<1.0	<1.0	1.0	6921222
Total Xylenes	ug/m3	3.0	3.1	<1.3	<1.3	1.3	6921222
1,1,1,2-Tetrachloroethane	ug/m3	<0.69	<0.69	<0.69	<0.69	0.69	6921222
Vinyl Bromide	ug/m3	<0.87	<0.87	<0.87	<0.87	0.87	6921222
Propene	ug/m3	<0.86	<0.86	<0.86	<0.86	0.86	6921222
2,2,4-Trimethylpentane	ug/m3	<0.93	<0.93	<0.93	<0.93	0.93	6921222
Carbon Disulfide	ug/m3	<1.6	<1.6	2.2	2.2	1.6	6921222
Vinyl Acetate	ug/m3	<0.70	<0.70	<0.70	<0.70	0.70	6921222

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023B

VOLATILE ORGANIC HYDROCARBONS BY GC/MS (AIR)

BV Labs ID		NNC428	NNC429	NNC430	NNC430		
Sampling Date		2020/08/31 11:42	2020/08/31 11:42	2020/08/31	2020/08/31		
COC Number		81761	81761	81761	81761		
	UNITS	**SV16-01**	**DUP A**	**SV16-02**	**SV16-02 Lab-Dup**	**RDL**	**QC Batch**
F1-BTEX, C6-C10 (as Toluene)	ug/m3	285	217	95.9	95.5	5.0	6936994
F2, C10-C16 (as Decane)	ug/m3	761	760	353	350	5.0	6936994

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C0M4970
Report Date: 2020/09/14

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023B

TEST SUMMARY

BV Labs ID: NNC428
Sample ID: SV16-01
Matrix: Air

Collected: 2020/08/31
Relinquished: 2020/08/31
Received: 2020/09/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	6936994	N/A	2020/09/10	Dany Marqass
Canister Pressure (TO-15)	PRES	6935877	N/A	2020/09/10	Dany Marqass
Volatile Organics in Air (ug/m3)	GC/MS	6921222	N/A	2020/09/11	Automated Statchk
Volatile Organics in Air (TO-15)	GC/MS	6935878	N/A	2020/09/10	Dany Marqass

BV Labs ID: NNC429
Sample ID: DUP A
Matrix: Air

Collected: 2020/08/31
Relinquished: 2020/08/31
Received: 2020/09/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	6936994	N/A	2020/09/10	Dany Marqass
Canister Pressure (TO-15)	PRES	6935877	N/A	2020/09/10	Dany Marqass
Volatile Organics in Air (ug/m3)	GC/MS	6921222	N/A	2020/09/11	Automated Statchk
Volatile Organics in Air (TO-15)	GC/MS	6935878	N/A	2020/09/10	Dany Marqass

BV Labs ID: NNC430
Sample ID: SV16-02
Matrix: Air

Collected: 2020/08/31
Relinquished: 2020/08/31
Received: 2020/09/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	6936994	N/A	2020/09/10	Dany Marqass
Canister Pressure (TO-15)	PRES	6935877	N/A	2020/09/10	Dany Marqass
Volatile Organics in Air (ug/m3)	GC/MS	6921222	N/A	2020/09/11	Automated Statchk
Volatile Organics in Air (TO-15)	GC/MS	6935878	N/A	2020/09/10	Dany Marqass

BV Labs ID: NNC430 Dup
Sample ID: SV16-02
Matrix: Air

Collected: 2020/08/31
Relinquished: 2020/08/31
Received: 2020/09/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	6936994	N/A	2020/09/10	Dany Marqass
Volatile Organics in Air (ug/m3)	GC/MS	6921222	N/A	2020/09/14	Automated Statchk
Volatile Organics in Air (TO-15)	GC/MS	6935878	N/A	2020/09/10	Dany Marqass

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

GENERAL COMMENTS

Results relate only to the items tested.

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6935878	DM2	Method Blank	Bromochloromethane	2020/09/10		97	%	60 - 140
			D5-Chlorobenzene	2020/09/10		98	%	60 - 140
			Difluorobenzene	2020/09/10		96	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2020/09/10	<0.20		ppbv	
			1,2-Dichlorotetrafluoroethane	2020/09/10	<0.17		ppbv	
			Chloromethane	2020/09/10	<0.30		ppbv	
			Vinyl Chloride	2020/09/10	<0.10		ppbv	
			Chloroethane	2020/09/10	<0.30		ppbv	
			1,3-Butadiene	2020/09/10	<0.50		ppbv	
			Trichlorofluoromethane (FREON 11)	2020/09/10	<0.20		ppbv	
			Ethanol (ethyl alcohol)	2020/09/10	<1.0		ppbv	
			Trichlorotrifluoroethane	2020/09/10	<0.15		ppbv	
			2-propanol	2020/09/10	<1.0		ppbv	
			2-Propanone	2020/09/10	<0.60		ppbv	
			Methyl Ethyl Ketone (2-Butanone)	2020/09/10	<0.20		ppbv	
			Methyl Isobutyl Ketone	2020/09/10	<0.20		ppbv	
			Methyl Butyl Ketone (2-Hexanone)	2020/09/10	<1.0		ppbv	
			Methyl t-butyl ether (MTBE)	2020/09/10	<0.20		ppbv	
			Ethyl Acetate	2020/09/10	<1.0		ppbv	
			1,1-Dichloroethylene	2020/09/10	<0.10		ppbv	
			cis-1,2-Dichloroethylene	2020/09/10	<0.10		ppbv	
			trans-1,2-Dichloroethylene	2020/09/10	<0.10		ppbv	
			Methylene Chloride(Dichloromethane)	2020/09/10	<0.60		ppbv	
			Chloroform	2020/09/10	<0.10		ppbv	
			Carbon Tetrachloride	2020/09/10	<0.10		ppbv	
			1,1-Dichloroethane	2020/09/10	<0.10		ppbv	
			1,2-Dichloroethane	2020/09/10	<0.10		ppbv	
			Ethylene Dibromide	2020/09/10	<0.10		ppbv	
			1,1,1-Trichloroethane	2020/09/10	<0.10		ppbv	
			1,1,2-Trichloroethane	2020/09/10	<0.10		ppbv	
			1,1,2,2-Tetrachloroethane	2020/09/10	<0.10		ppbv	
			cis-1,3-Dichloropropene	2020/09/10	<0.10		ppbv	
			trans-1,3-Dichloropropene	2020/09/10	<0.10		ppbv	
			1,2-Dichloropropane	2020/09/10	<0.10		ppbv	
			Bromomethane	2020/09/10	<0.10		ppbv	
			Bromoform	2020/09/10	<0.20		ppbv	
			Bromodichloromethane	2020/09/10	<0.20		ppbv	
			Dibromochloromethane	2020/09/10	<0.20		ppbv	
			Trichloroethylene	2020/09/10	<0.10		ppbv	
			Tetrachloroethylene	2020/09/10	<0.10		ppbv	
			Benzene	2020/09/10	<0.10		ppbv	
			Toluene	2020/09/10	<0.10		ppbv	
			Ethylbenzene	2020/09/10	<0.10		ppbv	
			p+m-Xylene	2020/09/10	<0.20		ppbv	
			o-Xylene	2020/09/10	<0.10		ppbv	
			Styrene	2020/09/10	<0.10		ppbv	
			4-ethyltoluene	2020/09/10	<0.50		ppbv	
			1,3,5-Trimethylbenzene	2020/09/10	<0.50		ppbv	
			1,2,4-Trimethylbenzene	2020/09/10	<0.50		ppbv	
			Chlorobenzene	2020/09/10	<0.10		ppbv	

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Benzyl chloride	2020/09/10	<0.50		ppbv	
			1,3-Dichlorobenzene	2020/09/10	<0.40		ppbv	
			1,4-Dichlorobenzene	2020/09/10	<0.10		ppbv	
			1,2-Dichlorobenzene	2020/09/10	<0.10		ppbv	
			1,2,4-Trichlorobenzene	2020/09/10	<0.50		ppbv	
			Hexachlorobutadiene	2020/09/10	<0.50		ppbv	
			Hexane	2020/09/10	<0.20		ppbv	
			Heptane	2020/09/10	<0.30		ppbv	
			Cyclohexane	2020/09/10	<0.20		ppbv	
			Tetrahydrofuran	2020/09/10	<0.40		ppbv	
			1,4-Dioxane	2020/09/10	<1.0		ppbv	
			Naphthalene	2020/09/10	<0.20		ppbv	
			Total Xylenes	2020/09/10	<0.30		ppbv	
			1,1,1,2-Tetrachloroethane	2020/09/10	<0.10		ppbv	
			Vinyl Bromide	2020/09/10	<0.20		ppbv	
			Propene	2020/09/10	<0.50		ppbv	
			2,2,4-Trimethylpentane	2020/09/10	<0.20		ppbv	
			Carbon Disulfide	2020/09/10	<0.50		ppbv	
			Vinyl Acetate	2020/09/10	<0.20		ppbv	
6936994	DM2	Method Blank	F1-BTEX, C6-C10 (as Toluene)	2020/09/10	<5.0		ug/m3	
			F2, C10-C16 (as Decane)	2020/09/10	<5.0		ug/m3	
6921222	ASC	RPD [NNC430-01]	Dichlorodifluoromethane (FREON 12)	2020/09/14	0.54		%	25
			1,2-Dichlorotetrafluoroethane	2020/09/14	NC		%	25
			Chloromethane	2020/09/14	NC		%	25
			Vinyl Chloride	2020/09/14	NC		%	25
			Chloroethane	2020/09/14	NC		%	25
			1,3-Butadiene	2020/09/14	NC		%	25
			Trichlorofluoromethane (FREON 11)	2020/09/14	5.4		%	25
			Ethanol (ethyl alcohol)	2020/09/14	2.7		%	25
			Trichlorotrifluoroethane	2020/09/14	NC		%	25
			2-propanol	2020/09/14	NC		%	25
			2-Propanone	2020/09/14	1.3		%	25
			Methyl Ethyl Ketone (2-Butanone)	2020/09/14	2.3		%	25
			Methyl Isobutyl Ketone	2020/09/14	NC		%	25
			Methyl Butyl Ketone (2-Hexanone)	2020/09/14	NC		%	25
			Methyl t-butyl ether (MTBE)	2020/09/14	NC		%	25
			Ethyl Acetate	2020/09/14	NC		%	25
			1,1-Dichloroethylene	2020/09/14	NC		%	25
			cis-1,2-Dichloroethylene	2020/09/14	NC		%	25
			trans-1,2-Dichloroethylene	2020/09/14	NC		%	25
			Methylene Chloride(Dichloromethane)	2020/09/14	NC		%	25
			Chloroform	2020/09/14	2.4		%	25
			Carbon Tetrachloride	2020/09/14	NC		%	25
			1,1-Dichloroethane	2020/09/14	NC		%	25
			1,2-Dichloroethane	2020/09/14	NC		%	25
			Ethylene Dibromide	2020/09/14	NC		%	25
			1,1,1-Trichloroethane	2020/09/14	NC		%	25
			1,1,2-Trichloroethane	2020/09/14	NC		%	25
			1,1,2,2-Tetrachloroethane	2020/09/14	NC		%	25
			cis-1,3-Dichloropropene	2020/09/14	NC		%	25

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			trans-1,3-Dichloropropene	2020/09/14	NC		%	25
			1,2-Dichloropropane	2020/09/14	NC		%	25
			Bromomethane	2020/09/14	NC		%	25
			Bromoform	2020/09/14	NC		%	25
			Bromodichloromethane	2020/09/14	NC		%	25
			Dibromochloromethane	2020/09/14	NC		%	25
			Trichloroethylene	2020/09/14	1.8		%	25
			Tetrachloroethylene	2020/09/14	5.9		%	25
			Benzene	2020/09/14	NC		%	25
			Toluene	2020/09/14	1.6		%	25
			Ethylbenzene	2020/09/14	NC		%	25
			p+m-Xylene	2020/09/14	NC		%	25
			o-Xylene	2020/09/14	NC		%	25
			Styrene	2020/09/14	NC		%	25
			4-ethyltoluene	2020/09/14	NC		%	25
			1,3,5-Trimethylbenzene	2020/09/14	NC		%	25
			1,2,4-Trimethylbenzene	2020/09/14	NC		%	25
			Chlorobenzene	2020/09/14	NC		%	25
			Benzyl chloride	2020/09/14	NC		%	25
			1,3-Dichlorobenzene	2020/09/14	NC		%	25
			1,4-Dichlorobenzene	2020/09/14	NC		%	25
			1,2-Dichlorobenzene	2020/09/14	NC		%	25
			1,2,4-Trichlorobenzene	2020/09/14	NC		%	25
			Hexachlorobutadiene	2020/09/14	NC		%	25
			Hexane	2020/09/14	NC		%	25
			Heptane	2020/09/14	NC		%	25
			Cyclohexane	2020/09/14	NC		%	25
			Tetrahydrofuran	2020/09/14	NC		%	25
			1,4-Dioxane	2020/09/14	NC		%	25
			Naphthalene	2020/09/14	NC		%	25
			Total Xylenes	2020/09/14	NC		%	25
			1,1,1,2-Tetrachloroethane	2020/09/14	NC		%	25
			Vinyl Bromide	2020/09/14	NC		%	25
			Propene	2020/09/14	NC		%	25
			2,2,4-Trimethylpentane	2020/09/14	NC		%	25
			Carbon Disulfide	2020/09/14	0.86		%	25
			Vinyl Acetate	2020/09/14	NC		%	25
6935878	DM2	RPD [NNC430-01]	Dichlorodifluoromethane (FREON 12)	2020/09/10	0.54		%	25
			1,2-Dichlorotetrafluoroethane	2020/09/10	NC		%	25
			Chloromethane	2020/09/10	NC		%	25
			Vinyl Chloride	2020/09/10	NC		%	25
			Chloroethane	2020/09/10	NC		%	25
			1,3-Butadiene	2020/09/10	NC		%	25
			Trichlorofluoromethane (FREON 11)	2020/09/10	5.4		%	25
			Ethanol (ethyl alcohol)	2020/09/10	2.7		%	25
			Trichlorotrifluoroethane	2020/09/10	NC		%	25
			2-propanol	2020/09/10	NC		%	25
			2-Propanone	2020/09/10	1.3		%	25
			Methyl Ethyl Ketone (2-Butanone)	2020/09/10	2.3		%	25
			Methyl Isobutyl Ketone	2020/09/10	NC		%	25

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Methyl Butyl Ketone (2-Hexanone)	2020/09/10	NC		%	25
			Methyl t-butyl ether (MTBE)	2020/09/10	NC		%	25
			Ethyl Acetate	2020/09/10	NC		%	25
			1,1-Dichloroethylene	2020/09/10	NC		%	25
			cis-1,2-Dichloroethylene	2020/09/10	NC		%	25
			trans-1,2-Dichloroethylene	2020/09/10	NC		%	25
			Methylene Chloride(Dichloromethane)	2020/09/10	NC		%	25
			Chloroform	2020/09/10	2.4		%	25
			Carbon Tetrachloride	2020/09/10	NC		%	25
			1,1-Dichloroethane	2020/09/10	NC		%	25
			1,2-Dichloroethane	2020/09/10	NC		%	25
			Ethylene Dibromide	2020/09/10	NC		%	25
			1,1,1-Trichloroethane	2020/09/10	NC		%	25
			1,1,2-Trichloroethane	2020/09/10	NC		%	25
			1,1,2,2-Tetrachloroethane	2020/09/10	NC		%	25
			cis-1,3-Dichloropropene	2020/09/10	NC		%	25
			trans-1,3-Dichloropropene	2020/09/10	NC		%	25
			1,2-Dichloropropane	2020/09/10	NC		%	25
			Bromomethane	2020/09/10	NC		%	25
			Bromoform	2020/09/10	NC		%	25
			Bromodichloromethane	2020/09/10	NC		%	25
			Dibromochloromethane	2020/09/10	NC		%	25
			Trichloroethylene	2020/09/10	1.8		%	25
			Tetrachloroethylene	2020/09/10	5.9		%	25
			Benzene	2020/09/10	NC		%	25
			Toluene	2020/09/10	1.6		%	25
			Ethylbenzene	2020/09/10	NC		%	25
			p+m-Xylene	2020/09/10	NC		%	25
			o-Xylene	2020/09/10	NC		%	25
			Styrene	2020/09/10	NC		%	25
			4-ethyltoluene	2020/09/10	NC		%	25
			1,3,5-Trimethylbenzene	2020/09/10	NC		%	25
			1,2,4-Trimethylbenzene	2020/09/10	NC		%	25
			Chlorobenzene	2020/09/10	NC		%	25
			Benzyl chloride	2020/09/10	NC		%	25
			1,3-Dichlorobenzene	2020/09/10	NC		%	25
			1,4-Dichlorobenzene	2020/09/10	NC		%	25
			1,2-Dichlorobenzene	2020/09/10	NC		%	25
			1,2,4-Trichlorobenzene	2020/09/10	NC		%	25
			Hexachlorobutadiene	2020/09/10	NC		%	25
			Hexane	2020/09/10	NC		%	25
			Heptane	2020/09/10	NC		%	25
			Cyclohexane	2020/09/10	NC		%	25
			Tetrahydrofuran	2020/09/10	NC		%	25
			1,4-Dioxane	2020/09/10	NC		%	25
			Naphthalene	2020/09/10	NC		%	25
			Total Xylenes	2020/09/10	NC		%	25
			1,1,1,2-Tetrachloroethane	2020/09/10	NC		%	25
			Vinyl Bromide	2020/09/10	NC		%	25
			Propene	2020/09/10	NC		%	25

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			2,2,4-Trimethylpentane	2020/09/10	NC		%	25
			Carbon Disulfide	2020/09/10	0.86		%	25
			Vinyl Acetate	2020/09/10	NC		%	25
6936994	DM2	RPD [NNC430-01]	F1-BTEX, C6-C10 (as Toluene)	2020/09/10	0.45		%	25
			F2, C10-C16 (as Decane)	2020/09/10	0.85		%	25
6935878	DM2	LCS	Bromochloromethane	2020/09/10		97	%	60 - 140
			D5-Chlorobenzene	2020/09/10		101	%	60 - 140
			Difluorobenzene	2020/09/10		100	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2020/09/10		101	%	70 - 130
			1,2-Dichlorotetrafluoroethane	2020/09/10		112	%	70 - 130
			Chloromethane	2020/09/10		114	%	70 - 130
			Vinyl Chloride	2020/09/10		116	%	70 - 130
			Chloroethane	2020/09/10		117	%	70 - 130
			1,3-Butadiene	2020/09/10		108	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2020/09/10		110	%	70 - 130
			Ethanol (ethyl alcohol)	2020/09/10		99	%	70 - 130
			Trichlorotrifluoroethane	2020/09/10		100	%	70 - 130
			2-propanol	2020/09/10		101	%	70 - 130
			2-Propanone	2020/09/10		90	%	70 - 130
			Methyl Ethyl Ketone (2-Butanone)	2020/09/10		101	%	70 - 130
			Methyl Isobutyl Ketone	2020/09/10		105	%	70 - 130
			Methyl Butyl Ketone (2-Hexanone)	2020/09/10		101	%	70 - 130
			Methyl t-butyl ether (MTBE)	2020/09/10		93	%	70 - 130
			Ethyl Acetate	2020/09/10		97	%	70 - 130
			1,1-Dichloroethylene	2020/09/10		95	%	70 - 130
			cis-1,2-Dichloroethylene	2020/09/10		99	%	70 - 130
			trans-1,2-Dichloroethylene	2020/09/10		104	%	70 - 130
			Methylene Chloride(Dichloromethane)	2020/09/10		109	%	70 - 130
			Chloroform	2020/09/10		99	%	70 - 130
			Carbon Tetrachloride	2020/09/10		115	%	70 - 130
			1,1-Dichloroethane	2020/09/10		107	%	70 - 130
			1,2-Dichloroethane	2020/09/10		96	%	70 - 130
			Ethylene Dibromide	2020/09/10		94	%	70 - 130
			1,1,1-Trichloroethane	2020/09/10		112	%	70 - 130
			1,1,2-Trichloroethane	2020/09/10		97	%	70 - 130
			1,1,2,2-Tetrachloroethane	2020/09/10		95	%	70 - 130
			cis-1,3-Dichloropropene	2020/09/10		105	%	70 - 130
			trans-1,3-Dichloropropene	2020/09/10		105	%	70 - 130
			1,2-Dichloropropane	2020/09/10		108	%	70 - 130
			Bromomethane	2020/09/10		109	%	70 - 130
			Bromoform	2020/09/10		116	%	70 - 130
			Bromodichloromethane	2020/09/10		102	%	70 - 130
			Dibromochloromethane	2020/09/10		110	%	70 - 130
			Trichloroethylene	2020/09/10		92	%	70 - 130
			Tetrachloroethylene	2020/09/10		93	%	70 - 130
			Benzene	2020/09/10		101	%	70 - 130
			Toluene	2020/09/10		96	%	70 - 130
			Ethylbenzene	2020/09/10		94	%	70 - 130
			p+m-Xylene	2020/09/10		98	%	70 - 130
			o-Xylene	2020/09/10		96	%	70 - 130

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Styrene	2020/09/10		98	%	70 - 130
			4-ethyltoluene	2020/09/10		100	%	70 - 130
			1,3,5-Trimethylbenzene	2020/09/10		111	%	70 - 130
			1,2,4-Trimethylbenzene	2020/09/10		113	%	70 - 130
			Chlorobenzene	2020/09/10		95	%	70 - 130
			Benzyl chloride	2020/09/10		124	%	70 - 130
			1,3-Dichlorobenzene	2020/09/10		109	%	70 - 130
			1,4-Dichlorobenzene	2020/09/10		107	%	70 - 130
			1,2-Dichlorobenzene	2020/09/10		104	%	70 - 130
			1,2,4-Trichlorobenzene	2020/09/10		131 (1)	%	70 - 130
			Hexachlorobutadiene	2020/09/10		126	%	70 - 130
			Hexane	2020/09/10		110	%	70 - 130
			Heptane	2020/09/10		104	%	70 - 130
			Cyclohexane	2020/09/10		108	%	70 - 130
			Tetrahydrofuran	2020/09/10		100	%	70 - 130
			1,4-Dioxane	2020/09/10		94	%	70 - 130
			Naphthalene	2020/09/10		125	%	70 - 130
			Total Xylenes	2020/09/10		97	%	70 - 130
			1,1,1,2-Tetrachloroethane	2020/09/10		108	%	70 - 130
			Vinyl Bromide	2020/09/10		92	%	70 - 130
			Propene	2020/09/10		93	%	70 - 130
			2,2,4-Trimethylpentane	2020/09/10		115	%	70 - 130
			Carbon Disulfide	2020/09/10		90	%	70 - 130
			Vinyl Acetate	2020/09/10		133 (1)	%	70 - 130

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Maureen Smith

Maureen Smith, Supervisor, Volatiles

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

6740 Campobello Road
Mississauga, ON L5N 2L8
www.bvlabs.com

Phone: (905) 817-5700
Fax: (905) 817-5779
Toll Free: 1-800-563-6266

EXXONMOBIL/IMPERIAL OIL - BUREAU VERITAS AIR CHAIN OF CUSTODY RECORD

Page 1 of 1

C of C # 81761

INVOICE INFORMATION	REPORT INFORMATION
Company Name: ☒ Imperial Oil ☐ ExxonMobil	Company Name: Golder Associates Ltd.
Contact Name: IOL Accounts Payable	Contact Name: Ian Sosney
Address: 102, 2535 - 3rd Ave SE Calgary, AB, T2A 7W5	Address: 110 Hannover Dr. #203A St. Catharines, ON, L2W 1A4
Email: Canada Accounts Payable Invoices@golder.com	Email: ian-sosney@golder.com
Ph: 403-299-5600	Ph: 647-522-4698
Sampler Name (Print): Jeremy Eckert	Consultant Project #: 1791706-1155-2023 B

ANALYSIS REQUESTED

	FIELD SAMPLE ID	Canister Serial #	Flow Regulator Serial #	Sample Collection DATE (YYYY/MM/DD)	Sample Collection TIME (24 HR)	Media Type (See Legend)	FLOW RATE (mL/min.)	LENGTH OF SAMPLING (minutes)	End Vacuum (inches of Hg)	BTEX	Aromatic/Aliphatic Hydrocarbon Fractionations	F1 (C6-C10) - F2 (C10-C16)	VOC (TO15)	Do not analyze
1	SV16-01	6543	FX1435	2020/08/31	1142	S	140	10	-5	X		X	X	
2	DUP A	6903	FX0826	↓	1142	S	140	10	-5	X		X	X	
3	SV16-02	1373	FX0568	↓		S	155	9	-5	X		X	X	
4	Unused	1349	na	↓	na	S	na	na	na					X
5														
6														
7														
8														
9														
10														
11														

IOL SITE LOCATION: 1660 Merivale Rd. Ottawa, ON

IOL PROJECT # (if applicable): NA

BUREAU VERITAS TASK ORDER # OR SERVICE ORDER # + LINE ITEM: 1791706-1155-7777

REGULATORY CRITERIA / DETECTION LIMITS: (PLEASE SPECIFY): NA

SPECIAL INSTRUCTIONS: IES A2601436 SAP 88001627

LEGEND
S - Summa Can
T - Tube
TB - Tedlar Bag
O - Other(Specify)
*TEMP N/A for SUMMA CAN

TURNAROUND TIME
Standard (10 days) ☒
Rush (9 days) ☐
(6 days) ☐
(3 days) ☐
Date Required

	YES	NO	COOLER ID # 1				YES	NO	COOLER ID #				YES	NO	COOLER ID #			
SEAL PRESENT	✓		TEMP °C	1	2	3			TEMP °C	1	2	3			TEMP °C	1	2	3
SEAL INTACT	✓																	
COOLING MEDIA PRESENT		✓																

RELINQUISHED BY:		DATE:	TIME (24 HR)	RECEIVED BY:		DATE:	TIME (24 HR)
1. [signature]	Jeremy Eckert	2020/08/31	1500	1. [signature]	ALKA PATEL	2020/09/01	13:30
2.				2.			
3.				3.			

LAB USE ONLY
BUREAU VERITAS JOB # COM4970

SAMPLES
LABELED BY: AKP
VERIFIED BY: LOR

IOL COC-AIR-(08/19) White: Bureau Veritas Yellow: Client

Unless otherwise agreed to in writing, work submitted on this Chain of Custody is subject to Bureau Veritas Laboratories' standard Terms and Conditions. Signing of this Chain of Custody document is acknowledgment and acceptance of our terms available at http://www.bvlabs.com/terms-and-conditions

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: August 31, 2020

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Bureau Veritas Mississauga

Consultant Project Number: 1791706-1155

Sample Submission Number: C0M4970

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			Lab control sample recovery outside acceptance range
Extraction Surrogate Recovery			X	of 70-130% for 1,2,4-trichlorobenzene (131%) and
Method Blank Concentration	X			vinyl acetate (133%). All remaining laboratory QC
Matrix Duplicate RPD	X			results are within acceptance criteria.
Matrix Spike Recovery			X	
Lab Control Sample Recovery		X		

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	All field QC samples are within
Trip Blank Concentration			X	alert limits.
Field Duplicate RPD	X			

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	n/a

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): Amanda Newberry

Date: September 21, 2020

Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023B
Your C.O.C. #: na

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2020/09/16
Report #: R6332856
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C0M4977
Received: 2020/09/01, 13:30

Sample Matrix: Air
Samples Received: 1

Analyses	Quantity	Laboratory Method	Analytical Method
BTEX and CCME Compounds in Air(TO-15mod)	1	BRL SOP-00304	EPA TO-15 m
Canister Pressure (TO-15)	1	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (ug/m3)	1	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (TO-15) (1)	1	BRL SOP-00304	EPA TO-15 m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard. All samples were analyzed within hold time unless otherwise flagged.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Air sampling canisters have been cleaned in accordance with U.S. EPA Method TO15. At the end of the cleaning, evacuation, and pressurization cycles, one canister was selected and was pressurized with Zero Air. This canister was then analyzed via TO15 on a GC/MS. The canister must have been found to contain <0.2 ppbv concentration of all target analytes in order for the batch to have been considered clean. Each canister also underwent a leak check prior to shipment.

Please Note: SUMMA® canister samples will be retained by Bureau Veritas Laboratories for a period of 5 calendar days or as contractually agreed from the date of this report, after which time they will be cleaned for reuse. If you require a longer sample storage period, please contact your service representative.

Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023B
Your C.O.C. #: na

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2020/09/16
Report #: R6332856
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C0M4977
Received: 2020/09/01, 13:30

Encryption Key

Kyle Reinhart
Project Manager
16 Sep 2020 17:04:14

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kyle Reinhart, Project Manager
Email: Kyle.Reinhart@bvlabs.com
Phone# (905)817-5802

==========

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

BV Labs Job #: C0M4977
Report Date: 2020/09/16

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023B

RESULTS OF ANALYSES OF AIR

BV Labs ID		NNC438	
Sampling Date		2020/08/31 12:51	
COC Number		na	
	UNITS	**FIELD BLANK**	**QC Batch**
Pressure on Receipt	psig	(-2.7)	6936624

QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023B

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		NNC438		
Sampling Date		2020/08/31 12:51		
COC Number		na		
	UNITS	**FIELD BLANK**	**RDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ppbv	0.50	0.20	6936570
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	0.17	6936570
Chloromethane	ppbv	0.52	0.30	6936570
Vinyl Chloride	ppbv	<0.10	0.10	6936570
Chloroethane	ppbv	<0.30	0.30	6936570
1,3-Butadiene	ppbv	<0.50	0.50	6936570
Trichlorofluoromethane (FREON 11)	ppbv	0.29	0.20	6936570
Ethanol (ethyl alcohol)	ppbv	1.7	1.0	6936570
Trichlorotrifluoroethane	ppbv	<0.15	0.15	6936570
2-propanol	ppbv	<1.0	1.0	6936570
2-Propanone	ppbv	2.16	0.60	6936570
Methyl Ethyl Ketone (2-Butanone)	ppbv	0.23	0.20	6936570
Methyl Isobutyl Ketone	ppbv	<0.20	0.20	6936570
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	1.0	6936570
Methyl t-butyl ether (MTBE)	ppbv	<0.20	0.20	6936570
Ethyl Acetate	ppbv	<1.0	1.0	6936570
1,1-Dichloroethylene	ppbv	<0.10	0.10	6936570
cis-1,2-Dichloroethylene	ppbv	<0.10	0.10	6936570
trans-1,2-Dichloroethylene	ppbv	<0.10	0.10	6936570
Methylene Chloride(Dichloromethane)	ppbv	<0.60	0.60	6936570
Chloroform	ppbv	<0.10	0.10	6936570
Carbon Tetrachloride	ppbv	<0.10	0.10	6936570
1,1-Dichloroethane	ppbv	<0.10	0.10	6936570
1,2-Dichloroethane	ppbv	<0.10	0.10	6936570
Ethylene Dibromide	ppbv	<0.10	0.10	6936570
1,1,1-Trichloroethane	ppbv	<0.10	0.10	6936570
1,1,2-Trichloroethane	ppbv	<0.10	0.10	6936570
1,1,2,2-Tetrachloroethane	ppbv	<0.10	0.10	6936570
cis-1,3-Dichloropropene	ppbv	<0.10	0.10	6936570
trans-1,3-Dichloropropene	ppbv	<0.10	0.10	6936570
1,2-Dichloropropane	ppbv	<0.10	0.10	6936570
Bromomethane	ppbv	<0.10	0.10	6936570
Bromoform	ppbv	<0.20	0.20	6936570
Bromodichloromethane	ppbv	<0.20	0.20	6936570

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023B

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		NNC438		
Sampling Date		2020/08/31 12:51		
COC Number		na		
	UNITS	**FIELD BLANK**	**RDL**	**QC Batch**
Dibromochloromethane	ppbv	<0.20	0.20	6936570
Trichloroethylene	ppbv	<0.10	0.10	6936570
Tetrachloroethylene	ppbv	<0.10	0.10	6936570
Benzene	ppbv	<0.10	0.10	6936570
Toluene	ppbv	0.14	0.10	6936570
Ethylbenzene	ppbv	<0.10	0.10	6936570
p+m-Xylene	ppbv	<0.20	0.20	6936570
o-Xylene	ppbv	<0.10	0.10	6936570
Styrene	ppbv	<0.10	0.10	6936570
4-ethyltoluene	ppbv	<0.50	0.50	6936570
1,3,5-Trimethylbenzene	ppbv	<0.50	0.50	6936570
1,2,4-Trimethylbenzene	ppbv	<0.50	0.50	6936570
Chlorobenzene	ppbv	<0.10	0.10	6936570
Benzyl chloride	ppbv	<0.50	0.50	6936570
1,3-Dichlorobenzene	ppbv	<0.40	0.40	6936570
1,4-Dichlorobenzene	ppbv	<0.10	0.10	6936570
1,2-Dichlorobenzene	ppbv	<0.10	0.10	6936570
1,2,4-Trichlorobenzene	ppbv	<0.50	0.50	6936570
Hexachlorobutadiene	ppbv	<0.50	0.50	6936570
Hexane	ppbv	<0.20	0.20	6936570
Heptane	ppbv	<0.30	0.30	6936570
Cyclohexane	ppbv	<0.20	0.20	6936570
Tetrahydrofuran	ppbv	<0.40	0.40	6936570
1,4-Dioxane	ppbv	<1.0	1.0	6936570
Naphthalene	ppbv	<0.20	0.20	6936570
Total Xylenes	ppbv	<0.30	0.30	6936570
1,1,1,2-Tetrachloroethane	ppbv	<0.10	0.10	6936570
Vinyl Bromide	ppbv	<0.20	0.20	6936570
Propene	ppbv	<0.90	0.90	6936570
2,2,4-Trimethylpentane	ppbv	<0.20	0.20	6936570
Carbon Disulfide	ppbv	<0.50	0.50	6936570
Vinyl Acetate	ppbv	<0.20	0.20	6936570

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023B

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		NNC438		
Sampling Date		2020/08/31 12:51		
COC Number		na		
	UNITS	**FIELD BLANK**	**RDL**	**QC Batch**
Instrument Surrogate Recovery (%)				
Bromochloromethane	%	84		6936570
D5-Chlorobenzene	%	81		6936570
Difluorobenzene	%	86		6936570

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023B

CALCULATED VOLATILE ORGANICS (AIR)

BV Labs ID		NNC438		
Sampling Date		2020/08/31 12:51		
COC Number		na		
	UNITS	**FIELD BLANK**	**RDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ug/m3	2.46	0.99	6921222
1,2-Dichlorotetrafluoroethane	ug/m3	<1.2	1.2	6921222
Chloromethane	ug/m3	1.07	0.62	6921222
Vinyl Chloride	ug/m3	<0.26	0.26	6921222
Chloroethane	ug/m3	<0.79	0.79	6921222
1,3-Butadiene	ug/m3	<1.1	1.1	6921222
Trichlorofluoromethane (FREON 11)	ug/m3	1.6	1.1	6921222
Ethanol (ethyl alcohol)	ug/m3	3.3	1.9	6921222
Trichlorotrifluoroethane	ug/m3	<1.2	1.2	6921222
2-propanol	ug/m3	<2.5	2.5	6921222
2-Propanone	ug/m3	5.1	1.4	6921222
Methyl Ethyl Ketone (2-Butanone)	ug/m3	0.69	0.59	6921222
Methyl Isobutyl Ketone	ug/m3	<0.82	0.82	6921222
Methyl Butyl Ketone (2-Hexanone)	ug/m3	<4.1	4.1	6921222
Methyl t-butyl ether (MTBE)	ug/m3	<0.72	0.72	6921222
Ethyl Acetate	ug/m3	<3.6	3.6	6921222
1,1-Dichloroethylene	ug/m3	<0.40	0.40	6921222
cis-1,2-Dichloroethylene	ug/m3	<0.40	0.40	6921222
trans-1,2-Dichloroethylene	ug/m3	<0.40	0.40	6921222
Methylene Chloride(Dichloromethane)	ug/m3	<2.1	2.1	6921222
Chloroform	ug/m3	<0.49	0.49	6921222
Carbon Tetrachloride	ug/m3	<0.63	0.63	6921222
1,1-Dichloroethane	ug/m3	<0.40	0.40	6921222
1,2-Dichloroethane	ug/m3	<0.40	0.40	6921222
Ethylene Dibromide	ug/m3	<0.77	0.77	6921222
1,1,1-Trichloroethane	ug/m3	<0.55	0.55	6921222
1,1,2-Trichloroethane	ug/m3	<0.55	0.55	6921222
1,1,2,2-Tetrachloroethane	ug/m3	<0.69	0.69	6921222
cis-1,3-Dichloropropene	ug/m3	<0.45	0.45	6921222
trans-1,3-Dichloropropene	ug/m3	<0.45	0.45	6921222
1,2-Dichloropropane	ug/m3	<0.46	0.46	6921222
Bromomethane	ug/m3	<0.39	0.39	6921222
Bromoform	ug/m3	<2.1	2.1	6921222
Bromodichloromethane	ug/m3	<1.3	1.3	6921222

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023B

CALCULATED VOLATILE ORGANICS (AIR)

BV Labs ID		NNC438		
Sampling Date		2020/08/31 12:51		
COC Number		na		
	UNITS	**FIELD BLANK**	**RDL**	**QC Batch**
Dibromochloromethane	ug/m3	<1.7	1.7	6921222
Trichloroethylene	ug/m3	<0.54	0.54	6921222
Tetrachloroethylene	ug/m3	<0.68	0.68	6921222
Benzene	ug/m3	<0.32	0.32	6921222
Toluene	ug/m3	0.51	0.38	6921222
Ethylbenzene	ug/m3	<0.43	0.43	6921222
p+m-Xylene	ug/m3	<0.87	0.87	6921222
o-Xylene	ug/m3	<0.43	0.43	6921222
Styrene	ug/m3	<0.43	0.43	6921222
4-ethyltoluene	ug/m3	<2.5	2.5	6921222
1,3,5-Trimethylbenzene	ug/m3	<2.5	2.5	6921222
1,2,4-Trimethylbenzene	ug/m3	<2.5	2.5	6921222
Chlorobenzene	ug/m3	<0.46	0.46	6921222
Benzyl chloride	ug/m3	<2.6	2.6	6921222
1,3-Dichlorobenzene	ug/m3	<2.4	2.4	6921222
1,4-Dichlorobenzene	ug/m3	<0.60	0.60	6921222
1,2-Dichlorobenzene	ug/m3	<0.60	0.60	6921222
1,2,4-Trichlorobenzene	ug/m3	<3.7	3.7	6921222
Hexachlorobutadiene	ug/m3	<5.3	5.3	6921222
Hexane	ug/m3	<0.70	0.70	6921222
Heptane	ug/m3	<1.2	1.2	6921222
Cyclohexane	ug/m3	<0.69	0.69	6921222
Tetrahydrofuran	ug/m3	<1.2	1.2	6921222
1,4-Dioxane	ug/m3	<3.6	3.6	6921222
Naphthalene	ug/m3	<1.0	1.0	6921222
Total Xylenes	ug/m3	<1.3	1.3	6921222
1,1,1,2-Tetrachloroethane	ug/m3	<0.69	0.69	6921222
Vinyl Bromide	ug/m3	<0.87	0.87	6921222
Propene	ug/m3	<1.5	1.5	6921222
2,2,4-Trimethylpentane	ug/m3	<0.93	0.93	6921222
Carbon Disulfide	ug/m3	<1.6	1.6	6921222
Vinyl Acetate	ug/m3	<0.70	0.70	6921222

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023B

VOLATILE ORGANIC HYDROCARBONS BY GC/MS (AIR)

BV Labs ID		NNC438		
Sampling Date		2020/08/31 12:51		
COC Number		na		
	UNITS	**FIELD BLANK**	**RDL**	**QC Batch**
F1-BTEX, C6-C10 (as Toluene)	ug/m3	12.8	5.0	6941950
F2, C10-C16 (as Decane)	ug/m3	6.7	5.0	6941950

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C0M4977
Report Date: 2020/09/16

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023B

TEST SUMMARY

BV Labs ID: NNC438
Sample ID: FIELD BLANK
Matrix: Air

Collected: 2020/08/31
Relinquished: 2020/08/31
Received: 2020/09/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	6941950	N/A	2020/09/10	Yao Liang Sun
Canister Pressure (TO-15)	PRES	6936624	N/A	2020/09/10	Yao Liang Sun
Volatile Organics in Air (ug/m3)	GC/MS	6921222	N/A	2020/09/11	Automated Statchk
Volatile Organics in Air (TO-15)	GC/MS	6936570	N/A	2020/09/10	Yao Liang Sun

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023B

GENERAL COMMENTS

3 compounds exceed 130% recovery criteria. These compounds met the %RSD criteria in the continuing calibration standard. The failure of these 3 compounds is not believed to have an effect on the integrity of the results.

Results relate only to the items tested.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6936570	LSY	Method Blank	Bromochloromethane	2020/09/10		98	%	60 - 140
			D5-Chlorobenzene	2020/09/10		96	%	60 - 140
			Difluorobenzene	2020/09/10		101	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2020/09/10	<0.20		ppbv	
			1,2-Dichlorotetrafluoroethane	2020/09/10	<0.17		ppbv	
			Chloromethane	2020/09/10	<0.30		ppbv	
			Vinyl Chloride	2020/09/10	<0.10		ppbv	
			Chloroethane	2020/09/10	<0.30		ppbv	
			1,3-Butadiene	2020/09/10	<0.50		ppbv	
			Trichlorofluoromethane (FREON 11)	2020/09/10	<0.20		ppbv	
			Ethanol (ethyl alcohol)	2020/09/10	<1.0		ppbv	
			Trichlorotrifluoroethane	2020/09/10	<0.15		ppbv	
			2-propanol	2020/09/10	<1.0		ppbv	
			2-Propanone	2020/09/10	<0.60		ppbv	
			Methyl Ethyl Ketone (2-Butanone)	2020/09/10	<0.20		ppbv	
			Methyl Isobutyl Ketone	2020/09/10	<0.20		ppbv	
			Methyl Butyl Ketone (2-Hexanone)	2020/09/10	<1.0		ppbv	
			Methyl t-butyl ether (MTBE)	2020/09/10	<0.20		ppbv	
			Ethyl Acetate	2020/09/10	<1.0		ppbv	
			1,1-Dichloroethylene	2020/09/10	<0.10		ppbv	
			cis-1,2-Dichloroethylene	2020/09/10	<0.10		ppbv	
			trans-1,2-Dichloroethylene	2020/09/10	<0.10		ppbv	
			Methylene Chloride(Dichloromethane)	2020/09/10	<0.60		ppbv	
			Chloroform	2020/09/10	<0.10		ppbv	
			Carbon Tetrachloride	2020/09/10	<0.10		ppbv	
			1,1-Dichloroethane	2020/09/10	<0.10		ppbv	
			1,2-Dichloroethane	2020/09/10	<0.10		ppbv	
			Ethylene Dibromide	2020/09/10	<0.10		ppbv	
			1,1,1-Trichloroethane	2020/09/10	<0.10		ppbv	
			1,1,2-Trichloroethane	2020/09/10	<0.10		ppbv	
			1,1,2,2-Tetrachloroethane	2020/09/10	<0.10		ppbv	
			cis-1,3-Dichloropropene	2020/09/10	<0.10		ppbv	
			trans-1,3-Dichloropropene	2020/09/10	<0.10		ppbv	
			1,2-Dichloropropane	2020/09/10	<0.10		ppbv	
			Bromomethane	2020/09/10	<0.10		ppbv	
			Bromoform	2020/09/10	<0.20		ppbv	
			Bromodichloromethane	2020/09/10	<0.20		ppbv	
			Dibromochloromethane	2020/09/10	<0.20		ppbv	
			Trichloroethylene	2020/09/10	<0.10		ppbv	
			Tetrachloroethylene	2020/09/10	<0.10		ppbv	
			Benzene	2020/09/10	<0.10		ppbv	
			Toluene	2020/09/10	<0.10		ppbv	
			Ethylbenzene	2020/09/10	<0.10		ppbv	
			p+m-Xylene	2020/09/10	<0.20		ppbv	
			o-Xylene	2020/09/10	<0.10		ppbv	
			Styrene	2020/09/10	<0.10		ppbv	
			4-ethyltoluene	2020/09/10	<0.50		ppbv	
			1,3,5-Trimethylbenzene	2020/09/10	<0.50		ppbv	
			1,2,4-Trimethylbenzene	2020/09/10	<0.50		ppbv	
			Chlorobenzene	2020/09/10	<0.10		ppbv	

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Benzyl chloride	2020/09/10	<0.50		ppbv	
			1,3-Dichlorobenzene	2020/09/10	<0.40		ppbv	
			1,4-Dichlorobenzene	2020/09/10	<0.10		ppbv	
			1,2-Dichlorobenzene	2020/09/10	<0.10		ppbv	
			1,2,4-Trichlorobenzene	2020/09/10	<0.50		ppbv	
			Hexachlorobutadiene	2020/09/10	<0.50		ppbv	
			Hexane	2020/09/10	<0.20		ppbv	
			Heptane	2020/09/10	<0.30		ppbv	
			Cyclohexane	2020/09/10	<0.20		ppbv	
			Tetrahydrofuran	2020/09/10	<0.40		ppbv	
			1,4-Dioxane	2020/09/10	<1.0		ppbv	
			Naphthalene	2020/09/10	<0.20		ppbv	
			Total Xylenes	2020/09/10	<0.30		ppbv	
			1,1,1,2-Tetrachloroethane	2020/09/10	<0.10		ppbv	
			Vinyl Bromide	2020/09/10	<0.20		ppbv	
			Propene	2020/09/10	<0.90		ppbv	
			2,2,4-Trimethylpentane	2020/09/10	<0.20		ppbv	
			Carbon Disulfide	2020/09/10	<0.50		ppbv	
			Vinyl Acetate	2020/09/10	<0.20		ppbv	
6941950	LSY	Method Blank	F1-BTEX, C6-C10 (as Toluene)	2020/09/10	<5.0		ug/m3	
			F2, C10-C16 (as Decane)	2020/09/10	<5.0		ug/m3	
6936570	LSY	LCS	Bromochloromethane	2020/09/10		110	%	60 - 140
			D5-Chlorobenzene	2020/09/10		107	%	60 - 140
			Difluorobenzene	2020/09/10		109	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2020/09/10		108	%	70 - 130
			1,2-Dichlorotetrafluoroethane	2020/09/10		110	%	70 - 130
			Chloromethane	2020/09/10		101	%	70 - 130
			Vinyl Chloride	2020/09/10		102	%	70 - 130
			Chloroethane	2020/09/10		102	%	70 - 130
			1,3-Butadiene	2020/09/10		94	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2020/09/10		111	%	70 - 130
			Ethanol (ethyl alcohol)	2020/09/10		84	%	70 - 130
			Trichlorotrifluoroethane	2020/09/10		100	%	70 - 130
			2-propanol	2020/09/10		100	%	70 - 130
			2-Propanone	2020/09/10		87	%	70 - 130
			Methyl Ethyl Ketone (2-Butanone)	2020/09/10		101	%	70 - 130
			Methyl Isobutyl Ketone	2020/09/10		100	%	70 - 130
			Methyl Butyl Ketone (2-Hexanone)	2020/09/10		101	%	70 - 130
			Methyl t-butyl ether (MTBE)	2020/09/10		98	%	70 - 130
			Ethyl Acetate	2020/09/10		95	%	70 - 130
			1,1-Dichloroethylene	2020/09/10		98	%	70 - 130
			cis-1,2-Dichloroethylene	2020/09/10		99	%	70 - 130
			trans-1,2-Dichloroethylene	2020/09/10		99	%	70 - 130
			Methylene Chloride(Dichloromethane)	2020/09/10		100	%	70 - 130
			Chloroform	2020/09/10		96	%	70 - 130
			Carbon Tetrachloride	2020/09/10		111	%	70 - 130
			1,1-Dichloroethane	2020/09/10		99	%	70 - 130
			1,2-Dichloroethane	2020/09/10		99	%	70 - 130
			Ethylene Dibromide	2020/09/10		99	%	70 - 130
			1,1,1-Trichloroethane	2020/09/10		113	%	70 - 130

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,1,2-Trichloroethane	2020/09/10		97	%	70 - 130
			1,1,2,2-Tetrachloroethane	2020/09/10		93	%	70 - 130
			cis-1,3-Dichloropropene	2020/09/10		105	%	70 - 130
			trans-1,3-Dichloropropene	2020/09/10		109	%	70 - 130
			1,2-Dichloropropane	2020/09/10		98	%	70 - 130
			Bromomethane	2020/09/10		102	%	70 - 130
			Bromoform	2020/09/10		103	%	70 - 130
			Bromodichloromethane	2020/09/10		98	%	70 - 130
			Dibromochloromethane	2020/09/10		106	%	70 - 130
			Trichloroethylene	2020/09/10		95	%	70 - 130
			Tetrachloroethylene	2020/09/10		101	%	70 - 130
			Benzene	2020/09/10		97	%	70 - 130
			Toluene	2020/09/10		97	%	70 - 130
			Ethylbenzene	2020/09/10		94	%	70 - 130
			p+m-Xylene	2020/09/10		99	%	70 - 130
			o-Xylene	2020/09/10		97	%	70 - 130
			Styrene	2020/09/10		104	%	70 - 130
			4-ethyltoluene	2020/09/10		101	%	70 - 130
			1,3,5-Trimethylbenzene	2020/09/10		115	%	70 - 130
			1,2,4-Trimethylbenzene	2020/09/10		121	%	70 - 130
			Chlorobenzene	2020/09/10		94	%	70 - 130
			Benzyl chloride	2020/09/10		122	%	70 - 130
			1,3-Dichlorobenzene	2020/09/10		119	%	70 - 130
			1,4-Dichlorobenzene	2020/09/10		117	%	70 - 130
			1,2-Dichlorobenzene	2020/09/10		115	%	70 - 130
			1,2,4-Trichlorobenzene	2020/09/10		141 (1)	%	70 - 130
			Hexachlorobutadiene	2020/09/10		130	%	70 - 130
			Hexane	2020/09/10		96	%	70 - 130
			Heptane	2020/09/10		97	%	70 - 130
			Cyclohexane	2020/09/10		98	%	70 - 130
			Tetrahydrofuran	2020/09/10		99	%	70 - 130
			1,4-Dioxane	2020/09/10		91	%	70 - 130
			Naphthalene	2020/09/10		144 (1)	%	70 - 130
			Total Xylenes	2020/09/10		98	%	70 - 130
			1,1,1,2-Tetrachloroethane	2020/09/10		103	%	70 - 130
			Vinyl Bromide	2020/09/10		87	%	70 - 130
			Propene	2020/09/10		85	%	70 - 130
			2,2,4-Trimethylpentane	2020/09/10		100	%	70 - 130
			Carbon Disulfide	2020/09/10		84	%	70 - 130
			Vinyl Acetate	2020/09/10		138 (1)	%	70 - 130

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C0M4977
Report Date: 2020/09/16

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023B

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Maureen Smith

Maureen Smith, Supervisor, Volatiles

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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EXXONMOBIL/IMPERIAL OIL - BUREAU VERITAS
AIR CHAIN OF CUSTODY RECORD

C of C # 81754

INVOICE INFORMATION	REPORT INFORMATION
Company Name: ☒ Imperial Oil ☐ ExxonMobil	Company Name: Golder Associates Ltd.
Contact Name: IOL Accounts Payable	Contact Name: Ian Sosney
Address: 102, 2535-3rd Ave SE Calgary, AB, T2A 7W5	Address: 110 Hannover Dr #203A St-Catharines, ON, L2W 1A4
Email: Canada Accounts Payable Invoices @golder.com	Email: ian_sosney@golder.com
Ph: 403-299-5600	Ph: 647-522-4698
Sampler Name (Print): Jeremy Eckert	Consultant Project #: 1791706-1155-2023B

	FIELD SAMPLE ID	Canister Serial #	Flow Regulator Serial #	Sample Collection DATE (YYYY/MM/DD)	Sample Collection TIME (24 HR)	Media Type (See Legend)	FLOW RATE (mL/min.)	LENGTH OF SAMPLING (minutes)	End Vacuum (inches of Hg)	BTEX	Aromatic/Aliphatic Hydrocarbon Fractionations	F1 (C6-C10) - F2 (C10-C16)	VOC (TO15)
1	Field Blank	6575	FX1432	2020/08/31	1251	S	155	9	-5	X		X	X
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													

IOL SITE LOCATION: 1660 Merivale Rd. Ottawa, ON

IOL PROJECT # (if applicable): NA

BUREAU VERITAS TASK ORDER # OR SERVICE ORDER # + LINE ITEM: 1791706-1155-7777

REGULATORY CRITERIA / DETECTION LIMITS: (PLEASE SPECIFY): NA

SPECIAL INSTRUCTIONS: IES A2601436 SAP 8800627

LEGEND
S - Summa Can
T - Tube
TB - Tedlar Bag
O - Other(Specify)
***TEMP N/A for SUMMA CAN**

TURNAROUND TIME
Standard (10 days) ☒
Rush (9 days) ☐
(6 days) ☐
(3 days) ☐

Date Required

	YES	NO	COOLER ID # 1				YES	NO	COOLER ID #				YES	NO	COOLER ID #			
SEAL PRESENT	✓		TEMP °C				SEAL PRESENT		TEMP °C				SEAL PRESENT		TEMP °C			
SEAL INTACT	✓			1	2	3	SEAL INTACT			1	2	3	SEAL INTACT			1	2	3
COOLING MEDIA PRESENT		✓					COOLING MEDIA PRESENT						COOLING MEDIA PRESENT					

RELINQUISHED BY:		DATE:	TIME (24 HR)	RECEIVED BY:		DATE:	TIME (24 HR)
1. signature	Jeremy Eckert printed name	2020/08/31 YYYY/MM/DD	1500 HR:MM	1. signature	ANCA PATEL printed name	2020/09/01 YYYY/MM/DD	13:30 HR:MM
2. signature	printed name	YYYY/MM/DD	HR:MM	2. signature	printed name	YYYY/MM/DD	HR:MM
3. signature	printed name	YYYY/MM/DD	HR:MM	3. signature	printed name	YYYY/MM/DD	HR:MM

LAB USE ONLY
BUREAU VERITAS JOB # CAM4977

SAMPLES
LABELED BY: AKP
VERIFIED BY: LOR

IOL COC-AIR-(08/19) White: Bureau Veritas Yellow: Client

Unless otherwise agreed to in writing, work submitted on this Chain of Custody is subject to Bureau Veritas Laboratories' standard Terms and Conditions. Signing of this Chain of Custody document is acknowledgment and acceptance of our terms available at http://www.bvlabs.com/terms-and-conditions

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: August 31, 2020

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Bureau Veritas Mississauga

Consultant Project Number: 1791706-1155

Sample Submission Number: C0M4977

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			Lab control sample recovery outside acceptance range
Extraction Surrogate Recovery			X	of 70-130% for 1,2,4-trichlorobenzene (141%),
Method Blank Concentration	X			naphthalene (144%) and vinyl acetate (138%). All
Matrix Duplicate RPD			X	remaining laboratory QC results are within
Matrix Spike Recovery			X	acceptance criteria.
Lab Control Sample Recovery		X		

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration	X			All field QC samples are within
Trip Blank Concentration			X	alert limits.
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	n/a

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): Amanda Newberry

Date: September 21, 2020

APPENDIX B

Quality Control/Quality Assurance

QUALITY ASSURANCE/QUALITY CONTROL

In conjunction with the field investigations completed to date, a quality assurance/quality control (QA/QC) program was implemented to ensure the integrity of the groundwater sampling and analytical testing results.

1.0 FIELD PROGRAM

All sampling activities were completed in accordance with Golder's Technical Field Procedures by trained Golder personnel. All field activities were documented in field notes and results were recorded on standard field forms. All field equipment involved in the sampling and monitoring of groundwater were decontaminated in accordance with Golder's Technical Procedures. Groundwater samples were collected using appropriate handling protocols and were placed in sample containers provided by Maxxam Analytics Inc. (now Bureau Veritas Laboratories [BVL]).

All re-useable field equipment involved in collecting samples was decontaminated between each sampling location. Groundwater samples were not directly contacted by hand. To help prevent cross-contamination, a new pair of clean nitrile gloves was used for the collection of each sample.

Samples were given unique identification numbers and the sampling containers were preserved in ice-filled coolers. Samples were logged onto formal chain-of-custody documents and transported to BVL's Mississauga Environmental Laboratory for chemical analysis. BVL is accredited by the Standards Council of Canada (SCC).

Three blind field duplicate groundwater samples were submitted for analysis of benzene, toluene, ethylbenzene, xylenes (BTEX), petroleum hydrocarbon (PHC) Fractions F1 to F4 and lead. Two blind field duplicate soil vapour samples were submitted for analysis of BTEX, PHC Fractions F1 and F2, and volatile organic compounds. Trip and field blanks were submitted as necessary, to evaluate the potential for cross-contamination during the sampling and transportation of the samples.

2.0 LABORATORY PROGRAM

The laboratory QA/QC program included adherence to laboratory sampling and analysis protocols (e.g., hold times, sample containers, preservatives, detection limits and approved methodology) and the analysis of laboratory method blanks, laboratory sample duplicates, surrogate recovery and chemical spikes.

The laboratory method blank analysis results were used to detect interferences or impurities introduced by the laboratory equipment, reagents, or solvents. Surrogate recovery is analyzed by spiking samples with known quantities of surrogate chemicals which have similar chemical properties to the parameters being analyzed. The reported recovery provides an indication of the analytical method accuracy for that sample. Matrix spikes were conducted by adding known concentrations of the analyte of interest to a sample to evaluate the effects of the sample matrix on the test method. The analysis of selected samples in duplicate is used to evaluate the reproducibility of the test method.

3.0 DATA RECEPTION

Once laboratory analytical results were received, Golder completed a review of field and laboratory quality. This included review of laboratory QC performance to confirm results are within acceptance criteria, as well as evaluation of field duplicate and blank results to confirm they were within alert limits. Upon receipt of the analytical

results, relative percent difference (RPD) values between the original samples and their blind field duplicates were calculated as follows:

$$RPD\% = \frac{|S - D|}{\frac{1}{2}(S + D)} \times 100$$

Where: RPD = relative percent difference
S = sample value
D = blind field duplicate or replicate value.

Since analytical error increases near the reportable detection limit (RDL), the RPD was only calculated where the concentrations of both the original and blind field duplicate samples were greater than five times the RDL. The calculated RPDs were then compared to parameter specific alert limits.

Exceedances of the QC acceptance or alert criteria were investigated with the laboratory and, if warranted, a corrective action report was requested from the laboratory.

4.0 DATA QUALITY REVIEW RESULTS

Results of the data quality review are summarized in Table B1. The RPD calculations and blank sample results are presented in Tables B2 to B6.

Three field duplicates, one field blank and one trip blank were submitted to the laboratory as part of the groundwater QC program.

Two field duplicates and two field blanks were submitted to the laboratory as part of the soil vapour QC program.

Based on the data quality review, seven data quality issues were identified. These issues are considered unlikely to have a material effect on the quality of the data presented in this report. The issues are discussed in detail in Table B1. All duplicated parameters were within acceptable RPD alert limits.

5.0 SUMMARY OF RESULTS

Based on the review of the QA/QC results, the data presented in this report are considered to be reliable.

Table B1
Summary of Quality Control Sample Results
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

BVL Job Number	Matrix	BVL Sample ID Affected	Test Affected	Data Quality Issue	Comments
C0J3841	Groundwater	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
C0J3843	Water	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
C0J3875	Groundwater	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
C0R2947	Water	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
C0R2950	Groundwater	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
C055468	Soil Vapour	n/a	Vinyl Acetate	Lab control sample recovery (54%) outside acceptance range of 70-130% for vinyl acetate for batch 6629871.	This data quality issue may represent a potential low bias for this sample. Vinyl acetate concentration in the sample was below the regulatory guideline and below the detection limit, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the vinyl acetate data reported can be considered reliable.
C055481	Soil Vapour	n/a	Vinyl Acetate	Lab control sample recovery (54%) outside acceptance range of 70-130% for vinyl acetate for batch 6629871.	This data quality issue may represent a potential low bias for this sample. Vinyl acetate concentration in the sample was below the regulatory guideline and below the detection limit, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the vinyl acetate data reported can be considered reliable.
C0M4970	Soil Vapour	NNC428, NNC429 and NNC430	1,2,4-Trichlorobenzene	Lab control sample recovery (131%) outside acceptance range of 70-130% for 1,2,4-trichlorobenzene for batch 6935878.	This data quality issue may represent a potential high bias for this sample. 1,2,4-Trichlorobenzene concentrations in both the samples and the field/lab duplicates were below the regulatory guideline and below the detection limit, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the 1,2,4-trichlorobenzene data reported can be considered reliable.
			Vinyl Acetate	Lab control sample recovery (133%) outside acceptance range of 70-130% for vinyl acetate for batch 6935878.	This data quality issue may represent a potential high bias for this sample. Vinyl acetate concentrations in both the samples and the field/lab duplicates were below the regulatory guideline and below the detection limit, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the vinyl acetate data reported can be considered reliable.
C0M4977	Soil Vapour	NNC438	1,2,4-Trichlorobenzene	Lab control sample recovery (141%) outside acceptance range of 70-130% for 1,2,4-trichlorobenzene for batch 6936570.	This data quality issue may represent a potential high bias for this sample. 1,2,4-Trichlorobenzene concentrations in the sample was below the regulatory guideline and below the detection limit, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the 1,2,4-trichlorobenzene data reported can be considered reliable.
			Naphthalene	Lab control sample recovery (144%) outside acceptance range of 70-130% for naphthalene for batch 6936570.	This data quality issue may represent a potential high bias for this sample. Naphthalene concentrations in the sample was below the regulatory guideline and below the detection limit, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the naphthalene data reported can be considered reliable.
			Vinyl Acetate	Lab control sample recovery (138%) outside acceptance range of 70-130% for vinyl acetate for batch 6936570.	This data quality issue may represent a potential high bias for this sample. Vinyl acetate concentrations in the sample was below the regulatory guideline and below the detection limit, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the vinyl acetate data reported can be considered reliable.

Notes:
BVL - Bureau Veritas Laboratories
n/a - not applicable

Table B2
Summary of Field Duplicate Sample Results - Petroleum Hydrocarbons and Dissolved Lead
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location	Units	Alert Limit	RDL	TH101	DUP B	RPD %	TH5	DUP A	RPD %	TH100	DUP A	RPD %
Sample Collection Date				28-Jul-20	28-Jul-20		29-Jul-20	29-Jul-20		14-Oct-20	14-Oct-20	
BVL Sample ID				NGI727	NGI730		NGI856	NGI861		NXK481	NXK482	
Benzene	µg/L	>80%	0.20	86	76	12	200	200	0	<0.20	<0.20	n/c
Toluene	µg/L	>80%	0.20	7.1	6.5	9	12	12	0	<0.20	<0.20	n/c
Ethylbenzene	µg/L	>80%	0.20	1000	900	11	830	790	5	<0.20	<0.20	n/c
Total Xylenes	µg/L	>80%	0.40	69	61	12	1,400	1,300	7	<0.40	<0.40	n/c
F1 (C_6-C_{10}) - BTEX	µg/L	>80%	25	5,700	4,900	15	6,000	5,900	2	<25	<25	n/c
F2 (C_{10}-C_{16})	µg/L	>80%	100	1,400	1,500	7	8,500	8,500	0	<100	<100	n/c
F3 (C_{16}-C_{34})	µg/L	>80%	200	<200	<200	n/c	570	470	n/c	<200	<200	n/c
F4 (C_{34}-C_{50})	µg/L	>80%	200	<200	<200	n/c	<200	<200	n/c	<200	<200	n/c
Dissolved Lead (Pb)	µg/L	>50%	0.50	6.6	6.4	3	26	25	4	<0.50	<0.50	n/c

Notes:

Bold/Underlined - value exceeds alert limit

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3 and 4

n/c - not calculated

RDL - reportable detection limit

RPD - relative percent difference

µg/L - micrograms per litre

> - greater than

< - less than

RPD is not calculated if either the original or field duplicate sample has a result of less than 5X the RDL

Table B3
Summary of Field Blank and Trip Blank Results - Petroleum Hydrocarbons
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Parameter	Units	Alert Limit	RDL	Field Blank	Do the results exceed the Alert Limit?	Trip Blank	Do the results exceed the Alert Limit?	Field Blank	Do the results exceed the Alert Limit?	Trip Blank	Do the results exceed the Alert Limit?
Sample Collection Date				29-Jul-20		29-Jul-20		14-Oct-20		14-Oct-20	
BVL Sample ID				NGI731		NGI732		NXK454		NXK455	
Benzene	µg/L	>5X RDL	0.2	<0.20	no	<0.20	no	<0.20	no	<0.20	no
Toluene	µg/L	>5X RDL	0.2	<0.20	no	<0.20	no	<0.20	no	<0.20	no
Ethylbenzene	µg/L	>5X RDL	0.2	<0.20	no	<0.20	no	<0.20	no	<0.20	no
Total Xylenes	µg/L	>5X RDL	0.4	<0.40	no	<0.40	no	<0.40	no	<0.40	no
F1 (C_6-C_{10}) - BTEX	µg/L	>2X RDL	25	<25	no	<25	no	<25	no	<25	no
F2 (C_{10}-C_{16})	µg/L	>2X RDL	100	<100	no	<100	no	<100	no	<100	no
F3 (C_{16}-C_{34})	µg/L	>2X RDL	240	<200	no	<200	no	<200	no	<200	no
F4 (C_{34}-C_{50})	µg/L	>2X RDL	200	<200	no	<200	no	<200	no	<200	no
Dissolved Lead (Pb)	µg/L	>2X RDL	0.5	<0.50	no	<0.50	no	<0.50	no	n/a	n/c

Notes:

Bold/Underlined - value exceeds alert limit

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3 and 4

n/c - not calculated

RDL - reportable detection limit

µg/L - micrograms per litre

> - greater than

< - less than

Table B4
Summary of Soil Vapour Field Duplicate Sample Results - Petroleum Hydrocarbons
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location	Units	Alert Limit	RDL	SV16-01	DUP A	RPD %	SV16-01	DUP A	RPD %
Sample Collection Date				28-Feb-20	28-Feb-20		31-Aug-20	31-Aug-20	
BVL Sample ID				MDF611	MDF613		NNC428	NNC429	
Benzene	µg/m^3	>50%	0.32	<0.32	<0.32	n/c	<0.32	<0.32	n/c
Toluene	µg/m^3	>50%	0.38	<0.38	0.49	n/c	0.73	0.65	n/c
Ethylbenzene	µg/m^3	>50%	0.43	0.47	<0.43	n/c	0.72	0.8	n/c
Xylenes, Total	µg/m^3	>50%	1.3	1.8	1.7	n/c	3	3.1	n/c
F1-BTEX, C_6-C_{10} (as Toluene)	µg/m^3	>50%	5.0	102	134	27	285	217	27
F2, C_{10}-C_{16} (as Decane)	µg/m^3	>50%	5.0	227	197	14	761	760	0

Notes:

Bold/Underlined - value exceeds alert limit

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2 - petroleum hydrocarbon fractions 1 and 2

n/c - not calculated

RDL - reportable detection limit

RPD - relative percent difference

µg/m^3 - micrograms per cubic metre

> - greater than

< - less than

RPD is not calculated if either the original or field duplicate sample has a result of less than 5X the RDL

Table B5
Summary of Soil Vapour Field Duplicate Sample Results - Volatile Organic Compounds
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location	Units	Alert Limit	RDL	SV16-01	DUP A	RPD %	SV16-01	DUP A	RPD %
Sample Collection Date				28-Feb-20	28-Feb-20		31-Aug-20	31-Aug-20	
BVL Sample ID				MDF611	MDF613		NNC428	NNC429	
Benzyl chloride	µg/m^3	>50%	2.6	<2.6	<2.6	n/c	<2.6	<2.6	n/c
Bromodichloromethane	µg/m^3	>50%	1.3	<1.3	<1.3	n/c	<1.3	<1.3	n/c
Bromoform	µg/m^3	>50%	2.1	<2.1	<2.1	n/c	<2.1	<2.1	n/c
Bromomethane	µg/m^3	>50%	0.39	<0.39	<0.39	n/c	<0.39	<0.39	n/c
1,3-Butadiene	µg/m^3	>50%	1.1	<1.1	<1.1	n/c	<1.1	<1.1	n/c
Carbon Disulfide	µg/m^3	>50%	1.6	<1.6	<1.6	n/c	<1.6	<1.6	n/c
Carbon Tetrachloride	µg/m^3	>50%	0.63	<0.63	<0.63	n/c	<0.63	<0.63	n/c
Chlorobenzene	µg/m^3	>50%	0.46	<0.46	<0.46	n/c	<0.46	<0.46	n/c
Chloroethane	µg/m^3	>50%	0.79	<0.79	<0.79	n/c	<0.79	<0.79	n/c
Chloroform	µg/m^3	>50%	0.49	12.9	12.7	2	44.2	44.9	2
Chloromethane	µg/m^3	>50%	0.62	<0.62	<0.62	n/c	<0.62	<0.62	n/c
Cyclohexane	µg/m^3	>50%	0.69	<0.69	<0.69	n/c	<0.69	<0.69	n/c
Dibromochloromethane	µg/m^3	>50%	1.7	<1.7	<1.7	n/c	<1.7	<1.7	n/c
1,2-Dibromoethane (Ethylene Dibromide)	µg/m^3	>50%	0.77	<0.77	<0.77	n/c	<0.77	<0.77	n/c
1,2-Dichlorobenzene	µg/m^3	>50%	0.60	<0.60	<0.60	n/c	<0.60	<0.60	n/c
1,3-Dichlorobenzene	µg/m^3	>50%	2.4	<2.4	<2.4	n/c	<2.4	<2.4	n/c
1,4-Dichlorobenzene	µg/m^3	>50%	0.60	<0.60	<0.60	n/c	0.81	0.83	n/c
Dichlorodifluoromethane (FREON 12)	µg/m^3	>50%	0.99	8.60	7.80	10	21.1	21.1	0
1,1-Dichloroethane	µg/m^3	>50%	0.40	<0.40	<0.40	n/c	<0.40	<0.40	n/c
1,2-Dichloroethane	µg/m^3	>50%	0.40	<0.40	<0.40	n/c	<0.40	<0.40	n/c
1,1-Dichloroethylene	µg/m^3	>50%	0.40	<0.40	<0.40	n/c	<0.40	<0.40	n/c
cis-1,2-Dichloroethylene	µg/m^3	>50%	0.40	<0.40	<0.40	n/c	<0.40	<0.40	n/c
trans-1,2-Dichloroethylene	µg/m^3	>50%	0.40	<0.40	<0.40	n/c	<0.40	<0.40	n/c
1,2-Dichloropropane	µg/m^3	>50%	0.46	<0.46	<0.46	n/c	<0.46	<0.46	n/c
cis-1,3-Dichloropropene	µg/m^3	>50%	0.45	<0.45	<0.45	n/c	<0.45	<0.45	n/c
trans-1,3-Dichloropropene	µg/m^3	>50%	0.45	<0.45	<0.45	n/c	<0.45	<0.45	n/c
1,2-Dichlorotetrafluoroethane	µg/m^3	>50%	1.2	<1.2	<1.2	n/c	<1.2	<1.2	n/c
1,4-Dioxane	µg/m^3	>50%	3.6	<3.6	<3.6	n/c	<3.6	<3.6	n/c
Ethanol (ethyl alcohol)	µg/m^3	>50%	1.9	5.6	3.6	n/c	3.7	12.7	n/c
Ethyl Acetate	µg/m^3	>50%	3.6	<3.6	<3.6	n/c	<3.6	<3.6	n/c
4-ethyltoluene	µg/m^3	>50%	2.5	<2.5	<2.5	n/c	<2.5	<2.5	n/c
Heptane	µg/m^3	>50%	1.2	<1.2	<1.2	n/c	<1.2	<1.2	n/c
Hexachlorobutadiene	µg/m^3	>50%	5.3	<5.3	<5.3	n/c	<5.3	<5.3	n/c
Hexane	µg/m^3	>50%	0.70	<0.70	<0.70	n/c	<0.70	<0.70	n/c

Notes:

Bold/Underlined - value exceeds alert limit

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2 - petroleum hydrocarbon fractions 1 and 2

n/c - not calculated

RDL - reportable detection limit

RPD - relative percent difference

µg/m^3 - micrograms per cubic metre

> - greater than

< - less than

RPD is not calculated if either the original or field duplicate sample has a result of less than 5X the RDL

Table B5
Summary of Soil Vapour Field Duplicate Sample Results - Volatile Organic Compounds
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location	Units	Alert Limit	RDL	SV16-01	DUP A	RPD %	SV16-01	DUP A	RPD %
Sample Collection Date				28-Feb-20	28-Feb-20		31-Aug-20	31-Aug-20	
BVL Sample ID				MDF611	MDF613		NNC428	NNC429	
Methyl Butyl Ketone (2-Hexanone)	µg/m^3	>50%	4.1	<4.1	<4.1	n/c	<4.1	<4.1	n/c
Methyl Ethyl Ketone (2-Butanone)	µg/m^3	>50%	0.59	1.29	1.19	n/c	3.07	3.19	4
Methyl Isobutyl Ketone	µg/m^3	>50%	0.82	<0.82	<0.82	n/c	<0.82	<0.82	n/c
Methyl t-butyl ether (MTBE)	µg/m^3	>50%	0.72	<0.72	<0.72	n/c	<0.72	<0.72	n/c
Methylene Chloride(Dichloromethane)	µg/m^3	>50%	2.1	<2.1	<2.1	n/c	<2.1	<2.1	n/c
2-propanol (Isopropanol)	µg/m^3	>50%	2.5	<2.5	<2.5	n/c	<2.5	<2.5	n/c
2-Propanone (Acetone)	µg/m^3	>50%	1.4	13.4	12.6	6	34.3	34.5	1
Propene (Propylene)	µg/m^3	>50%	0.86	<0.86	<0.86	n/c	<0.86	<0.86	n/c
Styrene	µg/m^3	>50%	0.43	<0.43	<0.43	n/c	<0.43	<0.43	n/c
1,1,1,2-Tetrachloroethane	µg/m^3	>50%	0.69	<0.69	<0.69	n/c	<0.69	<0.69	n/c
1,1,2,2-Tetrachloroethane	µg/m^3	>50%	0.69	<0.69	<0.69	n/c	<0.69	<0.69	n/c
Tetrachloroethylene	µg/m^3	>50%	0.68	1.80	1.60	23	7.23	7.38	2
Tetrahydrofuran	µg/m^3	>50%	1.2	<1.2	<1.2	n/c	<1.2	<1.2	n/c
1,2,4-Trichlorobenzene	µg/m^3	>50%	3.7	<3.7	<3.7	n/c	<3.7	<3.7	n/c
1,2,4-Trimethylbenzene	µg/m^3	>50%	2.5	<2.5	<2.5	n/c	3	3	n/c
1,1,1-Trichloroethane	µg/m^3	>50%	0.55	<0.55	<0.55	n/c	<0.55	<0.55	n/c
1,1,2-Trichloroethane	µg/m^3	>50%	0.55	<0.55	<0.55	n/c	<0.55	<0.55	n/c
Trichloroethylene	µg/m^3	>50%	0.54	<0.54	<0.54	n/c	<0.54	<0.54	n/c
Trichlorofluoromethane (FREON 11)	µg/m^3	>50%	1.1	<1.1	<1.1	n/c	2	2.1	n/c
Trichlorotrifluoroethane (FREON 113)	µg/m^3	>50%	1.2	<1.2	<1.2	n/c	<1.2	<1.2	n/c
1,3,5-Trimethylbenzene	µg/m^3	>50%	2.5	<2.5	<2.5	n/c	<2.5	<2.5	n/c
2,2,4-Trimethylpentane	µg/m^3	>50%	0.93	<0.93	<0.93	n/c	<0.93	<0.93	n/c
Vinyl Acetate	µg/m^3	>50%	0.70	<0.70	<0.70	n/c	<0.70	<0.70	n/c
Vinyl Bromide	µg/m^3	>50%	0.87	<0.87	<0.87	n/c	<0.87	<0.87	n/c
Vinyl Chloride	µg/m^3	>50%	0.26	<0.26	<0.26	n/c	<0.26	<0.26	n/c

Notes:

Bold/Underlined - value exceeds alert limit

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2 - petroleum hydrocarbon fractions 1 and 2

n/c - not calculated

RDL - reportable detection limit

RPD - relative percent difference

µg/m^3 - micrograms per cubic metre

> - greater than

< - less than

RPD is not calculated if either the original or field duplicate sample has a result of less than 5X the RDL

Table B6
Summary of Soil Vapour Field Blank Sample Results
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Parameter	Units	Alert Limit	RDL	Field Blank	Do the results exceed the Alert Limit?	Field Blank	Do the results exceed the Alert Limit?
Sample Collection Date				20-Feb-20		31-Aug-20	
BVL Sample ID				MDF527		NNC438	
Benzene	µg/m^3	>5X RDL	0.32	0.46	no	<0.32	no
Benzyl chloride	µg/m^3	>5X RDL	2.6	<2.6	no	<2.6	no
Bromodichloromethane	µg/m^3	>5X RDL	1.3	<1.3	no	<1.3	no
Bromoform	µg/m^3	>5X RDL	2.1	<2.1	no	<2.1	no
Bromomethane	µg/m^3	>5X RDL	0.39	<0.39	no	<0.39	no
1,3-Butadiene	µg/m^3	>5X RDL	1.1	<1.1	no	<1.1	no
Carbon Disulfide	µg/m^3	>5X RDL	1.6	<1.6	no	<1.6	no
Carbon Tetrachloride	µg/m^3	>5X RDL	0.63	<0.63	no	<0.63	no
Chlorobenzene	µg/m^3	>5X RDL	0.46	<0.46	no	<0.46	no
Chloroethane	µg/m^3	>5X RDL	0.79	<0.79	no	<0.79	no
Chloroform	µg/m^3	>5X RDL	0.49	<0.49	no	<0.49	no
Chloromethane	µg/m^3	>5X RDL	0.62	0.99	no	1.07	no
Cyclohexane	µg/m^3	>5X RDL	0.69	<0.69	no	<0.69	no
1,2-Dichlorobenzene	µg/m^3	>5X RDL	0.60	<0.60	no	<0.60	no
1,3-Dichlorobenzene	µg/m^3	>5X RDL	2.4	<2.4	no	<2.4	no
1,4-Dichlorobenzene	µg/m^3	>5X RDL	0.60	<0.60	no	<0.60	no
Dibromochloromethane	µg/m^3	>5X RDL	1.7	<1.7	no	<1.7	no
Dichlorodifluoromethane (FREON 12)	µg/m^3	>5X RDL	0.99	2.30	no	2.46	no
1,1-Dichloroethane	µg/m^3	>5X RDL	0.40	<0.40	no	<0.40	no
1,2-Dichloroethane	µg/m^3	>5X RDL	0.40	<0.40	no	<0.40	no
1,1-Dichloroethylene	µg/m^3	>5X RDL	0.40	<0.40	no	<0.40	no
cis-1,2-Dichloroethylene	µg/m^3	>5X RDL	0.40	<0.40	no	<0.40	no
trans-1,2-Dichloroethylene	µg/m^3	>5X RDL	0.40	<0.40	no	<0.40	no
1,2-Dichloropropane	µg/m^3	>5X RDL	0.46	<0.46	no	<0.46	no
cis-1,3-Dichloropropene	µg/m^3	>5X RDL	0.45	<0.45	no	<0.45	no
trans-1,3-Dichloropropene	µg/m^3	>5X RDL	0.45	<0.45	no	<0.45	no
1,2-Dichlorotetrafluoroethane	µg/m^3	>5X RDL	1.2	<1.2	no	<1.2	no
1,4-Dioxane	µg/m^3	>5X RDL	3.6	<3.6	no	<3.6	no
Ethanol (ethyl alcohol)	µg/m^3	>5X RDL	1.9	4.0	no	3.3	no
Ethyl Acetate	µg/m^3	>5X RDL	3.6	<3.6	no	<3.6	no
Ethylbenzene	µg/m^3	>5X RDL	0.43	<0.43	no	<0.43	no
Ethylene Dibromide	µg/m^3	>5X RDL	0.77	<0.77	no	<0.77	no
4-ethyltoluene	µg/m^3	>5X RDL	2.5	<2.5	no	<2.5	no
F1-BTEX, C6-C10 (as Toluene)	µg/m^3	>2X RDL	5.0	20.4	no	12.8	no
F2, C10-C16 (as Decane)	µg/m^3	>2X RDL	5.0	13.5	no	6.7	no
Heptane	µg/m^3	>5X RDL	1.2	<1.2	no	<1.2	no
Hexachlorobutadiene	µg/m^3	>5X RDL	5.3	<5.3	no	<5.3	no
Hexane	µg/m^3	>5X RDL	0.70	<0.70	no	<0.70	no

Notes:

Bold/Underlined - value exceeds alert limit

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2 - petroleum hydrocarbon fractions 1 and 2

RDL - reportable detection limit

RPD - relative percent difference

µg/m^3 - micrograms per cubic metre

> - greater than

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RPD is not calculated if either the original or field duplicate sample has a result of less than 5X the RDL

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Imperial Oil Limited

Parameter	Units	Alert Limit	RDL	Field Blank	Do the results exceed the Alert Limit?	Field Blank	Do the results exceed the Alert Limit?
Sample Collection Date				20-Feb-20		31-Aug-20	
BVL Sample ID				MDF527		NNC438	
Methyl Butyl Ketone (2-Hexanone)	µg/m^3	>5X RDL	4.1	<4.1	no	<4.1	no
Methyl Ethyl Ketone (2-Butanone)	µg/m^3	>5X RDL	0.59	0.70	no	0.69	no
Methyl Isobutyl Ketone	µg/m^3	>5X RDL	0.82	<0.82	no	<0.82	no
Methyl t-butyl ether (MTBE)	µg/m^3	>5X RDL	0.72	<0.72	no	<0.72	no
Methylene Chloride(Dichloromethane)	µg/m^3	>5X RDL	2.1	<2.1	no	<2.1	no
Naphthalene	µg/m^3	>5X RDL	1.0	<1.0	no	<1.0	no
2-propanol	µg/m^3	>5X RDL	2.5	<2.5	no	<2.5	no
2-Propanone	µg/m^3	>5X RDL	1.4	2.4	no	5.1	no
Propene	µg/m^3	>5X RDL	0.86	<0.86	no	<1.5	no
Styrene	µg/m^3	>5X RDL	0.43	<0.43	no	<0.43	no
1,1,1,2-Tetrachloroethane	µg/m^3	>5X RDL	0.69	<0.69	no	<0.69	no
1,1,2,2-Tetrachloroethane	µg/m^3	>5X RDL	0.69	<0.69	no	<0.69	no
Tetrachloroethylene	µg/m^3	>5X RDL	0.68	<0.68	no	<0.68	no
Tetrahydrofuran	µg/m^3	>5X RDL	1.2	<1.2	no	<1.2	no
Toluene	µg/m^3	>5X RDL	0.38	0.43	no	0.51	no
Total Xylenes	µg/m^3	>5X RDL	1.3	<1.3	no	<1.3	no
1,2,4-Trichlorobenzene	µg/m^3	>5X RDL	3.7	<3.7	no	<2.5	no
1,1,1-Trichloroethane	µg/m^3	>5X RDL	0.55	<0.55	no	<0.55	no
1,1,2-Trichloroethane	µg/m^3	>5X RDL	0.55	<0.55	no	<0.55	no
Trichloroethylene	µg/m^3	>5X RDL	0.54	<0.54	no	<0.54	no
Trichlorofluoromethane (FREON 11)	µg/m^3	>5X RDL	1.1	1.1	no	1.6	no
Trichlorotrifluoroethane	µg/m^3	>5X RDL	1.2	<1.2	no	<1.2	no
1,2,4-Trimethylbenzene	µg/m^3	>5X RDL	2.5	<2.5	no	<2.5	no
1,3,5-Trimethylbenzene	µg/m^3	>5X RDL	2.5	<2.5	no	<2.5	no
2,2,4-Trimethylpentane	µg/m^3	>5X RDL	0.93	<0.93	no	<0.93	no
Vinyl Acetate	µg/m^3	>5X RDL	0.70	<0.70	no	<0.70	no
Vinyl Bromide	µg/m^3	>5X RDL	0.87	<0.87	no	<0.87	no
Vinyl Chloride	µg/m^3	>5X RDL	0.26	<0.26	no	<0.26	no

Notes:

Bold/Underlined - value exceeds alert limit

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

RDL - reportable detection limit

RPD - relative percent difference

µg/m^3 - micrograms per cubic metre

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RPD is not calculated if either the original or field duplicate sample has a result of less than 5X the RDL

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July 30, 2020

Justin Ly
Imperial Oil Limited
505 Quarry Park Blvd S.E.
Calgary, Alberta
T2C 5N1

Groundwater Monitoring Program – 1660 Merivale Road, Ottawa, Ontario
TSSA Service Request # 791084

Dear Mr. Ly,

Thank you for submitting the following reports for the above captioned property:

- *"2018 Groundwater and Soil Vapour Probe Monitoring and Sampling Report, 1660 Merivale Road, Ottawa, Ontario",* prepared by Golder Associates Ltd. (Golder), dated December 14, 2018; and
- *"2019 Groundwater and Soil Vapour Probe Monitoring and Sampling Report, 1660 Merivale Road, Ottawa, Ontario",* prepared by Golder, dated January 31, 2020.

The 2018 groundwater monitoring report provides the following information:

- Seventeen (17) monitoring wells (TH1 through TH9, TH11, TH12, TH100 to TH102, MW15-01, MW15-02, MW16-01) were monitored on August 14-16, 2018 for depth to groundwater, petroleum vapour concentrations and presence or absence of liquid petroleum hydrocarbon (LPH). The monitoring well TH10 was decommissioned on August 24, 2016 and was replaced with monitoring well MW16-01.
- The depth to groundwater measured in the monitoring wells ranged from 2.44 metres below ground surface (mbgs) (in MW15-02) to 3.83 mbgs (in TH7). The inferred groundwater flow direction is to the south.
- The headspace organic vapour concentrations measured in the monitoring wells ranged from 2,537 parts per billion by volume (ppbv) to 8,102 ppbv during the July 3, 2018 monitoring event. During October 29, 2018 monitoring event, the headspace vapour readings measured in the monitoring wells ranged from 14 ppbv to 308 ppbv.
- LPH was not detected in any monitoring wells.
- Golder selected the Ontario Ministry of the Environment Conservation and Parks (MECP) Table 3 full depth generic Site Condition Standards (SCS) for all types of property use in a non-potable groundwater condition, and medium to fine textured soils as being applicable for use at this site.
- Groundwater samples were collected from seventeen (17) monitoring wells (TH1 through TH9, TH11, TH12, TH100 to TH102, MW15-01, MW15-02, MW16-01) on August 14-16, 2018. The groundwater samples were submitted to Maxxam Analytics Inc. (Maxxam), an accredited laboratory by the Canadian Association for Laboratory Accreditation Inc. (CALA). Groundwater samples were submitted for laboratory analysis of benzene, toluene, ethylbenzene, xylenes (BTEX), petroleum hydrocarbon fractions F1 to F4 (PHC F1-F4) and lead.
- The analytical results of the submitted groundwater samples were reported by Golder to be below the selected MECP Table 3 SCS for all analyzed parameters with the exceptions of the groundwater samples collected from TH4, TH5, TH9, TH12, TH101, TH102 and MW16-01, which exceeded for concentrations of one or more of benzene, PHC F1-F4 and lead.
- Golder also reports that the samples collected from two soil vapour probes (SV16-01 and SV16-02) did not exhibit any exceedances.

The 2019 groundwater monitoring report provides the following information:

- Seventeen (17) monitoring wells (TH1 through TH9, TH11, TH12, TH100 to TH102, MW15-01, MW15-02, MW16-01) were monitored on July 29-31, 2019 for depth to groundwater, petroleum vapour concentrations and presence or absence of LPH.
- The depth to groundwater measured in the monitoring wells ranged from 2.49 mbgs (in MW15-01) to 3.98 mbgs (in TH7). The inferred groundwater flow direction is to the south.
- The headspace organic vapour concentrations measured in the monitoring wells ranged from 16 ppbv to 240 ppbv during the June 21, 2019 monitoring event. During November 12, 2019 monitoring event, the headspace vapour readings measured in the monitoring wells ranged from non-detect to 10 ppbv.
- LPH was not detected in any monitoring wells.
- Golder selected the MECP Table 3 full depth generic SCS for all types of property use in a non-potable groundwater condition, and medium to fine textured soils as being applicable for use at this site.
- Groundwater samples were collected from seventeen (17) monitoring wells (TH1 through TH9, TH11, TH12, TH100 to TH102, MW15-01, MW15-02, MW16-01) on July 29-31, 2019. The groundwater samples were submitted to Bureau Veritas (BV), an accredited laboratory by the CALA. Groundwater samples were submitted for laboratory analysis of BTEX, PHC F1-F4 and lead.
- The analytical results of the submitted groundwater samples were reported by Golder to be below the selected MECP Table 3 SCS for all analyzed parameters with the exceptions of the groundwater samples collected from TH1, TH4, TH5, TH8, TH9, TH11, TH100, TH101 and TH102 and MW16-01, which exceeded for concentrations of one or more of PHC F1-F4.
- Golder also reports that the samples collected from two soil vapour probes (SV16-01 and SV16-02) did not exhibit any exceedances.

Our review of the 2018 and 2019 groundwater monitoring/sampling report indicates that the petroleum hydrocarbon (PHC) impacts were identified in groundwater both onsite (TH1, TH5 and TH4) and offsite (TH8, TH9, TH11, TH12, TH100, TH102, TH101), and the identified impacts have not been completely delineated. Based on the information provided to date, TSSA requires the following:

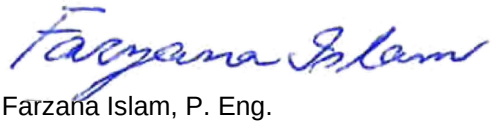
- The identified petroleum hydrocarbon impacts in groundwater must be completely delineated, both on-site and where practical, off-site;
- The City of Ottawa (the City) must be made aware of the identified impacts on the City's roadway allowances of Viewmount Drive and Merivale Road. TSSA must be copied and/or provided with copies of all correspondences between the City and Imperial Oil;
- Following the complete delineation, TSSA requires the submission of a formal Contaminant Management Plan (CMP) if further remedial work is not carried out to remove the impacted soil and/or groundwater;

Please submit an action plan to this office by September 14, 2020 addressing the above issues.

Please note, the soil vapour intrusion assessment guidance document titled "*Draft Technical Guidance: Soil Vapour Intrusion Assessment, September 2013*" has not been finalized by the Ministry of the Environment (MOE). It also has not been made available to public for use and is not in effect to date. As such, TSSA cannot provide comments on the soil vapour monitoring and sampling results.

Should you have any further questions, please do not hesitate to contact me directly. For general enquiries, please contact a Customer Service Advisor at 1.877.682.TSSA (8772) or e-mail customerservices@tssa.org. When contacting TSSA regarding this file, please refer to the Service Request number provided above.

Yours truly,



Farzana Islam, P. Eng.
Fuels Safety Program
Tel.: 416-734-3598
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Email: fislam@tssa.org

January 31, 2020 Project No. 1791706-1155

THIS REPORT CONTAINS PROVISIONS LIMITING LIABILITY, THE SCOPE OF THE REPORT AND THIRD PARTY RELIANCE

These documents and the information contained therein are confidential property of Imperial Oil and any disclosure of same is governed by the provisions of each of the applicable provincial and territorial freedom of information legislation, the Privacy Act (Canada) 1980-81-82-83, c.111, Sch. II "1", and the Access to Information Act (Canada) 1980-81-82-83, c.111, Sch. I "1", and, as such, legislation may be amended from time to time.

Imperial Oil Limited
505 Quarry Park Blvd SE
Calgary, Alberta
T2C 5N1

2019 GROUNDWATER AND SOIL VAPOUR PROBE MONITORING AND SAMPLING REPORT
1660 MERIVALE ROAD, OTTAWA, ONTARIO
SAP 88001627

INTRODUCTION

Golder Associates Ltd. (Golder) was retained by Imperial Oil Limited (Imperial) to conduct a groundwater and soil vapour probe monitoring and sampling program at the former retail fuel outlet and active Canadian Tire station, at 1660 Merivale Road, Ottawa, Ontario (the Site) (Figures 1 and 2). The fieldwork was conducted on June 21, July 29 to August 1, and November 12, 2019.

SCOPE OF WORK

Groundwater

- Annual monitoring of nine existing on-site (TH1 to TH7, MW15-01, and MW15-02) and eight off-site (TH8, TH9, TH11, TH12, TH100 to TH102, and MW16-01) groundwater monitoring wells for depth to groundwater and the thickness, if present, of light non-aqueous phase liquid (LNAPL);
- Collecting annual groundwater samples from nine on-site (TH1 to TH7, MW15-01, and MW15-02) and eight off-site (TH8, TH9, TH11, TH12, TH100 to TH102, and MW16-01) monitoring wells using the low-flow sampling method for laboratory analysis of benzene, toluene, ethylbenzene, xylenes (BTEX), petroleum hydrocarbon (PHC) fractions F1 to F4, and dissolved lead;
- Comparing the groundwater analytical results to the following guidelines:
  - Ministry of the Environment, Conservation and Parks' (MECP) Table 3 Full Depth Generic Site Condition Standards for groundwater in medium and fine textured soil in a non-potable groundwater from the document titled "Soil, Ground Water, and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act," dated April 15, 2011 (hereafter referred to as the Table 3 Standards).

Soil Vapour

- Collecting semi-annual soil vapour samples from two on-site soil vapour probes (SV16-01 and SV16-02) for laboratory analysis of BTEX, PHC Fractions F1 and F2, and volatile organic compounds (VOCs);

- Comparing the soil vapour analytical results to the following guidelines:
  - Health-Based Indoor Air Criteria provided by MECP Modified Generic Risk Assessment (Tier 2) Spreadsheet Model (lowest risk model) (November 1, 2016) for residential land use.
  - Soil vapour screening levels (SVSL) were generated for residential buildings with a basement (probe depth 0 to 30 centimetres below base of the building foundation).

METHODOLOGY

Groundwater

Depth to Groundwater and LNAPL Thickness

- Depth to groundwater was measured and, if present, the thickness of LNAPL using an oil/water interface probe. If LNAPL is detected, then its presence is confirmed visually using a bailer. Prior to use in each well, the interface probe was cleaned using a phosphate-free detergent and water solution and rinsed with deionized water to minimize the potential for cross-contamination. Depth to groundwater measurements were taken from the top of casing.

Low-Flow Sampling

- Groundwater samples were collected using the low-flow sampling method. Water was pumped from each well, at a rate of 0.1 to 1 litres per minute (L/min), using low density polyethylene (LDPE) tubing connected to a peristaltic pump with a portion of silicon tubing. Routine water quality indicator parameters were measured during pumping using a multi-parameter water quality meter and flow through cell. The parameters measured included electrical conductivity, pH, temperature, dissolved oxygen and reduction potential. Calibration of the meter was completed as per the manufacturer's instructions. Purged water was retained on Site in barrels for future off-site disposal.
- Twenty samples, including two duplicates, one field blank, one trip blank and 16 groundwater samples, were collected between July 29 and 31, 2019.
- One monitoring well (TH12) was damaged and could not be accessed.

Laboratory Analysis of Groundwater Samples

- Samples were submitted under chain-of-custody to Bureau Veritas Laboratories (BVL) in Mississauga, Ontario, a Standards Council of Canada (SCC) accredited laboratory, for analysis of BTEX, PHC Fractions F1 to F4, and dissolved lead.
- Groundwater samples for BTEX and PHC Fraction F1 analysis were placed in 44-millilitre (mL) clear glass vials provided by the laboratory and preserved with sodium bisulphate as a microbial inhibitor. The groundwater samples for PHC Fractions F2 to F4 analysis were placed in 250-mL amber glass bottles and preserved with sodium bisulphate. Groundwater samples for dissolved lead analysis were placed in 120-mL high-density polyethylene (HDPE) bottles, field filtered, and preserved with nitric acid.
- All sampling containers were placed in an ice-filled cooler immediately following sampling and transported to BVL for chemical analysis.

Waste Purge Water Removal

- Badger Daylighting of Ottawa, Ontario, an MECP licensed waste hauler, was used to recover approximately 40 L of waste purged groundwater from the Site on August 1, 2019. The liquid was disposed of at an MECP approved waste receiver.

Soil Vapour

Weather Conditions during Sampling

- Weather conditions[1] on June 21, 2019 were clear and sunny. Outdoor air temperatures were between 21.1 and 23.7 degrees Celsius (°C), relative humidity was between 35 and 50%, and barometric pressure was measured between 99.43 and 99.47 kilopascals (kPa) (Environmental Canada 2019, internet site).
- Weather conditions[2] on November 12, 2019 were clear and sunny. Outdoor air temperatures were between -8.7 to -8.0 °C, relative humidity was between 64 to 78%, and barometric pressure was measured between 100.20 to 100.25 kPa.

Probe Leak Testing

- The soil vapour probes (SV16-01 and SV16-02) were leak tested on June 21 and November 12, 2019, to assess whether ambient air was penetrating the ground surface (e.g., along the outside of the tubing) and mixing with soil vapours during sampling.
- Prior to sample collection, the soil vapour probe was purged using a sampling pump connected to the probe using dedicated Teflon tubing. Purging was conducted at a nominal flow rate of 200 mL/min. During purging, the flow rate and vacuum were measured using an inline flow calibrator and manometer.
- After each of three probe volumes, a soil gas screening sample was indirectly collected into a 1 L Tedlar bag using a vacuum chamber to eliminate cross-contamination from the sampling pump. The concentrations of methane, carbon dioxide, oxygen and combustible gases in the screening sample were measured using a RKI Eagle 2. The integrity of each vapour sampling probe and its connection to the sampling equipment was evaluated using helium leak testing. A plastic shroud placed over the sample probe and continuously purged with helium so that leakage of the sample probe seal or its connection to the sampling equipment would result in the detection of helium in the screening sample. Sample acceptance was based upon obtaining a helium concentration in the screening sample that was less than 1% of the shroud concentration.

Soil Vapour Sampling

- Soil vapour samples were collected following procedures outlined in the United States Environmental Protection Agency (US EPA) Method TO-15. A flow regulator supplied by BVL was used to regulate the volumetric soil vapour flow rate into the Summa canister at a flow rate of 70 mL/min during a 20-minute sampling period, or 140 mL/min during a 10-minute sampling period.
- A 1.4 L Summa canister, batch certified by BVL to be free of contaminants, was fitted with a flow regulator for sample collection. Prior to use, the initial Summa canister pressure was confirmed, with a vacuum gauge,

[1] Weather information was taken from the meteorological station (*2019 Hourly Data Report. Ottawa INTL A, Ontario*) located closest to the Site. Environment Canada 2019, internet site.

[2] Weather information was taken from the meteorological station (*2019 Hourly Data Report. Ottawa INTL A, Ontario*) located closest to the Site. Environment Canada 2019, internet site.

to be less than or equal to -27 inches of mercury during the July sampling event, and -27 inches of mercury during the November sampling event, when gauged.

Laboratory Analysis of Soil Vapour Samples

- Soil vapour samples were collected and submitted to the BVL Mississauga facility, for analysis of BTEX, PHC Fractions F1 and F2, and VOCs. During the June sampling event, four samples, including one field duplicate, one field blank and two soil vapour probe samples were submitted to BVL for analysis. During the November sampling event, four samples, including one field duplicate, one field blank and two soil vapour probe samples were submitted to BVL for analysis.

RESULTS

Groundwater

LNAPL Occurrence (Date; Observations)

- July 29 to July 31, 2019; not detected in any monitoring wells (Table 1).

Groundwater Monitoring (Date; Depth to Groundwater Range; Groundwater Direction)

- July 29 to July 31, 2019; depth to groundwater ranged from 2.49 to 3.98 metres below ground surface (mbgs) (Table 1); inferred to the south-southwest (Figure 3).

Groundwater Analytical Results (Date; Parameters; No. of wells)

- July 29 to July 31, 2019; BTEX and PHC Fractions F1 to F4; Exceedances of one or more parameters listed were identified at nine locations (Figure 4, Table 2).
- July 29 to July 31, 2019; Dissolved lead; No exceedances were identified (Figure 4, Table 2).

Soil Vapour

Probe Leak Test Results (Date; Probe; Result expressed as % helium)

- June 21, 2019; SV16-01 and SV16-02; 0% (Table 3).
- November 12, 2019; SV16-01 and SV16-02; 0% (Table 3).

Field Organic Vapour Results (Date; Range)

- June 21, 2019; 16 parts per billion by volume (ppbv) to 240 ppbv (Table 3).
- November 12, 2019; not-detected to 10 ppbv (Table 3).

Soil Vapour Analytical Results (Date; Parameters; No. of probes)

- June 21, 2019; BTEX, PHC Fractions F1 and F2; No exceedances were identified (Figure 5, Table 4).
- June 21, 2019; VOCs; No exceedances were identified (Figure 6, Table 5).
- November 12, 2019; BTEX, PHC Fractions F1 and F2; No exceedances were identified (Figure 5, Table 4).
- November 12, 2019; VOCs; No exceedances were identified (Figure 6, Table 5).

FIELD AND LABORATORY QUALITY ASSURANCE / QUALITY CONTROL

- Copies of the associated laboratory certificates of analysis are provided in Appendix A.
- A quality assurance/quality control (QA/QC) program was followed to minimize and quantify impacts introduced during sample collection, handling, shipping and analysis. As part of the QA/QC program, sampling protocols included minimizing sample handling, submitting field QA/QC samples, using dedicated non-contaminating sampling equipment, using sample-specific identification and labelling procedures, and using chain-of-custody records. A discussion of the QA/QC program is included in Appendix B.
- Based on the data quality review, no groundwater data quality issues were identified. There were 12 soil vapour data quality issues identified. Eleven of the data quality issues are considered unlikely to have any material effect on the quality of the data. Two of the data quality issues are for one of the ambient air samples. Elevated concentrations were likely due to variables associated with the Site. The data from one of the ambient air samples is considered suspect. All other data is considered reliable.

CLOSURE

We trust the information provided herein meets your requirements. If you have any questions about the contents of the letter, please contact the undersigned.

Golder Associates Ltd.



Ian Sosney for

Beau Drieschner, B.Sc.Hons

Environmental Field Technician

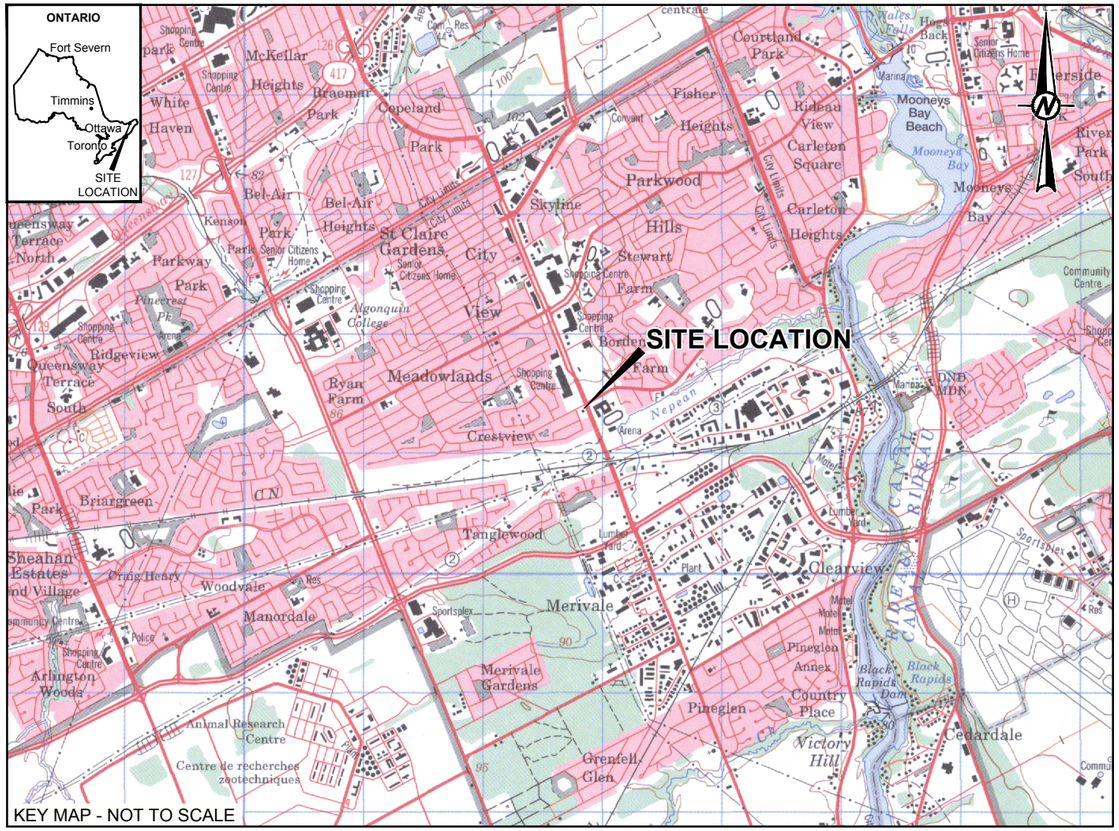
Roopnarine Mungal, B.Sc., M.Phil.(Chem.; Chem.Eng.); LEL, QPESA C.Chem.

Associate, Senior Environmental Consultant

BD/AB/RM/hf

Attachments: Limitations of Liability, Scope of Report and Third Party Reliance
Figures
Tables
Appendix A: Laboratory Certificates of Analysis and Data Quality Review Checklists
Appendix B: Quality Assurance/Quality Control





LEGEND

PROPERTY BOUNDARY

REFERENCE

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No: 11010-SITE PLAN OFFSITE-OCT14; SCALE: UNKNOWN; DATE: OCTOBER 2014.

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0 50 100
(APPROX.) METRES

CLIENT
IMPERIAL OIL LIMITED

CONSULTANT
GOLDER

YYYY-MM-DD	2020-01-28
DESIGNED	BDrieschner
PREPARED	TRomanyszyn
REVIEWED	ABellavance-Godin
APPROVED	RMungal

PROJECT
FORMER RETAIL FUEL OUTLET
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
SITE LOCATION PLAN

PROJECT NO.	PHASE-TASK	REV.	FIGURE
1791706	1155-1916B	0	1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25 mm

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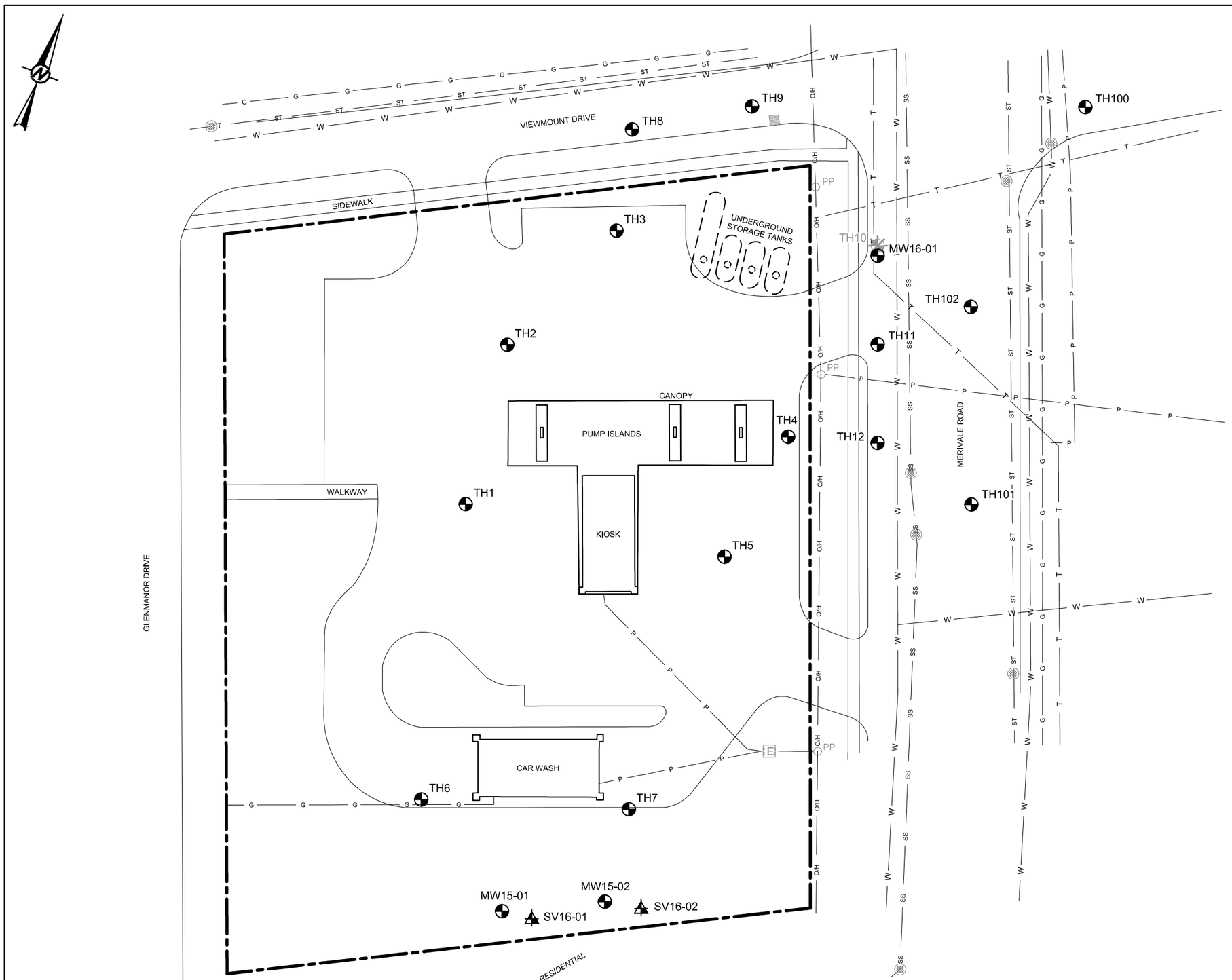

LEGEND

- PROPERTY BOUNDARY
- O/H — OVERHEAD POWER LINE
- G — UNDERGROUND GAS LINE
- P — UNDERGROUND POWER LINE
- SS — UNDERGROUND SANITARY LINE
- ST — UNDERGROUND STORM SEWER LINE
- T — UNDERGROUND TELEPHONE LINE
- W — UNDERGROUND WATERLINE
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL (DECOMMISSIONED)
- SOIL VAPOUR PROBE LOCATION
- CATCH BASIN
- ELECTRICAL PEDESTAL
- MANHOLE
- PP — POWER POLE

REFERENCE

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No.: 11010-SITE PLAN
ONSITE-JUN14; SCALE: UNKNOWN; DATE: JUNE 2014.

0 10 20
(APPROX.) METRES

CLIENT
IMPERIAL OIL LIMITED

PROJECT
FORMER RETAIL FUEL OUTLET
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
SITE PLAN WITH MONITORING WELL AND SOIL VAPOUR LOCATIONS

CONSULTANT
GOLDER

YYYY-MM-DD	2020-01-28
DESIGNED	BDrieschner
PREPARED	TRomanyszyn
REVIEWED	ABellavance-Godin
APPROVED	RMungal

PROJECT NO.	PHASE-TASK	REV.	FIGURE
1791706	1155-1916B	0	2

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25 mm

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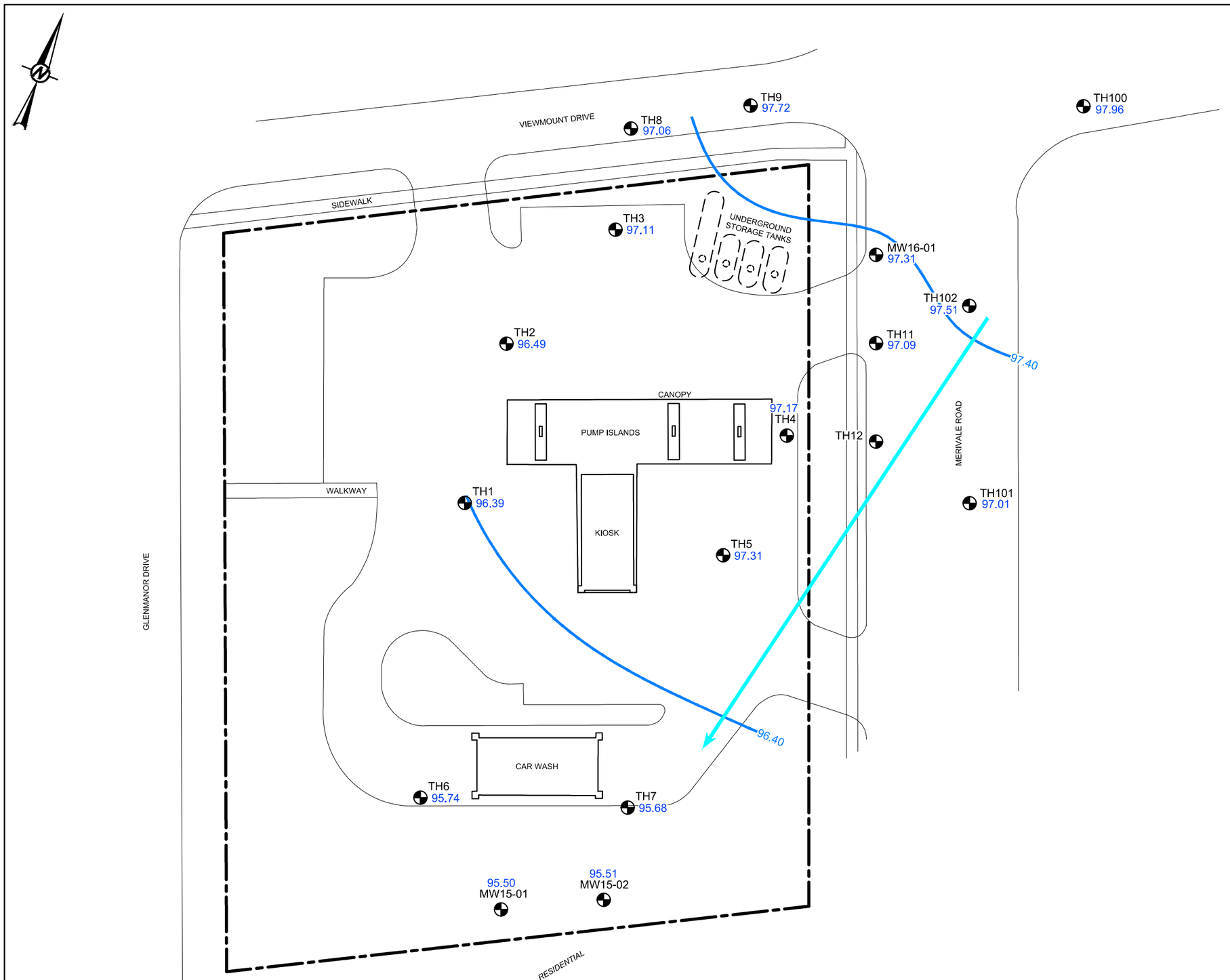

LEGEND

- PROPERTY BOUNDARY
- 97.40 GROUNDWATER CONTOUR (m)
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL
- 95.50 GROUNDWATER ELEVATION (m)
- DIRECTION OF GROUNDWATER FLOW

LIST OF APPLICABLE ABBREVIATIONS

m	METRE

NOTE

ELEVATIONS ARE RELATIVE TO A LOCAL BENCHMARK (CENTRE OF STORM SEWER CATCH BASIN LOCATED APPROXIMATELY 5 m WEST OF KIOSK), WITH AN ASSIGNED ELEVATION OF 100.00 m (EXP. 2013).

REFERENCE

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No.: 11010-SITE PLAN ONSITE-JUN14; SCALE: UNKNOWN; DATE: JUNE 2014.

0 10 20
(APPROX.) METRES

CLIENT
IMPERIAL OIL LIMITED

PROJECT
FORMER RETAIL FUEL OUTLET
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
GROUNDWATER ELEVATIONS
July 29, 2019

CONSULTANT
GOLDER

YYYY-MM-DD	2020-01-28
DESIGNED	BDrieschner
PREPARED	TRomanyszyn
REVIEWED	ABellavance-Godin
APPROVED	RMungal

PROJECT NO.	PHASE-TASK	REV.	FIGURE
1791706	1155-1916B	0	3

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25 mm

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TH1										Screen Interval: 2.6 to 5.6 mbgs
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-11	<0.20	<0.20	<0.20	<0.40	<25	<100	<100	<100	<5.0	<0.50
13-Jun-13	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	0.53
26-Aug-14	<0.20	0.75	<0.20	1.2	<25	<100	<200	<200	<5.0	<0.50
17-Nov-15	<0.20	0.27	0.28	<0.40	<25	<100	<200	<200	<5.0	<0.50
10-Aug-16	<0.20	<0.20	<0.20	<0.40	<25	<100	300	1,200[b]	<5.0	<0.50
05-Dec-16	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
21-Jun-17	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
16-Aug-18	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
30-Jul-19	<0.20	<0.20	<0.20	<0.40	<25	<100	350	1,400[b]	<5.0	<0.50

TH2										Screen Interval: 3.2 to 4.7 mbgs
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-11	0.77	<0.20	1.3	0.48	<25	<100	<100	<100	<5.0	<0.50
13-Jun-13	0.62	<0.20	2.2	<0.40	<25	<100	<200	<200	<5.0	<0.50
27-Aug-14	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
17-Nov-15	<0.20	0.29	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
17-Nov-15 (DUP)	<0.20	0.28	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
09-Aug-16	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
21-Jun-17	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
15-Aug-18	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
31-Jul-19	<0.20	<0.20	<0.20	<0.40	<25	<100	250	<200	na	<0.50

TH3										Screen Interval: 3.2 to 4.7 mbgs
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-11	27	2.4	79	150	1,100	430	<100	130	20	3.8
31-Aug-11 (DUP)	23	2.1	69	130	1,100	380	<100	110	17	3.9
13-Jun-13	11	0.61	66	85	900	350	<200	<200	<5.0	3.1
26-Aug-14	14	0.28	19	5.2	520	180	<200	<200	<5.0	2.2
28-Oct-15	25	<0.20	15	0.89	450	<100	<200	<200	<5.0	2.0
10-Aug-16	42	<0.20	26	1.5	560	110	<200	<200	<5.0	0.98
21-Jun-17	19	0.29	77	20	630	140	<200	<200	na	<0.50
15-Aug-18	7.4	<0.20	7.2	3.3	310	<100	<200	<200	na	0.76
31-Jul-19	18	<0.20	26	2.1	380	120	<200	<200	na	2.2

TH4										Screen Interval: 3.4 to 4.9 mbgs
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-11	610	610	3,400	19,000	26,000	17,000	360	170	540	2.6
13-Jun-13	200	35	1200	4,300	6,200	19,000	580	430	<100	5.8
26-Aug-14	500	37	1400	2600	4,700	1,400	<200	<200	58	3.0
26-Aug-14 (DUP)	540	40	1600	2700	400	1,400	<200	<200	62	1.9
17-Nov-15	180	18	560	930	1,900	940	240	230	<100	3.1
10-Aug-16	210	11	550	1,500	1,800	370	<200	<200	31	1.1
10-Aug-16 (DUP)	190	9.7	490	1,400	1,600	400	210	<200	27	1.7
21-Jun-17	210	28	470	1,500	2,000	930	<200	<200	na	0.78
16-Aug-18	400	14	860	3,400	3,100	1,300	250	<200	na	30
16-Aug-18 (DUP)	420	14	890	3,500	2,800	1,200	260	210	na	32
31-Jul-19	36	1.9	41	270	1,500	1,400	280	<200	na	12

TH5										Screen Interval: 3.5 to 5.0 mbgs
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-11	750	140	3,000	13,000	85,000	20,000	690	620	1,400	5.5
13-Jun-13	530	44	1600	3800	9,900	160,000	12,000	6,800	<100	8.3
13-Jun-13 (DUP)	550	44	1600	3800	9,200	110,000	7,000	4,300	<100	8
27-Aug-14	450	46	1600	3100	11,000	2,800	<200	<200	210	4.1
17-Nov-15	360	26	930	1,300	3,300	2,900	320	240	<100	3.7
10-Aug-16	420	43	1,500	3,700	13,000	11,000	1,100	810	240	0.81
21-Jun-17	210	25	690	1,800	4,400	3,600	420	350	na	1.8
21-Jun-17 (DUP)	190	23	640	1,600	4,400	3,200	490	450	na	2.2
16-Aug-18	510	37	1,400	2,600	6,700	3,300	300	<200	na	2.6
31-Jul-19	380	24	910	2,800	5,600	5,400	350	<200	na	8.4
31-Jul-19 (DUP)	380	26	940	2,900	5,700	4,100	290	<200	na	8.3

TH6										Screen Interval: 3.6 to 5.1 mbgs
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
20-Oct-11	<0.20	<0.20	<0.20	<0.40	<25	<100	<100	<100	<5.0	<0.50
20-Oct-11 (DUP)	<0.20	<0.20	<0.20	<0.40	<25	<100	<100	<100	<5.0	<0.50
13-Jun-13	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	0.6
27-Aug-14	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
28-Oct-15	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
28-Oct-15 (DUP)	<0.20	0.38	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
09-Aug-16	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
22-Jun-17	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
14-Aug-18	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
29-Jul-19	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50

TH7										Screen Interval: 4.4 to 5.8 mbgs
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
14-Nov-11	31	5.4	160	340	430	<100	<100	<100	<30	<0.5
13-Jun-13	37	2.8	140	130	550	460	<200	<200	<5.0	3.2
27-Aug-14	150	18	610	730	1,900	540	<200	<200	22	2.1
28-Oct-15	93	8.4	270	300	1,000	280	<200	<200	<5.0	1.2
09-Aug-16	62	5.8	120	140	500	150	<200	<200	<5.0	<0.50
22-Jun-17	93	8.7	240	190	800	190	<200	<200	na	0.54
14-Aug-18	22	0.53	8.8	0.60	68	<100	<200	<200	na	<0.50
29-Jul-19	46	1.4	43	2.5	400	110	<200	<200	na	<0.50

TH8										Screen Interval: 3.3 to 4.9 mbgs
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
13-Jun-13	3.9	<0.20	4.1	0.61	48	<100	<200	<200	<0.5	1.1
27-Oct-15	4.4	<0.20	0.51	0.41	<25	<100	<200	<200	<5.0	0.82
10-Aug-16	3.0	<0.20	0.66	<0.40	70	<100	<200	<200	<5.0	0.77
15-Aug-18	0.99	<0.20	0.80	<0.40	<25	<100	<200	<200	na	<2.5
15-Aug-18 (DUP)	1.0	<0.20	0.78	<0.40	<25	<100	<200	<200	na	<2.5
30-Jul-19	3.7	<0.20	1.0	<0.40	220	<100	440	1,500[b]	na	1.2

TH9										Screen Interval: 3.4 to 4.9 mbgs
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
06-Oct-14	31	3	230	290	1,000	570	610	420	15	1.1
27-Oct-15	51	7.2	390	350	2,500	1,100	220	360	35	2.6
10-Aug-16	23	1.8	250	70	1,600	350	<200	<200	11	1.1
20-Jun-17	36	5.5	460	370	4,200	1,200	<200	<200	na	2.3
15-Aug-18	12	0.69	78	49	740	190	350	1,600[b]	na	<0.50
30-Jul-19	0.81	<0.20	2.5	0.47	50	<100	540	1,900[b]	na	<0.50
30-Jul-19 (DUP)	0.84	<0.20	2.6	0.51	63	<100	1,200	3,000[b]	na	<0.50

TH10										Screen Interval: 3.3 to 4.9 mbgs
Date	B	T	E	X	F1	F2	F3	F4	H	Pb
11-Jun-13	73	58	52	200	1,400	560	<200	<200	35	1.2

TH11										Screen Interval: 3.3 to 4.9 mbgs
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
11-Jun-13	370	34	2,200	3,400	11,000	1,400	<200	<200	130	2.6
28-Oct-15	96	8.1	710	120	4,400	2,500	1,300	820	72	4.6
11-Aug-16	100	6.3	590	160	5,000	6,700	2,200	1,300	37	6.0
11-Aug-16 (DUP)	110	7.1	610	170	4,900	7,100	2,400	1,400	43	3.3
31-Jul-19	16	0.71	35	1.7	960	2,600	2,000	3,800[b]	na	0.81

TH12										Screen Interval: 3.3 to 4.9 mbgs
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
11-Jun-13	380	35	2,300	3,500	11,000	3,100	<200	<200	<100	6.8
11-Jun-13 (DUP)	360	34	2,300	3,500	11,000	2,800	<200	<200	<100	6.9
28-Oct-15	95	14	620	400	4,500	1,600	540	320	140	4.5
11-Aug-16	130	17	1,100	630	6,800	1,800	900	510	120	2.1
20-Jun-17	160	11	1,200	170	7,900	2,800	750	460	na	3.8
20-Jun-17 (DUP)	150	11	1,200	160	7,300	2,600	700	430	na	4.5

TH100										Screen Interval: 3.0 to 4.9 mbgs
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
06-Oct-14	<0.20	<0.20	0.31	0.91	<25	<100	<200	<200	<5.0	<0.50
27-Oct-15	<0.20	<0.20	0.94	1.1	<25	<100	<200	<200	<5.0	<0.50
27-Oct-15 (DUP)	<0.20	<0.20	0.24	<0.40	<25	<100	<200	<200	<5.0	<0.50
10-Aug-16	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
20-Jun-17	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
15-Aug-18	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<2.5
31-Jul-19	<0.20	<0.20	1.3	<0.40	<25	<100	460	1,400[b]	na	<0.50

TH101										Screen Interval: 3.0 to 4.9 mbgs
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
06-Oct-14	85	12	580	500	4,100	830	<200	<200	44	2.9
06-Oct-14 (DUP)	84	12	580	510	4,100	910	<200	<200	54	4.2
28-Oct-15	110	16	740	590	3,400	830	<200	<200	64	4.6
11-Aug-16	49	8.6	580	390	2,200	590	<200	<200	23	0.63
20-Jun-17	76	14	870	410	4,800	1,100	<200	<200	na	0.84
15-Aug-18	110	9.2	1,200	130	5,900	1,700	<200	<200	na	3.8
31-Jul-19	73	7.5	870	130	5,100	1,500	<200	<200	na	3.2

TH102										Screen Interval: 3.0 to 4.9 mbgs
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
06-Oct-14	0.72	0.52	16	42	360	360	<200	<200	7.2	3.9
28-Oct-15	42	1.6	100	140	970	350	<200	<200	23	1.5
11-Aug-16	8.3	<0.20	33	21	510	180	<200	<200	18	1.4
20-Jun-17	19	3.1	190	120	1,800	500	<200	<200	na	<0.50
31-Jul-19	4.5	1.5	33	27	500	270	<200	<200	na	2.8

MW15-01										Screen Interval: 3.0 to 6.0 mbgs
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
17-Nov-15	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
09-Aug-16	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
22-Jun-17	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
15-Aug-18	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
29-Jul-19	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50

MW15-02										Screen Interval: 2.7 to 4.9 mbgs
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
17-Nov-15	44	5.9	180	170	2,300	750	<200	<200	35	2.2
09-Aug-16	78	4.7	73	25	800	450	<200	<200	5.5	<0.50
22-Jun-17	20	1.0	1.5	2.3	190	110	<200	<200	na	1.1
14-Aug-18	2.0	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
29-Jul-19	1.7	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50

MW16-01										Screen Interval: 3.3 - 4.8 mbgs
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-16	18	3.8	41	59	250	<100	<200	<200	na	0.53
21-Jun-17	46	3.7	170	79	820	260	<200	<200	na	1.2
16-Aug-18	15	0.39	30	0.81	88	<100	260	<200	na	0.53
30-Jul-19	110	0.57	41	0.79	470	140	<200	<200	na	0.71

ONTARIO STANDARDS

PARAMETERS	B	T	E	X	F1	F2	F3	F4	HA	Pb
CRITERIA[a]	430	18,000	2,300	4,200	750[c]	150	500	500	520	25
RDL	0.20	0.20	0.20	0.40	100	100	200	200	10	0.50
UNITS	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L

(a) O.REG 153 (MOECC 2011) TABLE 3 FULL DEPTH GENERIC SITE CONDITION STANDARDS FOR ALL TYPES OF PROPERTY USE FOR GROUNDWATER IN MEDIUM AND FINE TEXTURED SOIL IN A NON-POTABLE GROUNDWATER CONDITION.

(b) BASELINE WAS NOT REACHED AT CARBON 50. VALUE PRESENTED CORRESPONDS TO THE GREATER OF THE F4 AND F4G VALUES.

(c) F1 FRACTION DOES NOT INCLUDE BTEX; HOWEVER, THE PROPONENT HAS THE CHOICE AS TO WHETHER OR NOT TO SUBTRACT BTEX FROM THE ANALYTICAL RESULT.

LEGEND

PROPERTY BOUNDARY

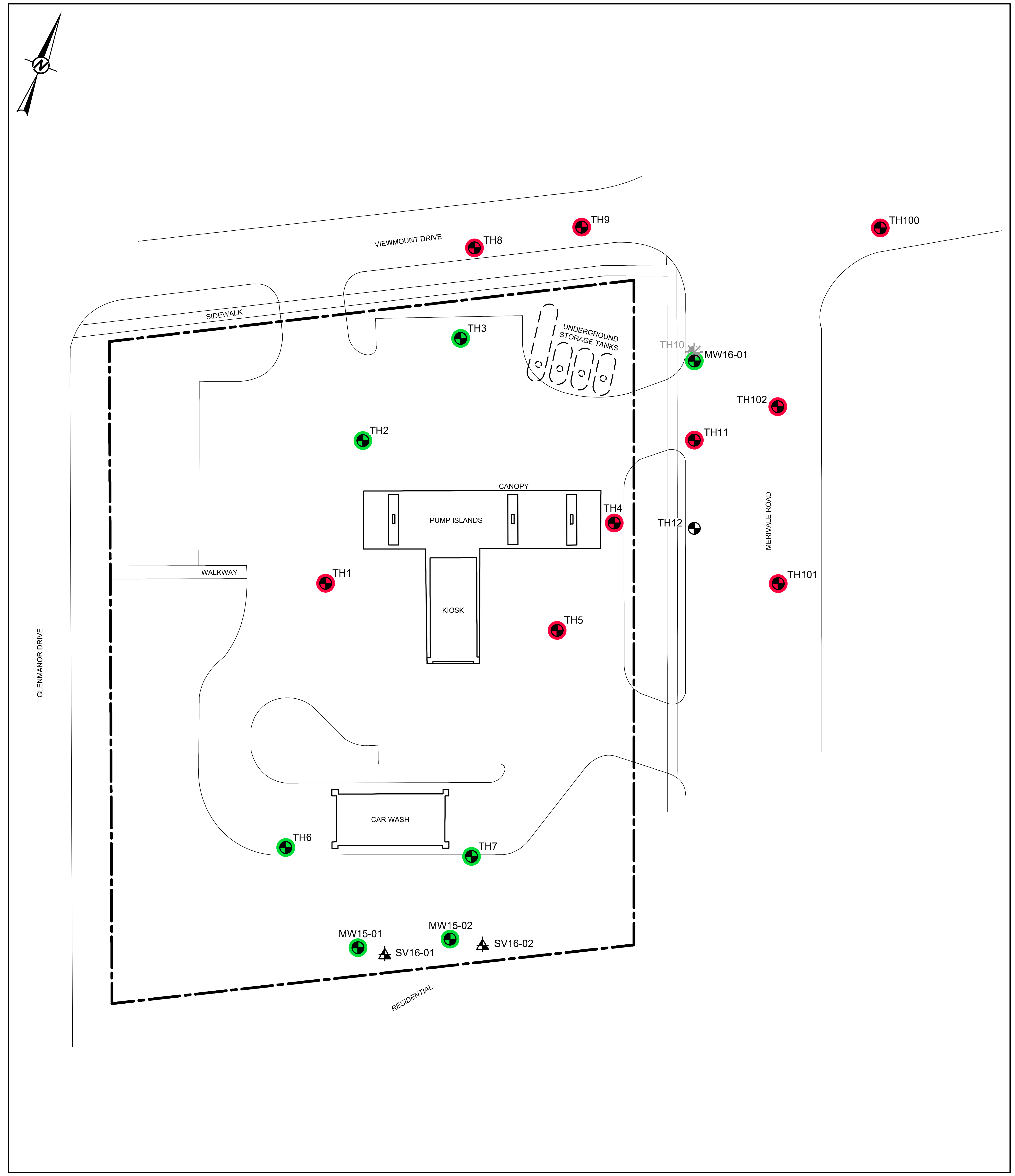
BOREHOLE LOCATION COMPLETED AS A MONITORING WELL

BOREHOLE LOCATION COMPLETED AS A MONITORING WELL (DECOMMISSIONED)

SOIL VAPOUR PROBE LOCATION

LIST OF APPLICABLE ABBREVIATIONS

<	LESS THAN
µg/L	MICROGRAMS PER LITRE
B	BENZENE
T	TOLUENE
E	ETHYLBENZENE
X	XYLENES
F1	PETROLEUM HYDROCARBON FRACTION 1 (C_6-C_{10}) LESS BTEX
F2	PETROLEUM HYDROCARBON FRACTION 2 (C_{10}-C_{16})
F3	PETROLEUM HYDROCARBON FRACTION 3 (C_{16}-C_{34})
F4	PETROLEUM HYDROCARBON FRACTION 4 (C_{34}-C_{50})
F4G	PETROLEUM HYDROCARBON 4 GRAVIMETRIC
HA	n-HEXANE
mbgs	METRES BELOW GROUND SURFACE
MOECC	MINISTRY OF THE ENVIRONMENT AND CLIMATE CHANGE
na	NOT ANALYZED
O.REG	ONTARIO REGULATION
RDL	REPORTABLE DETECTION LIMIT
Pb	DISSOLVED LEAD



NOTES

1. LOCATIONS WHERE CURRENT GROUNDWATER SAMPLE MEETS APPLICABLE GUIDELINES/STANDARDS FOR ALL PARAMETERS ANALYZED SHOWN IN **GREEN.**
2. LOCATIONS WHERE CURRENT GROUNDWATER SAMPLE EXCEEDS APPLICABLE GUIDELINES/STANDARDS FOR AT LEAST ONE OF THE PARAMETERS ANALYZED SHOWN IN **RED.**
3. EXCEEDANCES OF APPLICABLE GUIDELINES/STANDARDS IN TEXT ARE SHOWN IN **RED.**
4. LOCATION WHERE NO SAMPLES WERE TAKEN IN THE CURRENT SAMPLING EVENT SHOWN IN **BLACK**.

0 10 20
(APPROX.) METRES

REFERENCE

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No.: 11010-SITE PLAN ONSITE-JUN14; SCALE: UNKNOWN; DATE: JUNE 2014.

CLIENT
IMPERIAL OIL LIMITED

CONSULTANT
GOLDER

YYYY-MM-DD	2020-01-28
DESIGNED	BDrieschner
PREPARED	TRomanyszyn
REVIEWED	ABellavance-Godin
APPROVED	RMungal

PROJECT
FORMER RETAIL FUEL OUTLET
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
GROUNDWATER ANALYTICAL RESULTS - BTEX, PHC FRACTIONS F1-F4, n-HEXANE and DISSOLVED LEAD

PROJECT NO.	PHASE-TASK	REV.	FIGURE
1791706	1155-1916B	0	4

Path: \\golder.gds\CAL\M\CAD\imperial_oil\downstream\ottawa_on_1660_merivale_road\99_projects\1791706\02_PRODUCTION\1155-1916B\ONSITE\DWG\ | File Name: 1791706-1155-HS-0004.dwg | Last Edited By: yawang Date: 2020-01-29 Time:10:50:12 AM | Printed By: YaWang Date: 2020-01-29 Time:10:50:20 AM

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI C
25 mm
0

SV16-01																Screen Interval: 1.35 - 1.50 mbgs
Date	**B**	**T**	**E**	**X**	**F1**	**F2**	**Ali >C_5-C_6**	**Ali >C_6-C_8**	**Ali >C_8-C_{10}**	**Ali >C_{10}-C_{12}**	**Ali >C_{12}-C_{16}**	**Aro >C_7-C_8**	**Aro >C_8-C_{10}**	**Aro >C_{10}-C_{12}**	**Aro >C_{12}-C_{16}**
13-Dec-16	2.13	11.3	4.30	15.4	449	862	na	na	na	na	na	na	na	na	na
21-Jul-17	<0.32	3.93	4.56	21.7	424	6,090	na	na	na	na	na	na	na	na	na
21-Jul-17 (DUP)	<0.32	5.28	4.43	21.1	389	5,610	na	na	na	na	na	na	na	na	na
21-Nov-17	<0.32	1.28	1.41	5.2	145	501	na	na	na	na	na	na	na	na	na
03-Jul-18	<0.32	1.59	1.92	7.6	715	2,880	na	na	na	na	na	na	na	na	na
03-Jul-18 (DUP)	<0.32	1.71	2.35	9.4	832	3,400	na	na	na	na	na	na	na	na	na
30-Oct-18	<0.32	1.31	1.45	4.6	224	1,220	<5.0	<5.0	61.7	666	9.4	<5.0	<5.0	<5.0	<5.0
30-Oct-18 (DUP)	<0.32	1.33	1.27	4.1	188	1,040	<5.0	<5.0	52.6	551	13.9	<5.0	<5.0	<5.0	<5.0
21-Jun-19	<0.32	1.56	1.63	6.3	243	1,470	na	na	na	na	na	na	na	na	na
21-Jun-19 (DUP)	<0.32	0.52	<0.43	<0.30	165	360	na	na	na	na	na	na	na	na	na
12-Nov-19	<0.32	0.83	1.10	3.7	148	233	na	na	na	na	na	na	na	na	na
12-Nov-19 (DUP)	<0.32	0.65	<0.43	<1.3	110	166	na	na	na	na	na	na	na	na	na

SV16-02																Screen Interval: 1.45 - 1.6 mbgs
Date	**B**	**T**	**E**	**X**	**F1**	**F2**	**Ali >C_5-C_6**	**Ali >C_6-C_8**	**Ali >C_8-C_{10}**	**Ali >C_{10}-C_{12}**	**Ali >C_{12}-C_{16}**	**Aro >C_7-C_8**	**Aro >C_8-C_{10}**	**Aro >C_{10}-C_{12}**	**Aro >C_{12}-C_{16}**
13-Dec-16	1.38	8.57	2.75	9.6	439	563	na	na	na	na	na	na	na	na	na
13-Dec-16 (DUP)	1.45	8.70	2.76	10.1	448	559	na	na	na	na	na	na	na	na	na
21-Jul-17	<0.32	2.14	2.33	10.1	157	2,310	na	na	na	na	na	na	na	na	na
21-Nov-17	<0.32	0.68	0.67	2.5	98.3	281	na	na	na	na	na	na	na	na	na
21-Nov-17 (DUP)	<0.32	0.58	0.69	2.5	64.6	292	na	na	na	na	na	na	na	na	na
03-Jul-18	0.38	1.54	0.59	2.1	689	678	na	na	na	na	na	na	na	na	na
30-Oct-18	<0.32	<0.38	<0.43	<1.3	36.4	400	<5.0	<5.0	16.6	229	9.3	<5.0	<5.0	<5.0	<5.0
21-Jun-19	<0.32	0.39	<0.43	<1.3	70.6	331	na	na	na	na	na	na	na	na	na
12-Nov-19	<0.32	1.30	<0.43	<1.3	113	131	na	na	na	na	na	na	na	na	na

ONTARIO GUIDELINES

PARAMETERS	**B**	**T**	**E**	**X**	**F1**	**F2**	**Ali >C_5-C_6**	**Ali >C_6-C_8**	**Ali >C_8-C_{10}**	**Ali >C_{10}-C_{12}**	**Ali >C_{12}-C_{16}**	**Aro >C_7-C_8**	**Aro >C_8-C_{10}**	**Aro >C_{10}-C_{12}**	**Aro >C_{12}-C_{16}**
Health-Based Indoor Air Criteria[a]	0.51	1,043	209	146	2,491	471	n/s	9,594	521	521	521	n/s	104	104	104
SVSL[b]	25	52,143	10,429	7,300	124,530	23,530	n/s	479,714	26,071	26,071	26,071	n/s	5,214	5,214	5,214
RDL	0.32	0.38	0.43	1.3	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
UNITS	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m3	µg/m^3

(a) HEALTH-BASED INDOOR AIR CRITERIA PROVIDED BY MOECC MODIFIED GENERIC RISK ASSESSMENT (TIER 2) SPREADSHEET MODEL (NOVEMBER 1, 2016).

(b) SOIL VAPOUR SCREENING LEVELS (SVSL) FOR A RESIDENTIAL BUILDING WITH BASEMENT (PROBE DEPTH 0 - 30 CENTIMETRES BELOW BASE OF THE BUILDING FOUNDATION) CALCULATED BY DIVIDING HEALTH-BASED INDOOR AIR CRITERIA BY AN ATTENUATION FACTOR OF 0.02.

(c) RDL GREATER THAN SVSL.

LEGEND

PROPERTY BOUNDARY

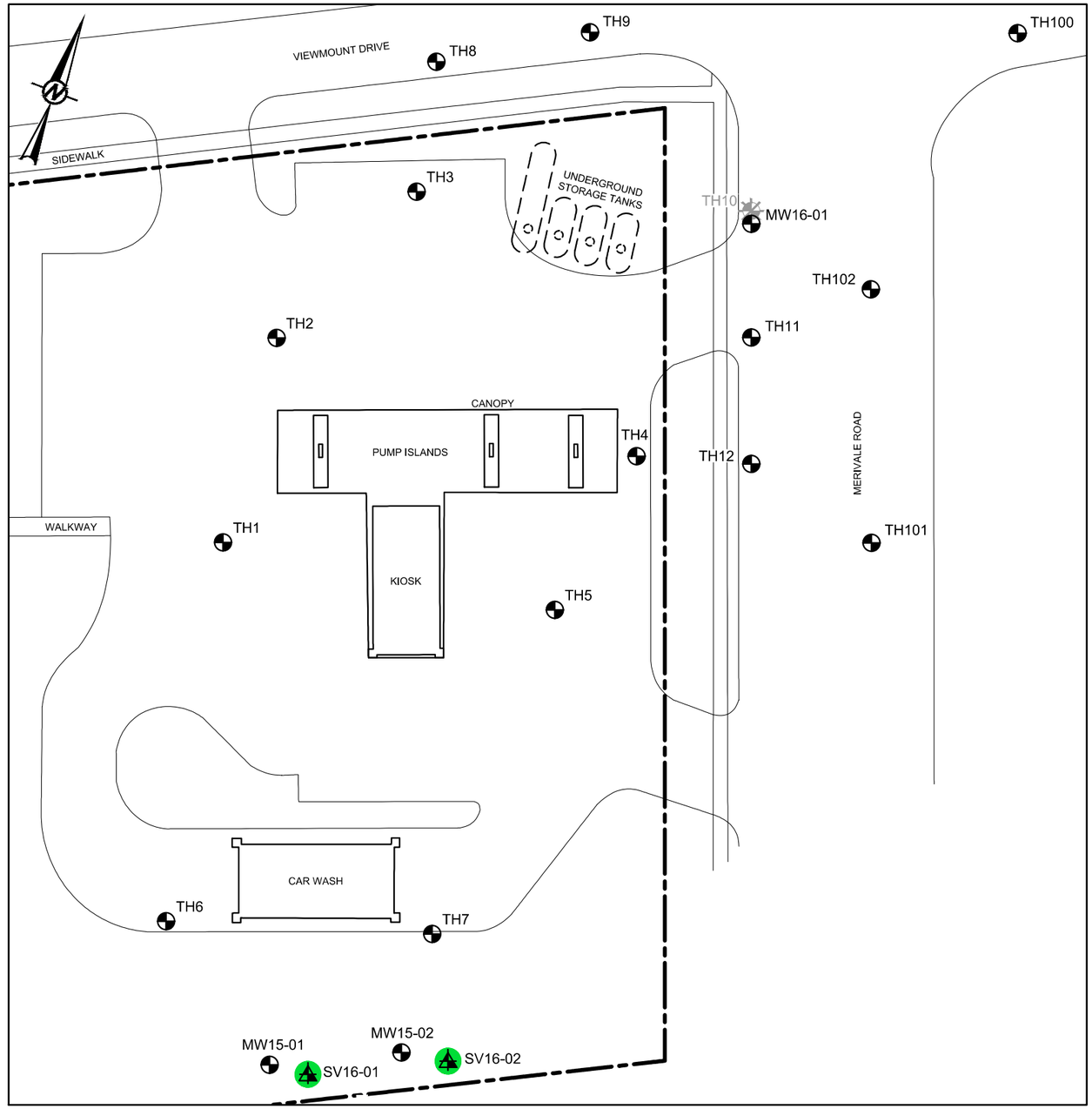
BOREHOLE LOCATION COMPLETED AS A MONITORING WELL

BOREHOLE LOCATION COMPLETED AS A MONITORING WELL (DECOMMISSIONED)

SOIL VAPOUR PROBE LOCATION

LIST OF APPLICABLE ABBREVIATIONS

>	GREATER THAN	B	BENZENE
<	LESS THAN	T	TOLUENE
µg/m^3	MICROGRAMS PER METRE CUBE	E	ETHYLBENZENE
Ali >C_{10}-C_{12}	ALIPHATICS >C_{10}-C_{12}	X	XYLENES
Ali >C_{12}-C_{16}	ALIPHATICS >C_{12}-C_{16}	F1	PETROLEUM HYDROCARBON FRACTION 1 (C_6-C_{10}) LESS BTEX
Ali >C_5-C_6	ALIPHATICS >C_5-C_6	F2	PETROLEUM HYDROCARBON FRACTION 2 (C_{10}-C_{16})
Ali >C_6-C_8	ALIPHATICS >C_6-C_8	mbgs	METRES BELOW GROUND SURFACE
Ali >C_8-C_{10}	ALIPHATICS >C_8-C_{10}	MOECC	MINISTRY OF ENVIRONMENT AND CLIMATE CHANGE
Aro >C_{10}-C_{12}	AROMATIC >C_{10}-C_{12}	n/s	NO STANDARD
Aro >C_{12}-C_{16}	AROMATIC >C_{12}-C_{16}	na	NOT ANALYZED
Aro >C_7-C_8	AROMATIC >C_7-C_8	RDL	REPORTABLE DETECTION LIMIT
Aro >C_8-C_{10}	AROMATIC >C_8-C_{10}	SVSL	SOIL VAPOUR SCREENING LEVELS



NOTES

1. LOCATIONS WHERE CURRENT SOIL VAPOUR SAMPLE MEETS APPLICABLE GUIDELINES/STANDARDS FOR ALL PARAMETERS ANALYZED SHOWN IN **GREEN.**
2. LOCATIONS WHERE CURRENT SOIL VAPOUR SAMPLE EXCEEDS APPLICABLE GUIDELINES/STANDARDS FOR AT LEAST ONE OF THE PARAMETERS ANALYZED SHOWN IN **RED.**
3. EXCEEDANCES OF APPLICABLE GUIDELINES/STANDARDS IN TEXT ARE SHOWN IN **RED.**

REFERENCE

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No.: 11010-SITE PLAN ONSITE-JUN14; SCALE: UNKNOWN; DATE: JUNE 2014.

CLIENT
IMPERIAL OIL LIMITED

CONSULTANT
GOLDER

YYYY-MM-DD	2020-01-28
DESIGNED	BDrieschner
PREPARED	TRomanyszyn
REVIEWED	ABellavance-Godin
APPROVED	RMungal

PROJECT
FORMER RETAIL FUEL OUTLET
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
SOIL VAPOUR ANALYTICAL RESULTS - BTEX, PHC FRACTIONS F1-F2, ALIPHATIC AND AROMATIC HYDROCARBONS

PROJECT NO.	PHASE-TASK	REV.	FIGURE
1791706	1155-1916B	0	5

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25 mm

0

Path: \\golder.gds\CAL\MCAD\IMPERIAL_OIL\DOWNSTREAM\OTTAWA_ON_1660_MERIVALE_ROAD\99_PROJECTS\1791706\02_PRODUCTION\1155-1916B\ONSITE\DWG\ | File Name: 1791706-1155-HS-0005.dwg | Last Edited By: yawang Date: 2020-01-29 Time:10:50:03 AM | Printed By: YaWang Date: 2020-01-29 Time:10:55:18 AM

LEGEND

PROPERTY BOUNDARY

BOREHOLE LOCATION COMPLETED AS A MONITORING WELL

BOREHOLE LOCATION COMPLETED AS A MONITORING WELL (DECOMMISSIONED)

SOIL VAPOUR PROBE LOCATION

LIST OF APPLICABLE ABBREVIATIONS

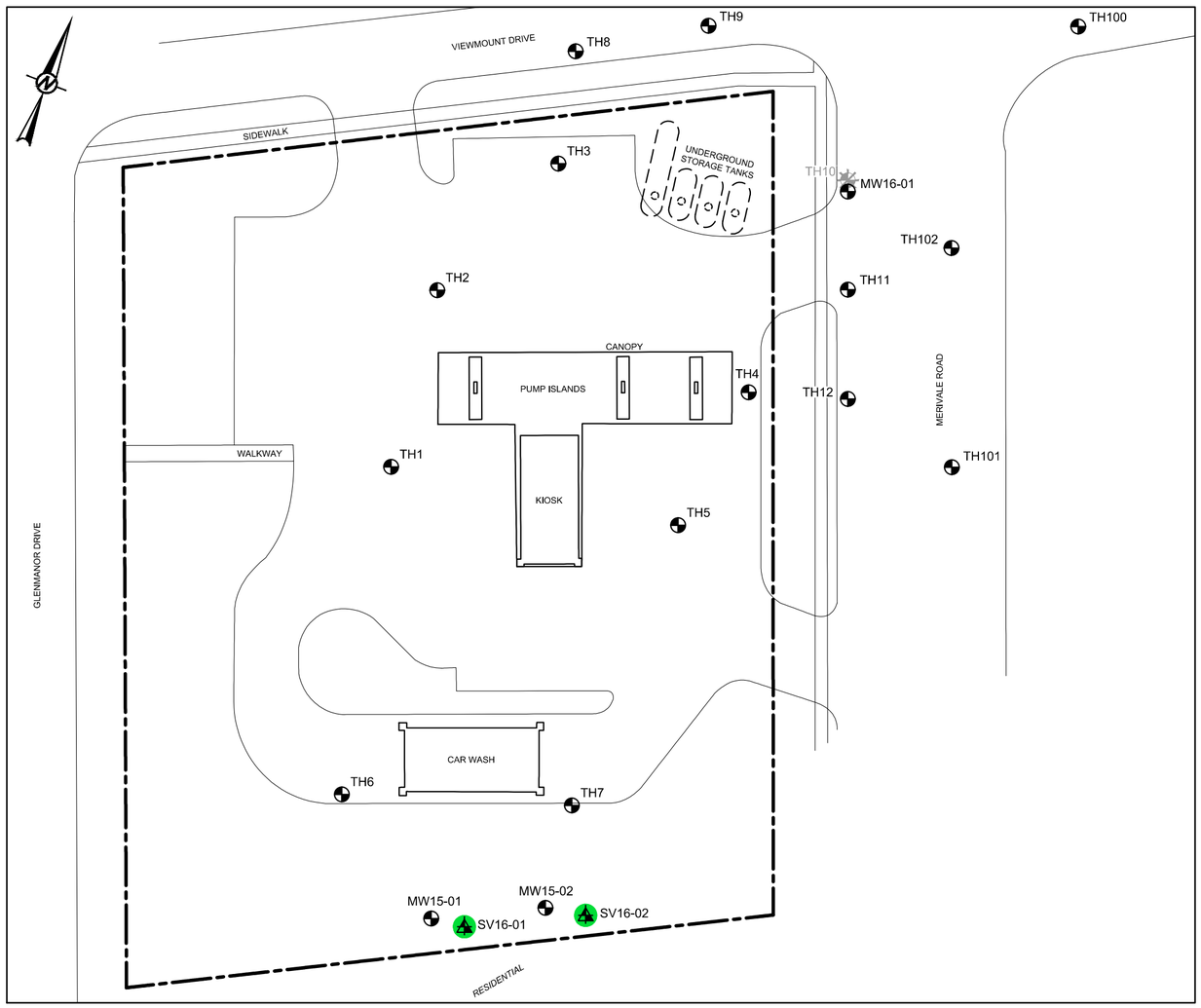
<	LESS THAN	CT	CARBON TETRACHLORIDE
µg/m³	MICROGRAMS PER METRE CUBE	CYHA	CYCLOHEXANE
1,1,1,2-TCA	1,1,1,2-TETRACHLOROETHANE	DBCM	DIBROMOCHLOROMETHANE
1,1,1-TCA	1,1,1-TRICHLOROETHANE	DCDFMA	DICHLORODIFLUOROMETHANE
1,1,2,2-TCA	1,1,2,2-TETRACHLOROETHANE	DCM	DICHLOROMETHANE
1,1,2-TCA	1,1,2-TRICHLOROETHANE	EAC	ETHYL ACETATE
1,1-DCA	1,1-DICHLOROETHANE	ETOH	ETHANOL
1,1-DCE	1,1-DICHLOROETHENE	F113	TRICHLOROTRIFLUOROETHANE (FREON 113)
1,2,4-TCB	1,2,4-TRICHLOROBENZENE	HPA	HEPTANE OR n-HELPTANE
1,2,4-TMB	1,2,4-TRIMETHYLBENZENE	HXCBDE	HEXACHLOROBUTADIENE
1,2-DBA	1,2-DIBROMOETHANE OR ETHYLENE DIBROMIDE	IPA	ISOPROPANOL OR 2-PROPANOL
1,2-DCA	1,2-DICHLOROETHANE	mbgs	METRES BELOW GROUND SURFACE
1,2-DCB	1,2-DICHLOROBENZENE	MBK	METHYL BUTYL KETONE (2-HEXANONE)
1,2-DCPA	1,2-DICHLOROPROPANE	MCB	CHLOROBENZENE
1,2-DCTFA	1,2-DICHLOROTETRAFLUOROETHANE	MEK	METHYL ETHYL KETONE (2-BUTANONE)
1,3,5-TMB	1,3,5-TRIMETHYLBENZENE	MIBK	4-METHYL-2-PENTANONE OR METHYL ISOBUTYL KETONE
1,3-BDE	1,3-BUTADIENE	MOECC	MINISTRY OF ENVIRONMENT AND CLIMATE CHANGE
1,3-DCB	1,3-DICHLOROBENZENE	MTBE	METHYL TERTIARY BUTYL ETHER
1,4-DCB	1,4-DICHLOROBENZENE	n/s	NO STANDARD
1,4-DOX	1,4-DIOXANE	O.REG	ONTARIO REGULATION
2,2,4-TMP	2,2,4-TRIMETHYLPENTANE	PCE	TETRACHLOROETHENE
4-ETT	4-ETHYLTOLUENE	PE	PROPENE OR PROPYLENE
ACTN	ACETONE	ST	STYRENE
BDCMA	BROMODICHLOROMETHANE	SVSL	SOIL VAPOUR SCREENING LEVELS
BF	BROMOFORM	t-1,2-DCE	TRANS-1,2-DICHLOROETHENE
BMA	BROMOMETHANE	TCE	TRICHLOROETHENE
BZLC	BENZYL CHLORIDE	TCFMA	TRICHLOROFLUOROMETHANE
c-1,2-DCE	CIS-1,2-DICHLOROETHENE	TCM	CHLOROFORM
c-1,3-DCPE	CIS-1,3-DICHLOROPROPENE	THF	TETRAHYDROFURAN
CA	CHLOROETHANE	VAC	VINYL ACETATE
CDS	CARBON DISULFIDE	VBr	VINYL BROMIDE
CMA	CHLOROMETHANE	VC	VINYL CHLORIDE

NOTES

1. LOCATIONS WHERE CURRENT SOIL VAPOUR SAMPLE MEETS APPLICABLE GUIDELINES/STANDARDS FOR ALL PARAMETERS ANALYZED SHOWN IN **GREEN**.
2. LOCATIONS WHERE CURRENT VAPOUR SAMPLE EXCEEDS APPLICABLE GUIDELINES/STANDARDS FOR AT LEAST ONE OF THE PARAMETERS ANALYZED SHOWN IN **RED**.
3. EXCEEDANCES OF APPLICABLE GUIDELINES/STANDARDS IN TEXT ARE SHOWN IN **RED.**

REFERENCE

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No.: 11010-SITE PLAN ONSITE-JUN14; SCALE: UNKNOWN; DATE: JUNE 2014.



SV16-01 — **Screen Interval: 1.35 - 1.50 mbgs**

Date	BZLC	BDCMA	BF	BMA	1,3-BDE	CDS	CT	MCB	CA	TCM	CMA	CYHA	DBCM	1,2-DBA	1,2-DCB	1,3-DCB	1,4-DCB	DCDFMA	1,1-DCA	1,2-DCA	1,1-DCE	c-1,2-DCE	t-1,2-DCE	1,2-DCPA	c-1,3-DCPE	t-1,3-DCPE	1,2-DCTFA	1,4-DOX	ETOH	EAC	4-ETT	HPA	HXCBDE	HA	MBK	MEK	MIBK	MTBE	DCM	IPA	ACTN	PE	ST	1,1,1,2-TCA	1,1,2,2-TCA	PCE	THF	1,2,4-TCB	1,2,4-TMB	1,1,1-TCA	1,1,2-TCA	TCE	TCFMA	F113	1,3,5-TMB	2,2,4-TMP	VAC	VBr	VC
13-Dec-16	<2.6	<1.3	<2.1	<0.39	<1.1	61.2	0.72	<0.46	<0.79	8.72	<0.62	0.86	<1.7	<0.77	<0.60	<2.4	<0.60	4.93	<0.40	<0.40	<0.40	0.97	47.5	<0.46	<0.45	<0.45	<1.2	<3.6	<1.9	<3.6	<2.5	3.7	<5.3[b]	15.9	<4.1	11.7	<4.1	<0.72	<2.8	3.3	29.3	<19	<0.43	<0.69	<0.69	5.98	5.5	<3.7	3.1	<0.55	<0.55	<0.54	2.5	1.5	<2.5	1.72	1.42	<0.87	<0.26
21-Jul-17	<2.6	<1.3	<2.1	<0.39	<1.1	26.8	<0.63	<0.46	<0.79	2.95	<0.62	<0.69	<1.7	<0.77	<0.60	4.6	1.31	12.9	<0.40	<0.40	<0.40	<0.40	1.33	<0.46	<0.45	<0.45	<1.2	<3.6	2.2	<3.6	2.8	<1.2	<5.3[b]	2.4	<4.1	4.0	<4.1	<0.72	3.2	<2.5	76.5	<2.6	<0.43	<0.69	<0.69	7.03	<1.2	<3.7	11.4	<0.55	<0.55	1.09	2.7	<1.2	3.5	<0.93	<0.70	<0.87	<0.26
21-Jul-17 (DUP)	<2.6	<1.3	<2.1	<0.39	<1.1	26.3	<0.63	<0.46	<0.79	2.78	<0.62	<0.69	<1.7	<0.77	<0.60	2.8	1.20	13.5	<0.40	<0.40	<0.40	<0.40	1.34	<0.46	<0.45	<0.45	<1.2	<3.6	2.3	<3.6	2.8	<1.6	<5.3[b]	2.0	<4.1	3.8	<4.1	<0.72	3.6	8.3	78.5	<1.7	<0.43	<0.69	<0.69	7.21	<1.2	<3.7	12.1	<0.55	<0.55	<0.54	2.7	<1.2	3.6	<0.93	<0.70	<0.87	<0.26
21-Nov-17	<2.6	<1.3	<2.1	<0.39	<1.1	3.8	<0.63	<0.46	<0.79	1.68	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	6.05	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	<1.9	<3.6	<2.5	<1.2	<5.3[b]	<1.1	<4.1	<2.9	<4.1	<0.72	<2.8	<2.5	2.9	<0.86	<0.43	<0.69	<0.69	66.1	<1.2	<3.7	<2.5	<0.55	<0.55	<0.54	1.3	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
03-Jul-18	<2.6	<1.3	<2.1	<0.39	<1.1	27.0	<0.63	<0.46	<0.79	0.74	<0.62	1.90	<1.7	<0.77	<0.60	<2.4	0.67	8.19	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	6.7	<3.6	<2.5	2.7	<5.3[b]	9.1	<4.1	7.6	<4.1	<0.72	<2.8	<2.5	89.5	0.95	<0.43	<0.69	<0.69	3.98	<1.2	<3.7	6.3	<0.55	<0.55	<0.54	1.6	<1.2	<2.5	2.26	<0.70	<0.87	<0.26
03-Jul-18 (DUP)	<2.6	<1.3	<2.1	<0.39	<1.1	41.6	<0.63	<0.46	<0.79	0.93	<0.62	2.44	<1.7	<0.77	<0.60	<2.4	0.83	9.31	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	6.9	<3.6	<2.5	4.7	<5.3[b]	10.4	<4.1	9.0	<4.1	<0.72	<2.8	<2.5	103	1.27	<0.43	<0.69	<0.69	4.90	<1.2	<3.7	7.7	<0.55	<0.55	<0.54	1.7	<1.2	<2.5	2.32	<0.70	<0.87	<0.26
30-Oct-18	<2.6	<1.3	<2.1	<0.39	<1.1	2.0	<0.63	<0.46	<0.79	182	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	4.85	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	5.4	<3.6	<2.5	<1.2	<5.3[b]	<1.1	<4.1	<2.9	<4.1	<0.72	<2.8	<2.5	7.5	<0.86	<0.43	<0.69	<0.69	3.07	<1.2	<3.7	<2.5	<0.55	<0.55	<0.54	1.2	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
30-Oct-18 (DUP)	<2.6	<1.3	<2.1	<0.39	<1.1	1.8	<0.63	<0.46	<0.79	159	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	4.54	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	2.5	<3.6	<2.5	<1.2	<5.3[b]	1.2	<4.1	<2.9	<4.1	<0.72	<2.8	<2.5	7.8	<0.86	<0.43	<0.69	<0.69	2.66	<1.2	<3.7	<2.5	<0.55	<0.55	<0.54	1.2	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
21-Jun-19	<2.6	<1.3	<2.1	<0.39	<1.1	3.0	<0.63	<0.46	<0.79	76.7	0.68	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	17.2	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	<2.5	<1.2	<5.3	1.22	<4.1[b]	7.82	<0.82	<0.72	<2.1	<0.20	<1.0	<2.5	148	<1.6	<0.43	<0.69	<0.69	9.95	<1.2	<3.7	<2.5	<0.55	<0.55	<0.54	1.6	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
21-Jun-19 (DUP)	<2.6	<1.3	<2.1	<0.39	<1.1	<1.6	<0.63	<0.46	<0.79	87.6	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	22.0	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	<2.5	<1.2	<5.3	<0.70	<4.1[b]	4.58	<0.82	<0.72	<2.1	<0.20	<1.0	<2.5	155	<1.6	<0.43	<0.69	<0.69	7.89	<1.2	<3.7	<2.5	<0.55	<0.55	<0.54	2.1	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
12-Nov-19	<2.6	<1.3	<2.1	<0.39	<1.1	<1.6	<0.63	<0.46	<0.79	52.9	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	6.13	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	2.3	<3.6	<2.5	<1.2	<5.3[b]	<0.70	<4.1	<0.59	<0.82	<0.72	<2.1	<2.5	4.7	<0.86	<0.43	<0.69	<0.69	3.36	<1.2	<3.7	<2.5	<0.55	<0.55	<0.54	<1.1	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
12-Nov-19 (DUP)	<2.6	<1.3	<2.1	<0.39	<1.1	<1.6	<0.63	<0.46	<0.79	0.58	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	16.4	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	2.4	<3.6	<2.5	<1.2	<5.3[b]	<0.70	<4.1	<0.59	<0.82	<0.72	<2.1	<2.5	5.1	<0.86	<0.43	<0.69	<0.69	0.79	<1.2	<3.7	<2.5	<0.55	<0.55	17.3	1.3	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26

SV16-02 — **Screen Interval: 1.45 - 1.6 mbgs**

Date	BZLC	BDCMA	BF	BMA	1,3-BDE	CDS	CT	MCB	CA	TCM	CMA	CYHA	DBCM	1,2-DBA	1,2-DCB	1,3-DCB	1,4-DCB	DCDFMA	1,1-DCA	1,2-DCA	1,1-DCE	c-1,2-DCE	t-1,2-DCE	1,2-DCPA	c-1,3-DCPE	t-1,3-DCPE	1,2-DCTFA	1,4-DOX	ETOH	EAC	4-ETT	HPA	HXCBDE	HA	MBK	MEK	MIBK	MTBE	DCM	IPA	ACTN	PE	ST	1,1,1,2-TCA	1,1,2,2-TCA	PCE	THF	1,2,4-TCB	1,2,4-TMB	1,1,1-TCA	1,1,2-TCA	TCE	TCFMA	F113	1,3,5-TMB	2,2,4-TMP	VAC	VBr	VC
13-Dec-16	<2.6	<1.3	<2.1	<0.39	<1.1	13.5	<0.63	<0.46	<0.79	10.8	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	6.46	<0.40	<0.40	<0.40	<0.40	12.6	<0.46	<0.45	<0.45	<1.2	<3.6	<1.9	<3.6	<2.5	1.4	<5.3[b]	3.4	<4.1	5.9	<4.1	<0.72	<2.8	<2.5	13.0	<1.5	<0.43	<0.69	<0.69	<0.68	<1.2	<3.7	2.6	<0.55	<0.55	4.55	1.5	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
13-Dec-16 (DUP)	<2.6	<1.3	<2.1	<0.39	<1.1	13.9	<0.63	<0.46	<0.79	11.1	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	6.55	<0.40	<0.40	<0.40	<0.40	13.1	<0.46	<0.45	<0.45	<1.2	<3.6	<1.9	<3.6	<2.5	1.5	<5.3[b]	3.7	<4.1	6.3	<4.1	<0.72	<2.8	<2.5	14.0	<1.5	<0.43	<0.69	<0.69	<0.68	<1.2	<3.7	2.7	<0.55	<0.55	4.94	1.4	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
21-Jul-17	<2.6	<1.3	<2.1	<0.39	<1.1	15.8	<0.63	<0.46	<0.79	2.56	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	36.0	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	<1.9	<3.6	<2.5	<1.2	<5.3[b]	<1.1	<4.1	<2.9	<4.1	<0.72	4.2	<2.5	17.6	<0.86	<0.43	<0.69	<0.69	1.38	<1.2	<3.7	3.4	<0.55	<0.55	5.04	2.4	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
21-Nov-17	<2.6	<1.3	<2.1	<0.39	<1.1	3.3	<0.63	<0.46	<0.79	1.38	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	13.1	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	<1.9	<3.6	<2.5	<1.2	<5.3[b]	<1.1	<4.1	<2.9	<4.1	<0.72	<2.8	<2.5	<1.9	<0.86	<0.43	<0.69	<0.69	81.9	<1.2	<3.7	<2.5	<0.55	<0.55	4.27	1.2	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
21-Nov-17 (DUP)	<2.6	<1.3	<2.1	<0.39	<1.1	3.3	<0.63	<0.46	<0.79	1.38	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	13.0	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	<1.9	<3.6	<2.5	<1.2	<5.3[b]	<1.1	<4.1	<2.9	<4.1	<0.72	<2.8	<2.5	2.4	<0.86	<0.43	<0.69	<0.69	41.4	<1.2	<3.7	<2.5	<0.55	<0.55	4.42	1.2	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
03-Jul-18	<2.6	<1.3	<2.1	<0.39	<1.1	12.8	<0.63	<0.46	<0.79	0.51	<0.62	2.09	<1.7	<0.77	<0.60	<2.4	<0.60	11.9	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	6.5	<3.6	<2.5	2.6	<5.3[b]	9.3	<4.1	7.9	<4.1	<0.72	<2.8	<2.5	97.1	0.99	0.54	<0.69	<0.69	<0.68	<1.2	<3.7	<2.5	<0.55	<0.55	0.95	1.4	<1.2	<2.5	2.29	<0.70	<0.87	<0.26
30-Oct-18	<2.6	<1.3	<2.1	<0.39	<1.1	<1.6	<0.63	<0.46	<0.79	<0.49	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	4.19	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	<1.9	<3.6	<2.5	<1.2	<5.3[b]	<1.1	<4.1	<2.9	<4.1	<0.72	<2.8	<2.5	5.5	<0.86	<0.43	<0.69	<0.69	<0.68	<1.2	<3.7	<2.5	<0.55	<0.55	2.12	<1.1	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
21-Jun-19	<2.6	<1.3	<2.1	<0.39	<1.1	3.1	<0.63	<0.46	<0.79	1.17	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	29.2	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	<1.9	<3.6	<2.5	<1.2	<5.3[b]	<0.70	<4.1	1.18	<0.82	<0.72	<2.1	<2.5	28.0	<0.86	<0.43	<0.69	<0.69	0.75	<1.2	<3.7	<2.5	<0.55	<0.55	2.82	2.0	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26
12-Nov-19	<2.6	<1.3	<2.1	<0.39	<1.1	<1.6	<0.63	<0.46	<0.79	0.52	<0.62	<0.69	<1.7	<0.77	<0.60	<2.4	<0.60	15.6	<0.40	<0.40	<0.40	<0.40	<0.40	<0.46	<0.45	<0.45	<1.2	<3.6	6.2	<3.6	<2.5	<1.2	<5.3[b]	0.84	<4.1	0.66	<0.82	<0.72	<2.1	<2.5	6.1	<0.86	<0.43	<0.69	<0.69	<0.68	<1.2	<3.7	<2.5	<0.55	<0.55	14.9	1.3	<1.2	<2.5	<0.93	<0.70	<0.87	<0.26

ONTARIO GUIDELINES

PARAMETERS	BZLC	BDCMA	BF	BMA	1,3-BDE	CDS	CT	MCB	CA	TCM	CMA	CYHA	DBCM	1,2-DBA	1,2-DCB	1,3-DCB	1,4-DCB	DCDFMA	1,1-DCA	1,2-DCA	1,1-DCE	c-1,2-DCE	t-1,2-DCE	1,2-DCPA	c-1,3-DCPE	t-1,3-DCPE	1,2-DCTFA	1,4-DOX	ETOH	EAC	4-ETT	HPA	HXCBDE	HA	MBK	MEK	MIBK	MTBE	DCM	IPA	ACTN	PE	ST	1,1,1,2-TCA	1,1,2,2-TCA	PCE	THF	1,2,4-TCB	1,2,4-TMB	1,1,1-TCA	1,1,2-TCA	TCE	TCFMA	F113	1,3,5-TMB	2,2,4-TMP	VAC	VBr	VC
Health-Based Indoor Air Criteria[a]	2.6	1.3	2.1	0.39	1.1	1.6	0.63	0.46	0.79	0.49	0.62	0.69	1.7	0.77	0.60	2.4	0.60	0.99	0.40	0.40	0.40	0.40	0.40	0.46	0.45	0.45	1.2	3.6	1.9	3.6	2.5	1.2	5.3	1.1	4.1	2.9	4.1	0.72	2.8	2.5	1.9	0.86	0.43	0.69	0.69	0.68	1.2	3.7	2.5	0.55	0.55	0.54	1.1	1.2	2.5	0.93	0.70	0.87	0.13
SVSL[b]	n/s	n/s	n/s	1.04	n/s	n/s	0.42	208.57	n/s	20.86	n/s	n/s	n/s	0.17	125.14	n/s	0.28	n/s	34.41	0.04	14.60	31.29	12.51	0.83	0.28	0.28	n/s	750.86	n/s	n/s	n/s	n/s	0.05	521.43	n/s	1,002.75	601.65	4.28	48.36	n/s	2,502.86	n/s	54.23	0.15	0.02	4.28	n/s	1.67	n/s	208.57	0.07	0.27	n/s	n/s	n/s	n/s	n/s	6.3
RDL	n/s	n/s	n/s	52	n/s	n/s	21	10,429	n/s	1,043	n/s	n/s	n/s	8	6,257	n/s	14	n/s	1,721	2	730	1,564	626	42	14	14	n/s	37,543	n/s	n/s	n/s	n/s	3	26,071	n/s	50,137	30,082	214	2,418	n/s	125,143	n/s	2,711	8	1	214	n/s	83	n/s	10,429	3	14	n/s	n/s	n/s	n/s	n/s	0.26
UNITS	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³

(a) HEALTH-BASED INDOOR AIR CRITERIA PROVIDED BY MOECC MODIFIED GENERIC RISK ASSESSMENT (TIER 2) SPREADSHEET MODEL (NOVEMBER 1, 2016).

(b) SOIL VAPOUR SCREENING LEVELS (SVSL) FOR A RESIDENTIAL BUILDING WITH BASEMENT (PROBE DEPTH 0 - 30 CENTIMETRES BELOW BASE OF THE BUILDING FOUNDATION) CALCULATED BY DIVIDING HEALTH-BASED INDOOR AIR CRITERIA BY AN ATTENUATION FACTOR OF 0.02.

(c) RDL GREATER THAN SVSL.

0 10 20
(APPROX.) METRES

CLIENT
IMPERIAL OIL LIMITED

CONSULTANT
GOLDER

YYYY-MM-DD	2020-01-28
DESIGNED	BDrieschner
PREPARED	TRomanyszyn
REVIEWED	ABellavance-Godin
APPROVED	RMungal

PROJECT
FORMER RETAIL FUEL OUTLET
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
SOIL VAPOUR ANALYTICAL RESULTS - VOLATILE ORGANIC COMPOUNDS

PROJECT NO.	PHASE-TASK	REV.	FIGURE
1791706	1155-1916B	0	6

© THIS REPRODUCTION DOES NOT MATCH WHAT IS SHOWN. THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI C
25 mm
0

Path: C:\Autodesk\Temp-Dwg\ACPublish_23600\ | File Name: 1791706-1155-HS-0006.dwg | Last Edited By: yawang Date: 2020-01-30 Time:11:11:57 AM | Printed By: YaWang Date: 2020-01-30 Time:11:12:18 AM

Table 1
Summary of Groundwater Field Monitoring Results
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Well Name	Screen Interval (mbgs)	Top of Casing Elevation[(a)] (m)	Ground Elevation[(a)] (m)	Monitoring Date	Depth to Groundwater (mbtoc)	Depth to Groundwater (mbgs)	Groundwater Elevation[(a)] (m)	Product Thickness (mm)	Headspace Vapours (ppmv)
TH1	2.6 - 5.6	99.99	100.08	9-Aug-16	3.70	3.79	96.29	n/d	45
				5-Dec-16	3.69	3.78	96.31	n/d	n/m
				21-Jun-17	3.23	3.32	96.76	n/d	n/d
				14-Aug-18	3.71	3.80	96.28	n/d	30
				29-Jul-19	3.61	3.70	96.39	n/d	n/m
TH2	3.2 - 4.7	100.04	100.14	17-Nov-15	3.47	3.57	96.57	n/d	5
				9-Aug-16	3.62	3.71	96.43	n/d	n/d
				21-Jun-17	3.58	3.67	96.47	n/d	n/d
				14-Aug-18	3.66	3.76	96.38	n/d	230
				29-Jul-19	3.56	3.65	96.49	n/d	n/m
TH3	3.2 - 4.7	100.28	100.41	28-Oct-15	3.40	3.53	96.88	n/d	195
				9-Aug-16	3.36	3.49	96.92	n/d	85
				21-Jun-17	3.10	3.23	97.18	n/d	180
				14-Aug-18	3.29	3.42	97.00	n/d	25% LEL
				29-Jul-19	3.17	3.30	97.11	n/d	n/m
TH4	3.4 - 4.9	100.27	100.35	17-Nov-15	3.01	3.09	97.26	n/d	160
				9-Aug-16	3.15	3.23	97.12	n/d	75
				21-Jun-17	3.08	3.16	97.19	n/d	n/d
				14-Aug-18	3.10	3.18	97.17	n/d	100% LEL
				29-Jul-19	3.10	3.18	97.17	n/d	n/m
TH5	3.5 - 5.0	100.12	100.23	17-Nov-15	3.09	3.20	97.03	n/d	230
				9-Aug-16	2.97	3.08	97.15	n/d	5
				21-Jun-17	2.82	2.93	97.30	n/d	n/d
				14-Aug-18	2.87	2.98	97.25	n/d	n/d
				29-Jul-19	2.82	2.93	97.31	n/d	n/m
TH6	3.6 - 5.1	99.99	99.54	28-Oct-15	3.84	3.94	95.60	n/d	1250
				9-Aug-16	3.82	3.92	95.62	n/d	45
				21-Jun-17	3.58	3.68	95.86	n/d	n/d
				14-Aug-18	3.61	3.16	96.38	n/d	n/d
				29-Jul-19	3.70	3.25	96.29	n/d	n/m
TH7	4.4 - 5.8	100.50	99.66	28-Oct-15	5.00	4.16	95.50	n/d	n/d
				9-Aug-16	5.01	4.17	95.49	n/d	15
				21-Jun-17	4.78	3.94	95.72	n/d	n/d
				14-Aug-18	4.67	3.83	95.83	n/d	n/d
				29-Jul-19	4.82	3.98	95.68	n/d	n/m
TH8	3.3 - 4.9	100.03	100.16	27-Oct-15	3.55	3.68	96.48	n/d	710
				10-Aug-16	n/m	n/a	n/a	n/m	10
				20-Jun-17	n/m	n/a	n/a	n/m	n/m
				15-Aug-18	3.36	3.49	96.68	n/d	n/d
				30-Jul-19	2.98	3.11	97.06	n/d	n/m

Notes:

[(a)] Elevations are relative to a local benchmark (centre of storm sewer catch basin located approximately 5 m west of kiosk), with an assigned elevation of 100.00 m (exp. 2013).

LEL - lower explosive limit

mbgs - metres below ground surface

mbtoc - metres below top of casing

mm - millimetres

n/a - not applicable

n/d - not detected

n/m - not measured

ppmv - parts per million by volume

Table 1
Summary of Groundwater Field Monitoring Results
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Well Name	Screen Interval (mbgs)	Top of Casing Elevation[(a)] (m)	Ground Elevation[(a)] (m)	Monitoring Date	Depth to Groundwater (mbtoc)	Depth to Groundwater (mbgs)	Groundwater Elevation[(a)] (m)	Product Thickness (mm)	Headspace Vapours (ppmv)
TH9	3.4 - 4.9	100.46	100.59	27-Oct-15	3.52	3.65	96.94	n/d	2,900
				10-Aug-16	3.55	3.68	96.91	n/d	100% LEL
				20-Jun-17	3.46	3.59	97.00	n/d	100% LEL
				15-Aug-18	2.74	2.87	97.72	n/d	84% LEL
				30-Jul-19	2.74	2.87	97.72	n/d	n/m
TH10	3.3 - 4.9	100.17	100.26	10-Jun-13	n/m	3.03	97.24	n/d	170
				6-Oct-14	n/m	n/a	n/a	n/m	n/m
				27-Oct-15	Destroyed				
				TH10 decommissioned on August 24, 2016					
TH11	3.3 - 4.9	99.90	100.04	27-Oct-15	2.91	3.05	96.99	n/d	25
				10-Aug-16	2.89	3.03	97.01	n/d	320
				20-Jun-17	n/m	n/a	n/a	n/m	n/m
				15-Aug-18	n/m	n/a	n/a	n/m	n/m
				31-Jul-19	2.81	2.95	97.09	n/d	n/m
TH12	3.3 - 4.9	99.60	99.74	27-Oct-15	2.75	2.89	96.85	n/d	n/d
				10-Aug-16	2.74	2.88	96.87	n/d	n/d
				20-Jun-17	2.61	2.75	97.00	n/d	880
				15-Aug-18	n/m	n/a	n/a	n/m	n/m
				31-Jul-19	n/m	n/a	n/a	n/m	n/m
TH100	3.0 - 4.9	101.40	101.52	27-Oct-15	3.52	3.64	97.88	n/d	n/d
				10-Aug-16	3.54	3.65	97.87	n/d	n/d
				20-Jun-17	3.33	3.47	98.07	n/d	n/d
				15-Aug-18	3.39	3.50	98.02	n/d	n/d
				30-Jul-19	3.44	3.56	97.96	n/d	n/m
TH101	3.0 - 4.9	99.94	100.06	27-Oct-15	2.98	3.10	96.96	n/d	100% LEL
				10-Aug-16	3.05	3.17	96.89	n/d	9,450
				20-Jun-17	2.94	3.06	97.00	n/d	100% LEL
				15-Aug-18	2.91	3.03	97.03	n/d	100% LEL
				30-Jul-19	2.94	3.06	97.01	n/d	n/m
TH102	3.0 - 4.9	100.59	100.69	27-Oct-15	3.04	3.14	97.55	n/d	2,700
				10-Aug-16	3.11	3.21	97.48	n/d	430
				20-Jun-17	3.06	3.16	97.53	n/d	420
				15-Aug-18	n/m	n/a	n/a	n/m	n/m
				30-Jul-19	3.08	3.18	97.51	n/d	n/m
MW15-01	3.0 - 6.0	97.84	97.99	17-Nov-15	2.26	2.41	95.58	n/d	n/d
				9-Aug-16	2.35	2.50	95.49	n/d	n/d
				21-Jun-17	2.16	2.31	95.68	n/d	n/d
				14-Aug-18	3.16	3.31	94.68	n/d	n/d
				29-Jul-19	2.35	2.49	95.50	n/d	n/m
MW15-02	2.7 - 4.9	98.01	98.08	17-Nov-15	2.49	2.56	95.52	n/d	n/d
				9-Aug-16	2.63	2.69	95.39	n/d	20
				21-Jun-17	2.52	2.58	95.50	n/d	n/d
				14-Aug-18	2.38	2.44	95.64	n/d	n/d
				29-Jul-19	2.50	2.57	95.51	n/d	n/m
MW16-01	3.3 - 4.8	100.19	100.30	31-Aug-16	2.87	2.97	97.32	n/d	185
				21-Jun-17	2.89	3.00	97.30	n/d	145
				15-Aug-18	2.82	2.93	97.37	n/d	n/d
				30-Jul-19	2.88	2.99	97.31	n/d	n/m

Notes:
[(a)] Elevations are relative to a local benchmark (centre of storm sewer catch basin located approximately 5 m west of kiosk), with an assigned elevation of 100.00 m (exp. 2013).
LEL - Lower explosive limit
mbgs - metres below ground surface
mbtoc - metres below top of casing
mm - millimetres
n/a - not applicable
n/d - not detected
n/m - not measured
ppmv - parts per million by volume

Table 2
Summary of Groundwater Analytical Results - Petroleum Hydrocarbons and Dissolved Lead
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

			Sample Location	MW15-01	MW15-02	MW16-01	TH1	TH2	TH3	TH4	TH5	
			Sample ID	MW15-01	MW15-02	MW16-01	TH1	TH2	TH3	TH4	TH5	DUP B
			BVL Sample ID	KKN235	KKN237	KKL936	KKN233	KKW306	KKW307	KKW308	KKW309	KKW310
			BVL Job Number	B9L2700	B9L2700	B9L2439	B9L2700	B9L4415	B9L4415	B9L4415	B9L4415	B9L4415
			Sample Date	29-Jul-19	29-Jul-19	30-Jul-19	30-Jul-19	31-Jul-19	31-Jul-19	31-Jul-19	31-Jul-19	31-Jul-19
Parameters	**Units**	**RDL**	**Standards[a]**									
Benzene	µg/L	0.20	430	<0.20	1.7	110	<0.20	<0.20	18	36	380	380
Toluene	µg/L	0.20	18,000	<0.20	<0.20	0.57	<0.20	<0.20	<0.20	1.9	24	26
Ethylbenzene	µg/L	0.20	2,300	<0.20	<0.20	41	<0.20	<0.20	26	41	910	940
Xylenes	µg/L	0.40	4,200	<0.40	<0.40	0.79	<0.40	<0.40	2.1	270	2,800	2,900
F1 (C_6-C_{10}) - BTEX	µg/L	130	750[c]	<25	<25	470	<25	<25	380	**1,500**	**5,600**	**5,700**
F2 (C_{10}-C_{16})	µg/L	100	150	<100	<100	140	<100	<100	120	**1,400**	**5,400**	**4,100**
F3 (C_{16}-C_{34})	µg/L	200	500	<200	<200	<200	350	250	<200	280	350	290
F4 (C_{34}-C_{50})	µg/L	200	500	<200	<200	<200	**1,400[b]**	<200	<200	<200	<200	<200
Lead	µg/L	0.50	25	<0.50	<0.50	0.71	<0.50	<0.50	2.2	12	8.4	8.3

Notes:

[a] O.Reg 153 (2011) Table 3 Full Depth Generic Site Condition Standards for all types of property use for groundwater in medium and fine textured soil in a non-potable ground water condition

[b] Baseline was not reached at Carbon 50. Value presented corresponds to the greater of the F4 and F4G values.

[c] F1 fraction does not include BTEX; however, the proponent has the choice as to whether or not to subtract BTEX from the analytical result.

Bold/Underlined - value exceeds criteria/standard

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3 and 4

F4G - petroleum hydrocarbon fraction 4 gravimetric

RDL - reportable detection limit

µg/L - micrograms per litre

< - less than

Table 2
Summary of Groundwater Analytical Results - Petroleum Hydrocarbons and Dissolved Lead
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

			Sample Location	TH6	TH7	TH8	TH9		TH11	TH100	TH101	TH102
			Sample ID	TH6	TH7	TH8	TH9	DUP A	TH11	TH100	TH101	TH102
			BVL Sample ID	KKN234	KKN236	KKL933	KKL934	KKL935	KKL929	KKL932	KKL930	KKL931
			BVL Job Number	B9L2700	B9L2700	B9L2439	B9L2439	B9L2439	B9L2439	B9L2439	B9L2439	B9L2439
			Sample Date	29-Jul-19	29-Jul-19	30-Jul-19	30-Jul-19	30-Jul-19	31-Jul-19	31-Jul-19	31-Jul-19	31-Jul-19
Parameters	**Units**	**RDL**	**Standards[a]**									
Benzene	µg/L	0.20	430	<0.20	46	3.7	0.81	0.84	16	<0.20	73	4.5
Toluene	µg/L	0.20	18,000	<0.20	1.4	<0.20	<0.20	<0.20	0.71	<0.20	7.5	1.5
Ethylbenzene	µg/L	0.20	2,300	<0.20	43	1.0	2.5	2.6	35	1.3	870	33
Xylenes	µg/L	0.40	4,200	<0.40	2.5	<0.40	0.47	0.51	1.7	<0.40	130	27
F1 (C_6-C_{10}) - BTEX	µg/L	130	750[c]	<25	400	220	50	63	**960**	<25	**5,100**	500
F2 (C_{10}-C_{16})	µg/L	100	150	<100	110	<100	<100	<100	**2,600**	<100	**1,500**	**270**
F3 (C_{16}-C_{34})	µg/L	200	500	<200	<200	440	**540**	**1,200**	**2,000**	460	<200	<200
F4 (C_{34}-C_{50})	µg/L	200	500	<200	<200	**1,500[b]**	**1,900[b]**	**3,000[b]**	**3,800[b]**	**1,400[b]**	<200	<200
Lead	µg/L	0.50	25	<0.50	<0.50	1.2	0.95	0.91	0.81	<0.50	3.2	2.8

Notes:

[a] O.Reg 153 (2011) Table 3 Full Depth Generic Site Condition Standards for all types of property use for groundwater in medium and fine textured soil in a non-potable ground water condition

[b] Baseline was not reached at Carbon 50. Value presented corresponds to the greater of the F4 and F4G values.

[c] F1 fraction does not include BTEX; however, the proponent has the choice as to whether or not to subtract BTEX from the analytical result.

Bold/Underlined - value exceeds criteria/standard

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3 and 4

F4G - petroleum hydrocarbon fraction 4 gravimetric

RDL - reportable detection limit

µg/L - micrograms per litre

< - less than

Table 3
Field Screening and Leak Test Measurements
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Sampling Location	Sampling Date	Organic Vapour Concentration (ppbv)	Methane Concentration (%)	Carbon dioxide Concentration (%)	Oxygen Concentration (%)	Helium Concentration - Shroud (ppmv)	Helium Concentration - Screening Sample (ppmv)	Helium Ratio of Below Grade/Shroud Concentration (%)	Pass Leak Test[(a)] (Y/N)
SV16-01	21-Jun-19	58	0.0	0.2	19.9	100,000	28,000	28.00	N
		160	0.0	2.5	14.9	100,000	50	0.05	Y
		240	0.0	2.3	17.0	n/m	n/m	n/a	n/a
	12-Nov-19	10	0.0	5.1	18.2	100,000	0	0	Y
		5	0.0	5.2	17.8	n/m	n/m	n/a	n/a
		6	0.0	5.2	17.7	n/m	n/m	n/a	n/a
SV16-02	21-Jun-19	16	0.0	1.2	20.0	100,000	0	0	Y
		78	0.0	2.6	17.5	n/m	n/m	n/a	n/a
		82	0.0	2.1	18.4	n/m	n/m	n/a	n/a
	12-Nov-19	2	0.0	3.8	19.1	100,000	0	0.00	Y
		n/d	0.0	3.9	19.2	n/m	n/m	n/a	n/a
		3	0.0	3.9	19.3	n/m	n/m	n/a	n/a

Notes:

[(a)] A leak test passes if the helium ratio of below grade to shroud concentration is less than 1%

n/a - not applicable

n/d - not detected

n/m - not measured

ppbv - parts per billion by volume

ppmv - parts per million by volume

> - greater than

< - less than

Table 4
Summary of Soil Vapour Analytical Results - Petroleum Hydrocarbons
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

			Sample Location	SV16-01			SV16-02			Health-Based Indoor Air Criteria[a]	SVSL[b]
			Sample ID	SV16-01	DUPA	SV16-01	SV16-02	SV16-02	DUPA		
			BVL Sample ID	KCI079	KCI078	LHI693	KCI080	LHI694	LHI695		
			BVL Job Number	B9H4030	B9H4030	B9V9715	B9H4030	B9V9715	B9V9715		
			Sample Date	21-Jun-19	21-Jun-19	12-Nov-19	21-Jun-19	12-Nov-19	12-Nov-19		
Parameters	**Units**	**RDL**									
Benzene	µg/m^3	0.32	<0.32	<0.32	<0.32	<0.32	<0.32	<0.32	0.51	25
Toluene	µg/m^3	0.38	1.56	0.52	0.83	0.39	1.30	0.65	1,043	52,143
Ethylbenzene	µg/m^3	0.43	1.63	<0.43	1.10	<0.43	<0.43	<0.43	209	10,429
Xylenes, Total	µg/m^3	1.3	6.3	<1.3	3.7	<1.3	<1.3	<1.3	146	7,300
F1-BTEX, C_6-C_{10} (as Toluene)	µg/m^3	5.0	243	165	148	70.6	113	110	2,491	124,530
F2, C_{10}-C_{16} (as Decane)	µg/m^3	5.0	1,470	360	233	331	131	166	471	23,530

Notes:
[a] Health-Based Indoor Air Criteria - Residential, provided by MOECC Modified Generic Risk Assessment, Approved Model (November 2016)
[b] Soil Vapour Screening Levels (SVSL) for a residential building with basement (probe depth 0 - 30 centimetres below base of the building foundation) calculated by dividing Health-Based Indoor Air Criteria by an attenuation factor of 0.02.
[c] RDL greater than standards
Bold/Underlined - value exceeds SVSL criteria
BTEX - benzene, toluene, ethylbenzene, xylenes
BVL - Bureau Veritas Laboratories
F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3 and 4
RDL - reportable detection limit
µg/m^3 - micrograms per cubic metre
< - less than
Table to be read in conjunction with Laboratory Certificate of Analysis

Table 5
Summary of Soil Vapour Analytical Results - Volatile Organic Compounds
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

			Sample Location	SV16-01			SV16-02			Health-Based Indoor Air Criteria[a]	SVSL[b]
			Sample ID	SV16-01	DUPA	SV16-01	SV16-02	SV16-02	DUPA		
			BVL Sample ID	KCI079	KCI078	LHI693	KCI080	LHI694	LHI695		
			BVL Job Number	B9H4030	B9H4030	B9V9715	B9H4030	B9V9715	B9V9715		
			Sample Date	21-Jun-19	21-Jun-19	12-Nov-19	21-Jun-19	12-Nov-19	12-Nov-19		
Parameters	**Units**	**RDL**									
Benzyl chloride	µg/m^3	2.6	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6	n/s	n/s
Bromodichloromethane	µg/m^3	1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	n/s	n/s
Bromoform	µg/m^3	2.1	<2.1	<2.1	<2.1	<2.1	<2.1	<2.1	n/s	n/s
Bromomethane	µg/m^3	0.39	<0.39	<0.39	<0.39	<0.39	<0.39	<0.39	1.04	52
1,3-Butadiene	µg/m^3	1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	n/s	n/s
Carbon Disulfide	µg/m^3	1.6	3.0	<1.6	<1.6	3.1	<1.6	<1.6	n/s	n/s
Carbon Tetrachloride	µg/m^3	0.63	<0.63	<0.63	<0.63	<0.63	<0.63	<0.63	0.42	21
Chlorobenzene	µg/m^3	0.46	<0.46	<0.46	<0.46	<0.46	<0.46	<0.46	209	10,429
Chloroethane	µg/m^3	0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	n/s	n/s
Chloroform	µg/m^3	0.49	76.7	87.6	52.9	1.17	0.52	0.58	20.86	1,043
Chloromethane	µg/m^3	0.62	0.68	<0.62	<0.62	<0.62	<0.62	<0.62	n/s	n/s
Cyclohexane	µg/m^3	0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	n/s	n/s
Dibromochloromethane	µg/m^3	1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	n/s	n/s
1,2-Dibromoethane (Ethylene Dibromide)	µg/m^3	0.77	<0.77	<0.77	<0.77	<0.77	<0.77	<0.77	0.17	8
1,2-Dichlorobenzene	µg/m^3	0.60	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60	125	6,257
1,3-Dichlorobenzene	µg/m^3	2.4	<2.4	<2.4	<2.4	<2.4	<2.4	<2.4	n/s	n/s
1,4-Dichlorobenzene	µg/m^3	0.60	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60	0.28	14
Dichlorodifluoromethane (FREON 12)	µg/m^3	0.99	17.2	22.0	6.13	29.2	15.6	16.4	n/s	n/s
1,1-Dichloroethane	µg/m^3	0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	34.41	1,721
1,2-Dichloroethane	µg/m^3	0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	0.04	2
1,1-Dichloroethylene	µg/m^3	0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	14.60	730
cis-1,2-Dichloroethylene	µg/m^3	0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	31.29	1,564
trans-1,2-Dichloroethylene	µg/m^3	0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	12.51	626
1,2-Dichloropropane	µg/m^3	0.46	<0.46	<0.46	<0.46	<0.46	<0.46	<0.46	0.83	42
cis-1,3-Dichloropropene	µg/m^3	0.45	<0.45	<0.45	<0.45	<0.45	<0.45	<0.45	0.28	14
trans-1,3-Dichloropropene	µg/m^3	0.45	<0.45	<0.45	<0.45	<0.45	<0.45	<0.45	0.28	14
1,2-Dichlorotetrafluoroethane	µg/m^3	1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	n/s	n/s
1,4-Dioxane	µg/m^3	3.6	<3.6	<3.6	<3.6	<3.6	<3.6	<3.6	751	37,543
Ethanol (ethyl alcohol)	µg/m^3	1.9	5.7	2.1	2.3	<1.9	6.2	2.4	n/s	n/s
Ethyl Acetate	µg/m^3	3.6	<3.6	<3.6	<3.6	<3.6	<3.6	<3.6	n/s	n/s
4-ethyltoluene	µg/m^3	2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	n/s	n/s
Heptane	µg/m^3	1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	n/s	n/s
Hexachlorobutadiene	µg/m^3	5.3	<5.3[c]	<5.3[c]	<5.3[c]	<5.3[c]	<5.3[c]	<5.3[c]	0.05	3
Hexane	µg/m^3	1.1	1.22	<0.70	<0.70	<0.70	0.84	<0.70	521	26,071

Notes:

[a] Health-Based Indoor Air Criteria - Residential, provided by MOECC Modified Generic Risk Assessment, Approved Model (November 2016)

[b] Soil Vapour Screening Levels (SVSL) for a residential building with basement (probe depth 0 - 30 centimetres below base of the building foundation) calculated by dividing Health-Based Indoor Air Criteria by an attenuation factor of 0.02

[c] RDL greater than standards

Bold/Underlined - value exceeds SVSL criteria

BVL - Bureau Veritas Laboratories

n/s - no standard

RDL - reportable detection limit

µg/m^3 - micrograms per cubic metre

< - less than

Table to be read in conjunction with Laboratory Certificate of Analysis

Table 5
Summary of Soil Vapour Analytical Results - Volatile Organic Compounds
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

			Sample Location	SV16-01			SV16-02			Health-Based Indoor Air Criteria[a]	SVSL[b]
			Sample ID	SV16-01	DUPA	SV16-01	SV16-02	SV16-02	DUPA		
			BVL Sample ID	KCI079	KCI078	LHI693	KCI080	LHI694	LHI695		
			BVL Job Number	B9H4030	B9H4030	B9V9715	B9H4030	B9V9715	B9V9715		
			Sample Date	21-Jun-19	21-Jun-19	12-Nov-19	21-Jun-19	12-Nov-19	12-Nov-19		
Parameters	**Units**	**RDL**									
Methyl Butyl Ketone (2-Hexanone)	µg/m^3	4.1	<4.1	<4.1	<4.1	<4.1	<4.1	<4.1	n/s	n/s
Methyl Ethyl Ketone (2-Butanone)	µg/m^3	2.9	7.82	4.58	<0.59	1.18	0.66	<0.59	1,003	50,137
Methyl Isobutyl Ketone	µg/m^3	4.1	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	602	30,082
Methyl t-butyl ether (MTBE)	µg/m^3	0.72	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72	4.28	214
Methylene Chloride(Dichloromethane)	µg/m^3	2.8	<2.1	<2.1	<2.1	<2.1	<2.1	<2.1	48.36	2,418
2-propanol (Isopropanol)	µg/m^3	2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	n/s	n/s
2-Propanone (Acetone)	µg/m^3	1.9	148	155	4.7	28.0	6.1	5.1	2,503	125,143
Propene (Propylene)	µg/m^3	0.86	<1.6	<1.6	<0.86	<0.86	<0.86	<0.86	n/s	n/s
Styrene	µg/m^3	0.43	<0.43	<0.43	<0.43	<0.43	<0.43	<0.43	54.23	2,711
1,1,1,2-Tetrachloroethane	µg/m^3	0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	0.15	8
1,1,2,2-Tetrachloroethane	µg/m^3	0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	0.02	1
Tetrachloroethylene	µg/m^3	0.68	9.95	7.89	3.36	0.75	<0.68	0.79	4.28	214
Tetrahydrofuran	µg/m^3	1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	n/s	n/s
1,2,4-Trichlorobenzene	µg/m^3	3.7	<3.7	<3.7	<3.7	<3.7	<3.7	<3.7	1.67	83
1,2,4-Trimethylbenzene	µg/m^3	2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	n/s	n/s
1,1,1-Trichloroethane	µg/m^3	0.55	<0.55	<0.55	<0.55	<0.55	<0.55	<0.55	209	10,429
1,1,2-Trichloroethane	µg/m^3	0.55	<0.55	<0.55	<0.55	<0.55	<0.55	<0.55	0.07	3
Trichloroethylene	µg/m^3	0.54	<0.54	<0.54	<0.54	2.82	14.9	17.3	0.27	14
Trichlorofluoromethane (FREON 11)	µg/m^3	1.1	1.6	2.1	<1.1	2.0	1.3	1.3	n/s	n/s
Trichlorotrifluoroethane (FREON 113)	µg/m^3	1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	n/s	n/s
1,3,5-Trimethylbenzene	µg/m^3	2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	n/s	n/s
2,2,4-Trimethylpentane	µg/m^3	0.93	<0.93	<0.93	<0.93	<0.93	<0.93	<0.93	n/s	n/s
Vinyl Acetate	µg/m^3	0.70	<0.70	<0.70	<0.70	<0.70	<0.70	<0.70	n/s	n/s
Vinyl Bromide	µg/m^3	0.87	<0.87	<0.87	<0.87	<0.87	<0.87	<0.87	n/s	n/s
Vinyl Chloride	µg/m^3	0.26	<0.26	<0.26	<0.26	<0.26	<0.26	<0.26	0.13	6.3

Notes:

[a] Health-Based Indoor Air Criteria - Residential, provided by MOECC Modified Generic Risk Assessment, Approved Model (November 2016)

[b] Soil Vapour Screening Levels (SVSL) for a residential building with basement (probe depth 0 - 30 centimetres below base of the building foundation) calculated by dividing Health-Based Indoor Air Criteria by an attenuation factor of 0.02.

[c] RDL greater than standards

Bold/Underlined - value exceeds SVSL criteria

BVL - Bureau Veritas Laboratories

n/s - no standard

RDL - reportable detection limit

µg/m^3 - micrograms per cubic metre

< - less than

Table to be read in conjunction with Laboratory Certificate of Analysis

APPENDIX A

Laboratory Certificates of Analysis and Data Quality Review Checklists

Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1923A
Your C.O.C. #: 80566

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2019/07/08
Report #: R5787022
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9H4030
Received: 2019/06/25, 10:04

Sample Matrix: Air
Samples Received: 3

Analyses	Quantity	Laboratory Method	Primary Reference
BTEX and CCME Compounds in Air(TO-15mod)	3	BRL SOP-00304	EPA TO-15 m
Canister Pressure (TO-15)	3	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (ug/m3)	3	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (TO-15) (1)	3	BRL SOP-00304	EPA TO-15 m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard. All samples were analyzed within hold time unless otherwise flagged.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Air sampling canisters have been cleaned in accordance with U.S. EPA Method TO15. At the end of the cleaning, evacuation, and pressurization cycles, one canister was selected and was pressurized with Zero Air. This canister was then analyzed via TO15 on a GC/MS. The canister must have been found to contain <0.2 ppbv concentration of all target analytes in order for the batch to have been considered clean. Each canister also underwent a leak check prior to shipment.

Please Note: SUMMA® canister samples will be retained by Bureau Veritas Laboratories for a period of 5 calendar days or as contractually agreed from the date of this report, after which time they will be cleaned for reuse. If you require a longer sample storage period, please contact your service representative.

Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1923A
Your C.O.C. #: 80566

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2019/07/08
Report #: R5787022
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9H4030
Received: 2019/06/25, 10:04

Encryption Key

Kyle Reinhart
Project Manager
08 Jul 2019 13:29:32

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kyle Reinhart, Project Manager
Email: Kyle.Reinhart@bvlabs.com
Phone# (905)817-5802

==========

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

BV Labs Job #: B9H4030
Report Date: 2019/07/08

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1923A

RESULTS OF ANALYSES OF AIR

BV Labs ID		KCI078	KCI079	KCI080	
Sampling Date		2019/06/21 12:15	2019/06/21 12:15	2019/06/21 11:01	
COC Number		80566	80566	80566	
	UNITS	**SV16-01**	**DUPA**	**SV16-02**	**QC Batch**
Pressure on Receipt	psig	(-3.3)	(-0.5)	(-2.9)	6206011
QC Batch = Quality Control Batch					

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1923A

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		KCI078	KCI079		KCI080		
Sampling Date		2019/06/21 12:15	2019/06/21 12:15		2019/06/21 11:01		
COC Number		80566	80566		80566		
	UNITS	**SV16-01**	**DUPA**	**RDL**	**SV16-02**	**RDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ppbv	3.47	4.45	0.20	5.91	0.20	6206012
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	<0.17	0.17	<0.17	0.17	6206012
Chloromethane	ppbv	0.33	<0.30	0.30	<0.30	0.30	6206012
Vinyl Chloride	ppbv	<0.10	<0.10	0.10	<0.10	0.10	6206012
Chloroethane	ppbv	<0.30	<0.30	0.30	<0.30	0.30	6206012
1,3-Butadiene	ppbv	<0.50	<0.50	0.50	<0.50	0.50	6206012
Trichlorofluoromethane (FREON 11)	ppbv	0.28	0.38	0.20	0.35	0.20	6206012
Ethanol (ethyl alcohol)	ppbv	3.0	1.1	1.0	<1.0	1.0	6206012
Trichlorotrifluoroethane	ppbv	<0.15	<0.15	0.15	<0.15	0.15	6206012
2-propanol	ppbv	<1.0	<1.0	1.0	<1.0	1.0	6206012
2-Propanone	ppbv	62.1	65.2	0.60	11.8	0.60	6206012
Methyl Ethyl Ketone (2-Butanone)	ppbv	2.65	1.55	0.20	0.40	0.20	6206012
Methyl Isobutyl Ketone	ppbv	<0.20	<0.20	0.20	<0.20	0.20	6206012
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	<1.0	1.0	<1.0	1.0	6206012
Methyl t-butyl ether (MTBE)	ppbv	<0.20	<0.20	0.20	<0.20	0.20	6206012
Ethyl Acetate	ppbv	<1.0	<1.0	1.0	<1.0	1.0	6206012
1,1-Dichloroethylene	ppbv	<0.10	<0.10	0.10	<0.10	0.10	6206012
cis-1,2-Dichloroethylene	ppbv	<0.10	<0.10	0.10	<0.10	0.10	6206012
trans-1,2-Dichloroethylene	ppbv	<0.10	<0.10	0.10	<0.10	0.10	6206012
Methylene Chloride(Dichloromethane)	ppbv	<0.60	<0.60	0.60	<0.60	0.60	6206012
Chloroform	ppbv	15.7	17.9	0.10	0.24	0.10	6206012
Carbon Tetrachloride	ppbv	<0.10	<0.10	0.10	<0.10	0.10	6206012
1,1-Dichloroethane	ppbv	<0.10	<0.10	0.10	<0.10	0.10	6206012
1,2-Dichloroethane	ppbv	<0.10	<0.10	0.10	<0.10	0.10	6206012
Ethylene Dibromide	ppbv	<0.10	<0.10	0.10	<0.10	0.10	6206012
1,1,1-Trichloroethane	ppbv	<0.10	<0.10	0.10	<0.10	0.10	6206012
1,1,2-Trichloroethane	ppbv	<0.10	<0.10	0.10	<0.10	0.10	6206012
1,1,2,2-Tetrachloroethane	ppbv	<0.10	<0.10	0.10	<0.10	0.10	6206012
cis-1,3-Dichloropropene	ppbv	<0.10	<0.10	0.10	<0.10	0.10	6206012
trans-1,3-Dichloropropene	ppbv	<0.10	<0.10	0.10	<0.10	0.10	6206012
1,2-Dichloropropane	ppbv	<0.10	<0.10	0.10	<0.10	0.10	6206012
Bromomethane	ppbv	<0.10	<0.10	0.10	<0.10	0.10	6206012
Bromoform	ppbv	<0.20	<0.20	0.20	<0.20	0.20	6206012
Bromodichloromethane	ppbv	<0.20	<0.20	0.20	<0.20	0.20	6206012

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1923A

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		KCI078	KCI079		KCI080		
Sampling Date		2019/06/21 12:15	2019/06/21 12:15		2019/06/21 11:01		
COC Number		80566	80566		80566		
	UNITS	**SV16-01**	**DUPA**	**RDL**	**SV16-02**	**RDL**	**QC Batch**
Dibromochloromethane	ppbv	<0.20	<0.20	0.20	<0.20	0.20	6206012
Trichloroethylene	ppbv	<0.10	<0.10	0.10	0.52	0.10	6206012
Tetrachloroethylene	ppbv	1.47	1.16	0.10	0.11	0.10	6206012
Benzene	ppbv	<0.10	<0.10	0.10	<0.10	0.10	6206012
Toluene	ppbv	0.41	0.14	0.10	0.10	0.10	6206012
Ethylbenzene	ppbv	0.37	<0.10	0.10	<0.10	0.10	6206012
p+m-Xylene	ppbv	1.08	0.22	0.20	<0.20	0.20	6206012
o-Xylene	ppbv	0.38	<0.10	0.10	<0.10	0.10	6206012
Styrene	ppbv	<0.10	<0.10	0.10	<0.10	0.10	6206012
4-ethyltoluene	ppbv	<0.50	<0.50	0.50	<0.50	0.50	6206012
1,3,5-Trimethylbenzene	ppbv	<0.50	<0.50	0.50	<0.50	0.50	6206012
1,2,4-Trimethylbenzene	ppbv	<0.50	<0.50	0.50	<0.50	0.50	6206012
Chlorobenzene	ppbv	<0.10	<0.10	0.10	<0.10	0.10	6206012
Benzyl chloride	ppbv	<0.50	<0.50	0.50	<0.50	0.50	6206012
1,3-Dichlorobenzene	ppbv	<0.40	<0.40	0.40	<0.40	0.40	6206012
1,4-Dichlorobenzene	ppbv	<0.10	<0.10	0.10	<0.10	0.10	6206012
1,2-Dichlorobenzene	ppbv	<0.10	<0.10	0.10	<0.10	0.10	6206012
1,2,4-Trichlorobenzene	ppbv	<0.50	<0.50	0.50	<0.50	0.50	6206012
Hexachlorobutadiene	ppbv	<0.50	<0.50	0.50	<0.50	0.50	6206012
Hexane	ppbv	0.35	<0.20	0.20	<0.20	0.20	6206012
Heptane	ppbv	<0.30	<0.30	0.30	<0.30	0.30	6206012
Cyclohexane	ppbv	<0.20	<0.20	0.20	<0.20	0.20	6206012
Tetrahydrofuran	ppbv	<0.40	<0.40	0.40	<0.40	0.40	6206012
1,4-Dioxane	ppbv	<1.0	<1.0	1.0	<1.0	1.0	6206012
Naphthalene	ppbv	<0.20	<0.20	0.20	<0.20	0.20	6206012
Total Xylenes	ppbv	1.46	<0.30	0.30	<0.30	0.30	6206012
1,1,1,2-Tetrachloroethane	ppbv	<0.10	<0.10	0.10	<0.10	0.10	6206012
Vinyl Bromide	ppbv	<0.20	<0.20	0.20	<0.20	0.20	6206012
Propene	ppbv	<0.91	<0.91	0.91	<0.50	0.50	6206012
2,2,4-Trimethylpentane	ppbv	<0.20	<0.20	0.20	<0.20	0.20	6206012
Carbon Disulfide	ppbv	0.95	<0.50	0.50	1.01	0.50	6206012
Vinyl Acetate	ppbv	<0.20	<0.20	0.20	<0.20	0.20	6206012

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1923A

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		KCI078	KCI079		KCI080		
Sampling Date		2019/06/21 12:15	2019/06/21 12:15		2019/06/21 11:01		
COC Number		80566	80566		80566		
	UNITS	**SV16-01**	**DUPA**	**RDL**	**SV16-02**	**RDL**	**QC Batch**
Instrument Surrogate Recovery (%)							
Bromochloromethane	%	94	87		84		6206012
D5-Chlorobenzene	%	77	87		72		6206012
Difluorobenzene	%	91	84		82		6206012

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1923A

CALCULATED VOLATILE ORGANICS (AIR)

BV Labs ID		KCI078	KCI079		KCI080		
Sampling Date		2019/06/21 12:15	2019/06/21 12:15		2019/06/21 11:01		
COC Number		80566	80566		80566		
	UNITS	**SV16-01**	**DUPA**	**RDL**	**SV16-02**	**RDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ug/m3	17.2	22.0	0.99	29.2	0.99	6195284
1,2-Dichlorotetrafluoroethane	ug/m3	<1.2	<1.2	1.2	<1.2	1.2	6195284
Chloromethane	ug/m3	0.68	<0.62	0.62	<0.62	0.62	6195284
Vinyl Chloride	ug/m3	<0.26	<0.26	0.26	<0.26	0.26	6195284
Chloroethane	ug/m3	<0.79	<0.79	0.79	<0.79	0.79	6195284
1,3-Butadiene	ug/m3	<1.1	<1.1	1.1	<1.1	1.1	6195284
Trichlorofluoromethane (FREON 11)	ug/m3	1.6	2.1	1.1	2.0	1.1	6195284
Ethanol (ethyl alcohol)	ug/m3	5.7	2.1	1.9	<1.9	1.9	6195284
Trichlorotrifluoroethane	ug/m3	<1.2	<1.2	1.2	<1.2	1.2	6195284
2-propanol	ug/m3	<2.5	<2.5	2.5	<2.5	2.5	6195284
2-Propanone	ug/m3	148	155	1.4	28.0	1.4	6195284
Methyl Ethyl Ketone (2-Butanone)	ug/m3	7.82	4.58	0.59	1.18	0.59	6195284
Methyl Isobutyl Ketone	ug/m3	<0.82	<0.82	0.82	<0.82	0.82	6195284
Methyl Butyl Ketone (2-Hexanone)	ug/m3	<4.1	<4.1	4.1	<4.1	4.1	6195284
Methyl t-butyl ether (MTBE)	ug/m3	<0.72	<0.72	0.72	<0.72	0.72	6195284
Ethyl Acetate	ug/m3	<3.6	<3.6	3.6	<3.6	3.6	6195284
1,1-Dichloroethylene	ug/m3	<0.40	<0.40	0.40	<0.40	0.40	6195284
cis-1,2-Dichloroethylene	ug/m3	<0.40	<0.40	0.40	<0.40	0.40	6195284
trans-1,2-Dichloroethylene	ug/m3	<0.40	<0.40	0.40	<0.40	0.40	6195284
Methylene Chloride(Dichloromethane)	ug/m3	<2.1	<2.1	2.1	<2.1	2.1	6195284
Chloroform	ug/m3	76.7	87.6	0.49	1.17	0.49	6195284
Carbon Tetrachloride	ug/m3	<0.63	<0.63	0.63	<0.63	0.63	6195284
1,1-Dichloroethane	ug/m3	<0.40	<0.40	0.40	<0.40	0.40	6195284
1,2-Dichloroethane	ug/m3	<0.40	<0.40	0.40	<0.40	0.40	6195284
Ethylene Dibromide	ug/m3	<0.77	<0.77	0.77	<0.77	0.77	6195284
1,1,1-Trichloroethane	ug/m3	<0.55	<0.55	0.55	<0.55	0.55	6195284
1,1,2-Trichloroethane	ug/m3	<0.55	<0.55	0.55	<0.55	0.55	6195284
1,1,2,2-Tetrachloroethane	ug/m3	<0.69	<0.69	0.69	<0.69	0.69	6195284
cis-1,3-Dichloropropene	ug/m3	<0.45	<0.45	0.45	<0.45	0.45	6195284
trans-1,3-Dichloropropene	ug/m3	<0.45	<0.45	0.45	<0.45	0.45	6195284
1,2-Dichloropropane	ug/m3	<0.46	<0.46	0.46	<0.46	0.46	6195284
Bromomethane	ug/m3	<0.39	<0.39	0.39	<0.39	0.39	6195284
Bromoform	ug/m3	<2.1	<2.1	2.1	<2.1	2.1	6195284
Bromodichloromethane	ug/m3	<1.3	<1.3	1.3	<1.3	1.3	6195284

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1923A

CALCULATED VOLATILE ORGANICS (AIR)

BV Labs ID		KCI078	KCI079		KCI080		
Sampling Date		2019/06/21 12:15	2019/06/21 12:15		2019/06/21 11:01		
COC Number		80566	80566		80566		
	UNITS	**SV16-01**	**DUPA**	**RDL**	**SV16-02**	**RDL**	**QC Batch**
Dibromochloromethane	ug/m3	<1.7	<1.7	1.7	<1.7	1.7	6195284
Trichloroethylene	ug/m3	<0.54	<0.54	0.54	2.82	0.54	6195284
Tetrachloroethylene	ug/m3	9.95	7.89	0.68	0.75	0.68	6195284
Benzene	ug/m3	<0.32	<0.32	0.32	<0.32	0.32	6195284
Toluene	ug/m3	1.56	0.52	0.38	0.39	0.38	6195284
Ethylbenzene	ug/m3	1.63	<0.43	0.43	<0.43	0.43	6195284
p+m-Xylene	ug/m3	4.70	0.94	0.87	<0.87	0.87	6195284
o-Xylene	ug/m3	1.65	<0.43	0.43	<0.43	0.43	6195284
Styrene	ug/m3	<0.43	<0.43	0.43	<0.43	0.43	6195284
4-ethyltoluene	ug/m3	<2.5	<2.5	2.5	<2.5	2.5	6195284
1,3,5-Trimethylbenzene	ug/m3	<2.5	<2.5	2.5	<2.5	2.5	6195284
1,2,4-Trimethylbenzene	ug/m3	<2.5	<2.5	2.5	<2.5	2.5	6195284
Chlorobenzene	ug/m3	<0.46	<0.46	0.46	<0.46	0.46	6195284
Benzyl chloride	ug/m3	<2.6	<2.6	2.6	<2.6	2.6	6195284
1,3-Dichlorobenzene	ug/m3	<2.4	<2.4	2.4	<2.4	2.4	6195284
1,4-Dichlorobenzene	ug/m3	<0.60	<0.60	0.60	<0.60	0.60	6195284
1,2-Dichlorobenzene	ug/m3	<0.60	<0.60	0.60	<0.60	0.60	6195284
1,2,4-Trichlorobenzene	ug/m3	<3.7	<3.7	3.7	<3.7	3.7	6195284
Hexachlorobutadiene	ug/m3	<5.3	<5.3	5.3	<5.3	5.3	6195284
Hexane	ug/m3	1.22	<0.70	0.70	<0.70	0.70	6195284
Heptane	ug/m3	<1.2	<1.2	1.2	<1.2	1.2	6195284
Cyclohexane	ug/m3	<0.69	<0.69	0.69	<0.69	0.69	6195284
Tetrahydrofuran	ug/m3	<1.2	<1.2	1.2	<1.2	1.2	6195284
1,4-Dioxane	ug/m3	<3.6	<3.6	3.6	<3.6	3.6	6195284
Naphthalene	ug/m3	<1.0	<1.0	1.0	<1.0	1.0	6195284
Total Xylenes	ug/m3	6.3	<1.3	1.3	<1.3	1.3	6195284
1,1,1,2-Tetrachloroethane	ug/m3	<0.69	<0.69	0.69	<0.69	0.69	6195284
Vinyl Bromide	ug/m3	<0.87	<0.87	0.87	<0.87	0.87	6195284
Propene	ug/m3	<1.6	<1.6	1.6	<0.86	0.86	6195284
2,2,4-Trimethylpentane	ug/m3	<0.93	<0.93	0.93	<0.93	0.93	6195284
Carbon Disulfide	ug/m3	3.0	<1.6	1.6	3.1	1.6	6195284
Vinyl Acetate	ug/m3	<0.70	<0.70	0.70	<0.70	0.70	6195284

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1923A

VOLATILE ORGANIC HYDROCARBONS BY GC/MS (AIR)

BV Labs ID		KCI078	KCI079	KCI080		
Sampling Date		2019/06/21 12:15	2019/06/21 12:15	2019/06/21 11:01		
COC Number		80566	80566	80566		
	UNITS	**SV16-01**	**DUPA**	**SV16-02**	**RDL**	**QC Batch**
F1-BTEX, C6-C10 (as Toluene)	ug/m3	243	165	70.6	5.0	6208068
F2, C10-C16 (as Decane)	ug/m3	1470	360	331	5.0	6208068

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

BV Labs Job #: B9H4030
Report Date: 2019/07/08

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1923A

TEST SUMMARY

BV Labs ID: KCI078
Sample ID: SV16-01
Matrix: Air

Collected: 2019/06/21
Relinquished: 2019/06/21
Received: 2019/06/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	6208068	N/A	2019/07/02	Dany Marqass
Canister Pressure (TO-15)	PRES	6206011	N/A	2019/07/02	Dany Marqass
Volatile Organics in Air (ug/m3)	GC/MS	6195284	N/A	2019/07/03	Automated Statchk
Volatile Organics in Air (TO-15)	GC/MS	6206012	N/A	2019/07/02	Dany Marqass

BV Labs ID: KCI079
Sample ID: DUPA
Matrix: Air

Collected: 2019/06/21
Relinquished: 2019/06/21
Received: 2019/06/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	6208068	N/A	2019/07/02	Dany Marqass
Canister Pressure (TO-15)	PRES	6206011	N/A	2019/07/02	Dany Marqass
Volatile Organics in Air (ug/m3)	GC/MS	6195284	N/A	2019/07/03	Automated Statchk
Volatile Organics in Air (TO-15)	GC/MS	6206012	N/A	2019/07/02	Dany Marqass

BV Labs ID: KCI080
Sample ID: SV16-02
Matrix: Air

Collected: 2019/06/21
Relinquished: 2019/06/21
Received: 2019/06/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	6208068	N/A	2019/07/02	Dany Marqass
Canister Pressure (TO-15)	PRES	6206011	N/A	2019/07/02	Dany Marqass
Volatile Organics in Air (ug/m3)	GC/MS	6195284	N/A	2019/07/03	Automated Statchk
Volatile Organics in Air (TO-15)	GC/MS	6206012	N/A	2019/07/02	Dany Marqass

GENERAL COMMENTS

WS#6206012: Vinyl Acetate was less than 60% recovery in the reference standard. There were no positives found for this compound therefore the data should not be affected.

Sample KCI078 [SV16-01] : Increased DL for propene due to propane interference.

Sample KCI079 [DUPA] : Increased DL for propene due to propane interference.

Results relate only to the items tested.

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6206012	DM2	Method Blank	Bromochloromethane	2019/07/02		118	%	60 - 140
			D5-Chlorobenzene	2019/07/02		88	%	60 - 140
			Difluorobenzene	2019/07/02		116	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2019/07/02	<0.20		ppbv	
			1,2-Dichlorotetrafluoroethane	2019/07/02	<0.17		ppbv	
			Chloromethane	2019/07/02	<0.30		ppbv	
			Vinyl Chloride	2019/07/02	<0.10		ppbv	
			Chloroethane	2019/07/02	<0.30		ppbv	
			1,3-Butadiene	2019/07/02	<0.50		ppbv	
			Trichlorofluoromethane (FREON 11)	2019/07/02	<0.20		ppbv	
			Ethanol (ethyl alcohol)	2019/07/02	<1.0		ppbv	
			Trichlorotrifluoroethane	2019/07/02	<0.15		ppbv	
			2-propanol	2019/07/02	<1.0		ppbv	
			2-Propanone	2019/07/02	<0.60		ppbv	
			Methyl Ethyl Ketone (2-Butanone)	2019/07/02	<0.20		ppbv	
			Methyl Isobutyl Ketone	2019/07/02	<0.20		ppbv	
			Methyl Butyl Ketone (2-Hexanone)	2019/07/02	<1.0		ppbv	
			Methyl t-butyl ether (MTBE)	2019/07/02	<0.20		ppbv	
			Ethyl Acetate	2019/07/02	<1.0		ppbv	
			1,1-Dichloroethylene	2019/07/02	<0.10		ppbv	
			cis-1,2-Dichloroethylene	2019/07/02	<0.10		ppbv	
			trans-1,2-Dichloroethylene	2019/07/02	<0.10		ppbv	
			Methylene Chloride(Dichloromethane)	2019/07/02	<0.60		ppbv	
			Chloroform	2019/07/02	<0.10		ppbv	
			Carbon Tetrachloride	2019/07/02	<0.10		ppbv	
			1,1-Dichloroethane	2019/07/02	<0.10		ppbv	
			1,2-Dichloroethane	2019/07/02	<0.070		ppbv	
			Ethylene Dibromide	2019/07/02	<0.10		ppbv	
			1,1,1-Trichloroethane	2019/07/02	<0.10		ppbv	
			1,1,2-Trichloroethane	2019/07/02	<0.10		ppbv	
			1,1,2,2-Tetrachloroethane	2019/07/02	<0.10		ppbv	
			cis-1,3-Dichloropropene	2019/07/02	<0.10		ppbv	
			trans-1,3-Dichloropropene	2019/07/02	<0.10		ppbv	
			1,2-Dichloropropane	2019/07/02	<0.10		ppbv	
			Bromomethane	2019/07/02	<0.10		ppbv	
			Bromoform	2019/07/02	<0.20		ppbv	
			Bromodichloromethane	2019/07/02	<0.20		ppbv	
			Dibromochloromethane	2019/07/02	<0.20		ppbv	
			Trichloroethylene	2019/07/02	<0.10		ppbv	
			Tetrachloroethylene	2019/07/02	<0.10		ppbv	
			Benzene	2019/07/02	<0.10		ppbv	
			Toluene	2019/07/02	<0.10		ppbv	
			Ethylbenzene	2019/07/02	<0.10		ppbv	
			p+m-Xylene	2019/07/02	<0.20		ppbv	
			o-Xylene	2019/07/02	<0.10		ppbv	
			Styrene	2019/07/02	<0.10		ppbv	
			4-ethyltoluene	2019/07/02	<0.50		ppbv	
			1,3,5-Trimethylbenzene	2019/07/02	<0.50		ppbv	
			1,2,4-Trimethylbenzene	2019/07/02	<0.50		ppbv	
			Chlorobenzene	2019/07/02	<0.10		ppbv	
			Benzyl chloride	2019/07/02	<0.50		ppbv	
			1,3-Dichlorobenzene	2019/07/02	<0.40		ppbv	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,4-Dichlorobenzene	2019/07/02	<0.10		ppbv	
			1,2-Dichlorobenzene	2019/07/02	<0.10		ppbv	
			1,2,4-Trichlorobenzene	2019/07/02	<0.50		ppbv	
			Hexachlorobutadiene	2019/07/02	<0.50		ppbv	
			Hexane	2019/07/02	<0.20		ppbv	
			Heptane	2019/07/02	<0.30		ppbv	
			Cyclohexane	2019/07/02	<0.20		ppbv	
			Tetrahydrofuran	2019/07/02	<0.40		ppbv	
			1,4-Dioxane	2019/07/02	<1.0		ppbv	
			Naphthalene	2019/07/02	<0.20		ppbv	
			Total Xylenes	2019/07/02	<0.30		ppbv	
			1,1,1,2-Tetrachloroethane	2019/07/02	<0.10		ppbv	
			Vinyl Bromide	2019/07/02	<0.20		ppbv	
			Propene	2019/07/02	<0.50		ppbv	
			2,2,4-Trimethylpentane	2019/07/02	<0.20		ppbv	
			Carbon Disulfide	2019/07/02	<0.50		ppbv	
			Vinyl Acetate	2019/07/02	<0.20		ppbv	
6208068	DM2	Method Blank	F1-BTEX, C6-C10 (as Toluene)	2019/07/02	<5.0		ug/m3	
			F2, C10-C16 (as Decane)	2019/07/02	<5.0		ug/m3	
6206012	DM2	LCS	Bromochloromethane	2019/07/02		113	%	60 - 140
			D5-Chlorobenzene	2019/07/02		115	%	60 - 140
			Difluorobenzene	2019/07/02		116	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2019/07/02		115	%	70 - 130
			1,2-Dichlorotetrafluoroethane	2019/07/02		99	%	70 - 130
			Chloromethane	2019/07/02		96	%	70 - 130
			Vinyl Chloride	2019/07/02		90	%	70 - 130
			Chloroethane	2019/07/02		85	%	70 - 130
			1,3-Butadiene	2019/07/02		98	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2019/07/02		116	%	70 - 130
			Ethanol (ethyl alcohol)	2019/07/02		103	%	70 - 130
			Trichlorotrifluoroethane	2019/07/02		95	%	70 - 130
			2-propanol	2019/07/02		79	%	70 - 130
			2-Propanone	2019/07/02		109	%	70 - 130
			Methyl Ethyl Ketone (2-Butanone)	2019/07/02		97	%	70 - 130
			Methyl Isobutyl Ketone	2019/07/02		103	%	70 - 130
			Methyl Butyl Ketone (2-Hexanone)	2019/07/02		105	%	70 - 130
			Methyl t-butyl ether (MTBE)	2019/07/02		111	%	70 - 130
			Ethyl Acetate	2019/07/02		124	%	70 - 130
			1,1-Dichloroethylene	2019/07/02		98	%	70 - 130
			cis-1,2-Dichloroethylene	2019/07/02		97	%	70 - 130
			trans-1,2-Dichloroethylene	2019/07/02		99	%	70 - 130
			Methylene Chloride(Dichloromethane)	2019/07/02		88	%	70 - 130
			Chloroform	2019/07/02		108	%	70 - 130
			Carbon Tetrachloride	2019/07/02		114	%	70 - 130
			1,1-Dichloroethane	2019/07/02		94	%	70 - 130
			1,2-Dichloroethane	2019/07/02		119	%	70 - 130
			Ethylene Dibromide	2019/07/02		106	%	70 - 130
			1,1,1-Trichloroethane	2019/07/02		122	%	70 - 130
			1,1,2-Trichloroethane	2019/07/02		104	%	70 - 130
			1,1,2,2-Tetrachloroethane	2019/07/02		93	%	70 - 130
			cis-1,3-Dichloropropene	2019/07/02		109	%	70 - 130
			trans-1,3-Dichloropropene	2019/07/02		117	%	70 - 130

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,2-Dichloropropane	2019/07/02		88	%	70 - 130
			Bromomethane	2019/07/02		91	%	70 - 130
			Bromoform	2019/07/02		106	%	70 - 130
			Bromodichloromethane	2019/07/02		123	%	70 - 130
			Dibromochloromethane	2019/07/02		125	%	70 - 130
			Trichloroethylene	2019/07/02		105	%	70 - 130
			Tetrachloroethylene	2019/07/02		110	%	70 - 130
			Benzene	2019/07/02		93	%	70 - 130
			Toluene	2019/07/02		108	%	70 - 130
			Ethylbenzene	2019/07/02		96	%	70 - 130
			p+m-Xylene	2019/07/02		100	%	70 - 130
			o-Xylene	2019/07/02		101	%	70 - 130
			Styrene	2019/07/02		101	%	70 - 130
			4-ethyltoluene	2019/07/02		111	%	70 - 130
			1,3,5-Trimethylbenzene	2019/07/02		108	%	70 - 130
			1,2,4-Trimethylbenzene	2019/07/02		113	%	70 - 130
			Chlorobenzene	2019/07/02		90	%	70 - 130
			Benzyl chloride	2019/07/02		111	%	70 - 130
			1,3-Dichlorobenzene	2019/07/02		109	%	70 - 130
			1,4-Dichlorobenzene	2019/07/02		106	%	70 - 130
			1,2-Dichlorobenzene	2019/07/02		112	%	70 - 130
			1,2,4-Trichlorobenzene	2019/07/02		118	%	70 - 130
			Hexachlorobutadiene	2019/07/02		121	%	70 - 130
			Hexane	2019/07/02		93	%	70 - 130
			Heptane	2019/07/02		102	%	70 - 130
			Cyclohexane	2019/07/02		96	%	70 - 130
			Tetrahydrofuran	2019/07/02		92	%	70 - 130
			1,4-Dioxane	2019/07/02		99	%	70 - 130
			Naphthalene	2019/07/02		120	%	70 - 130
			Total Xylenes	2019/07/02		100	%	70 - 130
			1,1,1,2-Tetrachloroethane	2019/07/02		95	%	70 - 130
			Vinyl Bromide	2019/07/02		101	%	70 - 130
			Propene	2019/07/02		97	%	70 - 130
			2,2,4-Trimethylpentane	2019/07/02		101	%	70 - 130
			Carbon Disulfide	2019/07/02		97	%	70 - 130
			Vinyl Acetate	2019/07/02		56 (1)	%	70 - 130

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

BV Labs Job #: B9H4030
Report Date: 2019/07/08

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1923A

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Melanie Mabini, VOC Analyst

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam
A Bureau Veritas Group Company

6740 Campobello Road
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Fax: (905) 817-5779
Toll Free: 1-800-563-6266

EXXONMOBIL/IMPERIAL OIL - MAXXAM AIR CHAIN OF CUSTODY RECORD

Page 1 of 1

C of C # 80566

INVOICE INFORMATION

Company Name: [X] Imperial Oil [ ] ExxonMobil
Contact Name: IOL Accounts Payable
Address: 102, 2535-3rd Ave SE
Calgary, AB T2A 7W5
Email: IOLAccounts_Payable@golder.com
Ph: 403-299-5600

Sampler Name (Print): Jeremy Eckert

REPORT INFORMATION

Company Name: Golder Associates Ltd.
Contact Name: Ian Sosney
Address: 110 Hanover Dr # 203
St. Catharines, ON L2S 0A4
Email: ian_sosney@golder.com
Ph: 647-522-4698

Consultant Project #: 1791706-1155-1923A

ANALYSIS REQUESTED

JE

FIELD SAMPLE ID	Canister Serial #	Flow Regulator Serial #	Sample Collection DATE (YYYY/MM/DD)	Sample Collection TIME (24 HR)	Media Type (See Legend)	FLOW RATE (mL/min.)	LENGTH OF SAMPLING (minutes)	BTEX	~~Aromatic/Aliphatic Hydrocarbon Fractionations~~	F1 (C6-C10) - F2 (C10-C16)	VOC (TO15)
1 SV16-01	2464	FX0130	2019/06/21	12:15	S	175	8	X	X	X	X
2 DUPA	1173	FX0130	2019/06/21	12:15	S	175	8	X	X	X	X
3 SV16-02	1476	FX0209	2019/06/21	11:01	S	200	7	X	X	X	X
4											
5											
6											
7											
8											
9											
10											
11											

IOL SITE LOCATION: 1660 Merivale Rd. Ottawa, ON

IOL PROJECT # (if applicable): ~~1791706-1155-1923A~~ JE N/A

MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM: 1791706-1155-7777

REGULATORY CRITERIA / DETECTION LIMITS: (PLEASE SPECIFY): N/A

SPECIAL INSTRUCTIONS:
IES: A2601436
SAP: 80001627

LEGEND
S - Summa Can
T - Tube
TB - Tedlar Bag
O - Other(Specify)
*TEMP N/A for SUMMA CAN

TURNAROUND TIME
Standard (10 days) [X]
Rush (9 days) [ ]
(6 days) [ ]
(3 days) [ ]

	YES	NO	COOLER ID # 1			
SEAL PRESENT		/	TEMP °C	1	2	3
SEAL INTACT		/				
COOLING MEDIA PRESENT		/				

	YES	NO	COOLER ID #			
SEAL PRESENT			TEMP °C	1	2	3
SEAL INTACT						
COOLING MEDIA PRESENT						

	YES	NO	COOLER ID #			
SEAL PRESENT			TEMP °C	1	2	3
SEAL INTACT						
COOLING MEDIA PRESENT						

Date Required

LAB USE ONLY
MAXXAM JOB # B9H4030

SAMPLES
LABELED BY: KKH
VERIFIED BY: AKP

RELINQUISHED BY:	DATE:	TIME (24 HR)	RECEIVED BY:	DATE:	TIME (24 HR)
1. [signature]	Jeremy Eckert 2019/06/21	14:00	1. Khushboo Kapoor KHUSHBOO KAPOOR	2019/06/25	10:04
2.			2.		
3.			3.		

IOL COC-AIR-(04/2016) White: Maxxam Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: June 21, 2019

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Bureau Veritas Mississauga

Consultant Project Number: 1791706-1155

Sample Submission Number: B9H4030

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			Lab control sample recovery (56%) outside acceptance
Extraction Surrogate Recovery			X	range of 70-130% for vinyl acetate. All remaining
Method Blank Concentration	X			laboratory QC results are within acceptance criteria.
Matrix Duplicate RPD			X	
Matrix Spike Recovery			X	
Lab Control Sample Recovery		X		

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	Samples SV16-01 and DUP A exceed the alert limit for
Trip Blank Concentration			X	methyl ethyl ketone (2-butanone) (52%) and F2,
Field Duplicate RPD		X		C10-C16 (as decane) (121%). All remaining field QC samples are within alert limits.

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	n/a

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): Amanda Newberry

Date: July 12, 2019

Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1923A
Your C.O.C. #: 80565

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2019/07/09
Report #: R5788946
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9H4037
Received: 2019/06/25, 10:04

Sample Matrix: Air
Samples Received: 1

Analyses	Quantity	Laboratory Method	Primary Reference
BTEX and CCME Compounds in Air(TO-15mod)	1	BRL SOP-00304	EPA TO-15 m
Canister Pressure (TO-15)	1	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (ug/m3)	1	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (TO-15) (1)	1	BRL SOP-00304	EPA TO-15 m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard. All samples were analyzed within hold time unless otherwise flagged.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Air sampling canisters have been cleaned in accordance with U.S. EPA Method TO15. At the end of the cleaning, evacuation, and pressurization cycles, one canister was selected and was pressurized with Zero Air. This canister was then analyzed via TO15 on a GC/MS. The canister must have been found to contain <0.2 ppbv concentration of all target analytes in order for the batch to have been considered clean. Each canister also underwent a leak check prior to shipment.

Please Note: SUMMA® canister samples will be retained by Bureau Veritas Laboratories for a period of 5 calendar days or as contractually agreed from the date of this report, after which time they will be cleaned for reuse. If you require a longer sample storage period, please contact your service representative.

Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1923A
Your C.O.C. #: 80565

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2019/07/09
Report #: R5788946
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9H4037
Received: 2019/06/25, 10:04

Encryption Key

Kyle Reinhart
Project Manager
09 Jul 2019 09:10:22

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kyle Reinhart, Project Manager
Email: Kyle.Reinhart@bvlabs.com
Phone# (905)817-5802

==========

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BV Labs Job #: B9H4037
Report Date: 2019/07/09

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1923A

RESULTS OF ANALYSES OF AIR

BV Labs ID		KCI089	
Sampling Date		2019/06/21 12:08	
COC Number		80565	
	UNITS	**FIELD BLANK**	**QC Batch**
Pressure on Receipt	psig	(-2.6)	6211411
QC Batch = Quality Control Batch			

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Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1923A

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		KCI089		
Sampling Date		2019/06/21 12:08		
COC Number		80565		
	UNITS	**FIELD BLANK**	**RDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ppbv	0.47	0.20	6210673
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	0.17	6210673
Chloromethane	ppbv	0.48	0.30	6210673
Vinyl Chloride	ppbv	<0.10	0.10	6210673
Chloroethane	ppbv	<0.30	0.30	6210673
1,3-Butadiene	ppbv	<0.50	0.50	6210673
Trichlorofluoromethane (FREON 11)	ppbv	<0.20	0.20	6210673
Ethanol (ethyl alcohol)	ppbv	2.4	1.0	6210673
Trichlorotrifluoroethane	ppbv	<0.15	0.15	6210673
2-propanol	ppbv	<1.0	1.0	6210673
2-Propanone	ppbv	4.23	0.60	6210673
Methyl Ethyl Ketone (2-Butanone)	ppbv	0.46	0.20	6210673
Methyl Isobutyl Ketone	ppbv	<0.20	0.20	6210673
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	1.0	6210673
Methyl t-butyl ether (MTBE)	ppbv	<0.20	0.20	6210673
Ethyl Acetate	ppbv	<1.0	1.0	6210673
1,1-Dichloroethylene	ppbv	<0.10	0.10	6210673
cis-1,2-Dichloroethylene	ppbv	<0.10	0.10	6210673
trans-1,2-Dichloroethylene	ppbv	<0.10	0.10	6210673
Methylene Chloride(Dichloromethane)	ppbv	<0.60	0.60	6210673
Chloroform	ppbv	<0.10	0.10	6210673
Carbon Tetrachloride	ppbv	<0.10	0.10	6210673
1,1-Dichloroethane	ppbv	<0.10	0.10	6210673
1,2-Dichloroethane	ppbv	<0.10	0.10	6210673
Ethylene Dibromide	ppbv	<0.10	0.10	6210673
1,1,1-Trichloroethane	ppbv	<0.10	0.10	6210673
1,1,2-Trichloroethane	ppbv	<0.10	0.10	6210673
1,1,2,2-Tetrachloroethane	ppbv	<0.10	0.10	6210673
cis-1,3-Dichloropropene	ppbv	<0.10	0.10	6210673
trans-1,3-Dichloropropene	ppbv	<0.10	0.10	6210673
1,2-Dichloropropane	ppbv	<0.10	0.10	6210673
Bromomethane	ppbv	<0.10	0.10	6210673
Bromoform	ppbv	<0.20	0.20	6210673
Bromodichloromethane	ppbv	<0.20	0.20	6210673

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		KCI089		
Sampling Date		2019/06/21 12:08		
COC Number		80565		
	UNITS	**FIELD BLANK**	**RDL**	**QC Batch**
Dibromochloromethane	ppbv	<0.20	0.20	6210673
Trichloroethylene	ppbv	<0.10	0.10	6210673
Tetrachloroethylene	ppbv	<0.10	0.10	6210673
Benzene	ppbv	0.12	0.10	6210673
Toluene	ppbv	0.32	0.10	6210673
Ethylbenzene	ppbv	<0.10	0.10	6210673
p+m-Xylene	ppbv	<0.20	0.20	6210673
o-Xylene	ppbv	<0.10	0.10	6210673
Styrene	ppbv	<0.10	0.10	6210673
4-ethyltoluene	ppbv	<0.50	0.50	6210673
1,3,5-Trimethylbenzene	ppbv	<0.50	0.50	6210673
1,2,4-Trimethylbenzene	ppbv	<0.50	0.50	6210673
Chlorobenzene	ppbv	<0.10	0.10	6210673
Benzyl chloride	ppbv	<0.50	0.50	6210673
1,3-Dichlorobenzene	ppbv	<0.40	0.40	6210673
1,4-Dichlorobenzene	ppbv	<0.10	0.10	6210673
1,2-Dichlorobenzene	ppbv	<0.10	0.10	6210673
1,2,4-Trichlorobenzene	ppbv	<0.50	0.50	6210673
Hexachlorobutadiene	ppbv	<0.50	0.50	6210673
Hexane	ppbv	0.23	0.20	6210673
Heptane	ppbv	<0.30	0.30	6210673
Cyclohexane	ppbv	<0.20	0.20	6210673
Tetrahydrofuran	ppbv	<0.40	0.40	6210673
1,4-Dioxane	ppbv	<1.0	1.0	6210673
Naphthalene	ppbv	<0.20	0.20	6210673
Total Xylenes	ppbv	<0.30	0.30	6210673
1,1,1,2-Tetrachloroethane	ppbv	<0.10	0.10	6210673
Vinyl Bromide	ppbv	<0.20	0.20	6210673
Propene	ppbv	<0.50	0.50	6210673
2,2,4-Trimethylpentane	ppbv	<0.20	0.20	6210673
Carbon Disulfide	ppbv	<0.50	0.50	6210673
Vinyl Acetate	ppbv	<0.20	0.20	6210673

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1923A

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		KCI089		
Sampling Date		2019/06/21 12:08		
COC Number		80565		
	UNITS	**FIELD BLANK**	**RDL**	**QC Batch**
Instrument Surrogate Recovery (%)				
Bromochloromethane	%	85		6210673
D5-Chlorobenzene	%	82		6210673
Difluorobenzene	%	87		6210673

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1923A

CALCULATED VOLATILE ORGANICS (AIR)

BV Labs ID		KCI089		
Sampling Date		2019/06/21 12:08		
COC Number		80565		
	UNITS	**FIELD BLANK**	**RDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ug/m3	2.33	0.99	6195284
1,2-Dichlorotetrafluoroethane	ug/m3	<1.2	1.2	6195284
Chloromethane	ug/m3	1.00	0.62	6195284
Vinyl Chloride	ug/m3	<0.26	0.26	6195284
Chloroethane	ug/m3	<0.79	0.79	6195284
1,3-Butadiene	ug/m3	<1.1	1.1	6195284
Trichlorofluoromethane (FREON 11)	ug/m3	<1.1	1.1	6195284
Ethanol (ethyl alcohol)	ug/m3	4.4	1.9	6195284
Trichlorotrifluoroethane	ug/m3	<1.2	1.2	6195284
2-propanol	ug/m3	<2.5	2.5	6195284
2-Propanone	ug/m3	10.1	1.4	6195284
Methyl Ethyl Ketone (2-Butanone)	ug/m3	1.35	0.59	6195284
Methyl Isobutyl Ketone	ug/m3	<0.82	0.82	6195284
Methyl Butyl Ketone (2-Hexanone)	ug/m3	<4.1	4.1	6195284
Methyl t-butyl ether (MTBE)	ug/m3	<0.72	0.72	6195284
Ethyl Acetate	ug/m3	<3.6	3.6	6195284
1,1-Dichloroethylene	ug/m3	<0.40	0.40	6195284
cis-1,2-Dichloroethylene	ug/m3	<0.40	0.40	6195284
trans-1,2-Dichloroethylene	ug/m3	<0.40	0.40	6195284
Methylene Chloride(Dichloromethane)	ug/m3	<2.1	2.1	6195284
Chloroform	ug/m3	<0.49	0.49	6195284
Carbon Tetrachloride	ug/m3	<0.63	0.63	6195284
1,1-Dichloroethane	ug/m3	<0.40	0.40	6195284
1,2-Dichloroethane	ug/m3	<0.40	0.40	6195284
Ethylene Dibromide	ug/m3	<0.77	0.77	6195284
1,1,1-Trichloroethane	ug/m3	<0.55	0.55	6195284
1,1,2-Trichloroethane	ug/m3	<0.55	0.55	6195284
1,1,2,2-Tetrachloroethane	ug/m3	<0.69	0.69	6195284
cis-1,3-Dichloropropene	ug/m3	<0.45	0.45	6195284
trans-1,3-Dichloropropene	ug/m3	<0.45	0.45	6195284
1,2-Dichloropropane	ug/m3	<0.46	0.46	6195284
Bromomethane	ug/m3	<0.39	0.39	6195284
Bromoform	ug/m3	<2.1	2.1	6195284
Bromodichloromethane	ug/m3	<1.3	1.3	6195284

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

CALCULATED VOLATILE ORGANICS (AIR)

BV Labs ID		KCI089		
Sampling Date		2019/06/21 12:08		
COC Number		80565		
	UNITS	**FIELD BLANK**	**RDL**	**QC Batch**
Dibromochloromethane	ug/m3	<1.7	1.7	6195284
Trichloroethylene	ug/m3	<0.54	0.54	6195284
Tetrachloroethylene	ug/m3	<0.68	0.68	6195284
Benzene	ug/m3	0.38	0.32	6195284
Toluene	ug/m3	1.22	0.38	6195284
Ethylbenzene	ug/m3	<0.43	0.43	6195284
p+m-Xylene	ug/m3	<0.87	0.87	6195284
o-Xylene	ug/m3	<0.43	0.43	6195284
Styrene	ug/m3	<0.43	0.43	6195284
4-ethyltoluene	ug/m3	<2.5	2.5	6195284
1,3,5-Trimethylbenzene	ug/m3	<2.5	2.5	6195284
1,2,4-Trimethylbenzene	ug/m3	<2.5	2.5	6195284
Chlorobenzene	ug/m3	<0.46	0.46	6195284
Benzyl chloride	ug/m3	<2.6	2.6	6195284
1,3-Dichlorobenzene	ug/m3	<2.4	2.4	6195284
1,4-Dichlorobenzene	ug/m3	<0.60	0.60	6195284
1,2-Dichlorobenzene	ug/m3	<0.60	0.60	6195284
1,2,4-Trichlorobenzene	ug/m3	<3.7	3.7	6195284
Hexachlorobutadiene	ug/m3	<5.3	5.3	6195284
Hexane	ug/m3	0.82	0.70	6195284
Heptane	ug/m3	<1.2	1.2	6195284
Cyclohexane	ug/m3	<0.69	0.69	6195284
Tetrahydrofuran	ug/m3	<1.2	1.2	6195284
1,4-Dioxane	ug/m3	<3.6	3.6	6195284
Naphthalene	ug/m3	<1.0	1.0	6195284
Total Xylenes	ug/m3	<1.3	1.3	6195284
1,1,1,2-Tetrachloroethane	ug/m3	<0.69	0.69	6195284
Vinyl Bromide	ug/m3	<0.87	0.87	6195284
Propene	ug/m3	<0.86	0.86	6195284
2,2,4-Trimethylpentane	ug/m3	<0.93	0.93	6195284
Carbon Disulfide	ug/m3	<1.6	1.6	6195284
Vinyl Acetate	ug/m3	<0.70	0.70	6195284

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

VOLATILE ORGANIC HYDROCARBONS BY GC/MS (AIR)

BV Labs ID		KCI089		
Sampling Date		2019/06/21 12:08		
COC Number		80565		
	UNITS	**FIELD BLANK**	**RDL**	**QC Batch**
F1-BTEX, C6-C10 (as Toluene)	ug/m3	20.4	5.0	6216286
F2, C10-C16 (as Decane)	ug/m3	13.5	5.0	6216286

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

BV Labs Job #: B9H4037
Report Date: 2019/07/09

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1923A

TEST SUMMARY

BV Labs ID: KCI089
Sample ID: FIELD BLANK
Matrix: Air

Collected: 2019/06/21
Relinquished: 2019/06/21
Received: 2019/06/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	6216286	N/A	2019/07/05	Dany Marqass
Canister Pressure (TO-15)	PRES	6211411	N/A	2019/07/04	Yao Liang Sun
Volatile Organics in Air (ug/m3)	GC/MS	6195284	N/A	2019/07/08	Maureen Smith
Volatile Organics in Air (TO-15)	GC/MS	6210673	N/A	2019/07/04	Yao Liang Sun

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GENERAL COMMENTS

Vinyl acetate was less than 60% recovery in the reference standard. There were no positives found for this compound therefore the data should not be affected.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6210673	LSY	Method Blank	Bromochloromethane	2019/07/04		84	%	60 - 140
			D5-Chlorobenzene	2019/07/04		83	%	60 - 140
			Difluorobenzene	2019/07/04		86	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2019/07/04	<0.20		ppbv	
			1,2-Dichlorotetrafluoroethane	2019/07/04	<0.17		ppbv	
			Chloromethane	2019/07/04	<0.30		ppbv	
			Vinyl Chloride	2019/07/04	<0.10		ppbv	
			Chloroethane	2019/07/04	<0.30		ppbv	
			1,3-Butadiene	2019/07/04	<0.50		ppbv	
			Trichlorofluoromethane (FREON 11)	2019/07/04	<0.20		ppbv	
			Ethanol (ethyl alcohol)	2019/07/04	<1.0		ppbv	
			Trichlorotrifluoroethane	2019/07/04	<0.15		ppbv	
			2-propanol	2019/07/04	<1.0		ppbv	
			2-Propanone	2019/07/04	<0.60		ppbv	
			Methyl Ethyl Ketone (2-Butanone)	2019/07/04	<0.20		ppbv	
			Methyl Isobutyl Ketone	2019/07/04	<0.20		ppbv	
			Methyl Butyl Ketone (2-Hexanone)	2019/07/04	<1.0		ppbv	
			Methyl t-butyl ether (MTBE)	2019/07/04	<0.20		ppbv	
			Ethyl Acetate	2019/07/04	<1.0		ppbv	
			1,1-Dichloroethylene	2019/07/04	<0.10		ppbv	
			cis-1,2-Dichloroethylene	2019/07/04	<0.10		ppbv	
			trans-1,2-Dichloroethylene	2019/07/04	<0.10		ppbv	
			Methylene Chloride(Dichloromethane)	2019/07/04	<0.60		ppbv	
			Chloroform	2019/07/04	<0.10		ppbv	
			Carbon Tetrachloride	2019/07/04	<0.10		ppbv	
			1,1-Dichloroethane	2019/07/04	<0.10		ppbv	
			1,2-Dichloroethane	2019/07/04	<0.10		ppbv	
			Ethylene Dibromide	2019/07/04	<0.10		ppbv	
			1,1,1-Trichloroethane	2019/07/04	<0.10		ppbv	
			1,1,2-Trichloroethane	2019/07/04	<0.10		ppbv	
			1,1,2,2-Tetrachloroethane	2019/07/04	<0.10		ppbv	
			cis-1,3-Dichloropropene	2019/07/04	<0.10		ppbv	
			trans-1,3-Dichloropropene	2019/07/04	<0.10		ppbv	
			1,2-Dichloropropane	2019/07/04	<0.10		ppbv	
			Bromomethane	2019/07/04	<0.10		ppbv	
			Bromoform	2019/07/04	<0.20		ppbv	
			Bromodichloromethane	2019/07/04	<0.20		ppbv	
			Dibromochloromethane	2019/07/04	<0.20		ppbv	
			Trichloroethylene	2019/07/04	<0.10		ppbv	
			Tetrachloroethylene	2019/07/04	<0.10		ppbv	
			Benzene	2019/07/04	<0.10		ppbv	
			Toluene	2019/07/04	<0.10		ppbv	
			Ethylbenzene	2019/07/04	<0.10		ppbv	
			p+m-Xylene	2019/07/04	<0.20		ppbv	
			o-Xylene	2019/07/04	<0.10		ppbv	
			Styrene	2019/07/04	<0.10		ppbv	
			4-ethyltoluene	2019/07/04	<0.50		ppbv	
			1,3,5-Trimethylbenzene	2019/07/04	<0.50		ppbv	
			1,2,4-Trimethylbenzene	2019/07/04	<0.50		ppbv	
			Chlorobenzene	2019/07/04	<0.10		ppbv	
			Benzyl chloride	2019/07/04	<0.50		ppbv	
			1,3-Dichlorobenzene	2019/07/04	<0.40		ppbv	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,4-Dichlorobenzene	2019/07/04	<0.10		ppbv	
			1,2-Dichlorobenzene	2019/07/04	<0.10		ppbv	
			1,2,4-Trichlorobenzene	2019/07/04	<0.50		ppbv	
			Hexachlorobutadiene	2019/07/04	<0.50		ppbv	
			Hexane	2019/07/04	<0.20		ppbv	
			Heptane	2019/07/04	<0.30		ppbv	
			Cyclohexane	2019/07/04	<0.20		ppbv	
			Tetrahydrofuran	2019/07/04	<0.40		ppbv	
			1,4-Dioxane	2019/07/04	<1.0		ppbv	
			Naphthalene	2019/07/04	<0.20		ppbv	
			Total Xylenes	2019/07/04	<0.30		ppbv	
			1,1,1,2-Tetrachloroethane	2019/07/04	<0.10		ppbv	
			Vinyl Bromide	2019/07/04	<0.20		ppbv	
			Propene	2019/07/04	<0.50		ppbv	
			2,2,4-Trimethylpentane	2019/07/04	<0.20		ppbv	
			Carbon Disulfide	2019/07/04	<0.50		ppbv	
			Vinyl Acetate	2019/07/04	<0.20		ppbv	
6216286	DM2	Method Blank	F1-BTEX, C6-C10 (as Toluene)	2019/07/05	<5.0		ug/m3	
			F2, C10-C16 (as Decane)	2019/07/05	<5.0		ug/m3	
6210673	LSY	LCS	Bromochloromethane	2019/07/04		103	%	60 - 140
			D5-Chlorobenzene	2019/07/04		105	%	60 - 140
			Difluorobenzene	2019/07/04		106	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2019/07/04		91	%	70 - 130
			1,2-Dichlorotetrafluoroethane	2019/07/04		91	%	70 - 130
			Chloromethane	2019/07/04		89	%	70 - 130
			Vinyl Chloride	2019/07/04		92	%	70 - 130
			Chloroethane	2019/07/04		90	%	70 - 130
			1,3-Butadiene	2019/07/04		91	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2019/07/04		86	%	70 - 130
			Ethanol (ethyl alcohol)	2019/07/04		88	%	70 - 130
			Trichlorotrifluoroethane	2019/07/04		96	%	70 - 130
			2-propanol	2019/07/04		73	%	70 - 130
			2-Propanone	2019/07/04		88	%	70 - 130
			Methyl Ethyl Ketone (2-Butanone)	2019/07/04		96	%	70 - 130
			Methyl Isobutyl Ketone	2019/07/04		92	%	70 - 130
			Methyl Butyl Ketone (2-Hexanone)	2019/07/04		91	%	70 - 130
			Methyl t-butyl ether (MTBE)	2019/07/04		102	%	70 - 130
			Ethyl Acetate	2019/07/04		125	%	70 - 130
			1,1-Dichloroethylene	2019/07/04		90	%	70 - 130
			cis-1,2-Dichloroethylene	2019/07/04		101	%	70 - 130
			trans-1,2-Dichloroethylene	2019/07/04		102	%	70 - 130
			Methylene Chloride(Dichloromethane)	2019/07/04		90	%	70 - 130
			Chloroform	2019/07/04		102	%	70 - 130
			Carbon Tetrachloride	2019/07/04		100	%	70 - 130
			1,1-Dichloroethane	2019/07/04		99	%	70 - 130
			1,2-Dichloroethane	2019/07/04		98	%	70 - 130
			Ethylene Dibromide	2019/07/04		97	%	70 - 130
			1,1,1-Trichloroethane	2019/07/04		98	%	70 - 130
			1,1,2-Trichloroethane	2019/07/04		98	%	70 - 130
			1,1,2,2-Tetrachloroethane	2019/07/04		85	%	70 - 130
			cis-1,3-Dichloropropene	2019/07/04		103	%	70 - 130
			trans-1,3-Dichloropropene	2019/07/04		100	%	70 - 130

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,2-Dichloropropane	2019/07/04		99	%	70 - 130
			Bromomethane	2019/07/04		95	%	70 - 130
			Bromoform	2019/07/04		96	%	70 - 130
			Bromodichloromethane	2019/07/04		105	%	70 - 130
			Dibromochloromethane	2019/07/04		102	%	70 - 130
			Trichloroethylene	2019/07/04		108	%	70 - 130
			Tetrachloroethylene	2019/07/04		95	%	70 - 130
			Benzene	2019/07/04		100	%	70 - 130
			Toluene	2019/07/04		101	%	70 - 130
			Ethylbenzene	2019/07/04		97	%	70 - 130
			p+m-Xylene	2019/07/04		96	%	70 - 130
			o-Xylene	2019/07/04		92	%	70 - 130
			Styrene	2019/07/04		101	%	70 - 130
			4-ethyltoluene	2019/07/04		94	%	70 - 130
			1,3,5-Trimethylbenzene	2019/07/04		92	%	70 - 130
			1,2,4-Trimethylbenzene	2019/07/04		92	%	70 - 130
			Chlorobenzene	2019/07/04		96	%	70 - 130
			Benzyl chloride	2019/07/04		88	%	70 - 130
			1,3-Dichlorobenzene	2019/07/04		89	%	70 - 130
			1,4-Dichlorobenzene	2019/07/04		88	%	70 - 130
			1,2-Dichlorobenzene	2019/07/04		88	%	70 - 130
			1,2,4-Trichlorobenzene	2019/07/04		82	%	70 - 130
			Hexachlorobutadiene	2019/07/04		75	%	70 - 130
			Hexane	2019/07/04		102	%	70 - 130
			Heptane	2019/07/04		97	%	70 - 130
			Cyclohexane	2019/07/04		102	%	70 - 130
			Tetrahydrofuran	2019/07/04		99	%	70 - 130
			1,4-Dioxane	2019/07/04		107	%	70 - 130
			Naphthalene	2019/07/04		84	%	70 - 130
			Total Xylenes	2019/07/04		95	%	70 - 130
			1,1,1,2-Tetrachloroethane	2019/07/04		99	%	70 - 130
			Vinyl Bromide	2019/07/04		99	%	70 - 130
			Propene	2019/07/04		95	%	70 - 130
			2,2,4-Trimethylpentane	2019/07/04		101	%	70 - 130
			Carbon Disulfide	2019/07/04		104	%	70 - 130
			Vinyl Acetate	2019/07/04		55 (1)	%	70 - 130

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

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BV Labs Job #: B9H4037
Report Date: 2019/07/09

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1923A

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Maureen Smith, Supervisor, Volatiles

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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EXXONMOBIL/IMPERIAL OIL - MAXXAM AIR CHAIN OF CUSTODY RECORD

Page 1 of 1

C of C # 80565

INVOICE INFORMATION

Company Name: ☒ Imperial Oil ☐ ExxonMobil
Contact Name: IOL Accounts Payable
Address: 102, 2535-3rd Ave SE
Calgary, AB T2A 7W5
Email: IOL_Accounts_Payable@golder.com
Ph: 403-299-5600
Sampler Name (Print): Jeremy Eckert

REPORT INFORMATION

Company Name: Golder Associates Ltd
Contact Name: Ian Sosney
Address: 110 Hannover Dr. #203
St. Catharines, ON L2S0A4
Email: ian_sosney@golder.com
Ph: 647-522-4698
Consultant Project #: 1791706-1155-1923A

ANALYSIS REQUESTED

	FIELD SAMPLE ID	Canister Serial #	Flow Regulator Serial #	Sample Collection DATE (YYYY/MM/DD)	Sample Collection TIME (24 HR)	Media Type (See Legend)	FLOW RATE (mL/min.)	LENGTH OF SAMPLING (minutes)	BTEX	~~Aromatic/Aliphatic Hydrocarbon Fractionation~~	F1 (C6-C10) - F2 (C10-C16)	VOC (T015)
1	Field Blank	1905	FX1121	2019/06/21	12:08	S	156	9	X	X	X	X
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												

IOL SITE LOCATION: 1660 Merivale Rd. Ottawa, ON

IOL PROJECT # (if applicable): NA

MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM: 1791706-1155-7777

REGULATORY CRITERIA / DETECTION LIMITS (PLEASE SPECIFY): N/A

SPECIAL INSTRUCTIONS: IES: A2601436
SAP: 8800162 7

LEGEND
S - Summa Can
T - Tedlar Bag
TB - Tedlar Bag
O - Other(Specify)
*TEMP N/A for SUMMA CAN

TURNAROUND TIME
Standard (10 days) ☒
Rush (9 days) ☐
(6 days) ☐
(3 days) ☐
Date Required

	YES	NO	COOLER ID #			
SEAL PRESENT		✓				
SEAL INTACT		✓	TEMP °C	1	2	3
COOLING MEDIA PRESENT		✓				

	YES	NO	COOLER ID #			
SEAL PRESENT						
SEAL INTACT			TEMP °C	1	2	3
COOLING MEDIA PRESENT						

	YES	NO	COOLER ID #			
SEAL PRESENT						
SEAL INTACT			TEMP °C	1	2	3
COOLING MEDIA PRESENT						

LAB USE ONLY
MAXXAM JOB # B9M4037

	RELINQUISHED BY:	DATE:	TIME (24 HR)	RECEIVED BY:	DATE:	TIME (24 HR)
1.	Jeremy Eckert	2019/06/21	14:00	1. Khushboo Kapoor (KHUSHBOO KAPOOR)	2019/06/25	10:04
2.				2.		
3.				3.		

SAMPLES
LABELED BY: KK4
VERIFIED BY: AKP

IOL COC-AIR-(04/2016) White: Maxxam Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: June 21, 2019

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Bureau Veritas Mississauga

Consultant Project Number: 1791706-1155

Sample Submission Number: B9H4037

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within
Extraction Surrogate Recovery			X	acceptance criteria.
Method Blank Concentration	X			
Matrix Duplicate RPD			X	
Matrix Spike Recovery			X	
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration		X		Field blank sample exceeded alert limits for 2-propanone.
Trip Blank Concentration			X	All field QC samples are within alert limits.
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	n/a

Is data considered to be reliable (Yes/No/Suspect)?: Suspect

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): Amanda Newberry

Date: July 12, 2019

Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1907
Your C.O.C. #: 727327-02-01

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2019/08/08
Report #: R5830842
Version: 2 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9L2439
Received: 2019/08/01, 10:35

Sample Matrix: Water
Samples Received: 8

Analyses	Quantity	Laboratory Method	Primary Reference
Petroleum Hydro. CCME F1 & BTEX in Water	8	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1)	8	CAM SOP-00316	CCME PHC-CWS m
F4G (CCME Hydrocarbons Gravimetric)	5	CAM SOP-00326	CCME PHC-CWS m
Dissolved Metals by ICPMS	8	CAM SOP-00447	EPA 6020B m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard. All samples were analyzed within hold time unless otherwise flagged.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas Laboratories conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following “Alberta Environment’s Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003”. Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1907
Your C.O.C. #: 727327-02-01

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2019/08/08
Report #: R5830842
Version: 2 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9L2439
Received: 2019/08/01, 10:35

Encryption Key

Patricia Legette
Project Manager
08 Aug 2019 15:39:10

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kyle Reinhart, Project Manager
Email: Kyle.Reinhart@bvlabs.com
Phone# (905)817-5802

==========

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

BV Labs Job #: B9L2439
Report Date: 2019/08/08

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1907

LEAD (DISSOLVED) IN WATER

BV Labs ID		KKL929	KKL930	KKL931	KKL932	KKL933	KKL934		
Sampling Date		2019/07/31 00:21	2019/07/31 01:06	2019/07/31 01:35	2019/07/31 02:23	2019/07/30 20:15	2019/07/30 20:47		
COC Number		727327-02-01	727327-02-01	727327-02-01	727327-02-01	727327-02-01	727327-02-01		
	UNITS	**TH11**	**TH101**	**TH102**	**TH100**	**TH8**	**TH9**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	0.81	3.2	2.8	<0.50	1.2	0.95	0.50	6259236

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

BV Labs ID		KKL935	KKL936		
Sampling Date		2019/07/30 20:47	2019/07/30 23:42		
COC Number		727327-02-01	727327-02-01		
	UNITS	**DUP A**	**MW16-01**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	0.91	0.71	0.50	6259236

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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BV Labs Job #: B9L2439
Report Date: 2019/08/08

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1907

O.REG 153 PHCS IN WATER (WATER)

BV Labs ID		KKL929		KKL930		KKL931	KKL932	KKL933		
Sampling Date		2019/07/31 00:21		2019/07/31 01:06		2019/07/31 01:35	2019/07/31 02:23	2019/07/30 20:15		
COC Number		727327-02-01		727327-02-01		727327-02-01	727327-02-01	727327-02-01		
	UNITS	**TH11**	**RDL**	**TH101**	**RDL**	**TH102**	**TH100**	**TH8**	**RDL**	**QC Batch**
Benzene	ug/L	16	0.20	73	4.0	4.5	<0.20	3.7	0.20	6262472
Toluene	ug/L	0.71	0.20	7.5	4.0	1.5	<0.20	<0.20	0.20	6262472
Ethylbenzene	ug/L	35	0.20	870	4.0	33	1.3	1.0	0.20	6262472
o-Xylene	ug/L	0.62	0.20	12	4.0	2.5	<0.20	<0.20	0.20	6262472
p+m-Xylene	ug/L	1.1	0.40	120	8.0	25	<0.40	<0.40	0.40	6262472
Total Xylenes	ug/L	1.7	0.40	130	8.0	27	<0.40	<0.40	0.40	6262472
F1 (C6-C10)	ug/L	1000	25	6200	500	560	<25	220	25	6262472
F1 (C6-C10) - BTEX	ug/L	960	25	5100	500	500	<25	220	25	6262472
F2 (C10-C16 Hydrocarbons)	ug/L	2600	100	1500	100	270	<100	<100	100	6263188
F3 (C16-C34 Hydrocarbons)	ug/L	2000	200	<200	200	<200	460	440	200	6263188
F4 (C34-C50 Hydrocarbons)	ug/L	1300	200	<200	200	<200	430	450	200	6263188
Reached Baseline at C50	ug/L	No		Yes		Yes	No	No		6263188
Extraction Surrogate Recovery (%)										
o-Terphenyl	%	100		107		108	104	108		6263188
Instrument Surrogate Recovery (%)										
1,4-Difluorobenzene	%	102		103		105	102	102		6262472
4-Bromofluorobenzene	%	101		101		100	99	99		6262472
D10-Ethylbenzene	%	89		90		93	89	89		6262472
D4-1,2-Dichloroethane	%	105		105		104	103	106		6262472

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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BV Labs Job #: B9L2439
Report Date: 2019/08/08

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1907

O.REG 153 PHCS IN WATER (WATER)

BV Labs ID		KKL934	KKL935	KKL936		
Sampling Date		2019/07/30 20:47	2019/07/30 20:47	2019/07/30 23:42		
COC Number		727327-02-01	727327-02-01	727327-02-01		
	UNITS	**TH9**	**DUP A**	**MW16-01**	**RDL**	**QC Batch**
Benzene	ug/L	0.81	0.84	110	0.20	6262472
Toluene	ug/L	<0.20	<0.20	0.57	0.20	6262472
Ethylbenzene	ug/L	2.5	2.6	41	0.20	6262472
o-Xylene	ug/L	<0.20	<0.20	<0.20	0.20	6262472
p+m-Xylene	ug/L	0.47	0.51	0.79	0.40	6262472
Total Xylenes	ug/L	0.47	0.51	0.79	0.40	6262472
F1 (C6-C10)	ug/L	54	67	620	25	6262472
F1 (C6-C10) - BTEX	ug/L	50	63	470	25	6262472
F2 (C10-C16 Hydrocarbons)	ug/L	<100	<100	140	100	6263188
F3 (C16-C34 Hydrocarbons)	ug/L	540	1200	<200	200	6263188
F4 (C34-C50 Hydrocarbons)	ug/L	510	1100	<200	200	6263188
Reached Baseline at C50	ug/L	No	No	Yes		6263188
Extraction Surrogate Recovery (%)						
o-Terphenyl	%	105	104	108		6263188
Instrument Surrogate Recovery (%)						
1,4-Difluorobenzene	%	102	103	102		6262472
4-Bromofluorobenzene	%	101	101	100		6262472
D10-Ethylbenzene	%	88	90	88		6262472
D4-1,2-Dichloroethane	%	104	104	107		6262472

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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BV Labs Job #: B9L2439
Report Date: 2019/08/08

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1907

PETROLEUM HYDROCARBONS (CCME)

BV Labs ID		KKL929	KKL932	KKL933	KKL934	KKL935		
Sampling Date		2019/07/31 00:21	2019/07/31 02:23	2019/07/30 20:15	2019/07/30 20:47	2019/07/30 20:47		
COC Number		727327-02-01	727327-02-01	727327-02-01	727327-02-01	727327-02-01		
	UNITS	**TH11**	**TH100**	**TH8**	**TH9**	**DUP A**	**RDL**	**QC Batch**
F4G-sg (Grav. Heavy Hydrocarbons)	ug/L	3800	1400	1500	1900	3000	500	6269011

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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BV Labs Job #: B9L2439
Report Date: 2019/08/08

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1907

TEST SUMMARY

BV Labs ID: KKL929
Sample ID: TH11
Matrix: Water

Collected: 2019/07/31
Relinquished: 2019/07/31
Received: 2019/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6262472	N/A	2019/08/06	Joe Paino
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6263188	2019/08/03	2019/08/06	Dorina Popa
F4G (CCME Hydrocarbons Gravimetric)	BAL	6269011	2019/08/08	2019/08/08	Francis Afonso
Dissolved Metals by ICPMS	ICP/MS	6259236	N/A	2019/08/02	Arefa Dabhad

BV Labs ID: KKL930
Sample ID: TH101
Matrix: Water

Collected: 2019/07/31
Relinquished: 2019/07/31
Received: 2019/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6262472	N/A	2019/08/03	Joe Paino
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6263188	2019/08/03	2019/08/06	Dorina Popa
Dissolved Metals by ICPMS	ICP/MS	6259236	N/A	2019/08/02	Arefa Dabhad

BV Labs ID: KKL931
Sample ID: TH102
Matrix: Water

Collected: 2019/07/31
Relinquished: 2019/07/31
Received: 2019/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6262472	N/A	2019/08/06	Joe Paino
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6263188	2019/08/03	2019/08/06	Dorina Popa
Dissolved Metals by ICPMS	ICP/MS	6259236	N/A	2019/08/02	Arefa Dabhad

BV Labs ID: KKL932
Sample ID: TH100
Matrix: Water

Collected: 2019/07/31
Relinquished: 2019/07/31
Received: 2019/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6262472	N/A	2019/08/03	Joe Paino
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6263188	2019/08/03	2019/08/06	Dorina Popa
F4G (CCME Hydrocarbons Gravimetric)	BAL	6269011	2019/08/08	2019/08/08	Francis Afonso
Dissolved Metals by ICPMS	ICP/MS	6259236	N/A	2019/08/02	Arefa Dabhad

BV Labs ID: KKL933
Sample ID: TH8
Matrix: Water

Collected: 2019/07/30
Relinquished: 2019/07/31
Received: 2019/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6262472	N/A	2019/08/06	Joe Paino
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6263188	2019/08/03	2019/08/06	Dorina Popa
F4G (CCME Hydrocarbons Gravimetric)	BAL	6269011	2019/08/08	2019/08/08	Francis Afonso
Dissolved Metals by ICPMS	ICP/MS	6259236	N/A	2019/08/02	Arefa Dabhad

BV Labs Job #: B9L2439
Report Date: 2019/08/08

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1907

TEST SUMMARY

BV Labs ID: KKL934
Sample ID: TH9
Matrix: Water

Collected: 2019/07/30
Relinquished: 2019/07/31
Received: 2019/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6262472	N/A	2019/08/03	Joe Paino
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6263188	2019/08/03	2019/08/06	Dorina Popa
F4G (CCME Hydrocarbons Gravimetric)	BAL	6269011	2019/08/08	2019/08/08	Francis Afonso
Dissolved Metals by ICPMS	ICP/MS	6259236	N/A	2019/08/02	Arefa Dabhad

BV Labs ID: KKL935
Sample ID: DUP A
Matrix: Water

Collected: 2019/07/30
Relinquished: 2019/07/31
Received: 2019/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6262472	N/A	2019/08/03	Joe Paino
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6263188	2019/08/03	2019/08/06	Dorina Popa
F4G (CCME Hydrocarbons Gravimetric)	BAL	6269011	2019/08/08	2019/08/08	Francis Afonso
Dissolved Metals by ICPMS	ICP/MS	6259236	N/A	2019/08/02	Arefa Dabhad

BV Labs ID: KKL936
Sample ID: MW16-01
Matrix: Water

Collected: 2019/07/30
Relinquished: 2019/07/31
Received: 2019/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6262472	N/A	2019/08/06	Joe Paino
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6263188	2019/08/03	2019/08/06	Dorina Popa
Dissolved Metals by ICPMS	ICP/MS	6259236	N/A	2019/08/02	Arefa Dabhad

BV Labs Job #: B9L2439
Report Date: 2019/08/08

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1907

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	0.7°C

F4 Gravimetric analysis included for samples TH11, TH100, TH8, TH9 and DUP A.

Results relate only to the items tested.

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BV Labs Job #: B9L2439
Report Date: 2019/08/08

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1907

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6259236	ADA	Method Blank	Dissolved Lead (Pb)	2019/08/02	<0.50		ug/L	
6262472	JP5	Method Blank	1,4-Difluorobenzene	2019/08/03		103	%	70 - 130
			4-Bromofluorobenzene	2019/08/03		99	%	70 - 130
			D10-Ethylbenzene	2019/08/03		88	%	70 - 130
			D4-1,2-Dichloroethane	2019/08/03		105	%	70 - 130
			Benzene	2019/08/03	<0.20		ug/L	
			Toluene	2019/08/03	<0.20		ug/L	
			Ethylbenzene	2019/08/03	<0.20		ug/L	
			o-Xylene	2019/08/03	<0.20		ug/L	
			p+m-Xylene	2019/08/03	<0.40		ug/L	
			Total Xylenes	2019/08/03	<0.40		ug/L	
			F1 (C6-C10)	2019/08/03	<25		ug/L	
			F1 (C6-C10) - BTEX	2019/08/03	<25		ug/L	
6263188	DPO	Method Blank	o-Terphenyl	2019/08/06		105	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2019/08/06	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2019/08/06	<200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2019/08/06	<200		ug/L	
6269011	FA	Method Blank	F4G-sg (Grav. Heavy Hydrocarbons)	2019/08/08	<500		ug/L	
6269011	FA	RPD	F4G-sg (Grav. Heavy Hydrocarbons)	2019/08/08	0		%	20
6259236	ADA	LCS	Dissolved Lead (Pb)	2019/08/02		97	%	80 - 120
6262472	JP5	LCS	1,4-Difluorobenzene	2019/08/03		104	%	70 - 130
			4-Bromofluorobenzene	2019/08/03		103	%	70 - 130
			D10-Ethylbenzene	2019/08/03		89	%	70 - 130
			D4-1,2-Dichloroethane	2019/08/03		105	%	70 - 130
			Benzene	2019/08/03		95	%	70 - 130
			Toluene	2019/08/03		93	%	70 - 130
			Ethylbenzene	2019/08/03		96	%	70 - 130
			o-Xylene	2019/08/03		94	%	70 - 130
			p+m-Xylene	2019/08/03		96	%	70 - 130
			F1 (C6-C10)	2019/08/03		104	%	70 - 130
6263188	DPO	LCS	o-Terphenyl	2019/08/06		113	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2019/08/06		98	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2019/08/06		104	%	60 - 130
			F4 (C34-C50 Hydrocarbons)	2019/08/06		113	%	60 - 130
6269011	FA	LCS	F4G-sg (Grav. Heavy Hydrocarbons)	2019/08/08		96	%	65 - 135

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

BV Labs Job #: B9L2439
Report Date: 2019/08/08

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1907

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Service Specialist

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Fax: (905) 817-5777
Toll Free: 800-563-6266

EXXONMOBIL/IMPERIAL OIL - BV LABS
CHAIN-OF-CUSTODY RECORD
ANALYSIS REQUESTED

Page 1 of 1
C of C # 727327-02-01
727327

INVOICE INFORMATION	REPORT INFORMATION
Company Name: Imperial Oil Ltd - Golder Associates Ltd	Company Name: Golder Associates Ltd
Contact Name: IOL Accounts Payable	Contact Name: Ian Sosney
Address: 102, 2535-3rd Avenue SE, Calgary AB T2A 7W5	Address: 110 Hanover Dr, Building A Suite 203, St. Catherines ON L2W 1A4
Email: IOLAccounts_Payable@golder.com	Email: Ian_Sosney@golder.com, IOL_1390@golder.co
Phone: (403) 299-5600	Phone: (905) 688-8217
Sampler Name (Print): Jeremy Eckert	Consultant Project #: 1791706-1155-1907

	FIELD SAMPLE ID	MATRIX: GROUND WATER	MATRIX: SURFACE WATER	MATRIX: SOIL	MATRIX: OTHER	# CONTAINERS	SAMPLING: DATE (YYYY/MM/DD)	SAMPLING: TIME (24 HR)	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	F1/BTEX	F2-F4	Lead
1	TH11	X				7	2019/07/31	00:21	X		X	X	X
2	TH101	X				7	2019/07/31	01:06	X		X	X	X
3	TH102	X				7	2019/07/31	01:35	X		X	X	X
4	TH100	X				7	2019/07/31	02:23	X		X	X	X
5	TH8	X				7	2019/07/30	20:15	X		X	X	X
6	TH9	X				7	2019/07/30	20:47	X		X	X	X
7	DUPA	X				7	2019/07/30	20:47	X		X	X	X
8	MW16-01	X				7	2019/07/30	23:42	X		X	X	X
9													
10													

IOL SITE LOCATION: 1660 Merivale Road, Ottawa, ON

IOL PROJECT # (if applicable): N/A

BV LABS TASK ORDER # OR SERVICE ORDER # + LINE ITEM: 1791706-1155-7777-

REGULATORY CRITERIA / DETECTION LIMITS:
[X] REG 153 Table 3 [ ] 2004 [X] 2011 [ ] RSC
(Please indicate which Reg. version and if RSC required)
[ ] ODWS [ ] PWQO
[ ] Other

SPECIAL INSTRUCTIONS:
IES: A2601436
SAP: 88001627
* samples may contain headspace and/or sediment

JARS USED AND NOT SUBMITTED
Enter N/A for Water: N/A

TURNAROUND TIME
Standard (5 days) [ ]
Rush (3 days) [X]
(2 days) [ ]
(1 day) [ ]
(same day) [ ]
Date Required

	YES	NO	COOLER ID: 1				YES	NO	COOLER ID:				YES	NO	COOLER ID:			
SEAL PRESENT	✓		TEMP °C	0	1	1	SEAL PRESENT			TEMP °C			SEAL PRESENT			TEMP °C		
SEAL INTACT	✓			1	2	3	SEAL INTACT				1	2	3	SEAL INTACT			1	2	3
COOLING MEDIA PRESENT	✓						COOLING MEDIA PRESENT							COOLING MEDIA PRESENT				

* RELINQUISHED BY:		DATE:	TIME (24 HR)	RECEIVED BY:		DATE:	TIME (24 HR)
1. [signature]	Jeremy Eckert	2019/07/31	1400	1. [signature]	MARK FERRER	2019/08/01	10:35
2.				2.			
3.				3.			

LAB USE ONLY
BV LABS JOB #: B9L2439
SAMPLES
LABELED BY: J-L
VERIFIED BY: FCN

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BV LABS' STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVLABS.COM/TERMS-AND-CONDITIONS.

COC – 1012 (2016) IOL – ON White: BV Labs Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: July 30 and 31, 2019

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Bureau Veritas Mississauga

Consultant Project Number: 1791706-1155

Sample Submission Number: B9L2439

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within
Extraction Surrogate Recovery	X			acceptance criteria.
Method Blank Concentration	X			
Matrix Duplicate RPD	X			
Matrix Spike Recovery			X	
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	All field QC samples are within
Trip Blank Concentration			X	alert limits.
Field Duplicate RPD	X			

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): Amanda Newberry

Date: August 12, 2019

Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1907
Your C.O.C. #: 727327-01-01

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2019/08/09
Report #: R5831762
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9L2700
Received: 2019/08/01, 10:35

Sample Matrix: Water
Samples Received: 5

Analyses	Quantity	Laboratory Method	Primary Reference
Petroleum Hydro. CCME F1 & BTEX in Water	5	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1)	5	CAM SOP-00316	CCME PHC-CWS m
F4G (CCME Hydrocarbons Gravimetric)	1	CAM SOP-00326	CCME PHC-CWS m
Dissolved Metals by ICPMS	5	CAM SOP-00447	EPA 6020B m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard. All samples were analyzed within hold time unless otherwise flagged.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas Laboratories conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following “Alberta Environment’s Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003”. Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1907
Your C.O.C. #: 727327-01-01

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2019/08/09
Report #: R5831762
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9L2700
Received: 2019/08/01, 10:35

Encryption Key

Patricia Legette
Project Manager
09 Aug 2019 10:24:04

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kyle Reinhart, Project Manager
Email: Kyle.Reinhart@bvlabs.com
Phone# (905)817-5802

==========

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

BV Labs Job #: B9L2700
Report Date: 2019/08/09

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1907

LEAD (DISSOLVED) IN WATER

BV Labs ID		KKN233	KKN234	KKN235	KKN236	KKN236	KKN237		
Sampling Date		2019/07/30 16:48	2019/07/29 15:59	2019/07/29 13:20	2019/07/29 15:17	2019/07/29 15:17	2019/07/29 14:21		
COC Number		727327-01-01	727327-01-01	727327-01-01	727327-01-01	727327-01-01	727327-01-01		
	UNITS	**TH1**	**TH6**	**MW15-01**	**TH7**	**TH7 Lab-Dup**	**MW15-02**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6261256

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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BV Labs Job #: B9L2700
Report Date: 2019/08/09

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1907

O.REG 153 PHCS IN WATER (WATER)

BV Labs ID		KKN233	KKN234	KKN235	KKN236	KKN237		
Sampling Date		2019/07/30 16:48	2019/07/29 15:59	2019/07/29 13:20	2019/07/29 15:17	2019/07/29 14:21		
COC Number		727327-01-01	727327-01-01	727327-01-01	727327-01-01	727327-01-01		
	UNITS	**TH1**	**TH6**	**MW15-01**	**TH7**	**MW15-02**	**RDL**	**QC Batch**
Benzene	ug/L	<0.20	<0.20	<0.20	46	1.7	0.20	6263354
Toluene	ug/L	<0.20	<0.20	<0.20	1.4	<0.20	0.20	6263354
Ethylbenzene	ug/L	<0.20	<0.20	<0.20	43	<0.20	0.20	6263354
o-Xylene	ug/L	<0.20	<0.20	<0.20	0.52	<0.20	0.20	6263354
p+m-Xylene	ug/L	<0.40	<0.40	<0.40	2.0	<0.40	0.40	6263354
Total Xylenes	ug/L	<0.40	<0.40	<0.40	2.5	<0.40	0.40	6263354
F1 (C6-C10)	ug/L	<25	<25	<25	490	<25	25	6263354
F1 (C6-C10) - BTEX	ug/L	<25	<25	<25	400	<25	25	6263354
F2 (C10-C16 Hydrocarbons)	ug/L	<100	<100	<100	110	<100	100	6265385
F3 (C16-C34 Hydrocarbons)	ug/L	350	<200	<200	<200	<200	200	6265385
F4 (C34-C50 Hydrocarbons)	ug/L	440	<200	<200	<200	<200	200	6265385
Reached Baseline at C50	ug/L	No	Yes	Yes	Yes	Yes		6265385
Extraction Surrogate Recovery (%)								
o-Terphenyl	%	105	107	105	105	107		6265385
Instrument Surrogate Recovery (%)								
1,4-Difluorobenzene	%	104	106	107	103	104		6263354
4-Bromofluorobenzene	%	98	97	97	98	98		6263354
D10-Ethylbenzene	%	90	92	91	88	90		6263354
D4-1,2-Dichloroethane	%	95	93	94	95	94		6263354

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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PETROLEUM HYDROCARBONS (CCME)

BV Labs ID		KKN233		
Sampling Date		2019/07/30 16:48		
COC Number		727327-01-01		
	UNITS	**TH1**	**RDL**	**QC Batch**
F4G-sg (Grav. Heavy Hydrocarbons)	ug/L	1400	500	6269011

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

BV Labs Job #: B9L2700
Report Date: 2019/08/09

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1907

TEST SUMMARY

BV Labs ID: KKN233
Sample ID: TH1
Matrix: Water

Collected: 2019/07/30
Relinquished: 2019/07/31
Received: 2019/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6263354	N/A	2019/08/04	Abdi Mohamud
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6265385	2019/08/06	2019/08/07	Prabhjot Gulati
F4G (CCME Hydrocarbons Gravimetric)	BAL	6269011	2019/08/08	2019/08/08	Francis Afonso
Dissolved Metals by ICPMS	ICP/MS	6261256	N/A	2019/08/06	Prempal Bhatti

BV Labs ID: KKN234
Sample ID: TH6
Matrix: Water

Collected: 2019/07/29
Relinquished: 2019/07/31
Received: 2019/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6263354	N/A	2019/08/04	Abdi Mohamud
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6265385	2019/08/06	2019/08/07	Prabhjot Gulati
Dissolved Metals by ICPMS	ICP/MS	6261256	N/A	2019/08/06	Prempal Bhatti

BV Labs ID: KKN235
Sample ID: MW15-01
Matrix: Water

Collected: 2019/07/29
Relinquished: 2019/07/31
Received: 2019/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6263354	N/A	2019/08/04	Abdi Mohamud
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6265385	2019/08/06	2019/08/07	Prabhjot Gulati
Dissolved Metals by ICPMS	ICP/MS	6261256	N/A	2019/08/06	Prempal Bhatti

BV Labs ID: KKN236
Sample ID: TH7
Matrix: Water

Collected: 2019/07/29
Relinquished: 2019/07/31
Received: 2019/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6263354	N/A	2019/08/06	Abdi Mohamud
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6265385	2019/08/06	2019/08/07	Prabhjot Gulati
Dissolved Metals by ICPMS	ICP/MS	6261256	N/A	2019/08/06	Prempal Bhatti

BV Labs ID: KKN236 Dup
Sample ID: TH7
Matrix: Water

Collected: 2019/07/29
Relinquished: 2019/07/31
Received: 2019/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Metals by ICPMS	ICP/MS	6261256	N/A	2019/08/06	Prempal Bhatti

BV Labs ID: KKN237
Sample ID: MW15-02
Matrix: Water

Collected: 2019/07/29
Relinquished: 2019/07/31
Received: 2019/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6263354	N/A	2019/08/04	Abdi Mohamud

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BV Labs Job #: B9L2700
Report Date: 2019/08/09

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1907

TEST SUMMARY

BV Labs ID: KKN237
Sample ID: MW15-02
Matrix: Water

Collected: 2019/07/29
Relinquished: 2019/07/31
Received: 2019/08/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6265385	2019/08/06	2019/08/07	Prabhjot Gulati
Dissolved Metals by ICPMS	ICP/MS	6261256	N/A	2019/08/06	Prempal Bhatti

BV Labs Job #: B9L2700
Report Date: 2019/08/09

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1907

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	4.3°C

Results relate only to the items tested.

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BV Labs Job #: B9L2700
Report Date: 2019/08/09

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1907

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6261256	PBA	Method Blank	Dissolved Lead (Pb)	2019/08/06	<0.50		ug/L	
6263354	ABD	Method Blank	1,4-Difluorobenzene	2019/08/03		105	%	70 - 130
			4-Bromofluorobenzene	2019/08/03		98	%	70 - 130
			D10-Ethylbenzene	2019/08/03		88	%	70 - 130
			D4-1,2-Dichloroethane	2019/08/03		95	%	70 - 130
			Benzene	2019/08/03	<0.20		ug/L	
			Toluene	2019/08/03	<0.20		ug/L	
			Ethylbenzene	2019/08/03	<0.20		ug/L	
			o-Xylene	2019/08/03	<0.20		ug/L	
			p+m-Xylene	2019/08/03	<0.40		ug/L	
			Total Xylenes	2019/08/03	<0.40		ug/L	
			F1 (C6-C10)	2019/08/03	<25		ug/L	
			F1 (C6-C10) - BTEX	2019/08/03	<25		ug/L	
6265385	GUL	Method Blank	o-Terphenyl	2019/08/07		108	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2019/08/07	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2019/08/07	<200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2019/08/07	<200		ug/L	
6269011	FA	Method Blank	F4G-sg (Grav. Heavy Hydrocarbons)	2019/08/08	<500		ug/L	
6269011	FA	RPD	F4G-sg (Grav. Heavy Hydrocarbons)	2019/08/08	0		%	20
6261256	PBA	RPD [KKN236-01]	Dissolved Lead (Pb)	2019/08/06	NC		%	20
6261256	PBA	Matrix Spike [KKN236-01]	Dissolved Lead (Pb)	2019/08/06		96	%	80 - 120
6261256	PBA	LCS	Dissolved Lead (Pb)	2019/08/06		97	%	80 - 120
6263354	ABD	LCS	1,4-Difluorobenzene	2019/08/03		105	%	70 - 130
			4-Bromofluorobenzene	2019/08/03		100	%	70 - 130
			D10-Ethylbenzene	2019/08/03		91	%	70 - 130
			D4-1,2-Dichloroethane	2019/08/03		96	%	70 - 130
			Benzene	2019/08/03		97	%	70 - 130
			Toluene	2019/08/03		96	%	70 - 130
			Ethylbenzene	2019/08/03		95	%	70 - 130
			o-Xylene	2019/08/03		93	%	70 - 130
			p+m-Xylene	2019/08/03		95	%	70 - 130
			F1 (C6-C10)	2019/08/03		103	%	70 - 130
6265385	GUL	LCS	o-Terphenyl	2019/08/07		111	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2019/08/07		111	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2019/08/07		117	%	60 - 130
			F4 (C34-C50 Hydrocarbons)	2019/08/07		121	%	60 - 130
6269011	FA	LCS	F4G-sg (Grav. Heavy Hydrocarbons)	2019/08/08		96	%	65 - 135

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

BV Labs Job #: B9L2700
Report Date: 2019/08/09

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1907

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Service Specialist

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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BUREAU VERITAS

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Fax: (905) 817-5777
Toll Free: 800-563-6266

EXXONMOBIL/IMPERIAL OIL - BV LABS
CHAIN-OF-CUSTODY RECORD
ANALYSIS REQUESTED

C of C # 727327-01-01

727327

INVOICE INFORMATION	REPORT INFORMATION
Company Name: Imperial Oil Ltd - Golder Associates Ltd	Company Name: Golder Associates Ltd
Contact Name: IOL Accounts Payable	Contact Name: Ian Sosnev
Address: 102, 2535-3rd Avenue SE Calgary AB T2A 7W5	Address: 110 Hanover Dr, Building A Suite 203 St. Catherines ON L2W 1A4
Email: IOLAccounts_Payable@golder.com	Email: Ian_Sosney@golder.com, IOL_1390@golder.co
Phone: (403) 299-5600	Phone: (905) 688-8217
Sampler Name (Print): Jeremy EcKert	Consultant Project #: 1791706-1155-1907

	FIELD SAMPLE ID	MATRIX: GROUND WATER	MATRIX: SURFACE WATER	MATRIX: SOIL	MATRIX: OTHER	# CONTAINERS	SAMPLING: DATE (YYYY/MM/DD)	SAMPLING: TIME (24 HR)	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	F1/BTEX	F2-F4	Lead
1	TH1	X				7	2019/07/30	1648	X		X	X	X
2	TH6	X				7	2019/07/29	1559	X		X	X	X
3	MW15-01	X				7	2019/07/29	1320	X		X	X	X
4	TH7	X				7	2019/07/29	1517	X		X	X	X
5	MW15-02	X				7	2019/07/29	1421	X		X	X	X
6													
7													
8													
9													
10													

IOL SITE LOCATION: 1660 Merivale Road, Ottawa, ON

IOL PROJECT # (if applicable): N/A

BV LABS TASK ORDER # OR SERVICE ORDER # + LINE ITEM: 1791706-1155-7777-

REGULATORY CRITERIA / DETECTION LIMITS:
☒ REG 153 Table 3 ☐ 2004 ☒ 2011 ☐ RSC
(Please indicate which Reg. version and if RSC required)
☐ ODWS ☐ PWQO
☐ Other

SPECIAL INSTRUCTIONS:
iES: A2601436
SAP: 8800162?
* samples may contain headspace and/or sediment

JARS USED AND NOT SUBMITTED Enter N/A for Water: N/A

TURNAROUND TIME
Standard (5 days) ☒
Rush (3 days) ☐
(2 days) ☐
(1 day) ☐
(same day) ☐
Date Required

	YES	NO	COOLER ID: 1			YES	NO	COOLER ID:			YES	NO	COOLER ID:		
SEAL PRESENT	V														
SEAL INTACT	V														
COOLING MEDIA PRESENT	V														
TEMP °C			4	5	4										
			1	2	3			1	2	3			1	2	3

LAB USE ONLY
BV LABS JOB # B9L2760

SAMPLES
LABELED BY: KVG
VERIFIED BY: FCN

* RELINQUISHED BY:		DATE:	TIME (24 HR)	RECEIVED BY:		DATE:	TIME (24 HR)
1.	Jeremy EcKert	2019/07/31	1400	1.	[illegible]	2019/08/01	10:35
2.				2.			
3.				3.			

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BV LABS' STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVLABS.COM/TERMS-AND-CONDITIONS.

COC – 1012 (2016) IOL – ON White: BV Labs Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: July 29 and 30, 2019

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Bureau Veritas Mississauga

Consultant Project Number: 1791706-1555

Sample Submission Number: B9L2700

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within
Extraction Surrogate Recovery	X			acceptance criteria.
Method Blank Concentration	X			
Matrix Duplicate RPD	X			
Matrix Spike Recovery	X			
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	No field QC samples were collected.
Trip Blank Concentration			X	
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): Amanda Newberry

Date: August 12, 2019

Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1907
Your C.O.C. #: 727327-03-01

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2019/08/13
Report #: R5836845
Version: 2 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9L4405
Received: 2019/08/02, 10:20

Sample Matrix: Water
Samples Received: 2

Analyses	Quantity	Laboratory Method	Primary Reference
Petroleum Hydro. CCME F1 & BTEX in Water	2	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1)	1	CAM SOP-00316	CCME PHC-CWS m
Dissolved Metals by ICPMS	2	CAM SOP-00447	EPA 6020B m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard. All samples were analyzed within hold time unless otherwise flagged.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas Laboratories conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following “Alberta Environment’s Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003”. Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1907
Your C.O.C. #: 727327-03-01

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2019/08/13
Report #: R5836845
Version: 2 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9L4405
Received: 2019/08/02, 10:20

Encryption Key

Kyle Reinhart
Project Manager
13 Aug 2019 14:37:06

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kyle Reinhart, Project Manager
Email: Kyle.Reinhart@bvlabs.com
Phone# (905)817-5802

==========

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BV Labs Job #: B9L4405
Report Date: 2019/08/13

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1907

LEAD (DISSOLVED) IN WATER

BV Labs ID		KKW280	KKW281		
Sampling Date		2019/07/31 18:15	2019/07/31 18:30		
COC Number		727327-03-01	727327-03-01		
	UNITS	**FIELD BLANK**	**TRIP BLANK**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	<0.50	<0.50	0.50	6263446

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1907

O.REG 153 PHCS IN WATER (WATER)

BV Labs ID		KKW280		
Sampling Date		2019/07/31 18:15		
COC Number		727327-03-01		
	UNITS	**FIELD BLANK**	**RDL**	**QC Batch**
Benzene	ug/L	<0.20	0.20	6265504
Toluene	ug/L	<0.20	0.20	6265504
Ethylbenzene	ug/L	<0.20	0.20	6265504
o-Xylene	ug/L	<0.20	0.20	6265504
p+m-Xylene	ug/L	<0.40	0.40	6265504
Total Xylenes	ug/L	<0.40	0.40	6265504
F1 (C6-C10)	ug/L	<25	25	6265504
F1 (C6-C10) - BTEX	ug/L	<25	25	6265504
F2 (C10-C16 Hydrocarbons)	ug/L	<100	100	6267136
F3 (C16-C34 Hydrocarbons)	ug/L	<240 (1)	240	6267136
F4 (C34-C50 Hydrocarbons)	ug/L	<200	200	6267136
Reached Baseline at C50	ug/L	Yes		6267136
Extraction Surrogate Recovery (%)				
o-Terphenyl	%	107		6267136
Instrument Surrogate Recovery (%)				
1,4-Difluorobenzene	%	103		6265504
4-Bromofluorobenzene	%	98		6265504
D10-Ethylbenzene	%	88		6265504
D4-1,2-Dichloroethane	%	96		6265504

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Elevated RDL due to background contamination.

PETROLEUM HYDROCARBONS (CCME)

BV Labs ID		KKW281		
Sampling Date		2019/07/31 18:30		
COC Number		727327-03-01		
	UNITS	**TRIP BLANK**	**RDL**	**QC Batch**
Benzene	ug/L	<0.20	0.20	6265504
Toluene	ug/L	<0.20	0.20	6265504
Ethylbenzene	ug/L	<0.20	0.20	6265504
o-Xylene	ug/L	<0.20	0.20	6265504
p+m-Xylene	ug/L	<0.40	0.40	6265504
Total Xylenes	ug/L	<0.40	0.40	6265504
F1 (C6-C10)	ug/L	<25	25	6265504
F1 (C6-C10) - BTEX	ug/L	<25	25	6265504
Instrument Surrogate Recovery (%)				
1,4-Difluorobenzene	%	105		6265504
4-Bromofluorobenzene	%	99		6265504
D10-Ethylbenzene	%	89		6265504
D4-1,2-Dichloroethane	%	96		6265504

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

BV Labs Job #: B9L4405
Report Date: 2019/08/13

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1907

TEST SUMMARY

BV Labs ID: KKW280
Sample ID: FIELD BLANK
Matrix: Water

Collected: 2019/07/31
Relinquished: 2019/08/01
Received: 2019/08/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6265504	N/A	2019/08/07	Ravinder Gaidhu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6267136	2019/08/07	2019/08/08	Prabhjot Gulati
Dissolved Metals by ICPMS	ICP/MS	6263446	N/A	2019/08/12	Prempal Bhatti

BV Labs ID: KKW281
Sample ID: TRIP BLANK
Matrix: Water

Collected: 2019/07/31
Relinquished: 2019/08/01
Received: 2019/08/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6265504	N/A	2019/08/07	Ravinder Gaidhu
Dissolved Metals by ICPMS	ICP/MS	6263446	N/A	2019/08/12	Prempal Bhatti

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BV Labs Job #: B9L4405
Report Date: 2019/08/13

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1907

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	1.7°C

Note: Analysis requirements unclear/absent. F2-F4 analysis requested on the COC for Trip Blank sample but the appropriate bottle was not received. Unable to complete the F2-F4 analysis on the trip blank.

Results relate only to the items tested.

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BV Labs Job #: B9L4405
Report Date: 2019/08/13

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1907

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6263446	PBA	Method Blank	Dissolved Lead (Pb)	2019/08/12	<0.50		ug/L	
6265504	RGA	Method Blank	1,4-Difluorobenzene	2019/08/07		104	%	70 - 130
			4-Bromofluorobenzene	2019/08/07		99	%	70 - 130
			D10-Ethylbenzene	2019/08/07		88	%	70 - 130
			D4-1,2-Dichloroethane	2019/08/07		97	%	70 - 130
			Benzene	2019/08/07	<0.20		ug/L	
			Toluene	2019/08/07	<0.20		ug/L	
			Ethylbenzene	2019/08/07	<0.20		ug/L	
			o-Xylene	2019/08/07	<0.20		ug/L	
			p+m-Xylene	2019/08/07	<0.40		ug/L	
			Total Xylenes	2019/08/07	<0.40		ug/L	
			F1 (C6-C10)	2019/08/07	<25		ug/L	
			F1 (C6-C10) - BTEX	2019/08/07	<25		ug/L	
6267136	GUL	Method Blank	o-Terphenyl	2019/08/08		109	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2019/08/08	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2019/08/08	<240 (1)		ug/L	
			F4 (C34-C50 Hydrocarbons)	2019/08/08	<200		ug/L	
6263446	PBA	LCS	Dissolved Lead (Pb)	2019/08/12		98	%	80 - 120
6265504	RGA	LCS	1,4-Difluorobenzene	2019/08/07		105	%	70 - 130
			4-Bromofluorobenzene	2019/08/07		99	%	70 - 130
			D10-Ethylbenzene	2019/08/07		87	%	70 - 130
			D4-1,2-Dichloroethane	2019/08/07		95	%	70 - 130
			Benzene	2019/08/07		93	%	70 - 130
			Toluene	2019/08/07		92	%	70 - 130
			Ethylbenzene	2019/08/07		90	%	70 - 130
			o-Xylene	2019/08/07		89	%	70 - 130
			p+m-Xylene	2019/08/07		90	%	70 - 130
			F1 (C6-C10)	2019/08/07		103	%	70 - 130
6267136	GUL	LCS	o-Terphenyl	2019/08/08		114	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2019/08/08		107	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2019/08/08		127	%	60 - 130
			F4 (C34-C50 Hydrocarbons)	2019/08/08		125	%	60 - 130

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

(1) Elevated RDL due to background contamination.

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BV Labs Job #: B9L4405
Report Date: 2019/08/13

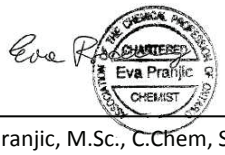
Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1907

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Service Specialist



Ewa Pranjic, M.Sc., C.Chem, Scientific Specialist

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Fax: (905) 817-5777
Toll Free: 800-563-6266

EXXONMOBIL/IMPERIAL OIL - BV LABS
CHAIN-OF-CUSTODY RECORD
ANALYSIS REQUESTED

Page 1 of 1
C of C # 727327-03-01
727327

INVOICE INFORMATION	REPORT INFORMATION
Company Name: Imperial Oil Ltd - Golder Associates Ltd	Company Name: Golder Associates Ltd
Contact Name: IOL Accounts Payable	Contact Name: Ian Sosnev
Address: 102, 2535-3rd Avenue SE Calgary AB T2A 7W5	Address: 110 Hanover Dr, Building A Suite 203 St. Catherines ON L2W 1A4
Email: IOLAccounts_Payable@golder.com	Email: Ian_Sosney@golder.com, IOL_1390@golder.co
Phone: (403) 299-5600	Phone: (905) 688-8217
Sampler Name (Print): Jeremy Eckert	Consultant Project #: 1791706-1155-1907

	FIELD SAMPLE ID	MATRIX: GROUND WATER	SURFACE WATER	SOIL	OTHER	# CONTAINERS	SAMPLING: DATE (YYYY/MM/DD)	TIME (24 HR)	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	F1/BTEX	F2-F4	Lead
1	Field Blank				X	7	2019/07/31	18:15			X	X	X
2	Trip Blank				X	5	↓	18:30			X	X	X
3													
4													
5													
6													
7													
8													
9													
10													

IOL SITE LOCATION:
1660 Merivale Road, Ottawa, ON

IOL PROJECT # (if applicable):
N/A

BV LABS TASK ORDER # OR SERVICE ORDER # + LINE ITEM:
1791706-1155-7777-

REGULATORY CRITERIA / DETECTION LIMITS:
[X] REG 153 Table 3 [ ] 2004 [X] 2011 [ ] RSC
(Please indicate which Reg. version and if RSC required)
[ ] ODWS [ ] PWQO
[ ] Other

SPECIAL INSTRUCTIONS:
IES: A2601436
SAP: 88001627
samples may contain headspace and/or sediment

JARS USED AND NOT SUBMITTED
Enter N/A for Water
N/A

TURNAROUND TIME
Standard (5 days) [X]
Rush (3 days) [ ]
(2 days) [ ]
(1 day) [ ]
(same day) [ ]
Date Required

	YES	NO	COOLER ID: 1					YES	NO	COOLER ID:					YES	NO	COOLER ID:			
SEAL PRESENT	V		TEMP °C	2	1	2	SEAL PRESENT			TEMP °C	1	2	3	SEAL PRESENT			TEMP °C	1	2	3
SEAL INTACT	V			1	2	3	SEAL INTACT							SEAL INTACT						
COOLING MEDIA PRESENT	V						COOLING MEDIA PRESENT							COOLING MEDIA PRESENT						

* RELINQUISHED BY:		DATE:	TIME (24 HR)	RECEIVED BY:		DATE:	TIME (24 HR)
1. [signature]	Jeremy Eckert	2019/08/01	09:00	1. [signature]	GYUESHEN TDRIZ	2019/08/02	10:20
2.				2.			
3.				3.			

LAB USE ONLY
BV LABS JOB # B9L4405
SAMPLES
LABELED BY: URG
VERIFIED BY: KWG

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BV LABS' STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVLABS.COM/TERMS-AND-CONDITIONS.

COC – 1012 (2016) IOL – ON White: BV Labs Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: July 31, 2019

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Bureau Veritas Mississauga

Consultant Project Number: 1791706-1155

Sample Submission Number: B9L4405

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within
Extraction Surrogate Recovery	X			acceptance criteria.
Method Blank Concentration	X			
Matrix Duplicate RPD			X	
Matrix Spike Recovery			X	
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration	X			All field QC samples are within
Trip Blank Concentration	X			alert limits.
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): Amanda Newberry

Date: August 19, 2019

Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1907
Your C.O.C. #: 727327-04-01

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2019/08/13
Report #: R5836847
Version: 2 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9L4415
Received: 2019/08/02, 10:20

Sample Matrix: Water
Samples Received: 5

Analyses	Quantity	Laboratory Method	Primary Reference
Petroleum Hydro. CCME F1 & BTEX in Water	5	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1)	5	CAM SOP-00316	CCME PHC-CWS m
Dissolved Metals by ICPMS	5	CAM SOP-00447	EPA 6020B m

Remarks:

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All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard. All samples were analyzed within hold time unless otherwise flagged.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.
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Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas Laboratories conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following “Alberta Environment’s Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003”. Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1907
Your C.O.C. #: 727327-04-01

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2019/08/13
Report #: R5836847
Version: 2 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9L4415
Received: 2019/08/02, 10:20

Encryption Key

Kyle Reinhart
Project Manager
13 Aug 2019 14:33:43

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kyle Reinhart, Project Manager
Email: Kyle.Reinhart@bvlabs.com
Phone# (905)817-5802

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BV Labs Job #: B9L4415
Report Date: 2019/08/13

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1907

LEAD (DISSOLVED) IN WATER

BV Labs ID		KKW306	KKW307	KKW308	KKW309	KKW310		
Sampling Date		2019/07/31 15:55	2019/07/31 16:32	2019/07/31 16:58	2019/07/31 18:10	2019/07/31 18:10		
COC Number		727327-04-01	727327-04-01	727327-04-01	727327-04-01	727327-04-01		
	UNITS	**TH2**	**TH3**	**TH4**	**TH5**	**DUPB**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	<0.50	2.2	12	8.4	8.3	0.50	6263446

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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BV Labs Job #: B9L4415
Report Date: 2019/08/13

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1907

O.REG 153 PHCS IN WATER (WATER)

BV Labs ID		KKW306	KKW307	KKW308		KKW309	KKW310		
Sampling Date		2019/07/31 15:55	2019/07/31 16:32	2019/07/31 16:58		2019/07/31 18:10	2019/07/31 18:10		
COC Number		727327-04-01	727327-04-01	727327-04-01		727327-04-01	727327-04-01		
	UNITS	**TH2**	**TH3**	**TH4**	**RDL**	**TH5**	**DUPB**	**RDL**	**QC Batch**
Benzene	ug/L	<0.20	18	36	0.20	380	380	4.0	6267452
Toluene	ug/L	<0.20	<0.20	1.9	0.20	24	26	4.0	6267452
Ethylbenzene	ug/L	<0.20	26	41	0.20	910	940	4.0	6267452
o-Xylene	ug/L	<0.20	0.26	5.0	0.20	37	39	4.0	6267452
p+m-Xylene	ug/L	<0.40	1.8	260	0.40	2800	2800	8.0	6267452
Total Xylenes	ug/L	<0.40	2.1	270	0.40	2800	2900	8.0	6267452
F1 (C6-C10)	ug/L	<25	430	1900	25	9700	9900	500	6267452
F1 (C6-C10) - BTEX	ug/L	<25	380	1500	25	5600	5700	500	6267452
F2 (C10-C16 Hydrocarbons)	ug/L	<100	120	1400	100	5400	4100	100	6266745
F3 (C16-C34 Hydrocarbons)	ug/L	250	<200	280	200	350	290	200	6266745
F4 (C34-C50 Hydrocarbons)	ug/L	<200	<200	<200	200	<200	<200	200	6266745
Reached Baseline at C50	ug/L	Yes	Yes	Yes		Yes	Yes		6266745
Extraction Surrogate Recovery (%)									
o-Terphenyl	%	96	99	99		103	101		6266745
Instrument Surrogate Recovery (%)									
1,4-Difluorobenzene	%	103	105	103		103	104		6267452
4-Bromofluorobenzene	%	97	100	103		102	102		6267452
D10-Ethylbenzene	%	89	89	89		89	89		6267452
D4-1,2-Dichloroethane	%	104	105	108		105	107		6267452

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

BV Labs Job #: B9L4415
Report Date: 2019/08/13

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1907

TEST SUMMARY

BV Labs ID: KKW306
Sample ID: TH2
Matrix: Water

Collected: 2019/07/31
Relinquished: 2019/08/01
Received: 2019/08/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6267452	N/A	2019/08/07	Anca Ganea
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6266745	2019/08/07	2019/08/08	Prabhjot Gulati
Dissolved Metals by ICPMS	ICP/MS	6263446	N/A	2019/08/12	Prempal Bhatti

BV Labs ID: KKW307
Sample ID: TH3
Matrix: Water

Collected: 2019/07/31
Relinquished: 2019/08/01
Received: 2019/08/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6267452	N/A	2019/08/08	Anca Ganea
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6266745	2019/08/07	2019/08/08	Prabhjot Gulati
Dissolved Metals by ICPMS	ICP/MS	6263446	N/A	2019/08/12	Prempal Bhatti

BV Labs ID: KKW308
Sample ID: TH4
Matrix: Water

Collected: 2019/07/31
Relinquished: 2019/08/01
Received: 2019/08/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6267452	N/A	2019/08/08	Anca Ganea
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6266745	2019/08/07	2019/08/08	Prabhjot Gulati
Dissolved Metals by ICPMS	ICP/MS	6263446	N/A	2019/08/13	Prempal Bhatti

BV Labs ID: KKW309
Sample ID: TH5
Matrix: Water

Collected: 2019/07/31
Relinquished: 2019/08/01
Received: 2019/08/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6267452	N/A	2019/08/08	Anca Ganea
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6266745	2019/08/07	2019/08/08	Prabhjot Gulati
Dissolved Metals by ICPMS	ICP/MS	6263446	N/A	2019/08/13	Prempal Bhatti

BV Labs ID: KKW310
Sample ID: DUPB
Matrix: Water

Collected: 2019/07/31
Relinquished: 2019/08/01
Received: 2019/08/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6267452	N/A	2019/08/08	Anca Ganea
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6266745	2019/08/07	2019/08/08	Prabhjot Gulati
Dissolved Metals by ICPMS	ICP/MS	6263446	N/A	2019/08/12	Prempal Bhatti

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	1.7°C

Results relate only to the items tested.

BV Labs Job #: B9L4415
Report Date: 2019/08/13

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1907

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6263446	PBA	Method Blank	Dissolved Lead (Pb)	2019/08/12	<0.50		ug/L	
6266745	GUL	Method Blank	o-Terphenyl	2019/08/08		101	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2019/08/08	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2019/08/08	<200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2019/08/08	<200		ug/L	
6267452	AGA	Method Blank	1,4-Difluorobenzene	2019/08/07		104	%	70 - 130
			4-Bromofluorobenzene	2019/08/07		97	%	70 - 130
			D10-Ethylbenzene	2019/08/07		88	%	70 - 130
			D4-1,2-Dichloroethane	2019/08/07		104	%	70 - 130
			Benzene	2019/08/07	<0.20		ug/L	
			Toluene	2019/08/07	<0.20		ug/L	
			Ethylbenzene	2019/08/07	<0.20		ug/L	
			o-Xylene	2019/08/07	<0.20		ug/L	
			p+m-Xylene	2019/08/07	<0.40		ug/L	
			Total Xylenes	2019/08/07	<0.40		ug/L	
			F1 (C6-C10)	2019/08/07	<25		ug/L	
			F1 (C6-C10) - BTEX	2019/08/07	<25		ug/L	
6263446	PBA	LCS	Dissolved Lead (Pb)	2019/08/12		98	%	80 - 120
6266745	GUL	LCS	o-Terphenyl	2019/08/08		105	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2019/08/08		114	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2019/08/08		120	%	60 - 130
			F4 (C34-C50 Hydrocarbons)	2019/08/08		116	%	60 - 130
6267452	AGA	LCS	1,4-Difluorobenzene	2019/08/07		104	%	70 - 130
			4-Bromofluorobenzene	2019/08/07		101	%	70 - 130
			D10-Ethylbenzene	2019/08/07		89	%	70 - 130
			D4-1,2-Dichloroethane	2019/08/07		104	%	70 - 130
			Benzene	2019/08/07		97	%	70 - 130
			Toluene	2019/08/07		94	%	70 - 130
			Ethylbenzene	2019/08/07		96	%	70 - 130
			o-Xylene	2019/08/07		93	%	70 - 130
			p+m-Xylene	2019/08/07		96	%	70 - 130
			F1 (C6-C10)	2019/08/07		98	%	70 - 130

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

BV Labs Job #: B9L4415
Report Date: 2019/08/13

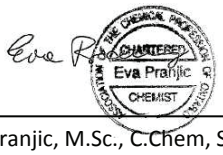
Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1907

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Service Specialist



Ewa Pranjic, M.Sc., C.Chem, Scientific Specialist

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Fax: (905) 817-5777
Toll Free: 800-563-6266

EXXONMOBIL/IMPERIAL OIL - BV LABS
CHAIN-OF-CUSTODY RECORD
ANALYSIS REQUESTED

C of C # 727327-04-01

727327

INVOICE INFORMATION	REPORT INFORMATION
Company Name: Imperial Oil Ltd - Golder Associates Ltd	Company Name: Golder Associates Ltd
Contact Name: IOL Accounts Payable	Contact Name: Ian Sosnev
Address: 102, 2535-3rd Avenue SE, Calgary AB T2A 7W5	Address: 110 Hanover Dr, Building A Suite 203, St. Catherines ON L2W 1A4
Email: IOLAccounts_Payable@golder.com	Email: Ian_Sosney@golder.com, IOL_1390@golder.co
Phone: (403) 299-5600	Phone: (905) 688-8217
Sampler Name (Print): Jeremy Eckert	Consultant Project #: 1791706-1155-1907

	FIELD SAMPLE ID	MATRIX: GROUND WATER	MATRIX: SURFACE WATER	MATRIX: SOIL	MATRIX: OTHER	# CONTAINERS	SAMPLING: DATE (YYYY/MM/DD)	SAMPLING: TIME (24 HR)	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	F1/BTEX	F2-F4	Lead
1	TH2	X				7	2019/07/31	15:55	X		X	X	X
2	TH3	X				7		16:32	X		X	X	X
3	TH4	X				7		16:58	X		X	X	X
4	TH5	X				7		18:10	X		X	X	X
5	~~[illegible]~~ DUP B	X				7		18:10	X		X	X	X
6													
7													
8													
9													
10													

IOL SITE LOCATION: 1660 Merivale Road, Ottawa, ON

IOL PROJECT # (if applicable): N/A

BV LABS TASK ORDER # OR SERVICE ORDER # + LINE ITEM: 1791706-1155-7777-

REGULATORY CRITERIA / DETECTION LIMITS:
- [X] REG 153 Table 3 [ ] 2004 [X] 2011 [ ] RSC
(Please indicate which Reg. version and if RSC required)
- [ ] ODWS [ ] PWQO
- [ ] Other

SPECIAL INSTRUCTIONS:
IES: A2601436
SAP: 88001627
* samples may contain headspace and/or sediment

JARS USED AND NOT SUBMITTED Enter N/A for Water: N/A

TURNAROUND TIME
- [X] Standard (5 days)
- [ ] Rush (3 days)
- [ ] (2 days)
- [ ] (1 day)
- [ ] (same day)

Date Required

	YES	NO	COOLER ID:				YES	NO	COOLER ID:				YES	NO	COOLER ID:			
SEAL PRESENT	✓																	
SEAL INTACT	✓		TEMP °C	2	1	2			TEMP °C						TEMP °C			
COOLING MEDIA PRESENT	✓			1	2	3				1	2	3				1	2	3

LAB USE ONLY
BV LABS JOB # B9L4415
SAMPLES

* RELINQUISHED BY:		DATE:	TIME (24 HR)	RECEIVED BY:		DATE:	TIME (24 HR)
1.	Jeremy Eckert	2019/08/01	09 00	1.	YULIHON IDRIS	2019/08/02	10:20
2.				2.			
3.				3.			

LABELED BY: URE VERIFIED BY: KVG

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BV LABS' STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVLABS.COM/TERMS-AND-CONDITIONS.

COC – 1012 (2016) IOL – ON

White: BV Labs

Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: July 31, 2019

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Bureau Veritas Mississauga

Consultant Project Number: 1791706-1155

Sample Submission Number: B9L4415

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within
Extraction Surrogate Recovery	X			acceptance criteria.
Method Blank Concentration	X			
Matrix Duplicate RPD			X	
Matrix Spike Recovery			X	
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	All field QC samples are within
Trip Blank Concentration			X	alert limits.
Field Duplicate RPD	X			

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): Amanda Newberry

Date: August 19, 2019

Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1923B
Your C.O.C. #: 78313

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2019/11/25
Report #: R5979216
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9V9715
Received: 2019/11/13, 12:00

Sample Matrix: Air
Samples Received: 3

Analyses	Quantity	Laboratory Method	Analytical Method
BTEX and CCME Compounds in Air(TO-15mod)	3	BRL SOP-00304	EPA TO-15 m
Canister Pressure (TO-15)	3	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (ug/m3)	3	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (TO-15) (1)	3	BRL SOP-00304	EPA TO-15 m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard. All samples were analyzed within hold time unless otherwise flagged.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Air sampling canisters have been cleaned in accordance with U.S. EPA Method TO15. At the end of the cleaning, evacuation, and pressurization cycles, one canister was selected and was pressurized with Zero Air. This canister was then analyzed via TO15 on a GC/MS. The canister must have been found to contain <0.2 ppbv concentration of all target analytes in order for the batch to have been considered clean. Each canister also underwent a leak check prior to shipment.

Please Note: SUMMA® canister samples will be retained by Bureau Veritas Laboratories for a period of 5 calendar days or as contractually agreed from the date of this report, after which time they will be cleaned for reuse. If you require a longer sample storage period, please contact your service representative.

Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1923B
Your C.O.C. #: 78313

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2019/11/25
Report #: R5979216
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9V9715
Received: 2019/11/13, 12:00

Encryption Key

Kyle Reinhart
Project Manager
25 Nov 2019 14:24:23

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kyle Reinhart, Project Manager
Email: Kyle.Reinhart@bvlabs.com
Phone# (905)817-5802

==========

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BV Labs Job #: B9V9715
Report Date: 2019/11/25

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1923B

RESULTS OF ANALYSES OF AIR

BV Labs ID		LHI693	LHI694		LHI695	
Sampling Date		2019/11/12 13:19	2019/11/12 11:54		2019/11/12 11:54	
COC Number		78313	78313		78313	
	UNITS	**SV16-01**	**SV16-02**	**QC Batch**	**DUPA**	**QC Batch**
Pressure on Receipt	psig	(-0.8)	(-2.0)	6452848	(-2.0)	6457319
QC Batch = Quality Control Batch						

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1923B

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		LHI693	LHI693	LHI694		LHI695		
Sampling Date		2019/11/12 13:19	2019/11/12 13:19	2019/11/12 11:54		2019/11/12 11:54		
COC Number		78313	78313	78313		78313		
	UNITS	**SV16-01**	**SV16-01 Lab-Dup**	**SV16-02**	**QC Batch**	**DUPA**	**RDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ppbv	1.24	1.18	3.15	6452470	3.32	0.20	6457320
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	<0.17	<0.17	6452470	<0.17	0.17	6457320
Chloromethane	ppbv	<0.30	<0.30	<0.30	6452470	<0.30	0.30	6457320
Vinyl Chloride	ppbv	<0.10	<0.10	<0.10	6452470	<0.10	0.10	6457320
Chloroethane	ppbv	<0.30	<0.30	<0.30	6452470	<0.30	0.30	6457320
1,3-Butadiene	ppbv	<0.50	<0.50	<0.50	6452470	<0.50	0.50	6457320
Trichlorofluoromethane (FREON 11)	ppbv	<0.20	0.22	0.24	6452470	0.23	0.20	6457320
Ethanol (ethyl alcohol)	ppbv	1.2	<1.0	3.3	6452470	1.3	1.0	6457320
Trichlorotrifluoroethane	ppbv	<0.15	<0.15	<0.15	6452470	<0.15	0.15	6457320
2-propanol	ppbv	<1.0	<1.0	<1.0	6452470	<1.0	1.0	6457320
2-Propanone	ppbv	2.00	2.25	2.57	6452470	2.13	0.60	6457320
Methyl Ethyl Ketone (2-Butanone)	ppbv	<0.20	0.22	0.22	6452470	<0.20	0.20	6457320
Methyl Isobutyl Ketone	ppbv	<0.20	<0.20	<0.20	6452470	<0.20	0.20	6457320
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	<1.0	<1.0	6452470	<1.0	1.0	6457320
Methyl t-butyl ether (MTBE)	ppbv	<0.20	<0.20	<0.20	6452470	<0.20	0.20	6457320
Ethyl Acetate	ppbv	<1.0	<1.0	<1.0	6452470	<1.0	1.0	6457320
1,1-Dichloroethylene	ppbv	<0.10	<0.10	<0.10	6452470	<0.10	0.10	6457320
cis-1,2-Dichloroethylene	ppbv	<0.10	<0.10	<0.10	6452470	<0.10	0.10	6457320
trans-1,2-Dichloroethylene	ppbv	<0.10	<0.10	<0.10	6452470	<0.10	0.10	6457320
Methylene Chloride(Dichloromethane)	ppbv	<0.60	<0.60	<0.60	6452470	<0.60	0.60	6457320
Chloroform	ppbv	10.8	11.4	0.11	6452470	0.12	0.10	6457320
Carbon Tetrachloride	ppbv	<0.10	<0.10	<0.10	6452470	<0.10	0.10	6457320
1,1-Dichloroethane	ppbv	<0.10	<0.10	<0.10	6452470	<0.10	0.10	6457320
1,2-Dichloroethane	ppbv	<0.10	<0.10	<0.10	6452470	<0.10	0.10	6457320
Ethylene Dibromide	ppbv	<0.10	<0.10	<0.10	6452470	<0.10	0.10	6457320
1,1,1-Trichloroethane	ppbv	<0.10	<0.10	<0.10	6452470	<0.10	0.10	6457320
1,1,2-Trichloroethane	ppbv	<0.10	<0.10	<0.10	6452470	<0.10	0.10	6457320
1,1,2,2-Tetrachloroethane	ppbv	<0.10	<0.10	<0.10	6452470	<0.10	0.10	6457320
cis-1,3-Dichloropropene	ppbv	<0.10	<0.10	<0.10	6452470	<0.10	0.10	6457320
trans-1,3-Dichloropropene	ppbv	<0.10	<0.10	<0.10	6452470	<0.10	0.10	6457320
1,2-Dichloropropane	ppbv	<0.10	<0.10	<0.10	6452470	<0.10	0.10	6457320
Bromomethane	ppbv	<0.10	<0.10	<0.10	6452470	<0.10	0.10	6457320
Bromoform	ppbv	<0.20	<0.20	<0.20	6452470	<0.20	0.20	6457320

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1923B

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		LHI693	LHI693	LHI694		LHI695		
Sampling Date		2019/11/12 13:19	2019/11/12 13:19	2019/11/12 11:54		2019/11/12 11:54		
COC Number		78313	78313	78313		78313		
	UNITS	**SV16-01**	**SV16-01 Lab-Dup**	**SV16-02**	**QC Batch**	**DUPA**	**RDL**	**QC Batch**
Bromodichloromethane	ppbv	<0.20	<0.20	<0.20	6452470	<0.20	0.20	6457320
Dibromochloromethane	ppbv	<0.20	<0.20	<0.20	6452470	<0.20	0.20	6457320
Trichloroethylene	ppbv	<0.10	<0.10	2.77	6452470	3.22	0.10	6457320
Tetrachloroethylene	ppbv	0.50	0.52	<0.10	6452470	0.12	0.10	6457320
Benzene	ppbv	<0.10	<0.10	<0.10	6452470	<0.10	0.10	6457320
Toluene	ppbv	0.22	0.23	0.35	6452470	0.17	0.10	6457320
Ethylbenzene	ppbv	0.25	0.27	<0.10	6452470	<0.10	0.10	6457320
p+m-Xylene	ppbv	0.65	0.69	<0.20	6452470	<0.20	0.20	6457320
o-Xylene	ppbv	0.22	0.25	<0.10	6452470	<0.10	0.10	6457320
Styrene	ppbv	<0.10	<0.10	<0.10	6452470	<0.10	0.10	6457320
4-ethyltoluene	ppbv	<0.50	<0.50	<0.50	6452470	<0.50	0.50	6457320
1,3,5-Trimethylbenzene	ppbv	<0.50	<0.50	<0.50	6452470	<0.50	0.50	6457320
1,2,4-Trimethylbenzene	ppbv	<0.50	<0.50	<0.50	6452470	<0.50	0.50	6457320
Chlorobenzene	ppbv	<0.10	<0.10	<0.10	6452470	<0.10	0.10	6457320
Benzyl chloride	ppbv	<0.50	<0.50	<0.50	6452470	<0.50	0.50	6457320
1,3-Dichlorobenzene	ppbv	<0.40	<0.40	<0.40	6452470	<0.40	0.40	6457320
1,4-Dichlorobenzene	ppbv	<0.10	<0.10	<0.10	6452470	<0.10	0.10	6457320
1,2-Dichlorobenzene	ppbv	<0.10	<0.10	<0.10	6452470	<0.10	0.10	6457320
1,2,4-Trichlorobenzene	ppbv	<0.50	<0.50	<0.50	6452470	<0.50	0.50	6457320
Hexachlorobutadiene	ppbv	<0.50	<0.50	<0.50	6452470	<0.50	0.50	6457320
Hexane	ppbv	<0.20	<0.20	0.24	6452470	<0.20	0.20	6457320
Heptane	ppbv	<0.30	<0.30	<0.30	6452470	<0.30	0.30	6457320
Cyclohexane	ppbv	<0.20	<0.20	<0.20	6452470	<0.20	0.20	6457320
Tetrahydrofuran	ppbv	<0.40	<0.40	<0.40	6452470	<0.40	0.40	6457320
1,4-Dioxane	ppbv	<1.0	<1.0	<1.0	6452470	<1.0	1.0	6457320
Naphthalene	ppbv	<0.20	<0.20	<0.20	6452470	<0.20	0.20	6457320
Total Xylenes	ppbv	0.86	0.93	<0.30	6452470	<0.30	0.30	6457320
1,1,1,2-Tetrachloroethane	ppbv	<0.10	<0.10	<0.10	6452470	<0.10	0.10	6457320
Vinyl Bromide	ppbv	<0.20	<0.20	<0.20	6452470	<0.20	0.20	6457320
Propene	ppbv	<0.50	<0.50	<0.50	6452470	<0.50	0.50	6457320
2,2,4-Trimethylpentane	ppbv	<0.20	<0.20	<0.20	6452470	<0.20	0.20	6457320
Carbon Disulfide	ppbv	<0.50	0.51	<0.50	6452470	<0.50	0.50	6457320
Vinyl Acetate	ppbv	<0.20	<0.20	<0.20	6452470	<0.20	0.20	6457320

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: B9V9715
Report Date: 2019/11/25

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1923B

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		LHI693	LHI693	LHI694		LHI695		
Sampling Date		2019/11/12 13:19	2019/11/12 13:19	2019/11/12 11:54		2019/11/12 11:54		
COC Number		78313	78313	78313		78313		
	UNITS	**SV16-01**	**SV16-01 Lab-Dup**	**SV16-02**	**QC Batch**	**DUPA**	**RDL**	**QC Batch**
Instrument Surrogate Recovery (%)								
Bromochloromethane	%	96	91	94	6452470	67		6457320
D5-Chlorobenzene	%	91	81	66	6452470	62		6457320
Difluorobenzene	%	96	89	89	6452470	63		6457320

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QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1923B

CALCULATED VOLATILE ORGANICS (AIR)

BV Labs ID		LHI693	LHI693	LHI694	LHI695		
Sampling Date		2019/11/12 13:19	2019/11/12 13:19	2019/11/12 11:54	2019/11/12 11:54		
COC Number		78313	78313	78313	78313		
	UNITS	**SV16-01**	**SV16-01 Lab-Dup**	**SV16-02**	**DUPA**	**RDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ug/m3	6.13	5.86	15.6	16.4	0.99	6441779
1,2-Dichlorotetrafluoroethane	ug/m3	<1.2	<1.2	<1.2	<1.2	1.2	6441779
Chloromethane	ug/m3	<0.62	<0.62	<0.62	<0.62	0.62	6441779
Vinyl Chloride	ug/m3	<0.26	<0.26	<0.26	<0.26	0.26	6441779
Chloroethane	ug/m3	<0.79	<0.79	<0.79	<0.79	0.79	6441779
1,3-Butadiene	ug/m3	<1.1	<1.1	<1.1	<1.1	1.1	6441779
Trichlorofluoromethane (FREON 11)	ug/m3	<1.1	1.2	1.3	1.3	1.1	6441779
Ethanol (ethyl alcohol)	ug/m3	2.3	<1.9	6.2	2.4	1.9	6441779
Trichlorotrifluoroethane	ug/m3	<1.2	<1.2	<1.2	<1.2	1.2	6441779
2-propanol	ug/m3	<2.5	<2.5	<2.5	<2.5	2.5	6441779
2-Propanone	ug/m3	4.7	5.4	6.1	5.1	1.4	6441779
Methyl Ethyl Ketone (2-Butanone)	ug/m3	<0.59	0.64	0.66	<0.59	0.59	6441779
Methyl Isobutyl Ketone	ug/m3	<0.82	<0.82	<0.82	<0.82	0.82	6441779
Methyl Butyl Ketone (2-Hexanone)	ug/m3	<4.1	<4.1	<4.1	<4.1	4.1	6441779
Methyl t-butyl ether (MTBE)	ug/m3	<0.72	<0.72	<0.72	<0.72	0.72	6441779
Ethyl Acetate	ug/m3	<3.6	<3.6	<3.6	<3.6	3.6	6441779
1,1-Dichloroethylene	ug/m3	<0.40	<0.40	<0.40	<0.40	0.40	6441779
cis-1,2-Dichloroethylene	ug/m3	<0.40	<0.40	<0.40	<0.40	0.40	6441779
trans-1,2-Dichloroethylene	ug/m3	<0.40	<0.40	<0.40	<0.40	0.40	6441779
Methylene Chloride(Dichloromethane)	ug/m3	<2.1	<2.1	<2.1	<2.1	2.1	6441779
Chloroform	ug/m3	52.9	55.5	0.52	0.58	0.49	6441779
Carbon Tetrachloride	ug/m3	<0.63	<0.63	<0.63	<0.63	0.63	6441779
1,1-Dichloroethane	ug/m3	<0.40	<0.40	<0.40	<0.40	0.40	6441779
1,2-Dichloroethane	ug/m3	<0.40	<0.40	<0.40	<0.40	0.40	6441779
Ethylene Dibromide	ug/m3	<0.77	<0.77	<0.77	<0.77	0.77	6441779
1,1,1-Trichloroethane	ug/m3	<0.55	<0.55	<0.55	<0.55	0.55	6441779
1,1,2-Trichloroethane	ug/m3	<0.55	<0.55	<0.55	<0.55	0.55	6441779
1,1,2,2-Tetrachloroethane	ug/m3	<0.69	<0.69	<0.69	<0.69	0.69	6441779
cis-1,3-Dichloropropene	ug/m3	<0.45	<0.45	<0.45	<0.45	0.45	6441779
trans-1,3-Dichloropropene	ug/m3	<0.45	<0.45	<0.45	<0.45	0.45	6441779
1,2-Dichloropropane	ug/m3	<0.46	<0.46	<0.46	<0.46	0.46	6441779
Bromomethane	ug/m3	<0.39	<0.39	<0.39	<0.39	0.39	6441779
Bromoform	ug/m3	<2.1	<2.1	<2.1	<2.1	2.1	6441779

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1923B

CALCULATED VOLATILE ORGANICS (AIR)

BV Labs ID		LHI693	LHI693	LHI694	LHI695		
Sampling Date		2019/11/12 13:19	2019/11/12 13:19	2019/11/12 11:54	2019/11/12 11:54		
COC Number		78313	78313	78313	78313		
	UNITS	**SV16-01**	**SV16-01 Lab-Dup**	**SV16-02**	**DUPA**	**RDL**	**QC Batch**
Bromodichloromethane	ug/m3	<1.3	<1.3	<1.3	<1.3	1.3	6441779
Dibromochloromethane	ug/m3	<1.7	<1.7	<1.7	<1.7	1.7	6441779
Trichloroethylene	ug/m3	<0.54	<0.54	14.9	17.3	0.54	6441779
Tetrachloroethylene	ug/m3	3.36	3.50	<0.68	0.79	0.68	6441779
Benzene	ug/m3	<0.32	<0.32	<0.32	<0.32	0.32	6441779
Toluene	ug/m3	0.83	0.86	1.30	0.65	0.38	6441779
Ethylbenzene	ug/m3	1.10	1.16	<0.43	<0.43	0.43	6441779
p+m-Xylene	ug/m3	2.80	2.99	<0.87	<0.87	0.87	6441779
o-Xylene	ug/m3	0.94	1.07	<0.43	<0.43	0.43	6441779
Styrene	ug/m3	<0.43	<0.43	<0.43	<0.43	0.43	6441779
4-ethyltoluene	ug/m3	<2.5	<2.5	<2.5	<2.5	2.5	6441779
1,3,5-Trimethylbenzene	ug/m3	<2.5	<2.5	<2.5	<2.5	2.5	6441779
1,2,4-Trimethylbenzene	ug/m3	<2.5	<2.5	<2.5	<2.5	2.5	6441779
Chlorobenzene	ug/m3	<0.46	<0.46	<0.46	<0.46	0.46	6441779
Benzyl chloride	ug/m3	<2.6	<2.6	<2.6	<2.6	2.6	6441779
1,3-Dichlorobenzene	ug/m3	<2.4	<2.4	<2.4	<2.4	2.4	6441779
1,4-Dichlorobenzene	ug/m3	<0.60	<0.60	<0.60	<0.60	0.60	6441779
1,2-Dichlorobenzene	ug/m3	<0.60	<0.60	<0.60	<0.60	0.60	6441779
1,2,4-Trichlorobenzene	ug/m3	<3.7	<3.7	<3.7	<3.7	3.7	6441779
Hexachlorobutadiene	ug/m3	<5.3	<5.3	<5.3	<5.3	5.3	6441779
Hexane	ug/m3	<0.70	<0.70	0.84	<0.70	0.70	6441779
Heptane	ug/m3	<1.2	<1.2	<1.2	<1.2	1.2	6441779
Cyclohexane	ug/m3	<0.69	<0.69	<0.69	<0.69	0.69	6441779
Tetrahydrofuran	ug/m3	<1.2	<1.2	<1.2	<1.2	1.2	6441779
1,4-Dioxane	ug/m3	<3.6	<3.6	<3.6	<3.6	3.6	6441779
Naphthalene	ug/m3	<1.0	<1.0	<1.0	<1.0	1.0	6441779
Total Xylenes	ug/m3	3.7	4.1	<1.3	<1.3	1.3	6441779
1,1,1,2-Tetrachloroethane	ug/m3	<0.69	<0.69	<0.69	<0.69	0.69	6441779
Vinyl Bromide	ug/m3	<0.87	<0.87	<0.87	<0.87	0.87	6441779
Propene	ug/m3	<0.86	<0.86	<0.86	<0.86	0.86	6441779
2,2,4-Trimethylpentane	ug/m3	<0.93	<0.93	<0.93	<0.93	0.93	6441779
Carbon Disulfide	ug/m3	<1.6	<1.6	<1.6	<1.6	1.6	6441779
Vinyl Acetate	ug/m3	<0.70	<0.70	<0.70	<0.70	0.70	6441779

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: B9V9715
Report Date: 2019/11/25

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1923B

VOLATILE ORGANIC HYDROCARBONS BY GC/MS (AIR)

BV Labs ID		LHI693	LHI693	LHI694		LHI695		
Sampling Date		2019/11/12 13:19	2019/11/12 13:19	2019/11/12 11:54		2019/11/12 11:54		
COC Number		78313	78313	78313		78313		
	UNITS	**SV16-01**	**SV16-01 Lab-Dup**	**SV16-02**	**QC Batch**	**DUPA**	**RDL**	**QC Batch**
F1-BTEX, C6-C10 (as Toluene)	ug/m3	148	128	113	6457354	110	5.0	6458420
F2, C10-C16 (as Decane)	ug/m3	233	229	131	6457354	166	5.0	6458420

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: B9V9715
Report Date: 2019/11/25

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1923B

TEST SUMMARY

BV Labs ID: LHI693
Sample ID: SV16-01
Matrix: Air

Collected: 2019/11/12
Relinquished: 2019/11/12
Received: 2019/11/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	6457354	N/A	2019/11/21	Ivana Bojko
Canister Pressure (TO-15)	PRES	6452848	N/A	2019/11/21	Ivana Bojko
Volatile Organics in Air (ug/m3)	GC/MS	6441779	N/A	2019/11/22	Maureen Smith
Volatile Organics in Air (TO-15)	GC/MS	6452470	N/A	2019/11/21	Ivana Bojko

BV Labs ID: LHI693 Dup
Sample ID: SV16-01
Matrix: Air

Collected: 2019/11/12
Relinquished: 2019/11/12
Received: 2019/11/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	6457354	N/A	2019/11/21	Ivana Bojko
Volatile Organics in Air (ug/m3)	GC/MS	6441779	N/A	2019/11/25	Maureen Smith
Volatile Organics in Air (TO-15)	GC/MS	6452470	N/A	2019/11/21	Ivana Bojko

BV Labs ID: LHI694
Sample ID: SV16-02
Matrix: Air

Collected: 2019/11/12
Relinquished: 2019/11/12
Received: 2019/11/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	6457354	N/A	2019/11/21	Ivana Bojko
Canister Pressure (TO-15)	PRES	6452848	N/A	2019/11/21	Ivana Bojko
Volatile Organics in Air (ug/m3)	GC/MS	6441779	N/A	2019/11/22	Maureen Smith
Volatile Organics in Air (TO-15)	GC/MS	6452470	N/A	2019/11/21	Ivana Bojko

BV Labs ID: LHI695
Sample ID: DUPA
Matrix: Air

Collected: 2019/11/12
Relinquished: 2019/11/12
Received: 2019/11/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	6458420	N/A	2019/11/22	Dany Marqass
Canister Pressure (TO-15)	PRES	6457319	N/A	2019/11/22	Dany Marqass
Volatile Organics in Air (ug/m3)	GC/MS	6441779	N/A	2019/11/25	Maureen Smith
Volatile Organics in Air (TO-15)	GC/MS	6457320	N/A	2019/11/22	Dany Marqass

GENERAL COMMENTS

1 compound exceed the 130% recovery criteria in the reference standard and 2 compounds were below the 70% recovery criteria in the reference standard. These compounds meet the %RSD criteria in the continuing calibration standard. The failure of these 3 compounds is not believed to have an effect on the integrity of the results.

WS# 6457320: Ethanol exceeded 140% recovery in the reference standard. The continuing calibration standard was acceptable therefore there should be no effect on the data. Vinyl Acetate was less than 60% recovery in the reference standard. There were no positives found for Vinyl Acetate therefore there should be no effect on the data.

Results relate only to the items tested.

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6452470	IB2	Method Blank	Bromochloromethane	2019/11/21		108	%	60 - 140
			D5-Chlorobenzene	2019/11/21		98	%	60 - 140
			Difluorobenzene	2019/11/21		105	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2019/11/21	<0.20		ppbv	
			1,2-Dichlorotetrafluoroethane	2019/11/21	<0.17		ppbv	
			Chloromethane	2019/11/21	<0.30		ppbv	
			Vinyl Chloride	2019/11/21	<0.10		ppbv	
			Chloroethane	2019/11/21	<0.30		ppbv	
			1,3-Butadiene	2019/11/21	<0.50		ppbv	
			Trichlorofluoromethane (FREON 11)	2019/11/21	<0.20		ppbv	
			Ethanol (ethyl alcohol)	2019/11/21	<1.0		ppbv	
			Trichlorotrifluoroethane	2019/11/21	<0.15		ppbv	
			2-propanol	2019/11/21	<1.0		ppbv	
			2-Propanone	2019/11/21	<0.60		ppbv	
			Methyl Ethyl Ketone (2-Butanone)	2019/11/21	<0.20		ppbv	
			Methyl Isobutyl Ketone	2019/11/21	<0.20		ppbv	
			Methyl Butyl Ketone (2-Hexanone)	2019/11/21	<1.0		ppbv	
			Methyl t-butyl ether (MTBE)	2019/11/21	<0.20		ppbv	
			Ethyl Acetate	2019/11/21	<1.0		ppbv	
			1,1-Dichloroethylene	2019/11/21	<0.10		ppbv	
			cis-1,2-Dichloroethylene	2019/11/21	<0.10		ppbv	
			trans-1,2-Dichloroethylene	2019/11/21	<0.10		ppbv	
			Methylene Chloride(Dichloromethane)	2019/11/21	<0.60		ppbv	
			Chloroform	2019/11/21	<0.10		ppbv	
			Carbon Tetrachloride	2019/11/21	<0.10		ppbv	
			1,1-Dichloroethane	2019/11/21	<0.10		ppbv	
			1,2-Dichloroethane	2019/11/21	<0.10		ppbv	
			Ethylene Dibromide	2019/11/21	<0.10		ppbv	
			1,1,1-Trichloroethane	2019/11/21	<0.10		ppbv	
			1,1,2-Trichloroethane	2019/11/21	<0.10		ppbv	
			1,1,2,2-Tetrachloroethane	2019/11/21	<0.10		ppbv	
			cis-1,3-Dichloropropene	2019/11/21	<0.10		ppbv	
			trans-1,3-Dichloropropene	2019/11/21	<0.10		ppbv	
			1,2-Dichloropropane	2019/11/21	<0.10		ppbv	
			Bromomethane	2019/11/21	<0.10		ppbv	
			Bromoform	2019/11/21	<0.20		ppbv	
			Bromodichloromethane	2019/11/21	<0.20		ppbv	
			Dibromochloromethane	2019/11/21	<0.20		ppbv	
			Trichloroethylene	2019/11/21	<0.10		ppbv	
			Tetrachloroethylene	2019/11/21	<0.10		ppbv	
			Benzene	2019/11/21	<0.10		ppbv	
			Toluene	2019/11/21	<0.10		ppbv	
			Ethylbenzene	2019/11/21	<0.10		ppbv	
			p+m-Xylene	2019/11/21	<0.20		ppbv	
			o-Xylene	2019/11/21	<0.10		ppbv	
			Styrene	2019/11/21	<0.10		ppbv	
			4-ethyltoluene	2019/11/21	<0.50		ppbv	
			1,3,5-Trimethylbenzene	2019/11/21	<0.50		ppbv	
			1,2,4-Trimethylbenzene	2019/11/21	<0.50		ppbv	
			Chlorobenzene	2019/11/21	<0.10		ppbv	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Benzyl chloride	2019/11/21	<0.50		ppbv	
			1,3-Dichlorobenzene	2019/11/21	<0.40		ppbv	
			1,4-Dichlorobenzene	2019/11/21	<0.10		ppbv	
			1,2-Dichlorobenzene	2019/11/21	<0.10		ppbv	
			1,2,4-Trichlorobenzene	2019/11/21	<0.50		ppbv	
			Hexachlorobutadiene	2019/11/21	<0.50		ppbv	
			Hexane	2019/11/21	<0.20		ppbv	
			Heptane	2019/11/21	<0.30		ppbv	
			Cyclohexane	2019/11/21	<0.20		ppbv	
			Tetrahydrofuran	2019/11/21	<0.40		ppbv	
			1,4-Dioxane	2019/11/21	<1.0		ppbv	
			Naphthalene	2019/11/21	<0.20		ppbv	
			Total Xylenes	2019/11/21	<0.30		ppbv	
			1,1,1,2-Tetrachloroethane	2019/11/21	<0.10		ppbv	
			Vinyl Bromide	2019/11/21	<0.20		ppbv	
			Propene	2019/11/21	<0.50		ppbv	
			2,2,4-Trimethylpentane	2019/11/21	<0.20		ppbv	
			Carbon Disulfide	2019/11/21	<0.50		ppbv	
			Vinyl Acetate	2019/11/21	<0.20		ppbv	
6457320	DM2	Method Blank	Bromochloromethane	2019/11/22		83	%	60 - 140
			D5-Chlorobenzene	2019/11/22		72	%	60 - 140
			Difluorobenzene	2019/11/22		82	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2019/11/22	<0.20		ppbv	
			1,2-Dichlorotetrafluoroethane	2019/11/22	<0.17		ppbv	
			Chloromethane	2019/11/22	<0.30		ppbv	
			Vinyl Chloride	2019/11/22	<0.10		ppbv	
			Chloroethane	2019/11/22	<0.30		ppbv	
			1,3-Butadiene	2019/11/22	<0.50		ppbv	
			Trichlorofluoromethane (FREON 11)	2019/11/22	<0.20		ppbv	
			Ethanol (ethyl alcohol)	2019/11/22	<1.0		ppbv	
			Trichlorotrifluoroethane	2019/11/22	<0.15		ppbv	
			2-propanol	2019/11/22	<1.0		ppbv	
			2-Propanone	2019/11/22	<0.60		ppbv	
			Methyl Ethyl Ketone (2-Butanone)	2019/11/22	<0.20		ppbv	
			Methyl Isobutyl Ketone	2019/11/22	<0.20		ppbv	
			Methyl Butyl Ketone (2-Hexanone)	2019/11/22	<1.0		ppbv	
			Methyl t-butyl ether (MTBE)	2019/11/22	<0.20		ppbv	
			Ethyl Acetate	2019/11/22	<1.0		ppbv	
			1,1-Dichloroethylene	2019/11/22	<0.10		ppbv	
			cis-1,2-Dichloroethylene	2019/11/22	<0.10		ppbv	
			trans-1,2-Dichloroethylene	2019/11/22	<0.10		ppbv	
			Methylene Chloride(Dichloromethane)	2019/11/22	<0.60		ppbv	
			Chloroform	2019/11/22	<0.10		ppbv	
			Carbon Tetrachloride	2019/11/22	<0.10		ppbv	
			1,1-Dichloroethane	2019/11/22	<0.10		ppbv	
			1,2-Dichloroethane	2019/11/22	<0.10		ppbv	
			Ethylene Dibromide	2019/11/22	<0.10		ppbv	
			1,1,1-Trichloroethane	2019/11/22	<0.10		ppbv	
			1,1,2-Trichloroethane	2019/11/22	<0.10		ppbv	
			1,1,2,2-Tetrachloroethane	2019/11/22	<0.10		ppbv	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			cis-1,3-Dichloropropene	2019/11/22	<0.10		ppbv	
			trans-1,3-Dichloropropene	2019/11/22	<0.10		ppbv	
			1,2-Dichloropropane	2019/11/22	<0.10		ppbv	
			Bromomethane	2019/11/22	<0.10		ppbv	
			Bromoform	2019/11/22	<0.20		ppbv	
			Bromodichloromethane	2019/11/22	<0.20		ppbv	
			Dibromochloromethane	2019/11/22	<0.20		ppbv	
			Trichloroethylene	2019/11/22	<0.10		ppbv	
			Tetrachloroethylene	2019/11/22	<0.10		ppbv	
			Benzene	2019/11/22	<0.10		ppbv	
			Toluene	2019/11/22	<0.10		ppbv	
			Ethylbenzene	2019/11/22	<0.10		ppbv	
			p+m-Xylene	2019/11/22	<0.20		ppbv	
			o-Xylene	2019/11/22	<0.10		ppbv	
			Styrene	2019/11/22	<0.10		ppbv	
			4-ethyltoluene	2019/11/22	<0.50		ppbv	
			1,3,5-Trimethylbenzene	2019/11/22	<0.50		ppbv	
			1,2,4-Trimethylbenzene	2019/11/22	<0.50		ppbv	
			Chlorobenzene	2019/11/22	<0.10		ppbv	
			Benzyl chloride	2019/11/22	<0.50		ppbv	
			1,3-Dichlorobenzene	2019/11/22	<0.40		ppbv	
			1,4-Dichlorobenzene	2019/11/22	<0.10		ppbv	
			1,2-Dichlorobenzene	2019/11/22	<0.10		ppbv	
			1,2,4-Trichlorobenzene	2019/11/22	<0.50		ppbv	
			Hexachlorobutadiene	2019/11/22	<0.50		ppbv	
			Hexane	2019/11/22	<0.20		ppbv	
			Heptane	2019/11/22	<0.30		ppbv	
			Cyclohexane	2019/11/22	<0.20		ppbv	
			Tetrahydrofuran	2019/11/22	<0.40		ppbv	
			1,4-Dioxane	2019/11/22	<1.0		ppbv	
			Naphthalene	2019/11/22	<0.20		ppbv	
			Total Xylenes	2019/11/22	<0.30		ppbv	
			1,1,1,2-Tetrachloroethane	2019/11/22	<0.10		ppbv	
			Vinyl Bromide	2019/11/22	<0.20		ppbv	
			Propene	2019/11/22	<0.50		ppbv	
			2,2,4-Trimethylpentane	2019/11/22	<0.20		ppbv	
			Carbon Disulfide	2019/11/22	<0.50		ppbv	
			Vinyl Acetate	2019/11/22	<0.20		ppbv	
6457354	IB2	Method Blank	F1-BTEX, C6-C10 (as Toluene)	2019/11/21	<5.0		ug/m3	
			F2, C10-C16 (as Decane)	2019/11/21	<5.0		ug/m3	
6458420	DM2	Method Blank	F1-BTEX, C6-C10 (as Toluene)	2019/11/22	<5.0		ug/m3	
			F2, C10-C16 (as Decane)	2019/11/22	<5.0		ug/m3	
6441779	ASC	RPD [LHI693-01]	Dichlorodifluoromethane (FREON 12)	2019/11/25	4.6		%	25
			1,2-Dichlorotetrafluoroethane	2019/11/25	NC		%	25
			Chloromethane	2019/11/25	NC		%	25
			Vinyl Chloride	2019/11/25	NC		%	25
			Chloroethane	2019/11/25	NC		%	25
			1,3-Butadiene	2019/11/25	NC		%	25
			Trichlorofluoromethane (FREON 11)	2019/11/25	8.7		%	25
			Ethanol (ethyl alcohol)	2019/11/25	18		%	25

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Trichlorotrifluoroethane	2019/11/25	NC		%	25
			2-propanol	2019/11/25	NC		%	25
			2-Propanone	2019/11/25	12		%	25
			Methyl Ethyl Ketone (2-Butanone)	2019/11/25	8.8		%	25
			Methyl Isobutyl Ketone	2019/11/25	NC		%	25
			Methyl Butyl Ketone (2-Hexanone)	2019/11/25	NC		%	25
			Methyl t-butyl ether (MTBE)	2019/11/25	NC		%	25
			Ethyl Acetate	2019/11/25	NC		%	25
			1,1-Dichloroethylene	2019/11/25	NC		%	25
			cis-1,2-Dichloroethylene	2019/11/25	NC		%	25
			trans-1,2-Dichloroethylene	2019/11/25	NC		%	25
			Methylene Chloride(Dichloromethane)	2019/11/25	NC		%	25
			Chloroform	2019/11/25	4.9		%	25
			Carbon Tetrachloride	2019/11/25	NC		%	25
			1,1-Dichloroethane	2019/11/25	NC		%	25
			1,2-Dichloroethane	2019/11/25	NC		%	25
			Ethylene Dibromide	2019/11/25	NC		%	25
			1,1,1-Trichloroethane	2019/11/25	NC		%	25
			1,1,2-Trichloroethane	2019/11/25	NC		%	25
			1,1,2,2-Tetrachloroethane	2019/11/25	NC		%	25
			cis-1,3-Dichloropropene	2019/11/25	NC		%	25
			trans-1,3-Dichloropropene	2019/11/25	NC		%	25
			1,2-Dichloropropane	2019/11/25	NC		%	25
			Bromomethane	2019/11/25	NC		%	25
			Bromoform	2019/11/25	NC		%	25
			Bromodichloromethane	2019/11/25	NC		%	25
			Dibromochloromethane	2019/11/25	NC		%	25
			Trichloroethylene	2019/11/25	NC		%	25
			Tetrachloroethylene	2019/11/25	4.1		%	25
			Benzene	2019/11/25	NC		%	25
			Toluene	2019/11/25	3.6		%	25
			Ethylbenzene	2019/11/25	5.7		%	25
			p+m-Xylene	2019/11/25	6.6		%	25
			o-Xylene	2019/11/25	12		%	25
			Styrene	2019/11/25	NC		%	25
			4-ethyltoluene	2019/11/25	NC		%	25
			1,3,5-Trimethylbenzene	2019/11/25	NC		%	25
			1,2,4-Trimethylbenzene	2019/11/25	NC		%	25
			Chlorobenzene	2019/11/25	NC		%	25
			Benzyl chloride	2019/11/25	NC		%	25
			1,3-Dichlorobenzene	2019/11/25	NC		%	25
			1,4-Dichlorobenzene	2019/11/25	NC		%	25
			1,2-Dichlorobenzene	2019/11/25	NC		%	25
			1,2,4-Trichlorobenzene	2019/11/25	NC		%	25
			Hexachlorobutadiene	2019/11/25	NC		%	25
			Hexane	2019/11/25	NC		%	25
			Heptane	2019/11/25	NC		%	25
			Cyclohexane	2019/11/25	NC		%	25
			Tetrahydrofuran	2019/11/25	NC		%	25
			1,4-Dioxane	2019/11/25	NC		%	25

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Naphthalene	2019/11/25	NC		%	25
			Total Xylenes	2019/11/25	8.0		%	25
			1,1,1,2-Tetrachloroethane	2019/11/25	NC		%	25
			Vinyl Bromide	2019/11/25	NC		%	25
			Propene	2019/11/25	NC		%	25
			2,2,4-Trimethylpentane	2019/11/25	NC		%	25
			Carbon Disulfide	2019/11/25	2.2		%	25
			Vinyl Acetate	2019/11/25	NC		%	25
6452470	IB2	RPD [LHI693-01]	Dichlorodifluoromethane (FREON 12)	2019/11/21	4.6		%	25
			1,2-Dichlorotetrafluoroethane	2019/11/21	NC		%	25
			Chloromethane	2019/11/21	NC		%	25
			Vinyl Chloride	2019/11/21	NC		%	25
			Chloroethane	2019/11/21	NC		%	25
			1,3-Butadiene	2019/11/21	NC		%	25
			Trichlorofluoromethane (FREON 11)	2019/11/21	8.7		%	25
			Ethanol (ethyl alcohol)	2019/11/21	18		%	25
			Trichlorotrifluoroethane	2019/11/21	NC		%	25
			2-propanol	2019/11/21	NC		%	25
			2-Propanone	2019/11/21	12		%	25
			Methyl Ethyl Ketone (2-Butanone)	2019/11/21	8.8		%	25
			Methyl Isobutyl Ketone	2019/11/21	NC		%	25
			Methyl Butyl Ketone (2-Hexanone)	2019/11/21	NC		%	25
			Methyl t-butyl ether (MTBE)	2019/11/21	NC		%	25
			Ethyl Acetate	2019/11/21	NC		%	25
			1,1-Dichloroethylene	2019/11/21	NC		%	25
			cis-1,2-Dichloroethylene	2019/11/21	NC		%	25
			trans-1,2-Dichloroethylene	2019/11/21	NC		%	25
			Methylene Chloride(Dichloromethane)	2019/11/21	NC		%	25
			Chloroform	2019/11/21	4.9		%	25
			Carbon Tetrachloride	2019/11/21	NC		%	25
			1,1-Dichloroethane	2019/11/21	NC		%	25
			1,2-Dichloroethane	2019/11/21	NC		%	25
			Ethylene Dibromide	2019/11/21	NC		%	25
			1,1,1-Trichloroethane	2019/11/21	NC		%	25
			1,1,2-Trichloroethane	2019/11/21	NC		%	25
			1,1,2,2-Tetrachloroethane	2019/11/21	NC		%	25
			cis-1,3-Dichloropropene	2019/11/21	NC		%	25
			trans-1,3-Dichloropropene	2019/11/21	NC		%	25
			1,2-Dichloropropane	2019/11/21	NC		%	25
			Bromomethane	2019/11/21	NC		%	25
			Bromoform	2019/11/21	NC		%	25
			Bromodichloromethane	2019/11/21	NC		%	25
			Dibromochloromethane	2019/11/21	NC		%	25
			Trichloroethylene	2019/11/21	NC		%	25
			Tetrachloroethylene	2019/11/21	4.1		%	25
			Benzene	2019/11/21	NC		%	25
			Toluene	2019/11/21	3.6		%	25
			Ethylbenzene	2019/11/21	5.7		%	25
			p+m-Xylene	2019/11/21	6.6		%	25
			o-Xylene	2019/11/21	12		%	25

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Styrene	2019/11/21	NC		%	25
			4-ethyltoluene	2019/11/21	NC		%	25
			1,3,5-Trimethylbenzene	2019/11/21	NC		%	25
			1,2,4-Trimethylbenzene	2019/11/21	NC		%	25
			Chlorobenzene	2019/11/21	NC		%	25
			Benzyl chloride	2019/11/21	NC		%	25
			1,3-Dichlorobenzene	2019/11/21	NC		%	25
			1,4-Dichlorobenzene	2019/11/21	NC		%	25
			1,2-Dichlorobenzene	2019/11/21	NC		%	25
			1,2,4-Trichlorobenzene	2019/11/21	NC		%	25
			Hexachlorobutadiene	2019/11/21	NC		%	25
			Hexane	2019/11/21	NC		%	25
			Heptane	2019/11/21	NC		%	25
			Cyclohexane	2019/11/21	NC		%	25
			Tetrahydrofuran	2019/11/21	NC		%	25
			1,4-Dioxane	2019/11/21	NC		%	25
			Naphthalene	2019/11/21	NC		%	25
			Total Xylenes	2019/11/21	8.0		%	25
			1,1,1,2-Tetrachloroethane	2019/11/21	NC		%	25
			Vinyl Bromide	2019/11/21	NC		%	25
			Propene	2019/11/21	NC		%	25
			2,2,4-Trimethylpentane	2019/11/21	NC		%	25
			Carbon Disulfide	2019/11/21	2.2		%	25
			Vinyl Acetate	2019/11/21	NC		%	25
6457354	IB2	RPD [LHI693-01]	F1-BTEX, C6-C10 (as Toluene)	2019/11/21	15		%	25
			F2, C10-C16 (as Decane)	2019/11/21	1.7		%	25
6452470	IB2	LCS	Bromochloromethane	2019/11/21		112	%	60 - 140
			D5-Chlorobenzene	2019/11/21		105	%	60 - 140
			Difluorobenzene	2019/11/21		109	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2019/11/21		104	%	70 - 130
			1,2-Dichlorotetrafluoroethane	2019/11/21		100	%	70 - 130
			Chloromethane	2019/11/21		105	%	70 - 130
			Vinyl Chloride	2019/11/21		101	%	70 - 130
			Chloroethane	2019/11/21		92	%	70 - 130
			1,3-Butadiene	2019/11/21		102	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2019/11/21		97	%	70 - 130
			Ethanol (ethyl alcohol)	2019/11/21		131 (1)	%	70 - 130
			Trichlorotrifluoroethane	2019/11/21		93	%	70 - 130
			2-propanol	2019/11/21		67 (1)	%	70 - 130
			2-Propanone	2019/11/21		92	%	70 - 130
			Methyl Ethyl Ketone (2-Butanone)	2019/11/21		100	%	70 - 130
			Methyl Isobutyl Ketone	2019/11/21		104	%	70 - 130
			Methyl Butyl Ketone (2-Hexanone)	2019/11/21		99	%	70 - 130
			Methyl t-butyl ether (MTBE)	2019/11/21		99	%	70 - 130
			Ethyl Acetate	2019/11/21		127	%	70 - 130
			1,1-Dichloroethylene	2019/11/21		97	%	70 - 130
			cis-1,2-Dichloroethylene	2019/11/21		97	%	70 - 130
			trans-1,2-Dichloroethylene	2019/11/21		101	%	70 - 130
			Methylene Chloride(Dichloromethane)	2019/11/21		100	%	70 - 130
			Chloroform	2019/11/21		101	%	70 - 130

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Carbon Tetrachloride	2019/11/21		101	%	70 - 130
			1,1-Dichloroethane	2019/11/21		97	%	70 - 130
			1,2-Dichloroethane	2019/11/21		104	%	70 - 130
			Ethylene Dibromide	2019/11/21		101	%	70 - 130
			1,1,1-Trichloroethane	2019/11/21		103	%	70 - 130
			1,1,2-Trichloroethane	2019/11/21		100	%	70 - 130
			1,1,2,2-Tetrachloroethane	2019/11/21		102	%	70 - 130
			cis-1,3-Dichloropropene	2019/11/21		101	%	70 - 130
			trans-1,3-Dichloropropene	2019/11/21		99	%	70 - 130
			1,2-Dichloropropane	2019/11/21		98	%	70 - 130
			Bromomethane	2019/11/21		95	%	70 - 130
			Bromoform	2019/11/21		109	%	70 - 130
			Bromodichloromethane	2019/11/21		111	%	70 - 130
			Dibromochloromethane	2019/11/21		109	%	70 - 130
			Trichloroethylene	2019/11/21		103	%	70 - 130
			Tetrachloroethylene	2019/11/21		100	%	70 - 130
			Benzene	2019/11/21		94	%	70 - 130
			Toluene	2019/11/21		99	%	70 - 130
			Ethylbenzene	2019/11/21		98	%	70 - 130
			p+m-Xylene	2019/11/21		99	%	70 - 130
			o-Xylene	2019/11/21		101	%	70 - 130
			Styrene	2019/11/21		99	%	70 - 130
			4-ethyltoluene	2019/11/21		109	%	70 - 130
			1,3,5-Trimethylbenzene	2019/11/21		105	%	70 - 130
			1,2,4-Trimethylbenzene	2019/11/21		108	%	70 - 130
			Chlorobenzene	2019/11/21		96	%	70 - 130
			Benzyl chloride	2019/11/21		92	%	70 - 130
			1,3-Dichlorobenzene	2019/11/21		110	%	70 - 130
			1,4-Dichlorobenzene	2019/11/21		110	%	70 - 130
			1,2-Dichlorobenzene	2019/11/21		112	%	70 - 130
			1,2,4-Trichlorobenzene	2019/11/21		113	%	70 - 130
			Hexachlorobutadiene	2019/11/21		108	%	70 - 130
			Hexane	2019/11/21		98	%	70 - 130
			Heptane	2019/11/21		108	%	70 - 130
			Cyclohexane	2019/11/21		101	%	70 - 130
			Tetrahydrofuran	2019/11/21		103	%	70 - 130
			1,4-Dioxane	2019/11/21		99	%	70 - 130
			Naphthalene	2019/11/21		110	%	70 - 130
			Total Xylenes	2019/11/21		100	%	70 - 130
			1,1,1,2-Tetrachloroethane	2019/11/21		99	%	70 - 130
			Vinyl Bromide	2019/11/21		95	%	70 - 130
			Propene	2019/11/21		111	%	70 - 130
			2,2,4-Trimethylpentane	2019/11/21		106	%	70 - 130
			Carbon Disulfide	2019/11/21		98	%	70 - 130
			Vinyl Acetate	2019/11/21		56 (1)	%	70 - 130
6457320	DM2	LCS	Bromochloromethane	2019/11/22		84	%	60 - 140
			D5-Chlorobenzene	2019/11/22		85	%	60 - 140
			Difluorobenzene	2019/11/22		86	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2019/11/22		111	%	70 - 130
			1,2-Dichlorotetrafluoroethane	2019/11/22		101	%	70 - 130

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Chloromethane	2019/11/22		96	%	70 - 130
			Vinyl Chloride	2019/11/22		98	%	70 - 130
			Chloroethane	2019/11/22		92	%	70 - 130
			1,3-Butadiene	2019/11/22		102	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2019/11/22		118	%	70 - 130
			Ethanol (ethyl alcohol)	2019/11/22		140 (1)	%	70 - 130
			Trichlorotrifluoroethane	2019/11/22		100	%	70 - 130
			2-propanol	2019/11/22		80	%	70 - 130
			2-Propanone	2019/11/22		108	%	70 - 130
			Methyl Ethyl Ketone (2-Butanone)	2019/11/22		92	%	70 - 130
			Methyl Isobutyl Ketone	2019/11/22		90	%	70 - 130
			Methyl Butyl Ketone (2-Hexanone)	2019/11/22		90	%	70 - 130
			Methyl t-butyl ether (MTBE)	2019/11/22		111	%	70 - 130
			Ethyl Acetate	2019/11/22		113	%	70 - 130
			1,1-Dichloroethylene	2019/11/22		105	%	70 - 130
			cis-1,2-Dichloroethylene	2019/11/22		98	%	70 - 130
			trans-1,2-Dichloroethylene	2019/11/22		102	%	70 - 130
			Methylene Chloride(Dichloromethane)	2019/11/22		90	%	70 - 130
			Chloroform	2019/11/22		108	%	70 - 130
			Carbon Tetrachloride	2019/11/22		88	%	70 - 130
			1,1-Dichloroethane	2019/11/22		95	%	70 - 130
			1,2-Dichloroethane	2019/11/22		115	%	70 - 130
			Ethylene Dibromide	2019/11/22		96	%	70 - 130
			1,1,1-Trichloroethane	2019/11/22		116	%	70 - 130
			1,1,2-Trichloroethane	2019/11/22		94	%	70 - 130
			1,1,2,2-Tetrachloroethane	2019/11/22		81	%	70 - 130
			cis-1,3-Dichloropropene	2019/11/22		99	%	70 - 130
			trans-1,3-Dichloropropene	2019/11/22		105	%	70 - 130
			1,2-Dichloropropane	2019/11/22		84	%	70 - 130
			Bromomethane	2019/11/22		101	%	70 - 130
			Bromoform	2019/11/22		101	%	70 - 130
			Bromodichloromethane	2019/11/22		111	%	70 - 130
			Dibromochloromethane	2019/11/22		111	%	70 - 130
			Trichloroethylene	2019/11/22		107	%	70 - 130
			Tetrachloroethylene	2019/11/22		106	%	70 - 130
			Benzene	2019/11/22		93	%	70 - 130
			Toluene	2019/11/22		98	%	70 - 130
			Ethylbenzene	2019/11/22		93	%	70 - 130
			p+m-Xylene	2019/11/22		95	%	70 - 130
			o-Xylene	2019/11/22		95	%	70 - 130
			Styrene	2019/11/22		99	%	70 - 130
			4-ethyltoluene	2019/11/22		106	%	70 - 130
			1,3,5-Trimethylbenzene	2019/11/22		99	%	70 - 130
			1,2,4-Trimethylbenzene	2019/11/22		102	%	70 - 130
			Chlorobenzene	2019/11/22		94	%	70 - 130
			Benzyl chloride	2019/11/22		85	%	70 - 130
			1,3-Dichlorobenzene	2019/11/22		101	%	70 - 130
			1,4-Dichlorobenzene	2019/11/22		99	%	70 - 130
			1,2-Dichlorobenzene	2019/11/22		99	%	70 - 130
			1,2,4-Trichlorobenzene	2019/11/22		120	%	70 - 130

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Hexachlorobutadiene	2019/11/22		109	%	70 - 130
			Hexane	2019/11/22		94	%	70 - 130
			Heptane	2019/11/22		90	%	70 - 130
			Cyclohexane	2019/11/22		92	%	70 - 130
			Tetrahydrofuran	2019/11/22		91	%	70 - 130
			1,4-Dioxane	2019/11/22		104	%	70 - 130
			Naphthalene	2019/11/22		119	%	70 - 130
			Total Xylenes	2019/11/22		95	%	70 - 130
			1,1,1,2-Tetrachloroethane	2019/11/22		101	%	70 - 130
			Vinyl Bromide	2019/11/22		117	%	70 - 130
			Propene	2019/11/22		92	%	70 - 130
			2,2,4-Trimethylpentane	2019/11/22		95	%	70 - 130
			Carbon Disulfide	2019/11/22		101	%	70 - 130
			Vinyl Acetate	2019/11/22		52 (1)	%	70 - 130

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: B9V9715
Report Date: 2019/11/25

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1923B

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Maureen Smith, Supervisor, Volatiles

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam
A Bureau Veritas Group Company

6740 Campobello Road
Mississauga, ON L5N 2L8
www.maxxam.ca

Phone: (905) 817-5700
Fax: (905) 817-5779
Toll Free: 1-800-563-6266

EXXONMOBIL/IMPERIAL OIL - MAXXAM
AIR CHAIN OF CUSTODY RECORD

Page 1 of 1

C of C # 78313

INVOICE INFORMATION	REPORT INFORMATION
Company Name: ☒ Imperial Oil ☐ ExxonMobil	Company Name: Golder Associates Ltd.
Contact Name: IOL Accounts Payable	Contact Name: Ian Sosney
Address: 102-2535, 3rd Ave SE Calgary, AB, T2A 7W5	Address: 110 Hanover Dr, #203A St. Catharines, ON L2W 1A4
Email: IOL_Accounts_Payable@golder.com	Email: ian_sosney@golder.com
Ph: 403-299-5600	Ph: 647-522-4698
Sampler Name (Print): Jeremy Eckert	Consultant Project #: 1791706-1155-1923B

	FIELD SAMPLE ID	Canister Serial #	Flow Regulator Serial #	Sample Collection DATE (YYYY/MM/DD)	Sample Collection TIME (24 HR)	Media Type (See Legend)	FLOW RATE (mL/min.)	LENGTH OF SAMPLING (minutes)	BTEX	Aromatic/Aliphatic Hydrocarbon Fractionations	F1 (C6-C10) - F2 (C10-C16)	VOC (TO15)
1	SV16-01	2079	FX0244	2019/11/12	13:19	S	87.5	16	X		X	X
2	SV16-02	205	FX1127	↓	11:54	S	87.5	16	X		X	X
3	DUPA	2400	FX1127	↓	11:54	S	87.5	16	X		X	X
4												
5												
6												
7												
8												
9												
10												
11												

IOL SITE LOCATION: 1660 Merivale Rd, Ottawa ON

IOL PROJECT # (if applicable): N/A

MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM: 1791706-1155-[redacted]7777

REGULATORY CRITERIA / DETECTION LIMITS: (PLEASE SPECIFY): N/A

SPECIAL INSTRUCTIONS:
IES: 4260/1436
SAP: 8800 1627
6 regulators included in shipment

LEGEND
S - Summa Can
T - Tube
TB - Tedlar Bag
O - Other(Specify)
*TEMP N/A for SUMMA CAN

TURNAROUND TIME
Standard (10 days) ☒
Rush (9 days) ☐
(6 days) ☐
(3 days) ☐

	YES	NO	COOLER ID # 1				COOLER ID #				COOLER ID #			
SEAL PRESENT	✓		TEMP °C	1	2	3								
SEAL INTACT	✓													
COOLING MEDIA PRESENT		✓												

RELINQUISHED BY:		DATE:	TIME (24 HR)	RECEIVED BY:		DATE:	TIME (24 HR)
1.	Jeremy Eckert	2019/11/12	16:00	1. Khushboo Kapoor	Khushboo Kapoor	2019/11/13	12:00
2.				2.			
3.				3.			

Date Required

LAB USE ONLY
MAXXAM JOB # B9V9715

SAMPLES
LABELED BY: KK4
VERIFIED BY: LOR

IOL COC-AIR-(04/2016) White: Maxxam Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: November 12, 2019

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Bureau Veritas Mississauga

Consultant Project Number: 1791706-1155

Sample Submission Number: B9V9715

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			Lab control sample recovery (131 and 140%) outside
Extraction Surrogate Recovery			X	acceptance range of 70-130% for ethanol. Lab control
Method Blank Concentration	X			sample recovery (67%) outside acceptance range of 70-
Matrix Duplicate RPD	X			130% for 2-propanol. Lab control sample recovery (52
Matrix Spike Recovery			X	and 56%) outside acceptance range of 70-130% for
Lab Control Sample Recovery		X		vinyl acetateAll remaining laboratory QC results are within acceptance criteria.

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	All field QC samples are within
Trip Blank Concentration			X	alert limits.
Field Duplicate RPD	X			

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	n/a

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): Amanda Newberry

Date: December 3, 2019

Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1923B
Your C.O.C. #: 78312

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2019/11/25
Report #: R5978689
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9V9727
Received: 2019/11/13, 12:00

Sample Matrix: Air
Samples Received: 1

Analyses	Quantity	Laboratory Method	Analytical Method
BTEX and CCME Compounds in Air(TO-15mod)	1	BRL SOP-00304	EPA TO-15 m
Canister Pressure (TO-15)	1	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (ug/m3)	1	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (TO-15) (1)	1	BRL SOP-00304	EPA TO-15 m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard. All samples were analyzed within hold time unless otherwise flagged.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Air sampling canisters have been cleaned in accordance with U.S. EPA Method TO15. At the end of the cleaning, evacuation, and pressurization cycles, one canister was selected and was pressurized with Zero Air. This canister was then analyzed via TO15 on a GC/MS. The canister must have been found to contain <0.2 ppbv concentration of all target analytes in order for the batch to have been considered clean. Each canister also underwent a leak check prior to shipment.

Please Note: SUMMA® canister samples will be retained by Bureau Veritas Laboratories for a period of 5 calendar days or as contractually agreed from the date of this report, after which time they will be cleaned for reuse. If you require a longer sample storage period, please contact your service representative.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1923B
Your C.O.C. #: 78312

Attention: Ian Sosney

Golder Associates Ltd
110 Hanover Dr, Building A
Suite 203
St. Catherines, ON
Canada L2W 1A4

Report Date: 2019/11/25
Report #: R5978689
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9V9727
Received: 2019/11/13, 12:00

Encryption Key

Kyle Reinhart
Project Manager
25 Nov 2019 09:52:01

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kyle Reinhart, Project Manager
Email: Kyle.Reinhart@bvlabs.com
Phone# (905)817-5802

==========

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

BV Labs Job #: B9V9727
Report Date: 2019/11/25

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1923B

RESULTS OF ANALYSES OF AIR

BV Labs ID		LHI888	
Sampling Date		2019/11/12 13:09	
COC Number		78312	
	UNITS	**FIELD BLANK**	**QC Batch**
Pressure on Receipt	psig	(-1.1)	6449645
QC Batch = Quality Control Batch			

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Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1923B

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		LHI888		
Sampling Date		2019/11/12 13:09		
COC Number		78312		
	UNITS	**FIELD BLANK**	**RDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ppbv	0.75	0.20	6449646
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	0.17	6449646
Chloromethane	ppbv	0.35	0.30	6449646
Vinyl Chloride	ppbv	<0.10	0.10	6449646
Chloroethane	ppbv	<0.30	0.30	6449646
1,3-Butadiene	ppbv	<0.50	0.50	6449646
Trichlorofluoromethane (FREON 11)	ppbv	0.24	0.20	6449646
Ethanol (ethyl alcohol)	ppbv	<1.0	1.0	6449646
Trichlorotrifluoroethane	ppbv	<0.15	0.15	6449646
2-propanol	ppbv	<1.0	1.0	6449646
2-Propanone	ppbv	1.54	0.60	6449646
Methyl Ethyl Ketone (2-Butanone)	ppbv	<0.20	0.20	6449646
Methyl Isobutyl Ketone	ppbv	<0.20	0.20	6449646
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	1.0	6449646
Methyl t-butyl ether (MTBE)	ppbv	<0.20	0.20	6449646
Ethyl Acetate	ppbv	<1.0	1.0	6449646
1,1-Dichloroethylene	ppbv	<0.10	0.10	6449646
cis-1,2-Dichloroethylene	ppbv	<0.10	0.10	6449646
trans-1,2-Dichloroethylene	ppbv	<0.10	0.10	6449646
Methylene Chloride(Dichloromethane)	ppbv	<0.60	0.60	6449646
Chloroform	ppbv	<0.10	0.10	6449646
Carbon Tetrachloride	ppbv	<0.10	0.10	6449646
1,1-Dichloroethane	ppbv	<0.10	0.10	6449646
1,2-Dichloroethane	ppbv	<0.10	0.10	6449646
Ethylene Dibromide	ppbv	<0.10	0.10	6449646
1,1,1-Trichloroethane	ppbv	<0.10	0.10	6449646
1,1,2-Trichloroethane	ppbv	<0.10	0.10	6449646
1,1,2,2-Tetrachloroethane	ppbv	<0.10	0.10	6449646
cis-1,3-Dichloropropene	ppbv	<0.10	0.10	6449646
trans-1,3-Dichloropropene	ppbv	<0.10	0.10	6449646
1,2-Dichloropropane	ppbv	<0.10	0.10	6449646
Bromomethane	ppbv	<0.10	0.10	6449646
Bromoform	ppbv	<0.20	0.20	6449646
Bromodichloromethane	ppbv	<0.20	0.20	6449646

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1923B

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		LHI888		
Sampling Date		2019/11/12 13:09		
COC Number		78312		
	UNITS	**FIELD BLANK**	**RDL**	**QC Batch**
Dibromochloromethane	ppbv	<0.20	0.20	6449646
Trichloroethylene	ppbv	<0.10	0.10	6449646
Tetrachloroethylene	ppbv	<0.10	0.10	6449646
Benzene	ppbv	0.11	0.10	6449646
Toluene	ppbv	<0.10	0.10	6449646
Ethylbenzene	ppbv	<0.10	0.10	6449646
p+m-Xylene	ppbv	<0.20	0.20	6449646
o-Xylene	ppbv	<0.10	0.10	6449646
Styrene	ppbv	<0.10	0.10	6449646
4-ethyltoluene	ppbv	<0.50	0.50	6449646
1,3,5-Trimethylbenzene	ppbv	<0.50	0.50	6449646
1,2,4-Trimethylbenzene	ppbv	<0.50	0.50	6449646
Chlorobenzene	ppbv	<0.10	0.10	6449646
Benzyl chloride	ppbv	<0.50	0.50	6449646
1,3-Dichlorobenzene	ppbv	<0.40	0.40	6449646
1,4-Dichlorobenzene	ppbv	<0.10	0.10	6449646
1,2-Dichlorobenzene	ppbv	<0.10	0.10	6449646
1,2,4-Trichlorobenzene	ppbv	<0.50	0.50	6449646
Hexachlorobutadiene	ppbv	<0.50	0.50	6449646
Hexane	ppbv	<0.20	0.20	6449646
Heptane	ppbv	<0.30	0.30	6449646
Cyclohexane	ppbv	<0.20	0.20	6449646
Tetrahydrofuran	ppbv	<0.40	0.40	6449646
1,4-Dioxane	ppbv	<1.0	1.0	6449646
Naphthalene	ppbv	<0.20	0.20	6449646
Total Xylenes	ppbv	<0.30	0.30	6449646
1,1,1,2-Tetrachloroethane	ppbv	<0.10	0.10	6449646
Vinyl Bromide	ppbv	<0.20	0.20	6449646
Propene	ppbv	<0.50	0.50	6449646
2,2,4-Trimethylpentane	ppbv	<0.20	0.20	6449646
Carbon Disulfide	ppbv	<0.50	0.50	6449646
Vinyl Acetate	ppbv	<0.20	0.20	6449646

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: B9V9727
Report Date: 2019/11/25

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1923B

VOLATILE ORGANICS BY GC/MS (AIR)

BV Labs ID		LHI888		
Sampling Date		2019/11/12 13:09		
COC Number		78312		
	UNITS	**FIELD BLANK**	**RDL**	**QC Batch**
Instrument Surrogate Recovery (%)				
Bromochloromethane	%	84		6449646
D5-Chlorobenzene	%	74		6449646
Difluorobenzene	%	82		6449646

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1923B

CALCULATED VOLATILE ORGANICS (AIR)

BV Labs ID		LHI888		
Sampling Date		2019/11/12 13:09		
COC Number		78312		
	UNITS	**FIELD BLANK**	**RDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ug/m3	3.70	0.99	6441779
1,2-Dichlorotetrafluoroethane	ug/m3	<1.2	1.2	6441779
Chloromethane	ug/m3	0.73	0.62	6441779
Vinyl Chloride	ug/m3	<0.26	0.26	6441779
Chloroethane	ug/m3	<0.79	0.79	6441779
1,3-Butadiene	ug/m3	<1.1	1.1	6441779
Trichlorofluoromethane (FREON 11)	ug/m3	1.4	1.1	6441779
Ethanol (ethyl alcohol)	ug/m3	<1.9	1.9	6441779
Trichlorotrifluoroethane	ug/m3	<1.2	1.2	6441779
2-propanol	ug/m3	<2.5	2.5	6441779
2-Propanone	ug/m3	3.6	1.4	6441779
Methyl Ethyl Ketone (2-Butanone)	ug/m3	<0.59	0.59	6441779
Methyl Isobutyl Ketone	ug/m3	<0.82	0.82	6441779
Methyl Butyl Ketone (2-Hexanone)	ug/m3	<4.1	4.1	6441779
Methyl t-butyl ether (MTBE)	ug/m3	<0.72	0.72	6441779
Ethyl Acetate	ug/m3	<3.6	3.6	6441779
1,1-Dichloroethylene	ug/m3	<0.40	0.40	6441779
cis-1,2-Dichloroethylene	ug/m3	<0.40	0.40	6441779
trans-1,2-Dichloroethylene	ug/m3	<0.40	0.40	6441779
Methylene Chloride(Dichloromethane)	ug/m3	<2.1	2.1	6441779
Chloroform	ug/m3	<0.49	0.49	6441779
Carbon Tetrachloride	ug/m3	<0.63	0.63	6441779
1,1-Dichloroethane	ug/m3	<0.40	0.40	6441779
1,2-Dichloroethane	ug/m3	<0.40	0.40	6441779
Ethylene Dibromide	ug/m3	<0.77	0.77	6441779
1,1,1-Trichloroethane	ug/m3	<0.55	0.55	6441779
1,1,2-Trichloroethane	ug/m3	<0.55	0.55	6441779
1,1,2,2-Tetrachloroethane	ug/m3	<0.69	0.69	6441779
cis-1,3-Dichloropropene	ug/m3	<0.45	0.45	6441779
trans-1,3-Dichloropropene	ug/m3	<0.45	0.45	6441779
1,2-Dichloropropane	ug/m3	<0.46	0.46	6441779
Bromomethane	ug/m3	<0.39	0.39	6441779
Bromoform	ug/m3	<2.1	2.1	6441779
Bromodichloromethane	ug/m3	<1.3	1.3	6441779

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1923B

CALCULATED VOLATILE ORGANICS (AIR)

BV Labs ID		LHI888		
Sampling Date		2019/11/12 13:09		
COC Number		78312		
	UNITS	**FIELD BLANK**	**RDL**	**QC Batch**
Dibromochloromethane	ug/m3	<1.7	1.7	6441779
Trichloroethylene	ug/m3	<0.54	0.54	6441779
Tetrachloroethylene	ug/m3	<0.68	0.68	6441779
Benzene	ug/m3	0.37	0.32	6441779
Toluene	ug/m3	<0.38	0.38	6441779
Ethylbenzene	ug/m3	<0.43	0.43	6441779
p+m-Xylene	ug/m3	<0.87	0.87	6441779
o-Xylene	ug/m3	<0.43	0.43	6441779
Styrene	ug/m3	<0.43	0.43	6441779
4-ethyltoluene	ug/m3	<2.5	2.5	6441779
1,3,5-Trimethylbenzene	ug/m3	<2.5	2.5	6441779
1,2,4-Trimethylbenzene	ug/m3	<2.5	2.5	6441779
Chlorobenzene	ug/m3	<0.46	0.46	6441779
Benzyl chloride	ug/m3	<2.6	2.6	6441779
1,3-Dichlorobenzene	ug/m3	<2.4	2.4	6441779
1,4-Dichlorobenzene	ug/m3	<0.60	0.60	6441779
1,2-Dichlorobenzene	ug/m3	<0.60	0.60	6441779
1,2,4-Trichlorobenzene	ug/m3	<3.7	3.7	6441779
Hexachlorobutadiene	ug/m3	<5.3	5.3	6441779
Hexane	ug/m3	<0.70	0.70	6441779
Heptane	ug/m3	<1.2	1.2	6441779
Cyclohexane	ug/m3	<0.69	0.69	6441779
Tetrahydrofuran	ug/m3	<1.2	1.2	6441779
1,4-Dioxane	ug/m3	<3.6	3.6	6441779
Naphthalene	ug/m3	<1.0	1.0	6441779
Total Xylenes	ug/m3	<1.3	1.3	6441779
1,1,1,2-Tetrachloroethane	ug/m3	<0.69	0.69	6441779
Vinyl Bromide	ug/m3	<0.87	0.87	6441779
Propene	ug/m3	<0.86	0.86	6441779
2,2,4-Trimethylpentane	ug/m3	<0.93	0.93	6441779
Carbon Disulfide	ug/m3	<1.6	1.6	6441779
Vinyl Acetate	ug/m3	<0.70	0.70	6441779

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: B9V9727
Report Date: 2019/11/25

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1923B

VOLATILE ORGANIC HYDROCARBONS BY GC/MS (AIR)

BV Labs ID		LHI888		
Sampling Date		2019/11/12 13:09		
COC Number		78312		
	UNITS	**FIELD BLANK**	**RDL**	**QC Batch**
F1-BTEX, C6-C10 (as Toluene)	ug/m3	14.9	5.0	6453213
F2, C10-C16 (as Decane)	ug/m3	<5.0	5.0	6453213

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: B9V9727
Report Date: 2019/11/25

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1923B

TEST SUMMARY

BV Labs ID: LHI888
Sample ID: FIELD BLANK
Matrix: Air

Collected: 2019/11/12
Relinquished: 2019/11/12
Received: 2019/11/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	6453213	N/A	2019/11/19	Dany Marqass
Canister Pressure (TO-15)	PRES	6449645	N/A	2019/11/19	Dany Marqass
Volatile Organics in Air (ug/m3)	GC/MS	6441779	N/A	2019/11/22	Automated Statchk
Volatile Organics in Air (TO-15)	GC/MS	6449646	N/A	2019/11/19	Dany Marqass

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GENERAL COMMENTS

WS# 6449646: Vinyl Acetate was less than 60% recovery in the reference standard. There were no positives found for Vinyl Acetate therefore there should be no effect on the data.

Results relate only to the items tested.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6449646	DM2	Method Blank	Bromochloromethane	2019/11/19		102	%	60 - 140
			D5-Chlorobenzene	2019/11/19		87	%	60 - 140
			Difluorobenzene	2019/11/19		101	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2019/11/19	<0.20		ppbv	
			1,2-Dichlorotetrafluoroethane	2019/11/19	<0.17		ppbv	
			Chloromethane	2019/11/19	<0.30		ppbv	
			Vinyl Chloride	2019/11/19	<0.10		ppbv	
			Chloroethane	2019/11/19	<0.30		ppbv	
			1,3-Butadiene	2019/11/19	<0.50		ppbv	
			Trichlorofluoromethane (FREON 11)	2019/11/19	<0.20		ppbv	
			Ethanol (ethyl alcohol)	2019/11/19	<1.0		ppbv	
			Trichlorotrifluoroethane	2019/11/19	<0.15		ppbv	
			2-propanol	2019/11/19	<1.0		ppbv	
			2-Propanone	2019/11/19	<0.60		ppbv	
			Methyl Ethyl Ketone (2-Butanone)	2019/11/19	<0.20		ppbv	
			Methyl Isobutyl Ketone	2019/11/19	<0.20		ppbv	
			Methyl Butyl Ketone (2-Hexanone)	2019/11/19	<1.0		ppbv	
			Methyl t-butyl ether (MTBE)	2019/11/19	<0.20		ppbv	
			Ethyl Acetate	2019/11/19	<1.0		ppbv	
			1,1-Dichloroethylene	2019/11/19	<0.10		ppbv	
			cis-1,2-Dichloroethylene	2019/11/19	<0.10		ppbv	
			trans-1,2-Dichloroethylene	2019/11/19	<0.10		ppbv	
			Methylene Chloride(Dichloromethane)	2019/11/19	<0.60		ppbv	
			Chloroform	2019/11/19	<0.10		ppbv	
			Carbon Tetrachloride	2019/11/19	<0.10		ppbv	
			1,1-Dichloroethane	2019/11/19	<0.10		ppbv	
			1,2-Dichloroethane	2019/11/19	<0.10		ppbv	
			Ethylene Dibromide	2019/11/19	<0.10		ppbv	
			1,1,1-Trichloroethane	2019/11/19	<0.10		ppbv	
			1,1,2-Trichloroethane	2019/11/19	<0.10		ppbv	
			1,1,2,2-Tetrachloroethane	2019/11/19	<0.10		ppbv	
			cis-1,3-Dichloropropene	2019/11/19	<0.10		ppbv	
			trans-1,3-Dichloropropene	2019/11/19	<0.10		ppbv	
			1,2-Dichloropropane	2019/11/19	<0.10		ppbv	
			Bromomethane	2019/11/19	<0.10		ppbv	
			Bromoform	2019/11/19	<0.20		ppbv	
			Bromodichloromethane	2019/11/19	<0.20		ppbv	
			Dibromochloromethane	2019/11/19	<0.20		ppbv	
			Trichloroethylene	2019/11/19	<0.10		ppbv	
			Tetrachloroethylene	2019/11/19	<0.10		ppbv	
			Benzene	2019/11/19	<0.10		ppbv	
			Toluene	2019/11/19	<0.10		ppbv	
			Ethylbenzene	2019/11/19	<0.10		ppbv	
			p+m-Xylene	2019/11/19	<0.20		ppbv	
			o-Xylene	2019/11/19	<0.10		ppbv	
			Styrene	2019/11/19	<0.10		ppbv	
			4-ethyltoluene	2019/11/19	<0.50		ppbv	
			1,3,5-Trimethylbenzene	2019/11/19	<0.50		ppbv	
			1,2,4-Trimethylbenzene	2019/11/19	<0.50		ppbv	
			Chlorobenzene	2019/11/19	<0.10		ppbv	

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Benzyl chloride	2019/11/19	<0.50		ppbv	
			1,3-Dichlorobenzene	2019/11/19	<0.40		ppbv	
			1,4-Dichlorobenzene	2019/11/19	<0.10		ppbv	
			1,2-Dichlorobenzene	2019/11/19	<0.10		ppbv	
			1,2,4-Trichlorobenzene	2019/11/19	<0.50		ppbv	
			Hexachlorobutadiene	2019/11/19	<0.50		ppbv	
			Hexane	2019/11/19	<0.20		ppbv	
			Heptane	2019/11/19	<0.30		ppbv	
			Cyclohexane	2019/11/19	<0.20		ppbv	
			Tetrahydrofuran	2019/11/19	<0.40		ppbv	
			1,4-Dioxane	2019/11/19	<1.0		ppbv	
			Naphthalene	2019/11/19	<0.20		ppbv	
			Total Xylenes	2019/11/19	<0.30		ppbv	
			1,1,1,2-Tetrachloroethane	2019/11/19	<0.10		ppbv	
			Vinyl Bromide	2019/11/19	<0.20		ppbv	
			Propene	2019/11/19	<0.50		ppbv	
			2,2,4-Trimethylpentane	2019/11/19	<0.20		ppbv	
			Carbon Disulfide	2019/11/19	<0.50		ppbv	
			Vinyl Acetate	2019/11/19	<0.20		ppbv	
6453213	DM2	Method Blank	F1-BTEX, C6-C10 (as Toluene)	2019/11/19	<5.0		ug/m3	
			F2, C10-C16 (as Decane)	2019/11/19	<5.0		ug/m3	
6449646	DM2	LCS	Bromochloromethane	2019/11/19		107	%	60 - 140
			D5-Chlorobenzene	2019/11/19		106	%	60 - 140
			Difluorobenzene	2019/11/19		108	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2019/11/19		100	%	70 - 130
			1,2-Dichlorotetrafluoroethane	2019/11/19		93	%	70 - 130
			Chloromethane	2019/11/19		87	%	70 - 130
			Vinyl Chloride	2019/11/19		89	%	70 - 130
			Chloroethane	2019/11/19		86	%	70 - 130
			1,3-Butadiene	2019/11/19		92	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2019/11/19		107	%	70 - 130
			Ethanol (ethyl alcohol)	2019/11/19		104	%	70 - 130
			Trichlorotrifluoroethane	2019/11/19		93	%	70 - 130
			2-propanol	2019/11/19		71	%	70 - 130
			2-Propanone	2019/11/19		98	%	70 - 130
			Methyl Ethyl Ketone (2-Butanone)	2019/11/19		84	%	70 - 130
			Methyl Isobutyl Ketone	2019/11/19		89	%	70 - 130
			Methyl Butyl Ketone (2-Hexanone)	2019/11/19		89	%	70 - 130
			Methyl t-butyl ether (MTBE)	2019/11/19		101	%	70 - 130
			Ethyl Acetate	2019/11/19		106	%	70 - 130
			1,1-Dichloroethylene	2019/11/19		95	%	70 - 130
			cis-1,2-Dichloroethylene	2019/11/19		93	%	70 - 130
			trans-1,2-Dichloroethylene	2019/11/19		94	%	70 - 130
			Methylene Chloride(Dichloromethane)	2019/11/19		84	%	70 - 130
			Chloroform	2019/11/19		102	%	70 - 130
			Carbon Tetrachloride	2019/11/19		114	%	70 - 130
			1,1-Dichloroethane	2019/11/19		89	%	70 - 130
			1,2-Dichloroethane	2019/11/19		106	%	70 - 130
			Ethylene Dibromide	2019/11/19		102	%	70 - 130
			1,1,1-Trichloroethane	2019/11/19		110	%	70 - 130

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,1,2-Trichloroethane	2019/11/19		97	%	70 - 130
			1,1,2,2-Tetrachloroethane	2019/11/19		89	%	70 - 130
			cis-1,3-Dichloropropene	2019/11/19		100	%	70 - 130
			trans-1,3-Dichloropropene	2019/11/19		107	%	70 - 130
			1,2-Dichloropropane	2019/11/19		84	%	70 - 130
			Bromomethane	2019/11/19		95	%	70 - 130
			Bromoform	2019/11/19		108	%	70 - 130
			Bromodichloromethane	2019/11/19		109	%	70 - 130
			Dibromochloromethane	2019/11/19		114	%	70 - 130
			Trichloroethylene	2019/11/19		106	%	70 - 130
			Tetrachloroethylene	2019/11/19		107	%	70 - 130
			Benzene	2019/11/19		91	%	70 - 130
			Toluene	2019/11/19		100	%	70 - 130
			Ethylbenzene	2019/11/19		95	%	70 - 130
			p+m-Xylene	2019/11/19		97	%	70 - 130
			o-Xylene	2019/11/19		98	%	70 - 130
			Styrene	2019/11/19		104	%	70 - 130
			4-ethyltoluene	2019/11/19		106	%	70 - 130
			1,3,5-Trimethylbenzene	2019/11/19		101	%	70 - 130
			1,2,4-Trimethylbenzene	2019/11/19		105	%	70 - 130
			Chlorobenzene	2019/11/19		96	%	70 - 130
			Benzyl chloride	2019/11/19		92	%	70 - 130
			1,3-Dichlorobenzene	2019/11/19		106	%	70 - 130
			1,4-Dichlorobenzene	2019/11/19		104	%	70 - 130
			1,2-Dichlorobenzene	2019/11/19		106	%	70 - 130
			1,2,4-Trichlorobenzene	2019/11/19		130	%	70 - 130
			Hexachlorobutadiene	2019/11/19		114	%	70 - 130
			Hexane	2019/11/19		88	%	70 - 130
			Heptane	2019/11/19		88	%	70 - 130
			Cyclohexane	2019/11/19		89	%	70 - 130
			Tetrahydrofuran	2019/11/19		85	%	70 - 130
			1,4-Dioxane	2019/11/19		100	%	70 - 130
			Naphthalene	2019/11/19		134 (1)	%	70 - 130
			Total Xylenes	2019/11/19		97	%	70 - 130
			1,1,1,2-Tetrachloroethane	2019/11/19		100	%	70 - 130
			Vinyl Bromide	2019/11/19		109	%	70 - 130
			Propene	2019/11/19		85	%	70 - 130
			2,2,4-Trimethylpentane	2019/11/19		92	%	70 - 130
			Carbon Disulfide	2019/11/19		94	%	70 - 130
			Vinyl Acetate	2019/11/19		49 (1)	%	70 - 130

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: B9V9727
Report Date: 2019/11/25

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-1923B

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Maureen Smith, Supervisor, Volatiles

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam
A Bureau Veritas Group Company

6740 Campobello Road
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EXXONMOBIL/IMPERIAL OIL - MAXXAM
AIR CHAIN OF CUSTODY RECORD

Page 1 of 1

C of C # 78312

INVOICE INFORMATION	REPORT INFORMATION
Company Name: ☒ Imperial Oil ☐ ExxonMobil	Company Name: Golder Associates Ltd.
Contact Name: IOL Accounts Payable	Contact Name: Ian Sosney
Address: 102-2535, 3rd Ave SE Calgary, AB, T2A 7W5	Address: 110 Hannover Dr # 203A St. Catharines, ON, L2W1A4
Email: IOLAccounts_Payable@golder.com	Email: ian_sosney@golder.com
Ph: 403-299-5600	Ph: 647-522-4898
Sampler Name (Print): Jeremy Eckert	Consultant Project #: 1791706-1155-1923B

	FIELD SAMPLE ID	Canister Serial #	Flow Regulator Serial #	Sample Collection DATE (YYYY/MM/DD)	Sample Collection TIME (24 HR)	Media Type (See Legend)	FLOW RATE (mL/min.)	LENGTH OF SAMPLING (minutes)	BTEX	Aromatic/Aliphatic Hydrocarbon Fractionations	F1 (C6-C10) - F2 (C10-C16)	VOC (TO15)
1	Field Blank	3013	FX0109	2019/11/12	13:09	S	233	6	X		X	X
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												

IOL SITE LOCATION: 1660 Merivale Rd, Ottawa, ON

IOL PROJECT # (if applicable): N/A

MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM: 1791706-1155-7777

REGULATORY CRITERIA / DETECTION LIMITS (PLEASE SPECIFY): N/A

SPECIAL INSTRUCTIONS: IES: A2601436 SAP: 8800 1627

LEGEND
S - Summa Can
T - Tube
TB - Tedlar Bag
O - Other(Specify)
*TEMP N/A for SUMMA CAN

TURNAROUND TIME
Standard (10 days) ☒
Rush (9 days) ☐
(6 days) ☐
(3 days) ☐

	YES	NO	COOLER ID # 1				YES	NO	COOLER ID #				YES	NO	COOLER ID #			
SEAL PRESENT	/		TEMP °C	1	2	3	SEAL PRESENT		TEMP °C	1	2	3	SEAL PRESENT		TEMP °C	1	2	3
SEAL INTACT	/						SEAL INTACT						SEAL INTACT					
COOLING MEDIA PRESENT		/					COOLING MEDIA PRESENT						COOLING MEDIA PRESENT					

RELINQUISHED BY:		DATE:	TIME (24 HR)	RECEIVED BY:		DATE:	TIME (24 HR)
1.	Jeremy Eckert	2019/11/12	16:00	1. Khushboo Kapoor	KHUSHBOO KAPOOR	2019/11/13	12:00
2.				2.			
3.				3.			

Date Required

LAB USE ONLY
MAXXAM JOB # B9V9727

SAMPLES
LABELED BY: KK4
VERIFIED BY: LOR

IOL COC-AIR-(04/2016) White: Maxxam Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: November 12, 2019

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Bureau Veritas Mississauga

Consultant Project Number: 1791706-1155

Sample Submission Number: B9V9727

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			Lab control sample recovery (134%) outside
Extraction Surrogate Recovery			X	acceptance range of 70-130% for naphthalene. Lab
Method Blank Concentration	X			control sample recovery (49%) outside acceptance
Matrix Duplicate RPD			X	range of 70-130% for vinyl acetate. All remaining
Matrix Spike Recovery			X	laboratory QC results are within acceptance criteria.
Lab Control Sample Recovery		X		

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration	X			All field QC samples are within
Trip Blank Concentration			X	alert limits.
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	n/a

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): Amanda Newberry

Date: December 3, 2019

APPENDIX B

Quality Control/Quality Assurance

QUALITY ASSURANCE/QUALITY CONTROL

In conjunction with the field investigations completed to date, a Quality Assurance/Quality Control (QA/QC) program was implemented to ensure the integrity of the groundwater sampling and soil vapour sampling and analytical testing results.

1.0 FIELD PROGRAM

All sampling activities were completed in accordance with Golder's Technical Field Procedures by trained Golder personnel. All field activities were documented in field notes and results were recorded on standard field forms. All field equipment involved in the sampling and monitoring of groundwater and soil vapour were decontaminated in accordance with Golder's Technical Procedures. Groundwater and soil vapour samples were collected using appropriate handling protocols and were placed in sample containers provided by Bureau Veritas Laboratories (BVL).

All re-useable field equipment involved in collecting samples was decontaminated between each sampling location. Groundwater and soil vapour samples were not directly contacted by hand. To help prevent cross-contamination, a new pair of clean nitrile gloves was used for the collection of each sample.

Samples were given unique identification numbers and the sampling containers were preserved in ice-filled coolers. Samples were logged onto formal chain-of-custody documents and transported to BVL's Mississauga Environmental Laboratory for chemical analysis. BVL is accredited by the Standards Council of Canada (SCC).

Two blind field duplicate groundwater sample were submitted for analysis of benzene, toluene, ethylbenzene, xylenes (BTEX), petroleum hydrocarbon (PHC) Fractions F1 to F4 and dissolved lead. Trip and field blanks were submitted for analysis, to evaluate the potential for cross-contamination during the sampling and transportation of the samples.

Soil Vapour

Field QA/QC for soil vapour sample collection included:

- using new, dedicated high density polyethylene (HDPE) tubing for each sample to avoid cross contamination;
- calibrating field instruments prior to use;
- conducting a helium leak tracer test for each probe;
- sealing all probes when not in use;
- storing all sampling materials away from potential sources of contamination;
- following chain-of-custody procedures during all sampling events; and
- monitoring of the Summa canister vacuums in the field before and after sampling using a pressure gauge supplied by BVL.

For each sampling event, one field duplicate soil vapour sample and one ambient air sample were submitted to the laboratory for the analysis of BTEX, PHC Fractions F1 and F2 and volatile organic compounds (VOCs) as part of the soil vapour program.

2.0 LABORATORY PROGRAM

The laboratory QA/QC program included adherence to laboratory sampling and analysis protocols (e.g., hold times, sample containers, preservatives, detection limits and approved methodology) and the analysis of laboratory method blanks, laboratory sample duplicates, surrogate recovery and chemical spikes.

The laboratory method blank analysis results were used to detect interferences or impurities introduced by the laboratory equipment, reagents, or solvents. Surrogate recovery is analyzed by spiking samples with known quantities of surrogate chemicals which have similar chemical properties to the parameters being analyzed. The reported recovery provides an indication of the analytical method accuracy for that sample. Matrix spikes were conducted by adding known concentrations of the analyte of interest to a sample to evaluate the effects of the sample matrix on the test method. The analysis of selected samples in duplicate is used to evaluate the reproducibility of the test method.

Soil Vapour

The Summa canisters were batch certified as clean before delivery to the Site. The Summa canister vacuums measured in June, were between -27.0 to -29.0 inches Hg [vac] before sampling and were measured between 0.0 and -5.0 inches Hg [vac] after sampling. The Summa canister vacuums measured in November, were between -27.0 and -28.0 inches Hg [vac] before sampling and were measured to be -5.0 inches Hg [vac] after sampling.

The laboratory QA/QC included the analyses of method blanks, laboratory control samples and continuing calibration verification standards.

3.0 DATA RECEPTION

Once laboratory analytical results were received, Golder completed a review of field and laboratory quality. This included review of laboratory QC performance to confirm results are within acceptance criteria, as well as evaluation of field duplicate and blank results to confirm they were within alert limits. Upon receipt of the analytical results, Relative Percent Difference (RPD) values between the original samples and their blind field duplicates were calculated as follows:

$$\text{RPD\%} = \frac{|S - D|}{\frac{1}{2}(S + D)} \times 100$$

Where: RPD = relative percent difference
S = sample value
D = blind field duplicate or replicate value.

Since analytical error increases near the Reportable Detection Limit (RDL), the RPD was only calculated where the concentrations of both the original and blind field duplicate samples were greater than five times the RDL. The calculated RPDs were then compared to parameter specific alert limits.

Exceedances of the QC acceptance or alert criteria were investigated with the laboratory and, if warranted, a corrective action report was requested from the laboratory.

4.0 DATA QUALITY REVIEW RESULTS

Results of the data quality review are summarized in Table B1. The RPD calculations and QC results are presented in Tables B2 to B6.

Two field duplicates, one field blank and one trip blank were submitted to the laboratory as part of the groundwater QC program.

For each sampling event, one field duplicate, and one ambient air sample were submitted to the laboratory as part of the soil vapour QC program.

Based on the data quality review, no data quality issues were identified as part of the groundwater QC program.

Based on the data quality review, 12 data quality issues were identified as part of the soil vapour QC program.

Eleven of the data quality issues are considered unlikely to have any material effect on the quality of the data. Two of the data quality issues are for one of the ambient air samples. Elevated concentrations were likely due to variables associated with the Site. This data is considered suspect. All of the data quality issues are discussed in Table B1.

5.0 SUMMARY OF RESULTS

Based on the review of the QA/QC results, the data from one of the ambient air samples is considered suspect. All other data is considered reliable.

Table B1
Summary of Quality Control Sample Results
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

BVL Job Number	Matrix	BVL Sample ID Affected	Test Affected	Data Quality Issue	Comments
B9H4030	Soil Vapour	KCI078 KCI079 KCI080	Vinyl Acetate	Lab control sample recovery (56%) outside acceptance range of 70-130% for vinyl acetate for batch 6206012.	This data quality issue may represent a potential low bias for this sample. As the recovery for this parameter (vinyl acetate) is outside the control limits, upon review BVL indicated that the overall quality control for this analysis meets laboratory acceptability criteria. Under these circumstances, the vinyl acetate data reported can be considered reliable.
		KCI078 KCI079	Methyl Ethyl Ketone (2-Butanone)	Field duplicate samples SV16-01 and DUP A exceed the alert limit for methyl ethyl ketone (2-butanone) (52%).	A quality check of the data yielded similar results. Sample non-homogeneity is believed to be the root cause. Methyl ethyl ketone (2-butanone) concentrations in both the sample and the field duplicate were below the regulatory guideline, indicating that there will likely not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the methyl ethyl ketone (2-butanone) data reported can be considered reliable.
		KCI078 KCI079	F2, C10-C16 (as Decane)	Field duplicate samples SV16-01 and DUP A exceed the alert limit for F2, C10-C16 (as decane) (121%).	A quality check of the data yielded similar results. Sample non-homogeneity is believed to be the root cause. F2 concentrations in both the sample and the field duplicate were below the regulatory guideline, indicating that there will likely not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the F2 data reported can be considered reliable.
B9H4037	Ambient Air	KCI089	Vinyl Acetate	Lab control sample recovery (56%) outside acceptance range of 70-130% for vinyl acetate for batch 6206012.	This data quality issue may represent a potential low bias for this sample. As the recovery for this parameter (vinyl acetate) is outside the control limits, upon review BVL indicated that the overall quality control for this analysis meets laboratory acceptability criteria. Under these circumstances, the vinyl acetate data reported can be considered reliable.
		KCI089	2-Propanone	Field blank sample exceeded alert limits for 2-propanone.	The field blank sample was prepared from ambient air present on site. Therefore, the concentrations are likely present from variables associated with the site. All samples associated with with this field blank may be biased high for 2-propanone. Thus, this 2-propanone data associated should be considered suspect.
B9L2439	Groundwater	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
B9L2700	Groundwater	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
B9L4405	Water	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
B9L4415	Groundwater	n/a	n/a	No data quality issues were identified.	The data are considered reliable.

Notes:
BVL - Bureau Veritas Laboratories
n/a - not applicable

Table B1
Summary of Quality Control Sample Results
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

BVL Job Number	Matrix	BVL Sample ID Affected	Test Affected	Data Quality Issue	Comments
B9V9715	Soil Vapour	LHI693 and LHI694	Ethanol (ethyl alcohol)	Lab control sample recovery (131%) outside acceptance range of 70-130% for ethanol for batch 6452470.	This data quality issue may represent a potential high bias for this sample. Ethanol (ethyl alcohol) concentrations in the samples and the lab duplicate were below the regulatory guideline, indicating that there will likely not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the ethanol (ethyl alcohol) data reported can be considered reliable.
		LHI695	Ethanol (ethyl alcohol)	Lab control sample recovery (140%) outside acceptance range of 70-130% for ethanol for batch 6457320.	This data quality issue may represent a potential high bias for this sample. Ethanol (ethyl alcohol) concentrations in the field duplicate was below the regulatory guideline, indicating that there will likely not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the ethanol (ethyl alcohol) data reported can be considered reliable.
		LHI693 LHI694	2-Propanol	Lab control sample recovery (67%) outside acceptance range of 70-130% for 2-propanol for batch 6452470.	This data quality issue may represent a potential low bias for this sample. As the recovery for this parameter (2-propanol) is outside the control limits, upon review BVL indicated that the overall quality control for this analysis meets laboratory acceptability criteria. Under these circumstances, the 2-propanol data reported can be considered reliable.
		LHI695	Vinyl Acetate	Lab control sample recovery (52%) outside acceptance range of 70-130% for vinyl acetate for batch 6457320.	This data quality issue may represent a potential low bias for this sample. As the recovery for this parameter (vinyl acetate) is outside the control limits, upon review BVL indicated that the overall quality control for this analysis meets laboratory acceptability criteria. Under these circumstances, the vinyl acetate data reported can be considered reliable.
		LHI693 LHI694	Vinyl Acetate	Lab control sample recovery (56%) outside acceptance range of 70-130% for vinyl acetate for batch 6452470.	This data quality issue may represent a potential low bias for this sample. As the recovery for this parameter (vinyl acetate) is outside the control limits, upon review BVL indicated that the overall quality control for this analysis meets laboratory acceptability criteria. Under these circumstances, the vinyl acetate data reported can be considered reliable.
B9V9727	Ambient Air	LHI888	Naphthalene	Lab control sample recovery (134%) outside acceptance range of 70-130% for naphthalene for batch 6449646.	This data quality issue may represent a potential high bias for this sample. Naphthalene concentration in the field blank was below the regulatory guideline and below the detection limit, indicating that there will likely not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the naphthalene data reported can be considered reliable.
		LHI888	Vinyl Acetate	Lab control sample recovery (49%) outside acceptance range of 70-130% for vinyl acetate for batch 6449646.	This data quality issue may represent a potential low bias for this sample. As the recovery for this parameter (vinyl acetate) is outside the control limits, upon review BVL indicated that the overall quality control for this analysis meets laboratory acceptability criteria. Under these circumstances, the vinyl acetate data reported can be considered reliable.

Notes:

BVL - Bureau Veritas Laboratories

n/a - not applicable

Table B2
Summary of Field Duplicate Sample Results - Petroleum Hydrocarbons and Dissolved Lead
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location	Units	Alert Limit	RDL	TH9	DUP A	RPD %	RDL	TH5	DUP B	RPD %
Sample Collection Date				30-Jul-19	30-Jul-19			31-Jul-19	31-Jul-19	
BVL Sample ID				KKL934	KKL935			KKW309	KKW310	
Benzene	µg/L	>80%	0.2	0.81	0.84	n/c	2	380	380	0
Toluene	µg/L	>80%	0.2	<0.20	<0.20	n/c	2	24	26	8
Ethylbenzene	µg/L	>80%	0.2	2.5	2.6	4	2	910	940	3
Total Xylenes	µg/L	>80%	0.4	0.47	0.51	n/c	4	2,800	2,900	4
F1 (C6-C10) - BTEX	µg/L	>80%	25	50	63	n/c	250	5,600	5,700	2
F2 (C10-C16 Hydrocarbons)	µg/L	>80%	100	<100	<100	n/c	100	5,400	4,100	27
F3 (C16-C34 Hydrocarbons)	µg/L	>80%	200	540	1,200	n/c	200	350	290	n/c
F4 (C34-C50 Hydrocarbons)	µg/L	>80%	200	1,900	3,000	n/c	200	<200	<200	n/c
Dissolved Lead (Pb)	µg/L	>50%	2.5	0.95	0.91	n/c	0.5	8.4	8.3	1

Notes:

Bold/Underlined - value exceeds alert limit

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3 and 4

n/c - not calculated

RDL - reportable detection limit

RPD - relative percent difference

µg/L - micrograms per litre

> - greater than

< - less than

RPD is not calculated if either the original or field duplicate sample has a result of less than 5X the RDL

Table B3
Summary of Field Blank and Trip Blank Results - Petroleum Hydrocarbons
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Parameter	Units	Alert Limit	RDL	Field Blank	Do the results exceed the Alert Limit?	Trip Blank	Do the results exceed the Alert Limit?
Sample Collection Date				31-Jul-19		31-Jul-19	
BVL Sample ID				KKW280		KKW281	
Benzene	µg/L	>5X RDL	0.2	<0.20	no	<0.20	no
Toluene	µg/L	>5X RDL	0.2	<0.20	no	<0.20	no
Ethylbenzene	µg/L	>5X RDL	0.2	<0.20	no	<0.20	no
Total Xylenes	µg/L	>5X RDL	0.4	<0.40	no	<0.40	no
F1 (C_6-C_{10}) - BTEX	µg/L	>2X RDL	25	<25	no	<25	no
F2 (C_{10}-C_{16})	µg/L	>2X RDL	100	<100	no	na	n/a
F3 (C_{16}-C_{34})	µg/L	>2X RDL	240	<240	no	na	n/a
F4 (C_{34}-C_{50})	µg/L	>2X RDL	200	<200	no	na	n/a

Notes:

Bold/Underlined - value exceeds alert limit

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2 - petroleum hydrocarbon fractions 1 and 2

na - not analyzed

n/a - not applicable

RDL - reportable detection limit

µg/L - micrograms per litre

> - greater than

< - less than

Alert limit is 5X the RDL for BTEX and 2X the RDL for F1 to F4

Table B4
Summary of Soil Vapour Field Duplicate Sample Results - Petroleum Hydrocarbons
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location	Units	Alert Limit	RDL	SV16-01	DUP A	RPD %	SV16-02	DUP A	RPD %
Sample Collection Date				21-Jun-19	21-Jun-19		12-Nov-19	12-Nov-19	
BVL Sample ID				KCI079	ICK078		LHI694	LHI695	
Benzene	µg/m^3	>50%	0.32	<0.32	<0.32	n/c	<0.32	<0.32	n/c
Toluene	µg/m^3	>50%	0.38	1.56	0.52	n/c	1.30	0.65	n/c
Ethylbenzene	µg/m^3	>50%	0.43	1.63	<0.43	n/c	<0.43	<0.43	n/c
Xylenes, Total	µg/m^3	>50%	1.3	6.3	<1.3	n/c	<1.3	<1.3	n/c
F1-BTEX, C_6-C_{10} (as Toluene)	µg/m^3	>50%	5.0	243	165	38	113	110	3
F2, C_{10}-C_{16} (as Decane)	µg/m^3	>50%	5.0	1,470	360	**121**	131	166	24

Notes:

Bold/Underlined - value exceeds alert limit

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2 - petroleum hydrocarbon fractions 1 and 2

n/a - not analysed

n/c - not calculated

RDL - reportable detection limit

RPD - relative percent difference

µg/m^3 - micrograms per cubic metre

> - greater than

< - less than

RPD is not calculated if either the original or field duplicate sample has a result of less than 5X the RDL

Table B5
Summary of Soil Vapour Field Duplicate Sample Results - Volatile Organic Compounds
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location	Units	Alert Limit	RDL	SV16-01	DUP A	RPD %	SV16-02	DUP A	RPD %
Sample Collection Date				21-Jun-19	21-Jun-19		12-Nov-19	12-Nov-19	
BVL Sample ID				KCI079	ICK078		LHI694	LHI695	
Benzyl chloride	µg/m^3	>50%	2.6	<2.6	<2.6	n/c	<2.6	<2.6	n/c
Bromodichloromethane	µg/m^3	>50%	1.3	<1.3	<1.3	n/c	<1.3	<1.3	n/c
Bromoform	µg/m^3	>50%	2.1	<2.1	<2.1	n/c	<2.1	<2.1	n/c
Bromomethane	µg/m^3	>50%	0.39	<0.39	<0.39	n/c	<0.39	<0.39	n/c
1,3-Butadiene	µg/m^3	>50%	1.1	<1.1	<1.1	n/c	<1.1	<1.1	n/c
Carbon Disulfide	µg/m^3	>50%	1.6	3.0	<1.6	n/c	<1.6	<1.6	n/c
Carbon Tetrachloride	µg/m^3	>50%	0.63	<0.63	<0.63	n/c	<0.63	<0.63	n/c
Chlorobenzene	µg/m^3	>50%	0.46	<0.46	<0.46	n/c	<0.46	<0.46	n/c
Chloroethane	µg/m^3	>50%	0.79	<0.79	<0.79	n/c	<0.79	<0.79	n/c
Chloroform	µg/m^3	>50%	0.49	76.7	87.6	13	0.52	0.58	n/c
Chloromethane	µg/m^3	>50%	0.62	0.68	<0.62	n/c	<0.62	<0.62	n/c
Cyclohexane	µg/m^3	>50%	0.69	<0.69	<0.69	n/c	<0.69	<0.69	n/c
Dibromochloromethane	µg/m^3	>50%	1.7	<1.7	<1.7	n/c	<1.7	<1.7	n/c
1,2-Dibromoethane (Ethylene Dibromide)	µg/m^3	>50%	0.77	<0.77	<0.77	n/c	<0.77	<0.77	n/c
1,2-Dichlorobenzene	µg/m^3	>50%	0.60	<0.60	<0.60	n/c	<0.60	<0.60	n/c
1,3-Dichlorobenzene	µg/m^3	>50%	2.4	<2.4	<2.4	n/c	<2.4	<2.4	n/c
1,4-Dichlorobenzene	µg/m^3	>50%	0.60	<0.60	<0.60	n/c	<0.60	<0.60	n/c
Dichlorodifluoromethane (FREON 12)	µg/m^3	>50%	0.99	17.2	22.0	24	15.6	16.4	5
1,1-Dichloroethane	µg/m^3	>50%	0.40	<0.40	<0.40	n/c	<0.40	<0.40	n/c
1,2-Dichloroethane	µg/m^3	>50%	0.40	<0.40	<0.40	n/c	<0.40	<0.40	n/c
1,1-Dichloroethylene	µg/m^3	>50%	0.40	<0.40	<0.40	n/c	<0.40	<0.40	n/c
cis-1,2-Dichloroethylene	µg/m^3	>50%	0.40	<0.40	<0.40	n/c	<0.40	<0.40	n/c
trans-1,2-Dichloroethylene	µg/m^3	>50%	0.40	<0.40	<0.40	n/c	<0.40	<0.40	n/c
1,2-Dichloropropane	µg/m^3	>50%	0.46	<0.46	<0.46	n/c	<0.46	<0.46	n/c
cis-1,3-Dichloropropene	µg/m^3	>50%	0.45	<0.45	<0.45	n/c	<0.45	<0.45	n/c
trans-1,3-Dichloropropene	µg/m^3	>50%	0.45	<0.45	<0.45	n/c	<0.45	<0.45	n/c
1,2-Dichlorotetrafluoroethane	µg/m^3	>50%	1.2	<1.2	<1.2	n/c	<1.2	<1.2	n/c
1,4-Dioxane	µg/m^3	>50%	3.6	<3.6	<3.6	n/c	<3.6	<3.6	n/c
Ethanol (ethyl alcohol)	µg/m^3	>50%	1.9	5.7	2.1	n/c	6.2	2.4	n/c
Ethyl Acetate	µg/m^3	>50%	3.6	<3.6	<3.6	n/c	<3.6	<3.6	n/c
4-ethyltoluene	µg/m^3	>50%	2.5	<2.5	<2.5	n/c	<2.5	<2.5	n/c
Heptane	µg/m^3	>50%	1.2	<1.2	<1.2	n/c	<1.2	<1.2	n/c
Hexachlorobutadiene	µg/m^3	>50%	5.3	<5.3	<5.3	n/c	<5.3	<5.3	n/c
Hexane	µg/m^3	>50%	1.1	1.22	<0.70	n/c	0.84	<0.70	n/c

Notes:

Bold/Underlined - value exceeds alert limit

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2 - petroleum hydrocarbon fractions 1 and 2

n/c - not calculated

RDL - reportable detection limit

RPD - relative percent difference

µg/m^3 - micrograms per cubic metre

> - greater than

< - less than

RPD is not calculated if either the original or field duplicate sample has a result of less than 5X the RDL

Table B5
Summary of Soil Vapour Field Duplicate Sample Results - Volatile Organic Compounds
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location	Units	Alert Limit	RDL	SV16-01	DUP A	RPD %	SV16-02	DUP A	RPD %
Sample Collection Date				21-Jun-19	21-Jun-19		12-Nov-19	12-Nov-19	
BVL Sample ID				KCI079	ICK078		LHI694	LHI695	
Methyl Butyl Ketone (2-Hexanone)	µg/m^3	>50%	4.1	<4.1	<4.1	n/c	<4.1	<4.1	n/c
Methyl Ethyl Ketone (2-Butanone)	µg/m^3	>50%	2.9	7.82	4.58	**52**	0.66	<0.59	n/c
Methyl Isobutyl Ketone	µg/m^3	>50%	4.1	<0.82	<0.82	n/c	<0.82	<0.82	n/c
Methyl t-butyl ether (MTBE)	µg/m^3	>50%	0.72	<0.72	<0.72	n/c	<0.72	<0.72	n/c
Methylene Chloride(Dichloromethane)	µg/m^3	>50%	2.8	<2.1	<2.1	n/c	<2.1	<2.1	n/c
2-propanol (Isopropanol)	µg/m^3	>50%	2.5	<2.5	<2.5	n/c	<2.5	<2.5	n/c
2-Propanone (Acetone)	µg/m^3	>50%	1.9	148	155	5	6.1	5.1	n/c
Propene (Propylene)	µg/m^3	>50%	0.86	<1.6	<1.6	n/c	<0.86	<0.86	n/c
Styrene	µg/m^3	>50%	0.43	<0.43	<0.43	n/c	<0.43	<0.43	n/c
1,1,1,2-Tetrachloroethane	µg/m^3	>50%	0.69	<0.69	<0.69	n/c	<0.69	<0.69	n/c
1,1,2,2-Tetrachloroethane	µg/m^3	>50%	0.69	<0.69	<0.69	n/c	<0.69	<0.69	n/c
Tetrachloroethylene	µg/m^3	>50%	0.68	9.95	7.89	23	<0.68	0.79	n/c
Tetrahydrofuran	µg/m^3	>50%	1.2	<1.2	<1.2	n/c	<1.2	<1.2	n/c
1,2,4-Trichlorobenzene	µg/m^3	>50%	3.7	<3.7	<3.7	n/c	<3.7	<3.7	n/c
1,2,4-Trimethylbenzene	µg/m^3	>50%	2.5	<2.5	<2.5	n/c	<2.5	<2.5	n/c
1,1,1-Trichloroethane	µg/m^3	>50%	0.55	<0.55	<0.55	n/c	<0.55	<0.55	n/c
1,1,2-Trichloroethane	µg/m^3	>50%	0.55	<0.55	<0.55	n/c	<0.55	<0.55	n/c
Trichloroethylene	µg/m^3	>50%	0.54	<0.54	<0.54	n/c	14.9	17.3	15
Trichlorofluoromethane (FREON 11)	µg/m^3	>50%	1.1	1.6	2.1	n/c	1.3	1.3	n/c
Trichlorotrifluoroethane (FREON 113)	µg/m^3	>50%	1.2	<1.2	<1.2	n/c	<1.2	<1.2	n/c
1,3,5-Trimethylbenzene	µg/m^3	>50%	2.5	<2.5	<2.5	n/c	<2.5	<2.5	n/c
2,2,4-Trimethylpentane	µg/m^3	>50%	0.93	<0.93	<0.93	n/c	<0.93	<0.93	n/c
Vinyl Acetate	µg/m^3	>50%	0.70	<0.70	<0.70	n/c	<0.70	<0.70	n/c
Vinyl Bromide	µg/m^3	>50%	0.87	<0.87	<0.87	n/c	<0.87	<0.87	n/c
Vinyl Chloride	µg/m^3	>50%	0.26	<0.26	<0.26	n/c	<0.26	<0.26	n/c

Notes:

Bold/Underlined - value exceeds alert limit

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2 - petroleum hydrocarbon fractions 1 and 2

n/c - not calculated

RDL - reportable detection limit

RPD - relative percent difference

µg/m^3 - micrograms per cubic metre

> - greater than

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RPD is not calculated if either the original or field duplicate sample has a result of less than 5X the RDL

Table B6
Summary of Soil Vapour Field Blank Sample Results
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Parameter	Units	Alert Limit	RDL	Field Blank	Do the results exceed the Alert Limit?	Field Blank	Do the results exceed the Alert Limit?
Sample Collection Date				21-Jun-19		12-Nov-19	
BVL Sample ID				KCI089		LHI888	
Benzene	µg/m^3	>5X RDL	0.32	0.38	no	0.37	no
Benzyl chloride	µg/m^3	>5X RDL	2.6	<2.6	no	<2.6	no
Bromodichloromethane	µg/m^3	>5X RDL	1.3	<1.3	no	<1.3	no
Bromoform	µg/m^3	>5X RDL	2.1	<2.1	no	<2.1	no
Bromomethane	µg/m^3	>5X RDL	0.39	<0.39	no	<0.39	no
1,3-Butadiene	µg/m^3	>5X RDL	1.1	<1.1	no	<1.1	no
Carbon Disulfide	µg/m^3	>5X RDL	1.6	<1.6	no	<1.6	no
Carbon Tetrachloride	µg/m^3	>5X RDL	0.63	<0.63	no	<0.63	no
Chlorobenzene	µg/m^3	>5X RDL	0.46	<0.46	no	<0.46	no
Chloroethane	µg/m^3	>5X RDL	0.79	<0.79	no	<0.79	no
Chloroform	µg/m^3	>5X RDL	0.49	<0.49	no	<0.49	no
Chloromethane	µg/m^3	>5X RDL	0.62	1.00	no	0.73	no
Cyclohexane	µg/m^3	>5X RDL	0.69	<0.69	no	<0.69	no
1,2-Dichlorobenzene	µg/m^3	>5X RDL	0.60	<0.60	no	<1.7	no
1,3-Dichlorobenzene	µg/m^3	>5X RDL	2.4	<2.4	no	<0.60	no
1,4-Dichlorobenzene	µg/m^3	>5X RDL	0.60	<0.60	no	<2.4	no
Dibromochloromethane	µg/m^3	>5X RDL	1.7	<1.7	no	<0.60	no
Dichlorodifluoromethane (FREON 12)	µg/m^3	>5X RDL	0.99	2.33	no	3.70	no
1,1-Dichloroethane	µg/m^3	>5X RDL	0.40	<0.40	no	<0.40	no
1,2-Dichloroethane	µg/m^3	>5X RDL	0.40	<0.40	no	<0.40	no
1,1-Dichloroethylene	µg/m^3	>5X RDL	0.40	<0.40	no	<0.40	no
cis-1,2-Dichloroethylene	µg/m^3	>5X RDL	0.40	<0.40	no	<0.40	no
trans-1,2-Dichloroethylene	µg/m^3	>5X RDL	0.40	<0.40	no	<0.40	no
1,2-Dichloropropane	µg/m^3	>5X RDL	0.46	<0.46	no	<0.46	no
cis-1,3-Dichloropropene	µg/m^3	>5X RDL	0.45	<0.45	no	<0.45	no
trans-1,3-Dichloropropene	µg/m^3	>5X RDL	0.45	<0.45	no	<0.45	no
1,2-Dichlorotetrafluoroethane	µg/m^3	>5X RDL	1.2	<1.2	no	<1.2	no
1,4-Dioxane	µg/m^3	>5X RDL	3.6	<3.6	no	<3.6	no
Ethanol (ethyl alcohol)	µg/m^3	>5X RDL	1.9	4.4	no	<1.9	no
Ethyl Acetate	µg/m^3	>5X RDL	3.6	<3.6	no	<3.6	no
Ethylbenzene	µg/m^3	>5X RDL	0.43	<0.43	no	<0.43	no
Ethylene Dibromide	µg/m^3	>5X RDL	0.77	<0.77	no	<0.77	no
4-ethyltoluene	µg/m^3	>5X RDL	2.5	<2.5	no	<2.5	no
F1-BTEX, C6-C10 (as Toluene)	µg/m^3	>2X RDL	5.0	20.4	no	14.9	no
F2, C10-C16 (as Decane)	µg/m^3	>2X RDL	5.0	13.5	no	<5.0	no
Heptane	µg/m^3	>5X RDL	1.2	<1.2	no	<1.2	no
Hexachlorobutadiene	µg/m^3	>5X RDL	5.3	<5.3	no	<5.3	no
Hexane	µg/m^3	>5X RDL	0.70	0.82	no	<0.70	no

Notes:

Bold/Underlined - value exceeds alert limit

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2 - petroleum hydrocarbon fractions 1 and 2

RDL - reportable detection limit

RPD - relative percent difference

µg/m^3 - micrograms per cubic metre

> - greater than

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Table B6
Summary of Soil Vapour Field Blank Sample Results
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Parameter	Units	Alert Limit	RDL	Field Blank	Do the results exceed the Alert Limit?	Field Blank	Do the results exceed the Alert Limit?
Sample Collection Date				21-Jun-19		12-Nov-19	
BVL Sample ID				KCI089		LHI888	
Methyl Butyl Ketone (2-Hexanone)	µg/m^3	>5X RDL	4.1	<4.1	no	<4.1	no
Methyl Ethyl Ketone (2-Butanone)	µg/m^3	>5X RDL	0.59	1.35	no	<0.59	no
Methyl Isobutyl Ketone	µg/m^3	>5X RDL	0.81	<0.82	no	<0.82	no
Methyl t-butyl ether (MTBE)	µg/m^3	>5X RDL	0.72	<0.72	no	<0.72	no
Methylene Chloride(Dichloromethane)	µg/m^3	>5X RDL	2.1	<2.1	no	<2.1	no
Naphthalene	µg/m^3	>5X RDL	1.0	<1.0	no	<1.0	no
2-propanol	µg/m^3	>5X RDL	2.5	<2.5	no	<2.5	no
2-Propanone	µg/m^3	>5X RDL	1.4	10.1	**yes**	3.6	no
Propene	µg/m^3	>5X RDL	0.86	<0.86	no	<0.86	no
Styrene	µg/m^3	>5X RDL	0.43	<0.43	no	<0.43	no
1,1,1,2-Tetrachloroethane	µg/m^3	>5X RDL	0.69	<0.69	no	<0.69	no
1,1,2,2-Tetrachloroethane	µg/m^3	>5X RDL	0.69	<0.69	no	<0.69	no
Tetrachloroethylene	µg/m^3	>5X RDL	0.68	<0.68	no	<0.68	no
Tetrahydrofuran	µg/m^3	>5X RDL	1.2	<1.2	no	<1.2	no
Toluene	µg/m^3	>5X RDL	0.38	1.22	no	<0.38	no
Total Xylenes	µg/m^3	>5X RDL	1.3	<1.3	no	<1.3	no
1,2,4-Trichlorobenzene	µg/m^3	>5X RDL	3.7	<3.7	no	<3.7	no
1,1,1-Trichloroethane	µg/m^3	>5X RDL	0.55	<0.55	no	<0.55	no
1,1,2-Trichloroethane	µg/m^3	>5X RDL	0.55	<0.55	no	<0.55	no
Trichloroethylene	µg/m^3	>5X RDL	0.54	<0.54	no	<0.54	no
Trichlorofluoromethane (FREON 11)	µg/m^3	>5X RDL	1.1	<1.1	no	1.4	no
Trichlorotrifluoroethane	µg/m^3	>5X RDL	1.2	<1.2	no	<1.2	no
1,2,4-Trimethylbenzene	µg/m^3	>5X RDL	2.5	<2.5	no	<2.5	no
1,3,5-Trimethylbenzene	µg/m^3	>5X RDL	2.5	<2.5	no	<2.5	no
2,2,4-Trimethylpentane	µg/m^3	>5X RDL	0.93	<0.93	no	<0.93	no
Vinyl Acetate	µg/m^3	>5X RDL	0.70	<0.70	no	<0.70	no
Vinyl Bromide	µg/m^3	>5X RDL	0.87	<0.87	no	<0.87	no
Vinyl Chloride	µg/m^3	>5X RDL	0.26	<0.26	no	<0.26	no

Notes:

Bold/Underlined - value exceeds alert limit

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

RDL - reportable detection limit

RPD - relative percent difference

µg/m^3 - micrograms per cubic metre

> - greater than

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RPD is not calculated if either the original or field duplicate sample has a result of less than 5X the RDL

December 14, 2018 Project No. 1791706-1155

THIS REPORT CONTAINS PROVISIONS LIMITING LIABILITY, THE SCOPE OF THE REPORT AND THIRD PARTY RELIANCE

These documents and the information contained therein are confidential property of Imperial Oil Limited and any disclosure of same is governed by the provisions of each of the applicable provincial and territorial freedom of information legislation, the Privacy Act (Canada) 1980-81-83, c.111, Sch. II "1", and the Access to Information Act (Canada) 1980-81-82-83, c.111, Sch. I "1", and, as such, legislation may be amended from time to time.

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2018 GROUNDWATER AND SOIL VAPOUR PROBE MONITORING AND SAMPLING REPORT
1660 MERIVALE ROAD, OTTAWA, ONTARIO
SAP 88001627

INTRODUCTION

Golder Associates Ltd. (Golder) was retained by Imperial Oil Limited (Imperial) to conduct a groundwater and soil vapour probe monitoring and sampling program at the former retail fuel outlet at 1660 Merivale Road, Ottawa, Ontario (the Site) (Figure 1 and 2). The fieldwork was conducted on July 2, August 14 to 16, and October 29, 2018.

SCOPE OF WORK

Groundwater

- Annual monitoring of 17 existing on- and off-Site groundwater monitoring wells for vapour concentrations, depth to groundwater and the thickness, if present, of light non-aqueous phase liquid (LNAPL);
- Collecting annual groundwater samples from nine on-Site (TH1 to TH7, MW15-01, and MW15-02) and eight off-Site (TH8, TH9, TH11, TH12, TH100 to TH102, and MW16-01) monitoring wells using the low-flow sampling method for laboratory analysis of benzene, toluene, ethylbenzene, xylenes (BTEX), petroleum hydrocarbon (PHC) fractions F1 to F4, and dissolved lead;
- Comparing the groundwater analytical results to the following guidelines:
  - Ministry of the Environment, Conservation and Parks' (MECP) Table 3 Full Depth Generic Site Condition Standards for groundwater in medium and fine textured soil in a non-potable groundwater from the document titled "Soil, Ground Water, and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act," dated April 15, 2011 (hereafter referred to as the Table 3 Standards).

Soil vapour

- Collecting semi-annual soil vapour samples from two on-Site soil vapour probes (SV16-01 and SV16-02) for laboratory analysis of BTEX, PHC fractions F1 and F2, and volatile organic compounds (VOCs);

- Comparing the soil vapour analytical results to the following guidelines:
  - Health-Based Indoor Air Criteria provided by MECP Modified Generic Risk Assessment (Tier 2) Spreadsheet Model (lowest risk model) (November 1, 2016) for residential land use.
  - Soil vapour screening levels (SVSL) were generated for residential buildings with a basement (probe depth 0 to 30 centimetres below base of the building foundation).

METHODOLOGY

Groundwater

Combustible Gas Headspace Concentrations

- Headspace vapour concentrations were measured using an RKI Eagle 2® Combustible Organic Vapour Monitor (OVM) with methane elimination. The OVM was bump tested daily to 400 parts per million by volume (ppmv) using a hexane standard. If the bump test differed more than 10% from the known concentration, the OVM was adjusted to match the exact concentration of the calibration gas. Calibrations were logged at the start of each day.
- Vapour concentrations were taken from inside of each well casing by placing the OVM nozzle about 15 to 30 centimetres (cm) below the top of casing (TOC). The OVM reading was taken immediately after the cap had been removed from the top of the monitoring well casing, to minimize the loss of volatiles from within the casing. The peak OVM reading was recorded.

Depth to Groundwater and LNAPL Thickness

- Depth to groundwater was measured and, if present, the thickness of LNAPL using an oil/water interface probe. If LNAPL is detected, then its presence is confirmed visually using a bailer. Prior to use in each well, the interface probe was cleaned using a phosphate-free detergent and water solution and rinsed with deionized water to minimize the potential for cross-contamination. Depth to groundwater measurements were taken from the TOC.

Low Flow Sampling

- Groundwater samples were collected using the low-flow sampling method. Water was pumped from each well, at a rate of 0.1 to 1 L/min, using low density polyethylene (LDPE) tubing connected to a peristaltic pump with a portion of silicon tubing. Routine water quality indicator parameters were measured during pumping using a multi-parameter water quality meter and flow through cell. The parameters measured included electrical conductivity (EC), pH, temperature, dissolved oxygen and reduction potential. Calibration of the meter was completed as per the manufacturer's instructions. Purged water was retained on-site in a 20-litre (L) pails for future off-site disposal.
- Eighteen samples, including two duplicates, one field blank, one trip blank and fourteen groundwater samples, were collected between August 14 and 16, 2018.
- Monitoring wells TH11, TH12, and TH102 were not monitored or sampled during this sampling event. Monitoring well TH11 was inaccessible as it was covered over with asphalt, TH12 was damaged, and TH102's cover was seized and could not be accessed.

Laboratory Analysis of Groundwater Samples

- Samples were submitted under chain-of-custody to Maxxam Analytics Inc. (Maxxam) in Mississauga, Ontario, a Standards Council of Canada (SCC) accredited laboratory, for analysis of BTEX, PHC Fractions F1 to F4, and dissolved lead.
- Groundwater samples for BTEX and PHC Fraction F1 analysis were placed in 44-millilitre (mL) clear glass vials provided by the laboratory and preserved with sodium bisulphate as a microbial inhibitor. The groundwater samples for PHC Fractions F2 to F4 analysis were placed in 250-mL amber glass bottles and preserved with sodium bisulphate.
- Groundwater samples for dissolved lead analysis were placed in 120-mL high-density polyethylene (HDPE) bottles, field filtered, and preserved with nitric acid.
- All sampling containers were placed in an ice-filled cooler immediately following sampling and transported to Maxxam for chemical analysis.

Waste Purge Water Removal

- Badger Daylighting of Ottawa, Ontario, a MECP licensed waste hauler, was used to recover approximately 50 L of waste purged groundwater from the Site on September 14, 2018. The liquid was disposed of at an MECP approved waste receiver.

Soil Vapour

Weather Conditions during Sampling

- Weather conditions[1] on July 3, 2018 were clear and sunny. Outdoor air temperatures were between 17.2 to 33.5 degrees Celsius (°C), relative humidity was between 28 to 89 percent (%), and barometric pressure was measured between 100.39 to 101.07 kilopascals (kPa) (Environmental Canada 2018, internet site).
- Weather conditions[2] on October 29, 2018 were clear and sunny. Outdoor air temperatures were between 0.9 to 4.3 °C, relative humidity was between 79 to 98%, and barometric pressure was measured between 99.05 to 99.84 kPa (Environmental Canada 2018, internet site).

Probe Leak Testing

- The soil vapour probes (SV16-01 and SV16-02) were leak tested on July 3 and October 29, 2018, to assess whether ambient air was penetrating the ground surface (e.g., along the outside of the tubing) and mixing with soil vapours during sampling.
- A plastic shroud was placed over the probe and the sampling equipment. The high-density polyethylene (HDPE) tubing leading from the probe connected to the sample train and exited through a hole on the top of the shroud. The shroud was then filled with helium from a cylinder. The helium concentration inside the shroud was measured using a helium detector. Once helium concentrations inside the shroud reached at least 6.4 percent helium by volume during the July sampling event, and 29.3 percent helium by volume

[1] Weather information was taken from the meteorological station (*2018 Hourly Data Report. Ottawa INTL A, Ontario*) located closest to the Site.

[2] Weather information was taken from the meteorological station (*2018 Hourly Data Report. Ottawa INTL A, Ontario*) located closest to the Site.

during the October sampling event, the helium flow was turned off. Soil vapour was monitored in a Tedlar sample bag, and the sample was collected until the Tedlar sample bag was full. The Tedlar bag was disconnected from the sample train, and the helium detector was connected to the Tedlar sample bag where maximum helium concentrations were recorded.

Soil Vapour Sampling

- Prior to sample collection, at least three probe volumes of soil gas were purged from the probes. An organic vapour detection system was used to measure organic vapour concentrations in the soil vapour collected in Tedlar bags.
- Soil vapour samples were collected following procedures outlined in the United States Environmental Protection Agency (USEPA) Method TO-15. A flow regulator supplied by Maxxam, was used to regulate the volumetric soil vapour flow rate into the Summa canister at a flow rate of 70 millilitres per minute (mL/min) during a 20-minute sampling period, or 140 mL/min during a 10-minute sampling period.
- A 1.4 litre (L) Summa canister, batch certified by Maxxam to be free of contaminants, was fitted with a flow regulator for sample collection. Prior to use, the initial Summa canister pressure was confirmed, with a vacuum gauge, to be less than or equal to -28 inches of mercury during the July sampling event, and -25 inches of mercury during the October sampling event, when gauged.

Laboratory Analysis of Soil Vapour Samples

- Soil vapour samples were collected and submitted to the Mississauga facility of Maxxam, a Standards Council of Canada (SCC) accredited laboratory, for analysis of BTEX, PHC Fractions F1 and F2, and VOCs. During the July 2018 sampling event, four samples, including one field duplicate, one field blank and two soil vapour probe samples were submitted to Maxxam for analysis. During the October 2018 sampling event, four samples, including one field duplicate, one field blank and two soil vapour probe samples were submitted to Maxxam for analysis.

RESULTS

Groundwater

Monitoring Well Headspace Vapour (Date; Range)

- August 14 to 16, 2018; not detected to 100% LEL (Table 1)

LNAPL Occurrence (Date; Observations)

- August 14 to 16, 2018; not detected in any monitoring wells (Table 1)

Groundwater Monitoring (Date; Depth to Groundwater Range; Groundwater Direction)

- August 14 to 16, 2018; depth to groundwater ranged from 2.44 to 3.83 metres below ground surface (mbgs) (Table 1); inferred to the southwest (Figure 3)

Groundwater Analytical Results (Date; Parameters; No. of wells)

- August 14 to 16, 2018; benzene, PHC F1, F2 and F4 and dissolved lead parameters; exceedances were detected in four sampling locations (Table 2 and Figure 4)

Probe Leak Test Results (Date; Probe; Result expressed as % helium)

- July 3, 2018; SV16-01 and SV16-02; 0% (Table 3)
- October 29, 2018; SV16-01 and SV16-02; 0% (Table 3)

Field Organic Vapour Results (Date; Range)

- July 3, 2018; 2,537 parts per billion by volume (ppbv) to 8,102 ppbv (Table 3)
- October 29, 2018; 14 ppbv to 308 ppbv (Table 3)

Soil Vapour Analytical Results (Date; Parameters; No. of probes)

- July 3, 2018; not applicable; no exceedances (Table 4 and Figure 5)
- October 29, 2018; not Applicable; no exceedances (Table 4 and Figure 5)

FIELD AND LABORATORY QUALITY ASSURANCE / QUALITY CONTROL

- Copies of the associated laboratory certificates of analysis are provided in Appendix A.
- No data quality issues were identified with groundwater samples. The data presented in this report are considered to be reliable
- The analytical results of the soil vapour data produced four data quality issues. The 2-propanone, F1-BTEX and C6-C10 (as toluene), F2 and C10-C16 (as decane), and hexane soil vapour data are considered suspect during the July 2018 sampling event. All samples associated with this field blank may be biased high, and should be considered suspect. Although the QA/QC data were biased high for these compounds, the sample data were well below the Soil Vapour Screening Levels, and therefore there will not be a material effect on the interpretation of the results. All other data, field duplicate, and field blank concentrations were within acceptable RPD alert limits. Data presented in this report are considered to be reliable.

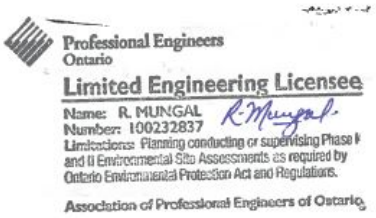
CLOSURE

We trust the information provided herein meets your requirements. If you have any questions about the contents of the letter, please contact the undersigned.

Golder Associates Ltd.

Leandra Mariani, B.Sc.
Environmental Scientist

Ian Sosney, B.Sc.
Project Manager



Roopnarine Mungal, B.Sc., M.Phil.(Chem.; Chem.Eng.); LEL, QPESA C.Chem.
Associate, Senior Environmental Consultant

LM/IS/RM/rk

Attachments: Limitations of Liability, Scope of Report and Third Party Reliance
Figures
Tables
Appendix A: Laboratory Certificates of Analysis and Data Quality Review Checklists
Appendix B: Quality Assurance/Quality Control

LIMITATION OF LIABILITY, SCOPE OF REPORT AND THIRD PARTY RELIANCE

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The investigation undertaken by Golder Associates Ltd. with respect to this report and any conclusions or recommendations made in this report reflect Golder Associates Ltd.'s judgement based on the site conditions observed at the time of the site inspection on the date(s) set out in this report and on information available at the time of preparation of this report. This report has been prepared for specific application to this site and it is based, in part, upon visual observation of the site, subsurface investigation at discrete locations and depths, and specific analysis of specific chemical parameters and materials during a specific time interval, all as described in this report. Unless otherwise stated, the findings cannot be extended to previous or future site conditions, portions of the site which were unavailable for direct investigation, subsurface locations which were not investigated directly, or chemical parameters, materials or analysis which were not addressed. Substances other than those addressed by the investigation described in this report may exist within the site, substances addressed by the investigation may exist in areas of the site not investigated and concentrations of substances addressed which are different than those reported may exist in areas other than the locations from which samples were taken.

If site conditions or applicable standards change or if any additional information becomes available at a future date, modifications to the findings, conclusions and recommendations in this report may be necessary.

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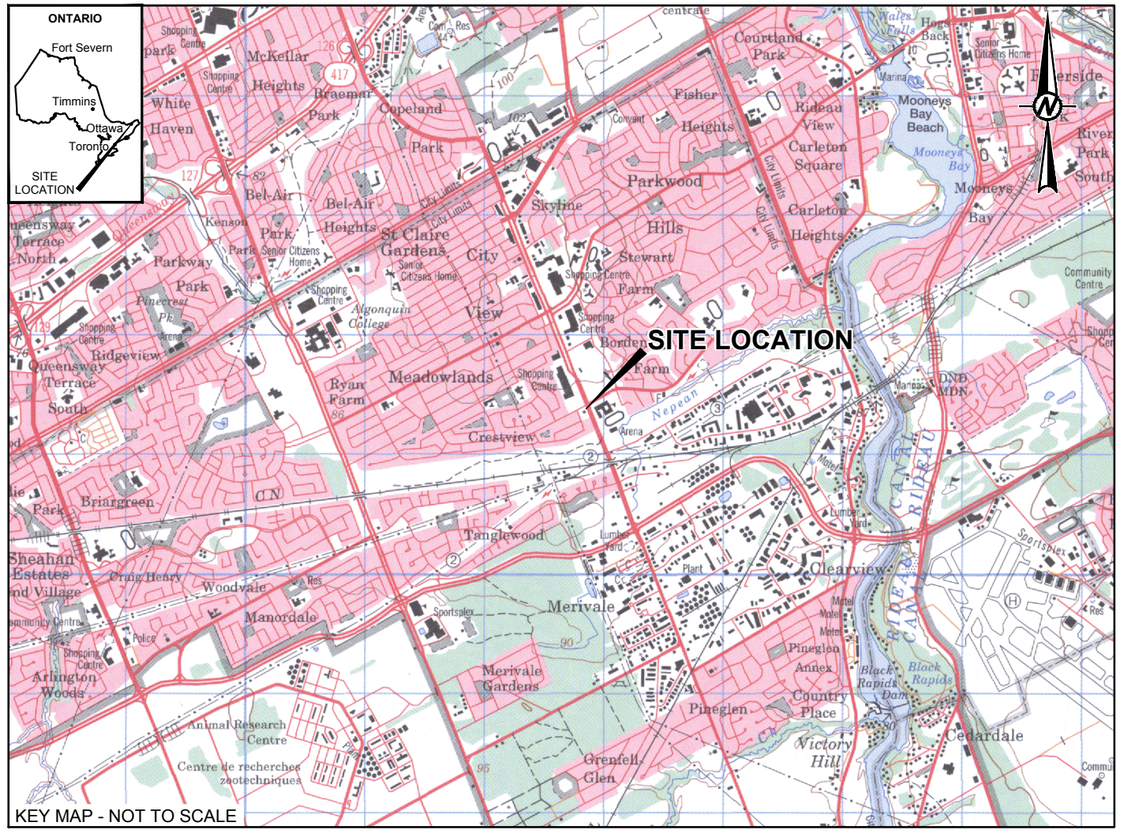

LEGEND

PROPERTY BOUNDARY

REFERENCE

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No: 11010-SITE PLAN OFFSITE-OCT14; SCALE: UNKNOWN; DATE: OCTOBER 2014.

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0 50 100
(APPROX.) METRES

CLIENT
IMPERIAL OIL LIMITED

CONSULTANT
GOLDER

YYYY-MM-DD	2018-12-13
DESIGNED	LMariani
PREPARED	PRicord
REVIEWED	ISosney
APPROVED	RMungal

PROJECT
FORMER RETAIL FUEL OUTLET
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
SITE LOCATION PLAN

PROJECT NO.	PHASE-TASK	REV.	FIGURE
1791706	1155-2016B	0	1

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25 mm
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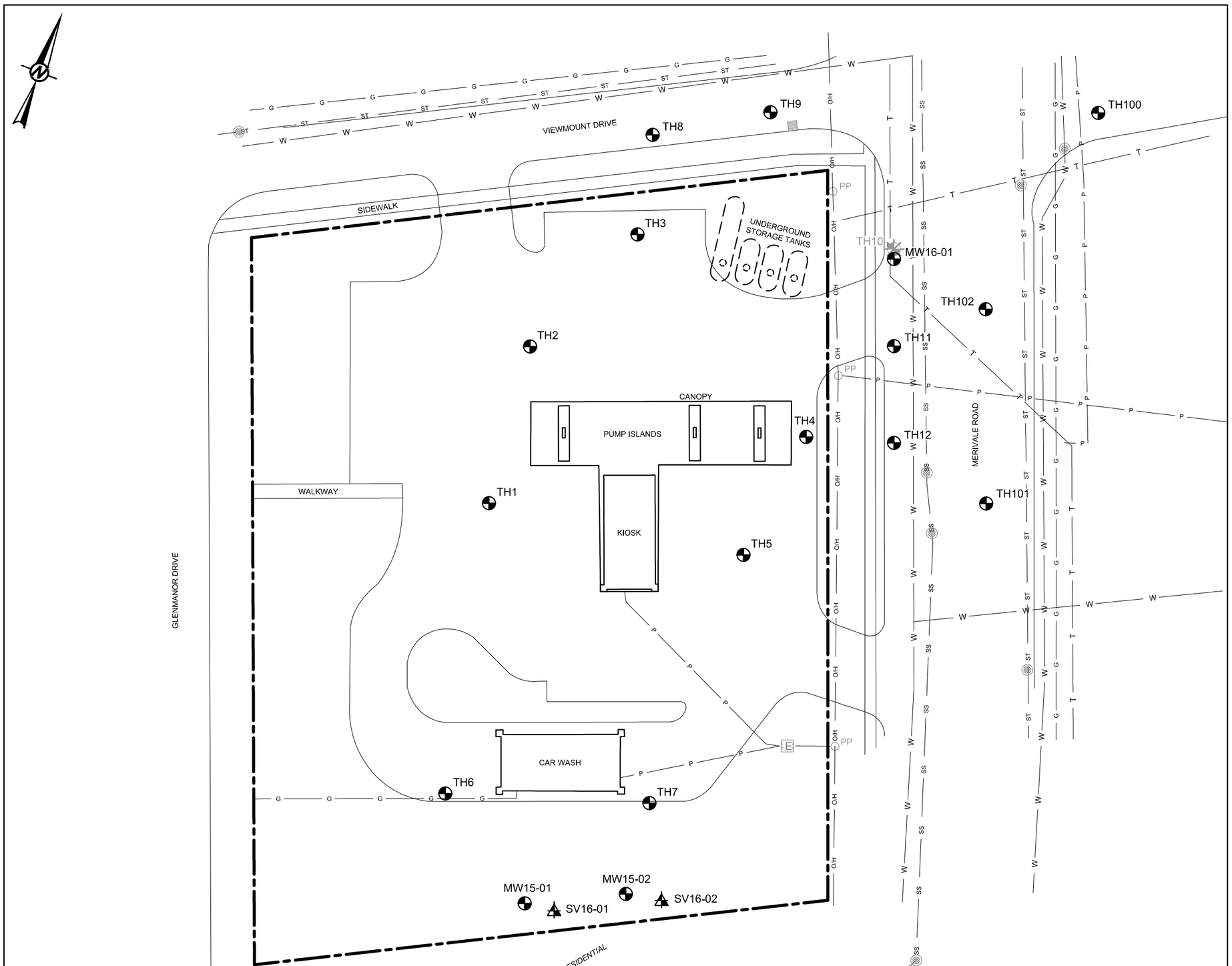

LEGEND

- PROPERTY BOUNDARY
- O/H — OVERHEAD POWER LINE
- G — UNDERGROUND GAS LINE
- P — UNDERGROUND POWER LINE
- SS — UNDERGROUND SANITARY LINE
- ST — UNDERGROUND STORM SEWER LINE
- T — UNDERGROUND TELEPHONE LINE
- W — UNDERGROUND WATERLINE
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL (DECOMMISSIONED)
- SOIL VAPOUR PROBE
- CATCH BASIN
- ELECTRICAL PEDESTAL
- MANHOLE
- POWER POLE

REFERENCE

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No.: 11010-SITE PLAN ONSITE-JUN14; SCALE: UNKNOWN; DATE: JUNE 2014.

0 10 20
(APPROX.) METRES

CLIENT
IMPERIAL OIL LIMITED

PROJECT
FORMER RETAIL FUEL OUTLET
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
SITE PLAN WITH SOIL VAPOUR AND MONITORING WELL LOCATIONS

CONSULTANT
GOLDER

YYYY-MM-DD	2018-12-13
DESIGNED	LMariani
PREPARED	PRicord
REVIEWED	ISosney
APPROVED	RMungal

PROJECT NO.	PHASE-TASK	REV.	FIGURE
1791706	1155-2016B	0	2

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25 mm

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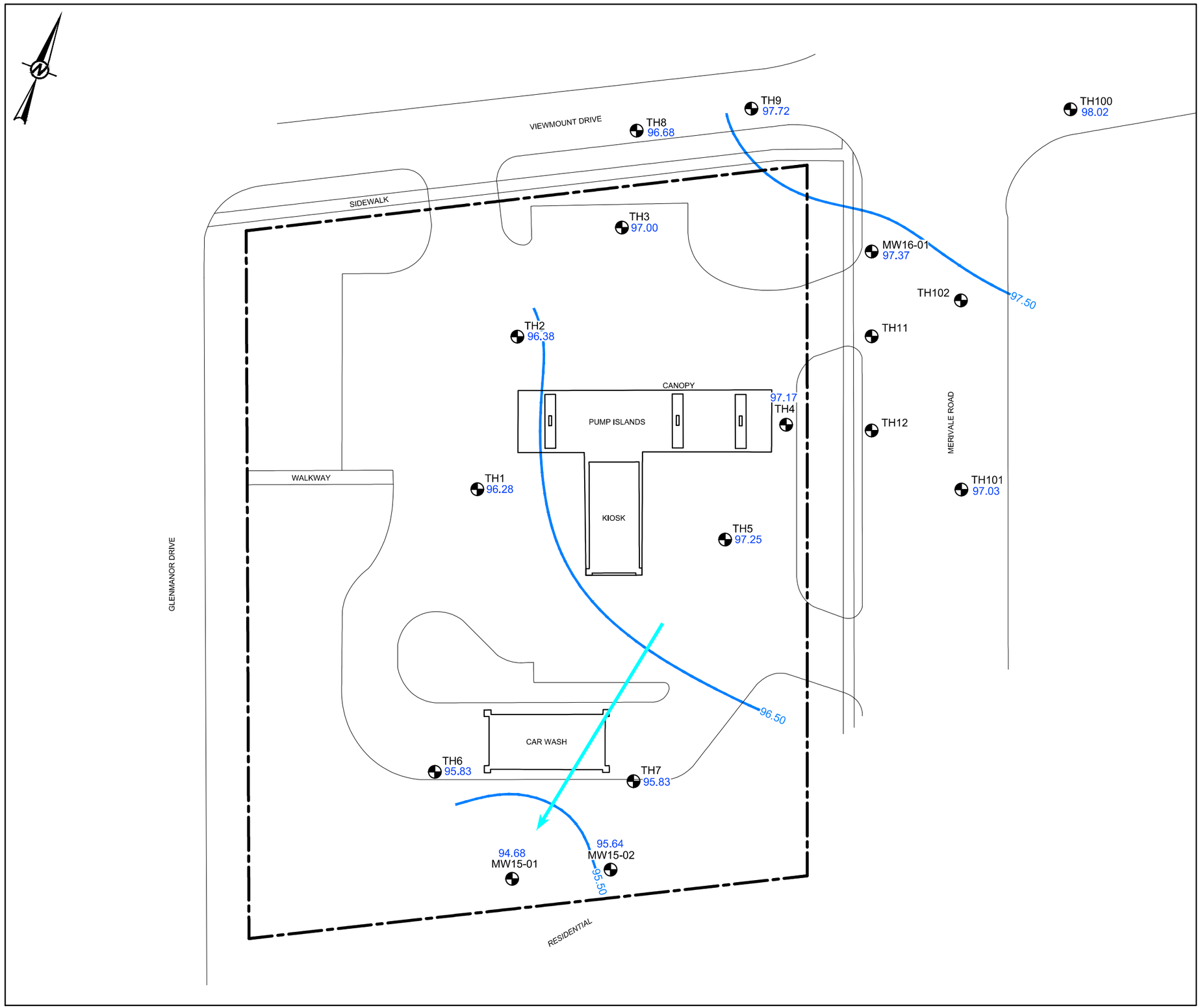

LEGEND

- PROPERTY BOUNDARY
- 97.50 GROUNDWATER CONTOUR (m)
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL
- 97.00 GROUNDWATER ELEVATION (m)
- DIRECTION OF GROUNDWATER FLOW

LIST OF APPLICABLE ABBREVIATIONS

m	METRE

NOTE

ELEVATIONS ARE BASED ON A LOCAL DATUM (GROUND SURFACE AT TH7) WITH ASSUMED ELEVATION OF 99.66 m.

REFERENCE

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No.: 11010-SITE PLAN ONSITE-JUN14; SCALE: UNKNOWN; DATE: JUNE 2014.

0 10 20
(APPROX.) METRES

CLIENT
IMPERIAL OIL LIMITED

PROJECT
FORMER RETAIL FUEL OUTLET
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
GROUNDWATER ELEVATIONS
August 14, 2018

CONSULTANT
GOLDER

YYYY-MM-DD	2018-12-13
DESIGNED	LMariani
PREPARED	PRicord
REVIEWED	ISosney
APPROVED	RMungal

PROJECT NO.	PHASE-TASK	REV.	FIGURE
1791706	1155-2016B	0	3

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B
25 mm
0

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TH1								Screen Interval: 2.6 to 5.6 mbgs		
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-11	<0.20	<0.20	<0.20	<0.40	<25	<100	<100	<100	<5.0	<0.50
13-Jun-13	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	0.53
26-Aug-14	<0.20	0.75	<0.20	1.2	<25	<100	<200	<200	<5.0	<0.50
17-Nov-15	<0.20	0.27	0.28	<0.40	<25	<100	<200	<200	<5.0	<0.50
10-Aug-16	<0.20	<0.20	<0.20	<0.40	<25	<100	300	**1,200**[b]	<5.0	<0.50
05-Dec-16	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
21-Jun-17	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
16-Aug-18	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50

TH2								Screen Interval: 3.2 to 4.7 mbgs		
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-11	0.77	<0.20	1.3	0.48	<25	<100	<100	<100	<5.0	<0.50
13-Jun-13	0.62	<0.20	2.2	<0.40	<25	<100	<200	<200	<5.0	<0.50
27-Aug-14	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
17-Nov-15	<0.20	0.29	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
17-Nov-15 (DUP)	<0.20	0.28	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
09-Aug-16	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
21-Jun-17	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
15-Aug-18	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50

TH3								Screen Interval: 3.2 to 4.7 mbgs		
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-11	27	2.4	79	150	**1,100**	**430**	<100	130	20	3.8
31-Aug-11 (DUP)	23	2.1	69	130	**1,100**	**380**	<100	110	17	3.9
13-Jun-13	11	0.61	66	85	**900**	**350**	<200	<200	<5.0	3.1
26-Aug-14	14	0.28	19	5.2	520	**180**	<200	<200	<5.0	2.2
28-Oct-15	25	<0.20	15	0.89	450	<100	<200	<200	<5.0	2.0
10-Aug-16	42	<0.20	26	1.5	560	110	<200	<200	<5.0	0.98
21-Jun-17	19	0.29	77	20	630	140	<200	<200	na	<0.50
15-Aug-18	7.4	<0.20	7.2	3.3	310	<100	<200	<200	na	0.76

TH4								Screen Interval: 3.4 to 4.9 mbgs		
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-11	**610**	610	**3,400**	**19,000**	**26,000**	**17,000**	360	170	**540**	2.6
13-Jun-13	200	35	1200	**4,300**	**6,200**	**19,000**	**580**	430	<100	5.8
26-Aug-14	**500**	37	1400	2600	**4,700**	**1,400**	<200	<200	58	3.0
26-Aug-14 (DUP)	**540**	40	1600	2700	400	**1,400**	<200	<200	62	1.9
17-Nov-15	180	18	560	930	**1,900**	**940**	240	230	<100	3.1
10-Aug-16	210	11	550	1,500	**1,800**	**370**	<200	<200	31	1.1
10-Aug-16 (DUP)	190	9.7	490	1,400	**1,600**	**400**	210	<200	27	1.7
21-Jun-17	210	28	470	1,500	**2,000**	**930**	<200	<200	na	0.78
16-Aug-18	400	14	860	3,400	**3,100**	**1,300**	250	<200	na	**30**
16-Aug-18 (DUP)	420	14	890	3,500	**2,800**	**1,200**	260	210	na	**32**

TH5								Screen Interval: 3.5 to 5.0 mbgs		
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-11	**750**	140	**3,000**	**13,000**	**85,000**	**20,000**	**690**	**620**	**1,400**	5.5
13-Jun-13	**530**	44	1600	3800	**9,900**	**160,000**	**12,000**	**6,800**	<100	8.3
13-Jun-13 (DUP)	**550**	44	1600	3800	**9,200**	**110,000**	**7,000**	**4,300**	<100	8
27-Aug-14	**450**	46	1600	3100	**11,000**	**2,800**	<200	<200	210	4.1
17-Nov-15	360	26	930	1,300	**3,300**	**2,900**	320	240	<100	3.7
10-Aug-16	420	43	1,500	3,700	**13,000**	**11,000**	**1,100**	**810**	240	0.81
21-Jun-17	210	25	690	1,800	**4,400**	**3,600**	420	350	na	1.8
21-Jun-17 (DUP)	190	23	640	1,600	**4,400**	**3,200**	490	450	na	2.2
16-Aug-18	**510**	37	1,400	2,600	**6,700**	**3,300**	300	<200	na	2.6

TH6								Screen Interval: 3.6 to 5.1 mbgs		
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
20-Oct-11	<0.20	<0.20	<0.20	<0.40	<25	<100	<100	<100	<5.0	<0.50
20-Oct-11 (DUP)	<0.20	<0.20	<0.20	<0.40	<25	<100	<100	<100	<5.0	<0.50
13-Jun-13	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	0.6
27-Aug-14	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
28-Oct-15	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
28-Oct-15 (DUP)	<0.20	0.38	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
09-Aug-16	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
22-Jun-17	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
14-Aug-18	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50

TH7								Screen Interval: 4.4 to 5.8 mbgs		
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
14-Nov-11	31	5.4	160	340	430	<100	<100	<100	<30	<0.5
13-Jun-13	37	2.8	140	130	550	**460**	<200	<200	<5.0	3.2
27-Aug-14	150	18	610	730	**1,900**	**540**	<200	<200	22	2.1
28-Oct-15	93	8.4	270	300	**1,000**	**280**	<200	<200	<5.0	1.2
09-Aug-16	62	5.8	120	140	500	150	<200	<200	<5.0	<0.50
22-Jun-17	93	8.7	240	190	**800**	**190**	<200	<200	na	0.54
14-Aug-18	22	0.53	8.8	0.60	68	<100	<200	<200	na	<0.50

TH8								Screen Interval: 3.3 to 4.9 mbgs		
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
13-Jun-13	3.9	<0.20	4.1	0.61	48	<100	<200	<200	<0.5	1.1
27-Oct-15	4.4	<0.20	0.51	0.41	<25	<100	<200	<200	<5.0	0.82
10-Aug-16	3.0	<0.20	0.66	<0.40	70	<100	<200	<200	<5.0	0.77
15-Aug-18	0.99	<0.20	0.80	<0.40	<25	<100	<200	<200	na	<2.5
15-Aug-18 (DUP)	1.0	<0.20	0.78	<0.40	<25	<100	<200	<200	na	<2.5

TH9								Screen Interval: 3.4 to 4.9 mbgs		
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
06-Oct-14	31	3	230	290	**1,000**	**570**	**610**	420	15	1.1
27-Oct-15	51	7.2	390	350	**2,500**	**1,100**	220	360	35	2.6
10-Aug-16	23	1.8	250	70	**1,600**	**350**	<200	<200	11	1.1
20-Jun-17	36	5.5	460	370	**4,200**	**1,200**	<200	<200	na	2.3
15-Aug-18	12	0.69	78	49	740	**190**	350	**1,600**[b]	na	<0.50

TH10								Screen Interval: 3.3 to 4.9 mbgs		
Date	B	T	E	X	F1	F2	F3	F4	H	Pb
11-Jun-13	73	58	52	200	**1,400**	**560**	<200	<200	35	1.2

TH11								Screen Interval: 3.3 to 4.9 mbgs		
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
11-Jun-13	370	34	2,200	3,400	**11,000**	**1,400**	<200	<200	130	2.6
28-Oct-15	96	8.1	710	120	**4,400**	**2,500**	**1,300**	**820**	72	4.6
11-Aug-16	100	6.3	590	160	**5,000**	**6,700**	**2,200**	**1,300**	37	6.0
11-Aug-16 (DUP)	110	7.1	610	170	**4,900**	**7,100**	**2,400**	**1,400**	43	3.3

TH12								Screen Interval: 3.3 to 4.9 mbgs		
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
11-Jun-13	380	35	2,300	3,500	**11,000**	**3,100**	<200	<200	<100	6.8
11-Jun-13 (DUP)	360	34	2,300	3,500	**11,000**	**2,800**	<200	<200	<100	6.9
28-Oct-15	95	14	620	400	**4,500**	**1,600**	**540**	320	140	4.5
11-Aug-16	130	17	1,100	630	**6,800**	**1,800**	**900**	**510**	120	2.1
20-Jun-17	160	11	1,200	170	**7,900**	**2,800**	**750**	460	na	3.8
20-Jun-17 (DUP)	150	11	1,200	160	**7,300**	**2,600**	**700**	430	na	4.5

TH100								Screen Interval: 3.0 to 4.9 mbgs		
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
06-Oct-14	<0.20	<0.20	0.31	0.91	<25	<100	<200	<200	<5.0	<0.50
27-Oct-15	<0.20	<0.20	0.94	1.1	<25	<100	<200	<200	<5.0	<0.50
27-Oct-15 (DUP)	<0.20	<0.20	0.24	<0.40	<25	<100	<200	<200	<5.0	<0.50
10-Aug-16	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
20-Jun-17	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
15-Aug-18	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<2.5

TH101								Screen Interval: 3.0 to 4.9 mbgs		
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
06-Oct-14	85	12	580	500	**4,100**	**830**	<200	<200	44	2.9
06-Oct-14 (DUP)	84	12	580	510	**4,100**	**910**	<200	<200	54	4.2
28-Oct-15	110	16	740	590	**3,400**	**830**	<200	<200	64	4.6
11-Aug-16	49	8.6	580	390	**2,200**	**590**	<200	<200	23	0.63
20-Jun-17	76	14	870	410	**4,800**	**1,100**	<200	<200	na	0.84
15-Aug-18	110	9.2	1,200	130	**5,900**	**1,700**	<200	<200	na	3.8

TH102								Screen Interval: 3.0 to 4.9 mbgs		
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
06-Oct-14	0.72	0.52	16	42	360	**360**	<200	<200	7.2	3.9
28-Oct-15	42	1.6	100	140	**970**	**350**	<200	<200	23	1.5
11-Aug-16	8.3	<0.20	33	21	510	**180**	<200	<200	18	1.4
20-Jun-17	19	3.1	190	120	**1,800**	**500**	<200	<200	na	<0.50

MW15-01								Screen Interval: 3.0 to 6.0 mbgs		
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
17-Nov-15	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
09-Aug-16	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
22-Jun-17	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50
15-Aug-18	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50

MW15-02								Screen Interval: 2.7 to 4.9 mbgs		
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
17-Nov-15	44	5.9	180	170	**2,300**	**750**	<200	<200	35	2.2
09-Aug-16	78	4.7	73	25	**800**	**450**	<200	<200	5.5	<0.50
22-Jun-17	20	1.0	1.5	2.3	190	110	<200	<200	na	1.1
14-Aug-18	2.0	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50

MW16-01								Screen Interval: 3.3 - 4.8 mbgs		
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-16	18	3.8	41	59	250	<100	<200	<200	na	0.53
21-Jun-17	46	3.7	170	79	**820**	**260**	<200	<200	na	1.2
16-Aug-18	15	0.39	30	0.81	88	<100	260	<200	na	0.53

ONTARIO STANDARDS

PARAMETERS	B	T	E	X	F1	F2	F3	F4	HA	Pb
CRITERIA[a]	430	18,000	2,300	4,200	750[b]	150	500	500	520	25
RDL	0.20	0.20	0.20	0.40	100	100	200	200	10	0.50
UNITS	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L

(a) O.REG 153 (MOECC 2011) TABLE 3 FULL DEPTH GENERIC SITE CONDITION STANDARDS FOR ALL TYPES OF PROPERTY USE FOR GROUNDWATER IN MEDIUM AND FINE TEXTURED SOIL IN A NON-POTABLE GROUNDWATER CONDITION.

(b) F1 FRACTION DOES NOT INCLUDE BTEX; HOWEVER, THE PROPONENT HAS THE CHOICE AS TO WHETHER OR NOT TO SUBTRACT BTEX FROM THE ANALYTICAL RESULT.

LEGEND

PROPERTY BOUNDARY

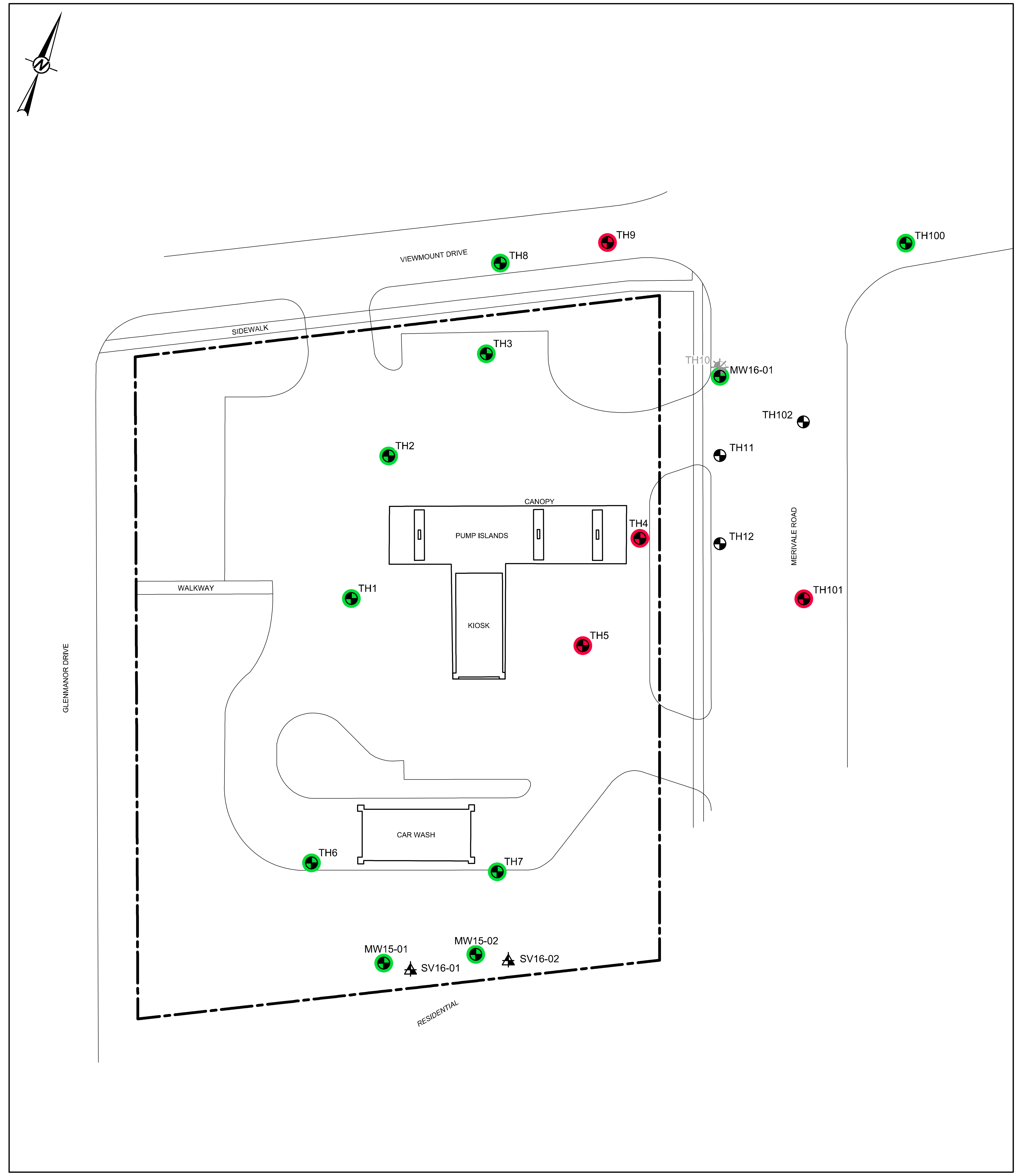
BOREHOLE LOCATION COMPLETED AS A MONITORING WELL

BOREHOLE LOCATION COMPLETED AS A MONITORING WELL (DECOMMISSIONED)

SOIL VAPOUR PROBE

LIST OF APPLICABLE ABBREVIATIONS

<	LESS THAN
μg/L	MICROGRAMS PER LITRE
B	BENZENE
T	TOLUENE
E	ETHYLBENZENE
X	XYLENES
F1	PETROLEUM HYDROCARBON FRACTION 1 (C_6-C_{10}) LESS BTEX
F2	PETROLEUM HYDROCARBON FRACTION 2 (C_{10}-C_{16})
F3	PETROLEUM HYDROCARBON FRACTION 3 (C_{16}-C_{21})
F4	PETROLEUM HYDROCARBON FRACTION 4 (C_{21}-C_{32})
HA	n-HEXANE
mbgs	METRES BELOW GROUND SURFACE
MOECC	MINISTRY OF THE ENVIRONMENT AND CLIMATE CHANGE
na	NOT ANALYZED
O.REG	ONTARIO REGULATION
RDL	REPORTABLE DETECTION LIMIT
Pb	LEAD



NOTES

1. LOCATIONS WHERE CURRENT GROUNDWATER SAMPLE MEETS APPLICABLE GUIDELINES/STANDARDS FOR ALL PARAMETERS ANALYZED SHOWN IN **GREEN.**
2. LOCATIONS WHERE CURRENT GROUNDWATER SAMPLE EXCEEDS APPLICABLE GUIDELINES/STANDARDS FOR AT LEAST ONE OF THE PARAMETERS ANALYZED SHOWN IN **RED.**
3. EXCEEDANCES OF APPLICABLE GUIDELINES/STANDARDS IN TEXT ARE SHOWN IN **RED.**
4. LOCATION WHERE NO SAMPLES WERE TAKEN IN THE CURRENT SAMPLING EVENT SHOWN IN **BLACK**.

0 10 20
(APPROX.) METRES

REFERENCE

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No.: 11010-SITE PLAN ONSITE-JUN14; SCALE: UNKNOWN; DATE: JUNE 2014.

CLIENT
IMPERIAL OIL LIMITED

CONSULTANT
GOLDER

YYYY-MM-DD	2018-12-13
DESIGNED	LMariani
PREPARED	PRicord
REVIEWED	ISosney
APPROVED	RMungal

PROJECT
FORMER RETAIL FUEL OUTLET
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
GROUNDWATER ANALYTICAL RESULTS - BTEX, PHC FRACTIONS F1 - F4, n-HEXANE AND DISSOLVED LEAD

PROJECT NO.	PHASE-TASK	REV.	FIGURE
1791706	1155-2016B	0	4

Path: C:\Users\dbondy\Desktop\ | File Name: 1791706-1155-HS-0004.dwg | Last Edited By: pricord Date: 2018-12-13 Time:12:25:49 PM | Printed By: dbondy Date: 2018-12-13 Time:12:27:33 PM
IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI C
25 mm
0

LEGEND

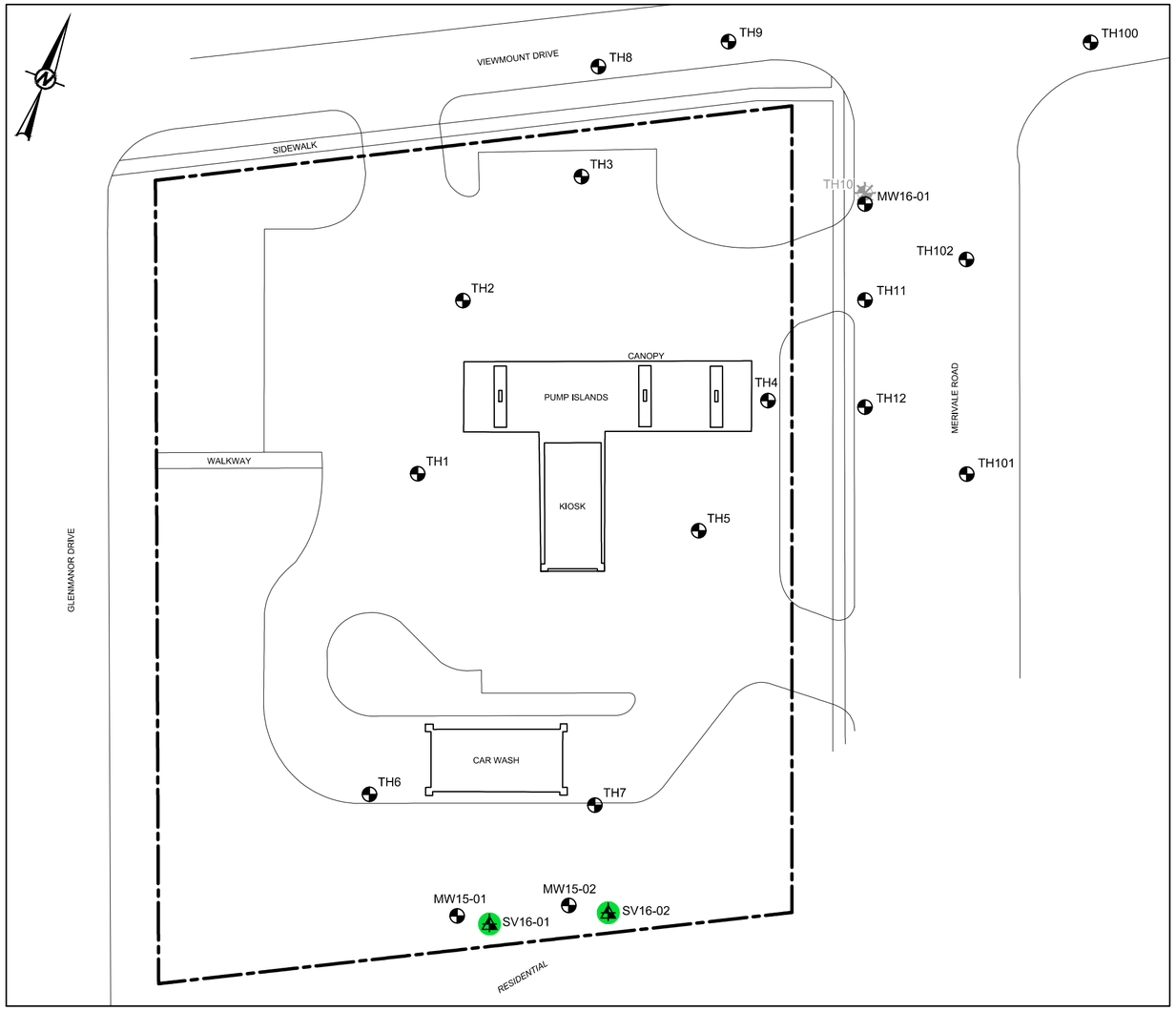
- PROPERTY BOUNDARY
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL (DECOMMISSIONED)
- SOIL VAPOUR PROBE

LIST OF APPLICABLE ABBREVIATIONS

<	LESS THAN	EAC	ETHYL ACETATE
µg/m³	MICROGRAMS PER CUBIC METRES	ETOH	ETHANOL
1,1-DCA	1,1-DICHLOROETHANE	F1	PETROLEUM HYDROCARBON FRACTION 1 (C_6-C_{10}) LESS BTEX
1,1-DCE	1,1-DICHLOROETHENE	F2	PETROLEUM HYDROCARBON FRACTION 2 (C_{10}-C_{16})
1,1,1-TCA	1,1,1-TRICHLOROETHANE	F113	FREON 113
1,1,1,2-TCA	1,1,1,2-TETRACHLOROETHANE	HA	n-HEXANE
1,1,2-TCA	1,1,2-TRICHLOROETHANE	HPA	HEPTANE
1,1,2,2-TCA	1,1,2,2-TETRACHLOROETHANE	HXCBDE	HEXACHLOROBUTADIENE
1,2-DBA	1,2-DIBROMOETHANE (ETHYLENE DIBROMIDE)	IPA	ISOPROPANOL
1,2-DCA	1,2-DICHLOROETHANE	mbgs	METRES BELOW GROUND SURFACE
1,2-DCB	1,2-DICHLOROBENZENE	MBK	METHYL BUTYL KETONE
1,2-DCPA	1,2-DICHLOROPROPANE	MCB	CHLOROBENZENE
1,2-DCTFA	1,2-DICHLOROTETRAFLUROACETONE	MEK	METHYL ETHYL KETONE (2-BUTANONE)
1,2,4-TCB	1,2,4-TRICHLOROBENZENE	MIBK	4-METHYL-2-PENTANONE OR METHYL ISOBUTYL KETONE
1,2,4-TMB	1,2,4-TRIMETHYLBENZENE	MOECC	MINISTRY OF THE ENVIRONMENT AND CLIMATE CHANGE
1,3-BDE	1,3-BROMINATED DIPHENYL ETHERS	MTBE	METHYL TERTIARY BUTYL ETHER
1,3-DCB	1,3-DICHLOROBENZENE	n/c	NOT CALCULATED
1,3,5-TMB	1,3,5-TRIMETHYLBENZENE	n/s	NO STANDARD
1,4-DCB	1,4-DICHLOROBENZENE	NA	NOT AVAILABLE
1,4-DOX	1,4-DIOXANE	PCE	TETRACHLOROETHENE
2,2,4-TMP	2,2,4-TRIMETHYLBENZENE	PE	PROPYLENE
4-ETT	4-ETHYLTOLUENE	RDL	REPORTABLE DETECTION LIMIT
ACTN	ACETONE	SVSL	SOIL VAPOUR SCREENING LEVEL
B	BENZENE	ST	STYRENE
BDCMA	BROMODICHLOROMETHANE	T	TOLUENE
BF	BROMOFORM	t-1,2-DCE	TRANS-1,2-DICHLOROETHENE
BMA	BROMOMETHANE	t-1,3-DCPE	TRANS-1,3-DICHLOROPROPENE
BZLC	BENZYL CHLORIDE	TCE	TRICHLOROETHENE
c-1,2-DCE	CIS-1,2-DICHLOROETHENE	TCFMA	TRICHLOROFLUOROMETHANE
c-1,3-DCPE	CIS-1,3-DICHLOROPROPENE	TCM	CHLOROFORM
CA	CHLOROETHANE	THF	TETRAHYDROFURAN
CDS	CARBON DISULFIDE	VAC	VINYL ACETATE
CMA	CHLOROMETHANE	VBr	VINYL BROMIDE
CT	CARBON TETRACHLORIDE	VC	VINYL CHLORIDE
CYHA	CYCLOHEXANE	X	XYLENES
DBCM	DIBROMOCHLOROMETHANE		
DCDFMA	DICHLORODIFLUOROMETHANE		
DCM	DICHLOROMETHANE		
E	ETHYLBENZENE		

NOTES

1. LOCATIONS WHERE MOST RECENT SOIL VAPOUR SAMPLE MEETS APPLICABLE GUIDELINES/STANDARDS FOR ALL PARAMETERS ANALYZED SHOWN IN **GREEN**.
2. LOCATIONS WHERE MOST RECENT SOIL VAPOUR SAMPLE EXCEEDS APPLICABLE GUIDELINES/STANDARDS FOR AT LEAST ONE OF THE PARAMETERS ANALYZED SHOWN IN **RED**.
3. EXCEEDANCES OF APPLICABLE GUIDELINES/STANDARDS IN TEXT ARE SHOWN IN **RED.**
4. LOCATION WHERE NO SAMPLES WERE TAKEN IN THE MOST RECENT SAMPLING EVENT SHOWN IN **BLACK**.



SV16-01 — Screen Interval: 1.35 - 1.50 mbgs

| Date | B | T | E | X | F1 | F2 | Aliphatic >C6-C8 | Aliphatic >C8-C10 | Aliphatic >C10-C12 | Aliphatic >C12-C16 | Aliphatic >C16-C34 | Aromatic >C6-C8 | Aromatic >C8-C10 | Aromatic >C10-C12 | Aromatic >C12-C16 | BZLC | BDCMA | BF | BMA | 1,3-BDE | CDS | CT | MCB | CA | TCM | CMA | CYHA | DBCM | 1,2-DBA | 1,2-DCB | 1,3-DCB | 1,4-DCB | DCDFMA | 1,1-DCA | 1,2-DCA | 1,1-DCE | c-1,2-DCE | t-1,2-DCE | 1,2-DCPA | c-1,3-DCPE | t-1,3-DCPE | 1,2-DCTFA | 1,4-DOX | ETOH | EAC | 4-ETT | HPA | HXCBDE | HA | MBK | MEK | MIBK | MTBE | DCM | IPA | ACTN | PE | ST | 1,1,1,2-TCA | 1,1,2,2-TCA | PCE | THF | 1,2,4-TCB | 1,2,4-TMB | 1,1,1-TCA | 1,1,2-TCA | TCE | TCFMA | F113 | 1,3,5-TMB | 2,2,4-TMP | VAC | VBr | VC |
|---|---|---|---

Table 1
Summary of Groundwater Field Monitoring Results
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Well Name	Top of Casing Elevation[(a)(b)] (masl)	Ground Elevation[(a)(b)] (masl)	Monitoring Date	Depth to Groundwater (mbtoc)	Depth to Groundwater (mbgs)	Groundwater Elevation[(a)(b)] (masl)	Product Thickness (mm)	Headspace Vapours (ppmv)
TH1	99.99	100.08	17-Nov-15	3.61	3.70	96.38	n/d	15
			9-Aug-16	3.70	3.79	96.29	n/d	45
			5-Dec-16	3.69	3.78	96.31	n/d	n/m
			21-Jun-17	3.23	3.32	96.76	n/d	n/d
			14-Aug-18	3.71	3.80	96.28	n/d	30
TH2	100.04	100.14	26-Aug-14	3.47	3.57	96.57	n/d	nd
			17-Nov-15	3.47	3.57	96.57	n/d	5
			9-Aug-16	3.62	3.71	96.43	n/d	n/d
			21-Jun-17	3.58	3.67	96.47	n/d	n/d
			14-Aug-18	3.66	3.76	96.38	n/d	230
TH3	100.28	100.41	26-Aug-14	3.31	3.44	96.97	n/d	n/d
			28-Oct-15	3.40	3.53	96.88	n/d	195
			9-Aug-16	3.36	3.49	96.92	n/d	85
			21-Jun-17	3.10	3.23	97.18	n/d	180
			14-Aug-18	3.29	3.42	97.00	n/d	25% LEL
TH4	100.27	100.35	26-Aug-14	2.95	3.03	97.32	n/d	30% LEL
			17-Nov-15	3.01	3.09	97.26	n/d	160
			9-Aug-16	3.15	3.23	97.12	n/d	75
			21-Jun-17	3.08	3.16	97.19	n/d	n/d
			14-Aug-18	3.10	3.18	97.17	n/d	100% LEL

Notes:

[(a)] TH1 to TH5 and TH7 elevations are relative to local benchmark (centre of storm sewer catch basin located approximately 5 metres west of kiosk).

[(b)] MW15-01 , MW15-02 and TH6 elevations are relative to local benchmark (ground surface at TH7).

[(c)] Well was not monitored due to bentonite in the casing prohibiting interface probe to descend

D - well was destroyed

LEL - Lower explosive limit

masl - metres above sea level

mbgs - metres below ground surface

mbtoc - metres below top of casing

mm - millimetres

NA - not available

n/d - not detected

n/m - not measured

ppmv - parts per million by volume

Table 1
Summary of Groundwater Field Monitoring Results
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Well Name	Top of Casing Elevation[(a)(b)] (masl)	Ground Elevation[(a)(b)] (masl)	Monitoring Date	Depth to Groundwater (mbtoc)	Depth to Groundwater (mbgs)	Groundwater Elevation[(a)(b)] (masl)	Product Thickness (mm)	Headspace Vapours (ppmv)
TH5	100.12	100.23	26-Aug-14	2.94	3.05	97.18	n/d	50
			17-Nov-15	3.09	3.20	97.03	n/d	230
			9-Aug-16	2.97	3.08	97.15	n/d	5
			21-Jun-17	2.82	2.93	97.30	n/d	n/d
			14-Aug-18	2.87	2.98	97.25	n/d	n/d
TH6	99.44	99.54	26-Aug-14	3.56	3.48	96.06	n/d	25
			28-Oct-15	3.84	3.94	95.60	n/d	1250
			9-Aug-16	3.82	3.92	95.62	n/d	45
			21-Jun-17	3.58	3.68	95.86	n/d	n/d
			14-Aug-18	3.61	3.71	95.83	n/d	n/d
TH7	100.50	99.66	26-Aug-14	4.88	4.05	95.62	n/d	n/d
			28-Oct-15	5.00	4.16	95.50	n/d	n/d
			9-Aug-16	5.01	4.17	95.49	n/d	15
			21-Jun-17	4.78	3.94	95.72	n/d	n/d
			14-Aug-18	4.67	3.83	95.83	n/d	n/d
TH8	100.03	100.16	6-Oct-14	3.45	n/m	NA	n/m	n/m
			27-Oct-15	3.55	3.68	96.48	n/d	710
			10-Aug-16	n/m[(c)]	n/m[(c)]	n/m[(c)]	n/m[(c)]	10
			20-Jun-17	n/m[(c)]	n/m[(c)]	n/m[(c)]	n/m[(c)]	n/m[(c)]
			15-Aug-18	3.36	3.49	96.68	n/d	n/d

Notes:

[(a)] TH1 to TH5 and TH7 elevations are relative to local benchmark (centre of storm sewer catch basin located approximately 5 metres west of kiosk).

[(b)] MW15-01 , MW15-02 and TH6 elevations are relative to local benchmark (ground surface at TH7).

[(c)] Well was not monitored due to bentonite in the casing prohibiting interface probe to descend

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Table 1
Summary of Groundwater Field Monitoring Results
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Well Name	Top of Casing Elevation[(a)(b)] (masl)	Ground Elevation[(a)(b)] (masl)	Monitoring Date	Depth to Groundwater (mbtoc)	Depth to Groundwater (mbgs)	Groundwater Elevation[(a)(b)] (masl)	Product Thickness (mm)	Headspace Vapours (ppmv)
TH9	100.46	100.59	6-Oct-14	3.45	3.58	97.01	n/d	100% LEL
			27-Oct-15	3.52	3.65	96.94	n/d	2,900
			10-Aug-16	3.55	3.68	96.91	n/d	100% LEL
			20-Jun-17	3.46	3.59	97.00	n/d	100% LEL
			15-Aug-18	2.74	2.87	97.72	n/d	84% LEL
TH10	100.17	100.26	10-Jun-13	n/m	3.03	97.24	n/d	170
			6-Oct-14	n/m	n/m	NA	n/m	n/m
			27-Oct-15	D	D	D	D	D
			TH10 decommissioned on August 24, 2016					
TH11	99.90	100.04	6-Oct-14	n/m	n/m	NA	n/m	n/m
			27-Oct-15	2.91	3.05	96.99	n/d	25
			10-Aug-16	2.89	3.03	97.01	n/d	320
			20-Jun-17	n/m	n/m	n/m	n/m	n/m
			15-Aug-18	n/m	n/m	n/m	n/m	n/m
TH12	99.60	99.74	6-Oct-14	n/m	n/m	NA	n/m	n/m
			27-Oct-15	2.75	2.89	96.85	n/d	n/d
			10-Aug-16	2.74	2.88	96.87	n/d	n/d
			20-Jun-17	2.61	2.75	97.00	n/d	880
			15-Aug-18	n/m	n/m	n/m	n/m	n/m
TH100	101.40	101.52	6-Oct-14	3.48	3.60	97.92	n/d	200
			27-Oct-15	3.52	3.64	97.88	n/d	n/d
			10-Aug-16	3.54	3.65	97.87	n/d	n/d
			20-Jun-17	3.33	3.47	98.07	n/d	n/d
			15-Aug-18	3.39	3.50	98.02	n/d	n/d

Notes:

[(a)] TH1 to TH5 and TH7 elevations are relative to local benchmark (centre of storm sewer catch basin located approximately 5 metres west of kiosk).

[(b)] MW15-01 , MW15-02 and TH6 elevations are relative to local benchmark (ground surface at TH7).

[(c)] Well was not monitored due to bentonite in the casing prohibiting interface probe to descend

D - well was destroyed

LEL - Lower explosive limit

masl - metres above sea level

mbgs - metres below ground surface

mbtoc - metres below top of casing

mm - millimetres

NA - not available

n/d - not detected

n/m - not measured

ppmv - parts per million by volume

Table 1
Summary of Groundwater Field Monitoring Results
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Well Name	Top of Casing Elevation[(a)(b)] (masl)	Ground Elevation[(a)(b)] (masl)	Monitoring Date	Depth to Groundwater (mbtoc)	Depth to Groundwater (mbgs)	Groundwater Elevation[(a)(b)] (masl)	Product Thickness (mm)	Headspace Vapours (ppmv)
TH101	99.94	100.06	6-Oct-14	2.90	3.02	97.04	n/d	50% LEL
			27-Oct-15	2.98	3.10	96.96	n/d	100% LEL
			10-Aug-16	3.05	3.17	96.89	n/d	9,450
			20-Jun-17	2.94	3.06	97.00	n/d	100% LEL
			15-Aug-18	2.91	3.03	97.03	n/d	100% LEL
TH102	100.59	100.69	6-Oct-14	3.05	3.15	97.54	n/d	10% LEL
			27-Oct-15	3.04	3.14	97.55	n/d	2,700
			10-Aug-16	3.11	3.21	97.48	n/d	430
			20-Jun-17	3.06	3.16	97.53	n/d	420
			15-Aug-18	n/m	n/m	n/m	n/m	n/m
MW15-01	97.84	97.99	17-Nov-15	2.26	2.41	95.58	n/d	n/d
			9-Aug-16	2.35	2.50	95.49	n/d	n/d
			21-Jun-17	2.16	2.31	95.68	n/d	n/d
			14-Aug-18	3.16	3.31	94.68	n/d	n/d
MW15-02	98.01	98.08	17-Nov-15	2.49	2.56	95.52	n/d	n/d
			9-Aug-16	2.63	2.69	95.39	n/d	20
			21-Jun-17	2.52	2.58	95.50	n/d	n/d
			14-Aug-18	2.38	2.44	95.64	n/d	n/d
MW16-01	100.19	100.30	31-Aug-16	2.87	2.97	97.32	n/d	185
			21-Jun-17	2.89	3.00	97.30	n/d	145
			15-Aug-18	2.82	2.93	97.37	n/d	n/d

Notes:

[(a)] TH1 to TH5 and TH7 elevations are relative to local benchmark (centre of storm sewer catch basin located approximately 5 metres west of kiosk).

[(b)] MW15-01 , MW15-02 and TH6 elevations are relative to local benchmark (ground surface at TH7).

[(c)] Well was not monitored due to bentonite in the casing prohibiting interface probe to descend

D - well was destroyed

LEL - Lower explosive limit

masl - metres above sea level

mbgs - metres below ground surface

mbtoc - metres below top of casing

mm - millimetres

NA - not available

n/d - not detected

n/m - not measured

ppmv - parts per million by volume

Table 2
Summary of Groundwater Analytical Results - Petroleum Hydrocarbons and Dissolved Lead
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

			Sample Location	**MW15-01**	**MW15-02**	**MW16-01**	**TH1**	**TH2**	**TH3**	**TH4**		**TH5**
			Sample ID	MW15-01	MW15-02	MW16-01	TH1	TH2	TH3	TH4	DUP B	TH5
			Maxxam Sample ID	HMW400	HMW399	HMW099	HMW192	HMW191	HMW401	HMW194	HMW195	HMW193
			Maxxam Job Number	B8L2047	B8L2047	B8L1946	B8L1982	B8L1982	B8L2047	B8L1982	B8L1982	B8L1982
			Sample Date	15-Aug-18	14-Aug-18	16-Aug-18	16-Aug-18	15-Aug-18	15-Aug-18	16-Aug-18	16-Aug-18	16-Aug-18
Parameters	**Units**	**RDL**	**Standards[a]**									
Benzene	µg/L	0.20	430	<0.20	2.0	15	<0.20	<0.20	7.4	400	420	**<u>510</u>**
Toluene	µg/L	0.20	18,000	<0.20	<0.20	0.39	<0.20	<0.20	<0.20	14	14	37
Ethylbenzene	µg/L	0.20	2,300	<0.20	<0.20	30	<0.20	<0.20	7.2	860	890	1,400
Xylenes	µg/L	0.40	4,200	<0.40	<0.40	0.81	<0.40	<0.40	3.3	3,400	3,500	2,600
F1 (C_6-C_{10}) - BTEX	µg/L	130	750[c]	<25	<25	88	<25	<25	310	**<u>3,100</u>**	**<u>2,800</u>**	**<u>6,700</u>**
F2 (C_{10}-C_{16})	µg/L	100	150	<100	<100	<100	<100	<100	<100	**<u>1,300</u>**	**<u>1,200</u>**	**<u>3,300</u>**
F3 (C_{16}-C_{34})	µg/L	200	500	<200	<200	260	<200	<200	<200	250	260	300
F4 (C_{34}-C_{50})	µg/L	200	500	<200	<200	<200	<200	<200	<200	<200	210	<200
Lead	µg/L	0.50	25	<0.50	<0.50	0.53	<0.50	<0.50	0.76	**<u>30</u>**	**<u>32</u>**	2.6

Notes:

[a] O.Reg 153 (2011) Table 3 Full Depth Generic Site Condition Standards for all types of property use for groundwater in medium and fine textured soil in a non-potable ground water condition

[b] Baseline was not reached at Carbon 50. Value presented corresponds to the greater of the F4 and F4G values.

[c] F1 fraction does not include BTEX; however, the proponent has the choice as to whether or not to subtract BTEX from the analytical result.

<u>Bold/Underlined</u> - value exceeds criteria/standard
BTEX - benzene, toluene, ethylbenzene, xylenes
F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3 and 4
RDL - reportable detection limit
µg/L - micrograms per litre
< - less than

Table 2
Summary of Groundwater Analytical Results - Petroleum Hydrocarbons and Dissolved Lead
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

			Sample Location	TH6	TH7	TH8		TH9	TH100	TH101
			Sample ID	TH6	TH7	TH8	DUP A	TH9	TH100	TH101
			Maxxam Sample ID	HMW397	HMW398	HMW381	HMW382	HMW383	HMW384	HMW098
			Maxxam Job Number	B8L2047	B8L2047	B8L2045	B8L2045	B8L2045	B8L2045	B8L1946
			Sample Date	14-Aug-18	14-Aug-18	15-Aug-18	15-Aug-18	15-Aug-18	15-Aug-18	15-Aug-18
Parameters	**Units**	**RDL**	**Standards[a]**							
Benzene	µg/L	0.20	430	<0.20	22	0.99	1.0	12	<0.20	110
Toluene	µg/L	0.20	18,000	<0.20	0.53	<0.20	<0.20	0.69	<0.20	9.2
Ethylbenzene	µg/L	0.20	2,300	<0.20	8.8	0.80	0.78	78	<0.20	1,200
Xylenes	µg/L	0.40	4,200	<0.40	0.60	<0.40	<0.40	49	<0.40	130
F1 (C_6-C_{10}) - BTEX	µg/L	130	750[c]	<25	68	<25	<25	740	<25	**5,900**
F2 (C_{10}-C_{16})	µg/L	100	150	<100	<100	<100	<100	**190**	<100	**1,700**
F3 (C_{16}-C_{34})	µg/L	200	500	<200	<200	<200	<200	350	<200	<200
F4 (C_{34}-C_{50})	µg/L	200	500	<200	<200	<200	<200	**1,600[b]**	<200	<200
Lead	µg/L	0.50	25	<0.50	<0.50	<2.5	<2.5	<0.50	<2.5	3.8

Notes:

[a] O.Reg 153 (2011) Table 3 Full Depth Generic Site Condition Standards for all types of property use for groundwater in medium and fine textured soil in a non-potable ground water condition

[b] Baseline was not reached at Carbon 50. Value presented corresponds to the greater of the F4 and F4G values.

[c] F1 fraction does not include BTEX; however, the proponent has the choice as to whether or not to subtract BTEX from the analytical result.

Bold/Underlined - value exceeds criteria/standard
BTEX - benzene, toluene, ethylbenzene, xylenes
F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3 and 4
RDL - reportable detection limit
µg/L - micrograms per litre
< - less than

Table 3
Field Screening and Leak Test Measurements
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Sampling Location	Sampling Date	Organic Vapour Concentration (ppbv)	Methane Concentration (%)	Carbon dioxide Concentration (%)	Oxygen Concentration (%)	Helium Concentration Inside Shroud (ppmv)	Helium Concentration in Probe (ppmv)	Helium Ratio of Below Grade/Shroud Concentration (%)	Pass Leak Test[(a)] (Y/N)
SV16-01	13-Dec-16	n/d	0.0	0.0	21.7	364,000	1,600	0.44	Y
		n/d	0.1	0.0	21.5	n/m	n/m	n/c	n/c
		197	0.0	0.0	21.3	n/m	n/m	n/c	n/c
	21-Jul-17	1610	0.0	0.5	18.1	129,000	0	0.00	Y
		1350	0.0	0.1	19.7	n/m	n/m	n/c	n/c
		1668	0.0	0.1	19.9	n/m	n/m	n/c	n/c
	21-Nov-17	24.92	0.0	0.9	20.1	218,000	0	0.00	Y
		22.12	0.0	0.9	20.2	n/m	n/m	n/c	n/c
		20.31	0.0	0.9	20.5	n/m	n/m	n/c	n/c
	3-Jul-18	6701	0.0	3.3	16.4	64,000	0	0.00	Y
		6483	0.0	3.2	16.4	n/m	n/m	n/c	n/c
		6705	0.0	3.2	16.5	n/m	n/m	n/c	n/c
	29-Oct-18	285	0.0	1.1	20.8	226,000	0	0.00	Y
		195	0.0	1.2	20.6	190,000	0	0.00	Y
		308	0.0	1.2	20.5	n/m	n/m	n/c	n/c
SV16-02	13-Dec-16	207	0.1	0.0	21.8	213,000	0	0.00	Y
		240	0.1	0.0	21.6	n/m	n/m	n/c	n/c
		209	0.1	0.0	21.7	n/m	n/m	n/c	n/c
	21-Jul-17	728	0.0	0.5	19.6	90,000	0	0.00	Y
		677	0.0	0.9	19.0	n/m	n/m	n/c	n/c
		686	0.0	0.7	19.1	n/m	n/m	n/c	n/c
	21-Nov-17	20.50	0.1	0.9	20.1	231,000	0	0.00	Y
		17.40	0.1	0.1	20.2	n/m	n/m	n/c	n/c
		13.73	0.0	0.5	19.9	n/m	n/m	n/c	n/c
	3-Jul-18	8102	0.0	5.1	16.8	34,000	0	0.00	Y
		3366	0.0	4.9	16.4	n/m	n/m	n/c	n/c
		2537	0.0	5.0	16.4	n/m	n/m	n/c	n/c
	29-Oct-18	14	0.0	0.9	21.0	161,000	0	0.00	Y
		79	0.1	1.0	21.0	293,000	0	0.00	Y

Notes:
[(a)] A leak test passes if the helium ratio of below grade to shroud concentration is less than 1%
n/c - not calculated
n/d - not detected
n/m - not measured
ppbv - parts per billion by volume
ppmv - parts per million by volume
> - greater than
< - less than

Table 4
Summary of Soil Vapour Analytical Results
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

	Sample Location		SV16-01				SV16-02		Health-Based Indoor Air Criteria[a]	SVSL[b]
	Sample ID		SV16-01	DUPA	SV16-01	DUPA	SV16-02	SV16-02		
	Maxxam Sample ID		HDH356	HDH358	IED332	IED333	HDH357	IED334		
	Maxxam Job Number		B8G6788	B8G6788	B8S9743	B8S9743	B8G6788	B8S9743		
	Sample Date		03-Jul-18	03-Jul-18	30-Oct-18	30-Oct-18	03-Jul-18	30-Oct-18		
Parameters	**Units**	**RDL**								
Benzene	µg/m^3	0.32	<0.32	<0.32	<0.32	<0.32	0.38	<0.32	0.51	25
Toluene	µg/m^3	0.38	1.59	1.71	1.31	1.33	1.54	<0.38	1042.86	52,143
Ethylbenzene	µg/m^3	0.43	1.92	2.35	1.45	1.27	0.59	<0.43	208.57	10,429
Xylenes, Total	µg/m^3	1.3	16-01	9.4	4.6	4.1	2.1	<1.3	146.00	7,300
F1-BTEX, C6-C10 (as Toluene)	µg/m^3	5.0	715	832	224	188	689	36.4	2490.60	124,530
F2, C10-C16 (as Decane)	µg/m^3	5.0	2,880	3,400	1,220	1,040	678	400	470.60	23,530
Aliphatic >C5-C6	µg/m^3	5.0	na	na	<5.0	<5.0	na	<5.0	n/s	n/s
Aliphatic >C6-C8	µg/m^3	5.0	na	na	<5.0	<5.0	na	<5.0	9594.29	479,714
Aliphatic >C8-C10	µg/m^3	5.0	na	na	61.7	52.6	na	16.6	521.43	26,071
Aliphatic >C10-C12	µg/m^3	5.0	na	na	666	551	na	229	521.43	26,071
Aliphatic >C12-C16	µg/m^3	5.0	na	na	9.4	13.9	na	9.3	521.43	26,071
Aromatic >C7-C8 (TEX Excluded)	µg/m^3	5.0	na	na	<5.0	<5.0	na	<5.0	n/s	n/s
Aromatic >C8-C10	µg/m^3	5.0	na	na	<5.0	<5.0	na	<5.0	104.29	5,214
Aromatic >C10-C12	µg/m^3	5.0	na	na	<5.0	<5.0	na	<5.0	104.29	5,214
Aromatic >C12-C16	µg/m^3	5.0	na	na	<5.0	<5.0	na	<5.0	104.29	5,214
Benzyl chloride	µg/m^3	2.6	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6	n/s	n/s
Bromodichloromethane	µg/m^3	1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	n/s	n/s
Bromoform	µg/m^3	2.1	<2.1	<2.1	<2.1	<2.1	<2.1	<2.1	n/s	n/s
Bromomethane	µg/m^3	0.39	<0.39	<0.39	<0.39	<0.39	<0.39	<0.39	1.04	52
1,3-Butadiene	µg/m^3	1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	n/s	n/s
Carbon Disulfide	µg/m^3	1.6	27.0	41.6	2.0	1.8	12.8	<1.6	n/s	n/s
Carbon Tetrachloride	µg/m^3	0.63	<0.63	<0.63	<0.63	<0.63	<0.63	<0.63	0.42	21
Chlorobenzene	µg/m^3	0.46	<0.46	<0.46	<0.46	<0.46	<0.46	<0.46	208.57	10,429
Chloroethane	µg/m^3	0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	n/s	n/s

Notes:

[a] Health-Based Indoor Air Criteria - Residential, provided by MOECC Modified Generic Risk Assessment, Approved Model (November 2016)

[b] Soil Vapour Screening Levels (SVSL) for a residential building with basement (probe depth 0 - 30 centimetres below base of the building foundation) calculated by dividing Health-Based Indoor Air Criteria by an attenuation factor of 0.02.

[c] RDL greater than standards

Bold/Underlined - value exceeds SVSL criteria

n/g - no guideline

n/c - not calculated

RDL - reportable detection limit

µg/m^3 - micrograms per cubic metre

< - less than

Table to be read in conjunction with Laboratory Certificate of Analysis

Table 4
Summary of Soil Vapour Analytical Results
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

	Sample Location		SV16-01				SV16-02		Health-Based Indoor Air Criteria[a]	SVSL[b]
	Sample ID		SV16-01	DUPA	SV16-01	DUPA	SV16-02	SV16-02		
	Maxxam Sample ID		HDH356	HDH358	IED332	IED333	HDH357	IED334		
	Maxxam Job Number		B8G6788	B8G6788	B8S9743	B8S9743	B8G6788	B8S9743		
	Sample Date		03-Jul-18	03-Jul-18	30-Oct-18	30-Oct-18	03-Jul-18	30-Oct-18		
Parameters	**Units**	**RDL**								
Chloroform	µg/m^3	0.49	0.74	0.93	182	159	0.51	<0.49	20.86	1,043
Chloromethane	µg/m^3	0.62	<0.62	<0.62	<0.62	<0.62	<0.62	<0.62	n/s	n/s
Cyclohexane	µg/m^3	0.69	1.90	2.44	<0.69	<0.69	2.09	<0.69	n/s	n/s
Dibromochloromethane	µg/m^3	1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	n/s	n/s
1,2-Dibromoethane (Ethylene Dibromide)	µg/m^3	0.77	<0.77	<0.77	<0.77	<0.77	<0.77	<0.77	0.17	8
1,2-Dichlorobenzene	µg/m^3	0.60	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60	125.14	6,257
1,3-Dichlorobenzene	µg/m^3	2.4	<2.4	<2.4	<2.4	<2.4	<2.4	<2.4	n/s	n/s
1,4-Dichlorobenzene	µg/m^3	0.60	0.67	0.83	<0.60	<0.60	<0.60	<0.60	0.28	14
Dichlorodifluoromethane (FREON 12)	µg/m^3	0.99	8.19	9.31	4.85	4.54	11.9	4.19	n/s	n/s
1,1-Dichloroethane	µg/m^3	0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	34.41	1,721
1,2-Dichloroethane	µg/m^3	0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	0.04	2
1,1-Dichloroethylene	µg/m^3	0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	14.60	730
cis-1,2-Dichloroethylene	µg/m^3	0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	31.29	1,564
trans-1,2-Dichloroethylene	µg/m^3	0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	12.51	626
1,2-Dichloropropane	µg/m^3	0.46	<0.46	<0.46	<0.46	<0.46	<0.46	<0.46	0.83	42
cis-1,3-Dichloropropene	µg/m^3	0.45	<0.45	<0.45	<0.45	<0.45	<0.45	<0.45	0.28	14
trans-1,3-Dichloropropene	µg/m^3	0.45	<0.45	<0.45	<0.45	<0.45	<0.45	<0.45	0.28	14
1,2-Dichlorotetrafluoroethane	µg/m^3	1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	n/s	n/s
1,4-Dioxane	µg/m^3	3.6	<3.6	<3.6	<3.6	<3.6	<3.6	<3.6	750.86	37,543
Ethanol (ethyl alcohol)	µg/m^3	1.9	6.7	6.9	5.4	2.5	6.5	<1.9	n/s	n/s
Ethyl Acetate	µg/m^3	3.6	<3.6	<3.6	<3.6	<3.6	<3.6	<3.6	n/s	n/s
4-ethyltoluene	µg/m^3	2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	n/s	n/s
Heptane	µg/m^3	1.2	2.7	4.7	<1.2	<1.2	2.6	<1.2	n/s	n/s
Hexachlorobutadiene	µg/m^3	5.3	<5.3[c]	<5.3[c]	<5.3[c]	<5.3[c]	<5.3[c]	<5.3[c]	0.05	3

Notes:

[a] Health-Based Indoor Air Criteria - Residential, provided by MOECC Modified Generic Risk Assessment, Approved Model (November 2016)

[b] Soil Vapour Screening Levels (SVSL) for a residential building with basement (probe depth 0 - 30 centimetres below base of the building foundation) calculated by dividing Health-Based Indoor Air Criteria by an attenuation factor of 0.02.

[c] RDL greater than standards

Bold/Underlined - value exceeds SVSL criteria

n/s - no standard

n/c - not calculated

RDL - reportable detection limit

µg/m^3 - micrograms per cubic metre

< - less than

Table to be read in conjunction with Laboratory Certificate of Analysis

Table 4
Summary of Soil Vapour Analytical Results
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

	Sample Location		SV16-01				SV16-02		Health-Based Indoor Air Criteria[a]	SVSL[b]
	Sample ID		SV16-01	DUPA	SV16-01	DUPA	SV16-02	SV16-02		
	Maxxam Sample ID		HDH356	HDH358	IED332	IED333	HDH357	IED334		
	Maxxam Job Number		B8G6788	B8G6788	B8S9743	B8S9743	B8G6788	B8S9743		
	Sample Date		03-Jul-18	03-Jul-18	30-Oct-18	30-Oct-18	03-Jul-18	30-Oct-18		
Parameters	**Units**	**RDL**								
Hexane	µg/m^3	1.1	9.1	10.4	<1.1	1.2	9.3	<1.1	521.43	26,071
Methyl Butyl Ketone (2-Hexanone)	µg/m^3	4.1	<4.1	<4.1	<4.1	<4.1	<4.1	<4.1	n/s	n/s
Methyl Ethyl Ketone (2-Butanone)	µg/m^3	2.9	7.6	9.0	<2.9	<2.9	7.9	<2.9	1002.75	50,137
Methyl Isobutyl Ketone	µg/m^3	4.1	<4.1	<4.1	<4.1	<4.1	<4.1	<4.1	601.65	30,082
Methyl t-butyl ether (MTBE)	µg/m^3	0.72	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72	4.28	214
Methylene Chloride(Dichloromethane)	µg/m^3	2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	48.36	2,418
2-propanol (Isopropanol)	µg/m^3	2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	n/s	n/s
2-Propanone (Acetone)	µg/m^3	1.9	89.5	103	7.5	7.8	97.1	5.5	2502.86	125,143
Propene (Propylene)	µg/m^3	0.86	0.95	1.27	<0.86	<0.86	0.99	<0.86	n/s	n/s
Styrene	µg/m^3	0.43	<0.43	<0.43	<0.43	<0.43	0.54	<0.43	54.23	2,711
1,1,1,2-Tetrachloroethane	µg/m^3	0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	0.15	8
1,1,2,2-Tetrachloroethane	µg/m^3	0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	0.02	1
Tetrachloroethylene	µg/m^3	0.68	3.98	4.90	3.07	2.66	<0.68	<0.68	4.28	214
Tetrahydrofuran	µg/m^3	1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	n/s	n/s
1,2,4-Trichlorobenzene	µg/m^3	3.7	<3.7	<3.7	<3.7	<3.7	<3.7	<3.7	1.67	83
1,2,4-Trimethylbenzene	µg/m^3	2.5	6.3	7.7	<2.5	<2.5	<2.5	<2.5	n/s	n/s
1,1,1-Trichloroethane	µg/m^3	0.55	<0.55	<0.55	<0.55	<0.55	<0.55	<0.55	208.57	10,429
1,1,2-Trichloroethane	µg/m^3	0.55	<0.55	<0.55	<0.55	<0.55	<0.55	<0.55	0.07	3
Trichloroethylene	µg/m^3	0.54	<0.54	<0.54	<0.54	<0.54	0.95	2.12	0.27	14
Trichlorofluoromethane (FREON 11)	µg/m^3	1.1	1.6	1.7	1.2	1.2	1.4	<1.1	n/s	n/s
Trichlorotrifluoroethane (FREON 113)	µg/m^3	1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	n/s	n/s
1,3,5-Trimethylbenzene	µg/m^3	2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	n/s	n/s
2,2,4-Trimethylpentane	µg/m^3	0.93	2.26	2.32	<0.93	<0.93	2.29	<0.93	n/s	n/s
Vinyl Acetate	µg/m^3	0.70	<0.70	<0.70	<0.70	<0.70	<0.70	<0.70	n/s	n/s
Vinyl Bromide	µg/m^3	0.87	<0.87	<0.87	<0.87	<0.87	<0.87	<0.87	n/s	n/s
Vinyl Chloride	µg/m^3	0.26	<0.26	<0.26	<0.26	<0.26	<0.26	<0.26	0.13	6.3

Notes:

[a] Health-Based Indoor Air Criteria - Residential, provided by MOECC Modified Generic Risk Assessment, Approved Model (November 2016)

[b] Soil Vapour Screening Levels (SVSL) for a residential building with basement (probe depth 0 - 30 centimetres below base of the building foundation) calculated by dividing Health-Based Indoor Air Criteria by an attenuation factor of 0.02.

[c] RDL greater than standards

Bold/Underlined - value exceeds SVSL criteria

n/s - no standard

n/c - not calculated

RDL - reportable detection limit

µg/m^3 - micrograms per cubic metre

< - less than

Table to be read in conjunction with Laboratory Certificate of Analysis

APPENDIX A

Laboratory Certificates of Analysis and Data Quality Review Checklists

Maxxam
A Bureau Veritas Group Company

Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155
Your C.O.C. #: 79745

Attention: Brandon McParlan

Golder Associates Ltd
1931 Robertson Road
Ottawa, ON
Canada K2H 5B7

Report Date: 2018/07/18
Report #: R5300219
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8G6788
Received: 2018/07/05, 08:00

Sample Matrix: AIR
Samples Received: 3

Analyses	Quantity	Laboratory Method	Primary Reference
BTEX and CCME Compounds in Air(TO-15mod)	3	BRL SOP-00304	EPA TO-15 m
Canister Pressure (TO-15)	3	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (ug/m3)	3	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (TO-15) (1)	3	BRL SOP-00304	EPA TO-15 m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. All samples were analyzed within hold time unless otherwise flagged.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Air sampling canisters have been cleaned in accordance with U.S. EPA Method TO15. At the end of the cleaning, evacuation, and pressurization cycles, one canister was selected and was pressurized with Zero Air. This canister was then analyzed via TO15 on a GC/MS. The canister must have been found to contain <0.2 ppbv concentration of all target analytes in order for the batch to have been considered clean. Each canister also underwent a leak check prior to shipment.

Please Note: SUMMA® canister samples will be retained by Maxxam for a period of 5 calendar days or as contractually agreed from the date of this report, after which time they will be cleaned for reuse. If you require a longer sample storage period, please contact your service representative.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam
A Bureau Veritas Group Company

Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155
Your C.O.C. #: 79745

Attention: Brandon McParlan

Golder Associates Ltd
1931 Robertson Road
Ottawa, ON
Canada K2H 5B7

Report Date: 2018/07/18
Report #: R5300219
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8G6788
Received: 2018/07/05, 08:00

Encryption Key



Patricia Legette
Project Manager
18 Jul 2018 10:19:33

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kyle Reinhart, Project Manager - Environmental Customer Service
Email: kreinhart@maxxam.ca
Phone# (905) 817-5700

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam Job #: B8G6788
Report Date: 2018/07/18

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

RESULTS OF ANALYSES OF AIR

Maxxam ID		HDH356	HDH357	HDH358	
Sampling Date		2018/07/03 14:33	2018/07/03 13:03	2018/07/03 14:33	
COC Number		79745	79745	79745	
	UNITS	**SV16-01**	**SV16-02**	**DUPA**	**QC Batch**
Pressure on Receipt	psig	(-2.5)	(-2.5)	(-2.9)	5629440
QC Batch = Quality Control Batch					

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Maxxam Job #: B8G6788
Report Date: 2018/07/18

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		HDH356	HDH357	HDH358		
Sampling Date		2018/07/03 14:33	2018/07/03 13:03	2018/07/03 14:33		
COC Number		79745	79745	79745		
	UNITS	**SV16-01**	**SV16-02**	**DUPA**	**RDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ppbv	1.66	2.42	1.88	0.20	5627561
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	<0.17	<0.17	0.17	5627561
Chloromethane	ppbv	<0.30	<0.30	<0.30	0.30	5627561
Vinyl Chloride	ppbv	<0.10	<0.10	<0.10	0.10	5627561
Chloroethane	ppbv	<0.30	<0.30	<0.30	0.30	5627561
1,3-Butadiene	ppbv	<0.50	<0.50	<0.50	0.50	5627561
Trichlorofluoromethane (FREON 11)	ppbv	0.28	0.25	0.29	0.20	5627561
Ethanol (ethyl alcohol)	ppbv	3.5	3.4	3.7	1.0	5627561
Trichlorotrifluoroethane	ppbv	<0.15	<0.15	<0.15	0.15	5627561
2-propanol	ppbv	<1.0	<1.0	<1.0	1.0	5627561
2-Propanone	ppbv	37.7	40.9	43.5	0.80	5627561
Methyl Ethyl Ketone (2-Butanone)	ppbv	2.6	2.7	3.1	1.0	5627561
Methyl Isobutyl Ketone	ppbv	<1.0	<1.0	<1.0	1.0	5627561
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	<1.0	<1.0	1.0	5627561
Methyl t-butyl ether (MTBE)	ppbv	<0.20	<0.20	<0.20	0.20	5627561
Ethyl Acetate	ppbv	<1.0	<1.0	<1.0	1.0	5627561
1,1-Dichloroethylene	ppbv	<0.10	<0.10	<0.10	0.10	5627561
cis-1,2-Dichloroethylene	ppbv	<0.10	<0.10	<0.10	0.10	5627561
trans-1,2-Dichloroethylene	ppbv	<0.10	<0.10	<0.10	0.10	5627561
Methylene Chloride(Dichloromethane)	ppbv	<0.80	<0.80	<0.80	0.80	5627561
Chloroform	ppbv	0.15	0.11	0.19	0.10	5627561
Carbon Tetrachloride	ppbv	<0.10	<0.10	<0.10	0.10	5627561
1,1-Dichloroethane	ppbv	<0.10	<0.10	<0.10	0.10	5627561
1,2-Dichloroethane	ppbv	<0.10	<0.10	<0.10	0.10	5627561
Ethylene Dibromide	ppbv	<0.10	<0.10	<0.10	0.10	5627561
1,1,1-Trichloroethane	ppbv	<0.10	<0.10	<0.10	0.10	5627561
1,1,2-Trichloroethane	ppbv	<0.10	<0.10	<0.10	0.10	5627561
1,1,2,2-Tetrachloroethane	ppbv	<0.10	<0.10	<0.10	0.10	5627561
cis-1,3-Dichloropropene	ppbv	<0.10	<0.10	<0.10	0.10	5627561
trans-1,3-Dichloropropene	ppbv	<0.10	<0.10	<0.10	0.10	5627561
1,2-Dichloropropane	ppbv	<0.10	<0.10	<0.10	0.10	5627561
Bromomethane	ppbv	<0.10	<0.10	<0.10	0.10	5627561
Bromoform	ppbv	<0.20	<0.20	<0.20	0.20	5627561
Bromodichloromethane	ppbv	<0.20	<0.20	<0.20	0.20	5627561

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B8G6788
Report Date: 2018/07/18

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		HDH356	HDH357	HDH358		
Sampling Date		2018/07/03 14:33	2018/07/03 13:03	2018/07/03 14:33		
COC Number		79745	79745	79745		
	UNITS	**SV16-01**	**SV16-02**	**DUPA**	**RDL**	**QC Batch**
Dibromochloromethane	ppbv	<0.20	<0.20	<0.20	0.20	5627561
Trichloroethylene	ppbv	<0.10	0.18	<0.10	0.10	5627561
Tetrachloroethylene	ppbv	0.59	<0.10	0.72	0.10	5627561
Benzene	ppbv	<0.10	0.12	<0.10	0.10	5627561
Toluene	ppbv	0.42	0.41	0.45	0.10	5627561
Ethylbenzene	ppbv	0.44	0.14	0.54	0.10	5627561
p+m-Xylene	ppbv	1.30	0.34	1.63	0.20	5627561
o-Xylene	ppbv	0.44	0.13	0.54	0.10	5627561
Styrene	ppbv	<0.10	0.13	<0.10	0.10	5627561
4-ethyltoluene	ppbv	<0.50	<0.50	<0.50	0.50	5627561
1,3,5-Trimethylbenzene	ppbv	<0.50	<0.50	<0.50	0.50	5627561
1,2,4-Trimethylbenzene	ppbv	1.28	<0.50	1.56	0.50	5627561
Chlorobenzene	ppbv	<0.10	<0.10	<0.10	0.10	5627561
Benzyl chloride	ppbv	<0.50	<0.50	<0.50	0.50	5627561
1,3-Dichlorobenzene	ppbv	<0.40	<0.40	<0.40	0.40	5627561
1,4-Dichlorobenzene	ppbv	0.11	<0.10	0.14	0.10	5627561
1,2-Dichlorobenzene	ppbv	<0.10	<0.10	<0.10	0.10	5627561
1,2,4-Trichlorobenzene	ppbv	<0.50	<0.50	<0.50	0.50	5627561
Hexachlorobutadiene	ppbv	<0.50	<0.50	<0.50	0.50	5627561
Hexane	ppbv	2.58	2.64	2.95	0.30	5627561
Heptane	ppbv	0.66	0.62	1.15	0.30	5627561
Cyclohexane	ppbv	0.55	0.61	0.71	0.20	5627561
Tetrahydrofuran	ppbv	<0.40	<0.40	<0.40	0.40	5627561
1,4-Dioxane	ppbv	<1.0	<1.0	<1.0	1.0	5627561
Naphthalene	ppbv	<0.50	<0.50	<0.50	0.50	5627561
Total Xylenes	ppbv	1.74	0.48	2.17	0.30	5627561
1,1,1,2-Tetrachloroethane	ppbv	<0.10	<0.10	<0.10	0.10	5627561
Vinyl Bromide	ppbv	<0.20	<0.20	<0.20	0.20	5627561
Propene	ppbv	0.55 (1)	0.57 (1)	0.74 (1)	0.50	5627561
2,2,4-Trimethylpentane	ppbv	0.48	0.49	0.50	0.20	5627561
Carbon Disulfide	ppbv	8.68	4.10	13.4	0.50	5627561
Vinyl Acetate	ppbv	<0.20	<0.20	<0.20	0.20	5627561

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Propene is a mixture of both propene and propane and this represents the highest possible concentration of propene.

Maxxam Job #: B8G6788
Report Date: 2018/07/18

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		HDH356	HDH357	HDH358		
Sampling Date		2018/07/03 14:33	2018/07/03 13:03	2018/07/03 14:33		
COC Number		79745	79745	79745		
	UNITS	**SV16-01**	**SV16-02**	**DUPA**	**RDL**	**QC Batch**
Instrument Surrogate Recovery (%)						
Bromochloromethane	%	95	94	97		5627561
D5-Chlorobenzene	%	97	93	92		5627561
Difluorobenzene	%	96	94	97		5627561

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8G6788
Report Date: 2018/07/18

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

CALCULATED VOLATILE ORGANICS (AIR)

Maxxam ID		HDH356	HDH357	HDH358		
Sampling Date		2018/07/03 14:33	2018/07/03 13:03	2018/07/03 14:33		
COC Number		79745	79745	79745		
	UNITS	**SV16-01**	**SV16-02**	**DUPA**	**RDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ug/m3	8.19	11.9	9.31	0.99	5616470
1,2-Dichlorotetrafluoroethane	ug/m3	<1.2	<1.2	<1.2	1.2	5616470
Chloromethane	ug/m3	<0.62	<0.62	<0.62	0.62	5616470
Vinyl Chloride	ug/m3	<0.26	<0.26	<0.26	0.26	5616470
Chloroethane	ug/m3	<0.79	<0.79	<0.79	0.79	5616470
1,3-Butadiene	ug/m3	<1.1	<1.1	<1.1	1.1	5616470
Trichlorofluoromethane (FREON 11)	ug/m3	1.6	1.4	1.7	1.1	5616470
Ethanol (ethyl alcohol)	ug/m3	6.7	6.5	6.9	1.9	5616470
Trichlorotrifluoroethane	ug/m3	<1.2	<1.2	<1.2	1.2	5616470
2-propanol	ug/m3	<2.5	<2.5	<2.5	2.5	5616470
2-Propanone	ug/m3	89.5	97.1	103	1.9	5616470
Methyl Ethyl Ketone (2-Butanone)	ug/m3	7.6	7.9	9.0	2.9	5616470
Methyl Isobutyl Ketone	ug/m3	<4.1	<4.1	<4.1	4.1	5616470
Methyl Butyl Ketone (2-Hexanone)	ug/m3	<4.1	<4.1	<4.1	4.1	5616470
Methyl t-butyl ether (MTBE)	ug/m3	<0.72	<0.72	<0.72	0.72	5616470
Ethyl Acetate	ug/m3	<3.6	<3.6	<3.6	3.6	5616470
1,1-Dichloroethylene	ug/m3	<0.40	<0.40	<0.40	0.40	5616470
cis-1,2-Dichloroethylene	ug/m3	<0.40	<0.40	<0.40	0.40	5616470
trans-1,2-Dichloroethylene	ug/m3	<0.40	<0.40	<0.40	0.40	5616470
Methylene Chloride(Dichloromethane)	ug/m3	<2.8	<2.8	<2.8	2.8	5616470
Chloroform	ug/m3	0.74	0.51	0.93	0.49	5616470
Carbon Tetrachloride	ug/m3	<0.63	<0.63	<0.63	0.63	5616470
1,1-Dichloroethane	ug/m3	<0.40	<0.40	<0.40	0.40	5616470
1,2-Dichloroethane	ug/m3	<0.40	<0.40	<0.40	0.40	5616470
Ethylene Dibromide	ug/m3	<0.77	<0.77	<0.77	0.77	5616470
1,1,1-Trichloroethane	ug/m3	<0.55	<0.55	<0.55	0.55	5616470
1,1,2-Trichloroethane	ug/m3	<0.55	<0.55	<0.55	0.55	5616470
1,1,2,2-Tetrachloroethane	ug/m3	<0.69	<0.69	<0.69	0.69	5616470
cis-1,3-Dichloropropene	ug/m3	<0.45	<0.45	<0.45	0.45	5616470
trans-1,3-Dichloropropene	ug/m3	<0.45	<0.45	<0.45	0.45	5616470
1,2-Dichloropropane	ug/m3	<0.46	<0.46	<0.46	0.46	5616470
Bromomethane	ug/m3	<0.39	<0.39	<0.39	0.39	5616470
Bromoform	ug/m3	<2.1	<2.1	<2.1	2.1	5616470
Bromodichloromethane	ug/m3	<1.3	<1.3	<1.3	1.3	5616470

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B8G6788
Report Date: 2018/07/18

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

CALCULATED VOLATILE ORGANICS (AIR)

Maxxam ID		HDH356	HDH357	HDH358		
Sampling Date		2018/07/03 14:33	2018/07/03 13:03	2018/07/03 14:33		
COC Number		79745	79745	79745		
	UNITS	**SV16-01**	**SV16-02**	**DUPA**	**RDL**	**QC Batch**
Dibromochloromethane	ug/m3	<1.7	<1.7	<1.7	1.7	5616470
Trichloroethylene	ug/m3	<0.54	0.95	<0.54	0.54	5616470
Tetrachloroethylene	ug/m3	3.98	<0.68	4.90	0.68	5616470
Benzene	ug/m3	<0.32	0.38	<0.32	0.32	5616470
Toluene	ug/m3	1.59	1.54	1.71	0.38	5616470
Ethylbenzene	ug/m3	1.92	0.59	2.35	0.43	5616470
p+m-Xylene	ug/m3	5.64	1.48	7.09	0.87	5616470
o-Xylene	ug/m3	1.93	0.58	2.35	0.43	5616470
Styrene	ug/m3	<0.43	0.54	<0.43	0.43	5616470
4-ethyltoluene	ug/m3	<2.5	<2.5	<2.5	2.5	5616470
1,3,5-Trimethylbenzene	ug/m3	<2.5	<2.5	<2.5	2.5	5616470
1,2,4-Trimethylbenzene	ug/m3	6.3	<2.5	7.7	2.5	5616470
Chlorobenzene	ug/m3	<0.46	<0.46	<0.46	0.46	5616470
Benzyl chloride	ug/m3	<2.6	<2.6	<2.6	2.6	5616470
1,3-Dichlorobenzene	ug/m3	<2.4	<2.4	<2.4	2.4	5616470
1,4-Dichlorobenzene	ug/m3	0.67	<0.60	0.83	0.60	5616470
1,2-Dichlorobenzene	ug/m3	<0.60	<0.60	<0.60	0.60	5616470
1,2,4-Trichlorobenzene	ug/m3	<3.7	<3.7	<3.7	3.7	5616470
Hexachlorobutadiene	ug/m3	<5.3	<5.3	<5.3	5.3	5616470
Hexane	ug/m3	9.1	9.3	10.4	1.1	5616470
Heptane	ug/m3	2.7	2.6	4.7	1.2	5616470
Cyclohexane	ug/m3	1.90	2.09	2.44	0.69	5616470
Tetrahydrofuran	ug/m3	<1.2	<1.2	<1.2	1.2	5616470
1,4-Dioxane	ug/m3	<3.6	<3.6	<3.6	3.6	5616470
Naphthalene	ug/m3	<2.6	<2.6	<2.6	2.6	5616470
Total Xylenes	ug/m3	7.6	2.1	9.4	1.3	5616470
1,1,1,2-Tetrachloroethane	ug/m3	<0.69	<0.69	<0.69	0.69	5616470
Vinyl Bromide	ug/m3	<0.87	<0.87	<0.87	0.87	5616470
Propene	ug/m3	0.95	0.99	1.27	0.86	5616470
2,2,4-Trimethylpentane	ug/m3	2.26	2.29	2.32	0.93	5616470
Carbon Disulfide	ug/m3	27.0	12.8	41.6	1.6	5616470
Vinyl Acetate	ug/m3	<0.70	<0.70	<0.70	0.70	5616470

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B8G6788
Report Date: 2018/07/18

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

VOLATILE ORGANIC HYDROCARBONS BY GC/MS (AIR)

Maxxam ID		HDH356	HDH357	HDH358		
Sampling Date		2018/07/03 14:33	2018/07/03 13:03	2018/07/03 14:33		
COC Number		79745	79745	79745		
	UNITS	**SV16-01**	**SV16-02**	**DUPA**	**RDL**	**QC Batch**
F1-BTEX, C6-C10 (as Toluene)	ug/m3	715	689	832	5.0	5629549
F2, C10-C16 (as Decane)	ug/m3	2880	678	3400	5.0	5629549

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8G6788
Report Date: 2018/07/18

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

TEST SUMMARY

Maxxam ID: HDH356
Sample ID: SV16-01
Matrix: AIR

Collected: 2018/07/03
Relinquished: 2018/07/03
Received: 2018/07/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	5629549	N/A	2018/07/13	Yao Liang Sun
Canister Pressure (TO-15)	PRES	5629440	N/A	2018/07/13	Yao Liang Sun
Volatile Organics in Air (ug/m3)	GC/MS	5616470	N/A	2018/07/14	Angel Guerrero
Volatile Organics in Air (TO-15)	GC/MS	5627561	N/A	2018/07/13	Yao Liang Sun

Maxxam ID: HDH357
Sample ID: SV16-02
Matrix: AIR

Collected: 2018/07/03
Relinquished: 2018/07/03
Received: 2018/07/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	5629549	N/A	2018/07/13	Yao Liang Sun
Canister Pressure (TO-15)	PRES	5629440	N/A	2018/07/13	Yao Liang Sun
Volatile Organics in Air (ug/m3)	GC/MS	5616470	N/A	2018/07/14	Angel Guerrero
Volatile Organics in Air (TO-15)	GC/MS	5627561	N/A	2018/07/13	Yao Liang Sun

Maxxam ID: HDH358
Sample ID: DUPA
Matrix: AIR

Collected: 2018/07/03
Relinquished: 2018/07/03
Received: 2018/07/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	5629549	N/A	2018/07/13	Yao Liang Sun
Canister Pressure (TO-15)	PRES	5629440	N/A	2018/07/13	Yao Liang Sun
Volatile Organics in Air (ug/m3)	GC/MS	5616470	N/A	2018/07/14	Angel Guerrero
Volatile Organics in Air (TO-15)	GC/MS	5627561	N/A	2018/07/13	Yao Liang Sun

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Maxxam Job #: B8G6788
Report Date: 2018/07/18

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

GENERAL COMMENTS

Results relate only to the items tested.

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Maxxam Job #: B8G6788
Report Date: 2018/07/18

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5627561	LSY	Method Blank	Bromochloromethane	2018/07/13		96	%	60 - 140
			D5-Chlorobenzene	2018/07/13		93	%	60 - 140
			Difluorobenzene	2018/07/13		98	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2018/07/13	<0.20		ppbv	
			1,2-Dichlorotetrafluoroethane	2018/07/13	<0.17		ppbv	
			Chloromethane	2018/07/13	<0.30		ppbv	
			Vinyl Chloride	2018/07/13	<0.10		ppbv	
			Chloroethane	2018/07/13	<0.30		ppbv	
			1,3-Butadiene	2018/07/13	<0.50		ppbv	
			Trichlorofluoromethane (FREON 11)	2018/07/13	<0.20		ppbv	
			Ethanol (ethyl alcohol)	2018/07/13	<1.0		ppbv	
			Trichlorotrifluoroethane	2018/07/13	<0.15		ppbv	
			2-propanol	2018/07/13	<1.0		ppbv	
			2-Propanone	2018/07/13	<0.80		ppbv	
			Methyl Ethyl Ketone (2-Butanone)	2018/07/13	<1.0		ppbv	
			Methyl Isobutyl Ketone	2018/07/13	<1.0		ppbv	
			Methyl Butyl Ketone (2-Hexanone)	2018/07/13	<1.0		ppbv	
			Methyl t-butyl ether (MTBE)	2018/07/13	<0.20		ppbv	
			Ethyl Acetate	2018/07/13	<1.0		ppbv	
			1,1-Dichloroethylene	2018/07/13	<0.10		ppbv	
			cis-1,2-Dichloroethylene	2018/07/13	<0.10		ppbv	
			trans-1,2-Dichloroethylene	2018/07/13	<0.10		ppbv	
			Methylene Chloride(Dichloromethane)	2018/07/13	<0.80		ppbv	
			Chloroform	2018/07/13	<0.10		ppbv	
			Carbon Tetrachloride	2018/07/13	<0.10		ppbv	
			1,1-Dichloroethane	2018/07/13	<0.10		ppbv	
			1,2-Dichloroethane	2018/07/13	<0.10		ppbv	
			Ethylene Dibromide	2018/07/13	<0.10		ppbv	
			1,1,1-Trichloroethane	2018/07/13	<0.10		ppbv	
			1,1,2-Trichloroethane	2018/07/13	<0.10		ppbv	
			1,1,2,2-Tetrachloroethane	2018/07/13	<0.10		ppbv	
			cis-1,3-Dichloropropene	2018/07/13	<0.10		ppbv	
			trans-1,3-Dichloropropene	2018/07/13	<0.10		ppbv	
			1,2-Dichloropropane	2018/07/13	<0.10		ppbv	
			Bromomethane	2018/07/13	<0.10		ppbv	
			Bromoform	2018/07/13	<0.20		ppbv	
			Bromodichloromethane	2018/07/13	<0.20		ppbv	
			Dibromochloromethane	2018/07/13	<0.20		ppbv	
			Trichloroethylene	2018/07/13	<0.10		ppbv	
			Tetrachloroethylene	2018/07/13	<0.10		ppbv	
			Benzene	2018/07/13	<0.10		ppbv	
			Toluene	2018/07/13	<0.10		ppbv	
			Ethylbenzene	2018/07/13	<0.10		ppbv	
			p+m-Xylene	2018/07/13	<0.20		ppbv	
			o-Xylene	2018/07/13	<0.10		ppbv	
			Styrene	2018/07/13	<0.10		ppbv	
			4-ethyltoluene	2018/07/13	<0.50		ppbv	
			1,3,5-Trimethylbenzene	2018/07/13	<0.50		ppbv	
			1,2,4-Trimethylbenzene	2018/07/13	<0.50		ppbv	
			Chlorobenzene	2018/07/13	<0.10		ppbv	
			Benzyl chloride	2018/07/13	<0.50		ppbv	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,3-Dichlorobenzene	2018/07/13	<0.40		ppbv	
			1,4-Dichlorobenzene	2018/07/13	<0.10		ppbv	
			1,2-Dichlorobenzene	2018/07/13	<0.10		ppbv	
			1,2,4-Trichlorobenzene	2018/07/13	<0.50		ppbv	
			Hexachlorobutadiene	2018/07/13	<0.50		ppbv	
			Hexane	2018/07/13	<0.30		ppbv	
			Heptane	2018/07/13	<0.30		ppbv	
			Cyclohexane	2018/07/13	<0.20		ppbv	
			Tetrahydrofuran	2018/07/13	<0.40		ppbv	
			1,4-Dioxane	2018/07/13	<1.0		ppbv	
			Naphthalene	2018/07/13	<0.50		ppbv	
			Total Xylenes	2018/07/13	<0.30		ppbv	
			1,1,1,2-Tetrachloroethane	2018/07/13	<0.10		ppbv	
			Vinyl Bromide	2018/07/13	<0.20		ppbv	
			Propene	2018/07/13	<0.50		ppbv	
			2,2,4-Trimethylpentane	2018/07/13	<0.20		ppbv	
			Carbon Disulfide	2018/07/13	<0.50		ppbv	
			Vinyl Acetate	2018/07/13	<0.20		ppbv	
5629549	LSY	Method Blank	F1-BTEX, C6-C10 (as Toluene)	2018/07/13	<5.0		ug/m3	
			F2, C10-C16 (as Decane)	2018/07/13	<5.0		ug/m3	
5627561	LSY	LCS	Bromochloromethane	2018/07/13		105	%	60 - 140
			D5-Chlorobenzene	2018/07/13		104	%	60 - 140
			Difluorobenzene	2018/07/13		106	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2018/07/13		96	%	70 - 130
			1,2-Dichlorotetrafluoroethane	2018/07/13		88	%	70 - 130
			Chloromethane	2018/07/13		88	%	70 - 130
			Vinyl Chloride	2018/07/13		85	%	70 - 130
			Chloroethane	2018/07/13		90	%	70 - 130
			1,3-Butadiene	2018/07/13		106	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2018/07/13		102	%	70 - 130
			Ethanol (ethyl alcohol)	2018/07/13		83	%	70 - 130
			Trichlorotrifluoroethane	2018/07/13		94	%	70 - 130
			2-propanol	2018/07/13		98	%	70 - 130
			2-Propanone	2018/07/13		108	%	70 - 130
			Methyl Ethyl Ketone (2-Butanone)	2018/07/13		115	%	70 - 130
			Methyl Isobutyl Ketone	2018/07/13		106	%	70 - 130
			Methyl Butyl Ketone (2-Hexanone)	2018/07/13		111	%	70 - 130
			Methyl t-butyl ether (MTBE)	2018/07/13		100	%	70 - 130
			Ethyl Acetate	2018/07/13		108	%	70 - 130
			1,1-Dichloroethylene	2018/07/13		95	%	70 - 130
			cis-1,2-Dichloroethylene	2018/07/13		95	%	70 - 130
			trans-1,2-Dichloroethylene	2018/07/13		105	%	70 - 130
			Methylene Chloride(Dichloromethane)	2018/07/13		87	%	70 - 130
			Chloroform	2018/07/13		100	%	70 - 130
			Carbon Tetrachloride	2018/07/13		107	%	70 - 130
			1,1-Dichloroethane	2018/07/13		95	%	70 - 130
			1,2-Dichloroethane	2018/07/13		95	%	70 - 130
			Ethylene Dibromide	2018/07/13		101	%	70 - 130
			1,1,1-Trichloroethane	2018/07/13		90	%	70 - 130
			1,1,2-Trichloroethane	2018/07/13		100	%	70 - 130
			1,1,2,2-Tetrachloroethane	2018/07/13		101	%	70 - 130

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Maxxam Job #: B8G6788
Report Date: 2018/07/18

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			cis-1,3-Dichloropropene	2018/07/13		94	%	70 - 130
			trans-1,3-Dichloropropene	2018/07/13		98	%	70 - 130
			1,2-Dichloropropane	2018/07/13		97	%	70 - 130
			Bromomethane	2018/07/13		101	%	70 - 130
			Bromoform	2018/07/13		131 (1)	%	70 - 130
			Bromodichloromethane	2018/07/13		118	%	70 - 130
			Dibromochloromethane	2018/07/13		118	%	70 - 130
			Trichloroethylene	2018/07/13		94	%	70 - 130
			Tetrachloroethylene	2018/07/13		93	%	70 - 130
			Benzene	2018/07/13		101	%	70 - 130
			Toluene	2018/07/13		104	%	70 - 130
			Ethylbenzene	2018/07/13		102	%	70 - 130
			p+m-Xylene	2018/07/13		99	%	70 - 130
			o-Xylene	2018/07/13		97	%	70 - 130
			Styrene	2018/07/13		99	%	70 - 130
			4-ethyltoluene	2018/07/13		114	%	70 - 130
			1,3,5-Trimethylbenzene	2018/07/13		91	%	70 - 130
			1,2,4-Trimethylbenzene	2018/07/13		93	%	70 - 130
			Chlorobenzene	2018/07/13		102	%	70 - 130
			Benzyl chloride	2018/07/13		113	%	70 - 130
			1,3-Dichlorobenzene	2018/07/13		97	%	70 - 130
			1,4-Dichlorobenzene	2018/07/13		94	%	70 - 130
			1,2-Dichlorobenzene	2018/07/13		94	%	70 - 130
			1,2,4-Trichlorobenzene	2018/07/13		98	%	70 - 130
			Hexachlorobutadiene	2018/07/13		87	%	70 - 130
			Hexane	2018/07/13		98	%	70 - 130
			Heptane	2018/07/13		98	%	70 - 130
			Cyclohexane	2018/07/13		99	%	70 - 130
			Tetrahydrofuran	2018/07/13		95	%	70 - 130
			1,4-Dioxane	2018/07/13		104	%	70 - 130
			Naphthalene	2018/07/13		106	%	70 - 130
			Total Xylenes	2018/07/13		98	%	70 - 130
			Vinyl Bromide	2018/07/13		122	%	70 - 130
			Propene	2018/07/13		97	%	70 - 130
			2,2,4-Trimethylpentane	2018/07/13		116	%	70 - 130
			Carbon Disulfide	2018/07/13		114	%	70 - 130
			Vinyl Acetate	2018/07/13		102	%	70 - 130

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

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Maxxam Job #: B8G6788
Report Date: 2018/07/18

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Angel Guerrero, Team Leader, VOC Air

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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EXXONMOBIL/IMPERIAL OIL - MAXXAM
AIR CHAIN OF CUSTODY RECORD

Page 1 of 1

C of C # 79745

INVOICE INFORMATION	REPORT INFORMATION
Company Name: ☒ Imperial Oil Golder ☐ ExxonMobil	Company Name: Golder Associates
Contact Name: IOL Accounts Payable	Contact Name: Brandon McFarlan
Address: 102, 2535-3rd Avenue SE Calgary, AB T2A 7W5	Address: 1931 Robertson Rd. Ottawa, ON K2H 5B7
Email: IOLAccounts_Payable@golder.com	Email: bmcparlan@golder.com
Ph: 403-299-5600	Ph: 613 880 4891
Sampler Name (Print): Leandra Mariani	Consultant Project #: 1791706-1155

ANALYSIS REQUESTED

	FIELD SAMPLE ID	Canister Serial #	Flow Regulator Serial #	Sample Collection DATE (YYYY/MM/DD)	Sample Collection TIME (24 HR)	Media Type (See Legend)	FLOW RATE (L/min)	LENGTH OF SAMPLING (minutes)	BTEX	Aromatic/Aliphatic Hydrocarbon Fractionations	F1 (C6-C10) - F2 (C10-C16)	VOC (TO15)
1	SV16-01	6570	FX1416	2018/07/03	14:33	S	0.14	10	X		X	X
2	SV16-02	6561	FX0572	↓	13:03	S	0.14	10	X		X	X
3	DUPA	6568	FX1415	↓	14:33	S	0.14	10	X		X	X
4												
5												
6												
7												
8												
9												
10												
11												

IOL SITE LOCATION: 1660 Merivale Rd. Ottawa, ON

IOL PROJECT # (if applicable): N/A

MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM: 1791706-1155-7777

REGULATORY CRITERIA / DETECTION LIMITS: (PLEASE SPECIFY): N/A

SPECIAL INSTRUCTIONS: IES: A2601436 SAP: 88001627 Used & Unused equipment included in shipment

LEGEND
S - Summa Can
T - Tube
TB - Tedlar Bag
O - Other(Specify)
*TEMP N/A for SUMMA CAN

TURNAROUND TIME
Standard (10 days) ☒
Rush (9 days) ☐
(6 days) ☐
(3 days) ☐
Date Required

	YES	NO	COOLER ID # 1		YES	NO	COOLER ID #		YES	NO	COOLER ID #
SEAL PRESENT	✓		TEMP °C 1 2 3	SEAL PRESENT			TEMP °C 1 2 3	SEAL PRESENT			TEMP °C 1 2 3
SEAL INTACT	✓			SEAL INTACT				SEAL INTACT			
COOLING MEDIA PRESENT		✓		COOLING MEDIA PRESENT				COOLING MEDIA PRESENT			

LAB USE ONLY
MAXXAM JOB # B8G6788

RELINQUISHED BY:		DATE:	TIME (24 HR)	RECEIVED BY:		DATE:	TIME (24 HR)
1. [signature]	Leandra Mariani	2018/07/03	16:00	1. [signature]	Harsit Ziw	2018/07/05	08:00
2.				2.			
3.				3.			

SAMPLES
LABELED BY: HGL
VERIFIED BY: GKI

IOL COC-AIR-(04/2016) White: Maxxam Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: July 3, 2018

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Maxxam Analytics Mississauga

Consultant Project Number: 1791706-1155

Sample Submission Number: B8G6788

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within
Extraction Surrogate Recovery			X	acceptance criteria.
Method Blank Concentration	X			
Matrix Duplicate RPD			X	
Matrix Spike Recovery			X	
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	All field QC samples are within
Trip Blank Concentration			X	alert limits.
Field Duplicate RPD	X			

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	n/a

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): Amanda Newberry

Date: July 18, 2018

Maxxam
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Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155
Your C.O.C. #: 79744

Attention: Brandon McParlan

Golder Associates Ltd
1931 Robertson Road
Ottawa, ON
Canada K2H 5B7

Report Date: 2018/07/18
Report #: R5300218
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8G6792
Received: 2018/07/05, 08:00

Sample Matrix: AIR
Samples Received: 1

Analyses	Quantity	Laboratory Method	Primary Reference
BTEX and CCME Compounds in Air(TO-15mod)	1	BRL SOP-00304	EPA TO-15 m
Canister Pressure (TO-15)	1	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (ug/m3)	1	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (TO-15) (1)	1	BRL SOP-00304	EPA TO-15 m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. All samples were analyzed within hold time unless otherwise flagged.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Air sampling canisters have been cleaned in accordance with U.S. EPA Method TO15. At the end of the cleaning, evacuation, and pressurization cycles, one canister was selected and was pressurized with Zero Air. This canister was then analyzed via TO15 on a GC/MS. The canister must have been found to contain <0.2 ppbv concentration of all target analytes in order for the batch to have been considered clean. Each canister also underwent a leak check prior to shipment.

Please Note: SUMMA® canister samples will be retained by Maxxam for a period of 5 calendar days or as contractually agreed from the date of this report, after which time they will be cleaned for reuse. If you require a longer sample storage period, please contact your service representative.

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Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155
Your C.O.C. #: 79744

Attention: Brandon McParlan

Golder Associates Ltd
1931 Robertson Road
Ottawa, ON
Canada K2H 5B7

Report Date: 2018/07/18
Report #: R5300218
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8G6792
Received: 2018/07/05, 08:00

Encryption Key



Patricia Legette
Project Manager
18 Jul 2018 10:17:50

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kyle Reinhart, Project Manager - Environmental Customer Service
Email: kreinhart@maxxam.ca
Phone# (905) 817-5700

==========

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Maxxam Job #: B8G6792
Report Date: 2018/07/18

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

RESULTS OF ANALYSES OF AIR

Maxxam ID		HDH368	
Sampling Date		2018/07/03 13:01	
COC Number		79744	
	UNITS	**FIELD BLANK**	**QC Batch**
Pressure on Receipt	psig	(-3.1)	5629440

QC Batch = Quality Control Batch

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Maxxam Job #: B8G6792
Report Date: 2018/07/18

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		HDH368		
Sampling Date		2018/07/03 13:01		
COC Number		79744		
	UNITS	**FIELD BLANK**	**RDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ppbv	0.45	0.20	5627561
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	0.17	5627561
Chloromethane	ppbv	0.37	0.30	5627561
Vinyl Chloride	ppbv	<0.10	0.10	5627561
Chloroethane	ppbv	<0.30	0.30	5627561
1,3-Butadiene	ppbv	<0.50	0.50	5627561
Trichlorofluoromethane (FREON 11)	ppbv	0.22	0.20	5627561
Ethanol (ethyl alcohol)	ppbv	2.7	1.0	5627561
Trichlorotrifluoroethane	ppbv	<0.15	0.15	5627561
2-propanol	ppbv	<1.0	1.0	5627561
2-Propanone	ppbv	4.81	0.80	5627561
Methyl Ethyl Ketone (2-Butanone)	ppbv	<1.0	1.0	5627561
Methyl Isobutyl Ketone	ppbv	<1.0	1.0	5627561
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	1.0	5627561
Methyl t-butyl ether (MTBE)	ppbv	<0.20	0.20	5627561
Ethyl Acetate	ppbv	<1.0	1.0	5627561
1,1-Dichloroethylene	ppbv	<0.10	0.10	5627561
cis-1,2-Dichloroethylene	ppbv	<0.10	0.10	5627561
trans-1,2-Dichloroethylene	ppbv	<0.10	0.10	5627561
Methylene Chloride(Dichloromethane)	ppbv	<0.80	0.80	5627561
Chloroform	ppbv	<0.10	0.10	5627561
Carbon Tetrachloride	ppbv	<0.10	0.10	5627561
1,1-Dichloroethane	ppbv	<0.10	0.10	5627561
1,2-Dichloroethane	ppbv	<0.10	0.10	5627561
Ethylene Dibromide	ppbv	<0.10	0.10	5627561
1,1,1-Trichloroethane	ppbv	<0.10	0.10	5627561
1,1,2-Trichloroethane	ppbv	<0.10	0.10	5627561
1,1,2,2-Tetrachloroethane	ppbv	<0.10	0.10	5627561
cis-1,3-Dichloropropene	ppbv	<0.10	0.10	5627561
trans-1,3-Dichloropropene	ppbv	<0.10	0.10	5627561
1,2-Dichloropropane	ppbv	<0.10	0.10	5627561
Bromomethane	ppbv	<0.10	0.10	5627561
Bromoform	ppbv	<0.20	0.20	5627561
Bromodichloromethane	ppbv	<0.20	0.20	5627561

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B8G6792
Report Date: 2018/07/18

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		HDH368		
Sampling Date		2018/07/03 13:01		
COC Number		79744		
	UNITS	**FIELD BLANK**	**RDL**	**QC Batch**
Dibromochloromethane	ppbv	<0.20	0.20	5627561
Trichloroethylene	ppbv	<0.10	0.10	5627561
Tetrachloroethylene	ppbv	<0.10	0.10	5627561
Benzene	ppbv	<0.10	0.10	5627561
Toluene	ppbv	0.19	0.10	5627561
Ethylbenzene	ppbv	<0.10	0.10	5627561
p+m-Xylene	ppbv	<0.20	0.20	5627561
o-Xylene	ppbv	<0.10	0.10	5627561
Styrene	ppbv	<0.10	0.10	5627561
4-ethyltoluene	ppbv	<0.50	0.50	5627561
1,3,5-Trimethylbenzene	ppbv	<0.50	0.50	5627561
1,2,4-Trimethylbenzene	ppbv	<0.50	0.50	5627561
Chlorobenzene	ppbv	<0.10	0.10	5627561
Benzyl chloride	ppbv	<0.50	0.50	5627561
1,3-Dichlorobenzene	ppbv	<0.40	0.40	5627561
1,4-Dichlorobenzene	ppbv	<0.10	0.10	5627561
1,2-Dichlorobenzene	ppbv	<0.10	0.10	5627561
1,2,4-Trichlorobenzene	ppbv	<0.50	0.50	5627561
Hexachlorobutadiene	ppbv	<0.50	0.50	5627561
Hexane	ppbv	2.42	0.30	5627561
Heptane	ppbv	0.73	0.30	5627561
Cyclohexane	ppbv	0.58	0.20	5627561
Tetrahydrofuran	ppbv	<0.40	0.40	5627561
1,4-Dioxane	ppbv	<1.0	1.0	5627561
Naphthalene	ppbv	<0.50	0.50	5627561
Total Xylenes	ppbv	<0.30	0.30	5627561
1,1,1,2-Tetrachloroethane	ppbv	<0.10	0.10	5627561
Vinyl Bromide	ppbv	<0.20	0.20	5627561
Propene	ppbv	<0.50	0.50	5627561
2,2,4-Trimethylpentane	ppbv	0.50	0.20	5627561
Carbon Disulfide	ppbv	1.25	0.50	5627561
Vinyl Acetate	ppbv	<0.20	0.20	5627561

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8G6792
Report Date: 2018/07/18

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		HDH368		
Sampling Date		2018/07/03 13:01		
COC Number		79744		
	UNITS	**FIELD BLANK**	**RDL**	**QC Batch**
Instrument Surrogate Recovery (%)				
Bromochloromethane	%	96		5627561
D5-Chlorobenzene	%	95		5627561
Difluorobenzene	%	96		5627561

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8G6792
Report Date: 2018/07/18

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

CALCULATED VOLATILE ORGANICS (AIR)

Maxxam ID		HDH368		
Sampling Date		2018/07/03 13:01		
COC Number		79744		
	UNITS	**FIELD BLANK**	**RDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ug/m3	2.24	0.99	5616470
1,2-Dichlorotetrafluoroethane	ug/m3	<1.2	1.2	5616470
Chloromethane	ug/m3	0.76	0.62	5616470
Vinyl Chloride	ug/m3	<0.26	0.26	5616470
Chloroethane	ug/m3	<0.79	0.79	5616470
1,3-Butadiene	ug/m3	<1.1	1.1	5616470
Trichlorofluoromethane (FREON 11)	ug/m3	1.3	1.1	5616470
Ethanol (ethyl alcohol)	ug/m3	5.2	1.9	5616470
Trichlorotrifluoroethane	ug/m3	<1.2	1.2	5616470
2-propanol	ug/m3	<2.5	2.5	5616470
2-Propanone	ug/m3	11.4	1.9	5616470
Methyl Ethyl Ketone (2-Butanone)	ug/m3	<2.9	2.9	5616470
Methyl Isobutyl Ketone	ug/m3	<4.1	4.1	5616470
Methyl Butyl Ketone (2-Hexanone)	ug/m3	<4.1	4.1	5616470
Methyl t-butyl ether (MTBE)	ug/m3	<0.72	0.72	5616470
Ethyl Acetate	ug/m3	<3.6	3.6	5616470
1,1-Dichloroethylene	ug/m3	<0.40	0.40	5616470
cis-1,2-Dichloroethylene	ug/m3	<0.40	0.40	5616470
trans-1,2-Dichloroethylene	ug/m3	<0.40	0.40	5616470
Methylene Chloride(Dichloromethane)	ug/m3	<2.8	2.8	5616470
Chloroform	ug/m3	<0.49	0.49	5616470
Carbon Tetrachloride	ug/m3	<0.63	0.63	5616470
1,1-Dichloroethane	ug/m3	<0.40	0.40	5616470
1,2-Dichloroethane	ug/m3	<0.40	0.40	5616470
Ethylene Dibromide	ug/m3	<0.77	0.77	5616470
1,1,1-Trichloroethane	ug/m3	<0.55	0.55	5616470
1,1,2-Trichloroethane	ug/m3	<0.55	0.55	5616470
1,1,2,2-Tetrachloroethane	ug/m3	<0.69	0.69	5616470
cis-1,3-Dichloropropene	ug/m3	<0.45	0.45	5616470
trans-1,3-Dichloropropene	ug/m3	<0.45	0.45	5616470
1,2-Dichloropropane	ug/m3	<0.46	0.46	5616470
Bromomethane	ug/m3	<0.39	0.39	5616470
Bromoform	ug/m3	<2.1	2.1	5616470
Bromodichloromethane	ug/m3	<1.3	1.3	5616470

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B8G6792
Report Date: 2018/07/18

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

CALCULATED VOLATILE ORGANICS (AIR)

Maxxam ID		HDH368		
Sampling Date		2018/07/03 13:01		
COC Number		79744		
	UNITS	**FIELD BLANK**	**RDL**	**QC Batch**
Dibromochloromethane	ug/m3	<1.7	1.7	5616470
Trichloroethylene	ug/m3	<0.54	0.54	5616470
Tetrachloroethylene	ug/m3	<0.68	0.68	5616470
Benzene	ug/m3	<0.32	0.32	5616470
Toluene	ug/m3	0.71	0.38	5616470
Ethylbenzene	ug/m3	<0.43	0.43	5616470
p+m-Xylene	ug/m3	<0.87	0.87	5616470
o-Xylene	ug/m3	<0.43	0.43	5616470
Styrene	ug/m3	<0.43	0.43	5616470
4-ethyltoluene	ug/m3	<2.5	2.5	5616470
1,3,5-Trimethylbenzene	ug/m3	<2.5	2.5	5616470
1,2,4-Trimethylbenzene	ug/m3	<2.5	2.5	5616470
Chlorobenzene	ug/m3	<0.46	0.46	5616470
Benzyl chloride	ug/m3	<2.6	2.6	5616470
1,3-Dichlorobenzene	ug/m3	<2.4	2.4	5616470
1,4-Dichlorobenzene	ug/m3	<0.60	0.60	5616470
1,2-Dichlorobenzene	ug/m3	<0.60	0.60	5616470
1,2,4-Trichlorobenzene	ug/m3	<3.7	3.7	5616470
Hexachlorobutadiene	ug/m3	<5.3	5.3	5616470
Hexane	ug/m3	8.5	1.1	5616470
Heptane	ug/m3	3.0	1.2	5616470
Cyclohexane	ug/m3	2.00	0.69	5616470
Tetrahydrofuran	ug/m3	<1.2	1.2	5616470
1,4-Dioxane	ug/m3	<3.6	3.6	5616470
Naphthalene	ug/m3	<2.6	2.6	5616470
Total Xylenes	ug/m3	<1.3	1.3	5616470
1,1,1,2-Tetrachloroethane	ug/m3	<0.69	0.69	5616470
Vinyl Bromide	ug/m3	<0.87	0.87	5616470
Propene	ug/m3	<0.86	0.86	5616470
2,2,4-Trimethylpentane	ug/m3	2.34	0.93	5616470
Carbon Disulfide	ug/m3	3.9	1.6	5616470
Vinyl Acetate	ug/m3	<0.70	0.70	5616470

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B8G6792
Report Date: 2018/07/18

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

VOLATILE ORGANIC HYDROCARBONS BY GC/MS (AIR)

Maxxam ID		HDH368		
Sampling Date		2018/07/03 13:01		
COC Number		79744		
	UNITS	**FIELD BLANK**	**RDL**	**QC Batch**
F1-BTEX, C6-C10 (as Toluene)	ug/m3	616	5.0	5629549
F2, C10-C16 (as Decane)	ug/m3	89.6	5.0	5629549

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8G6792
Report Date: 2018/07/18

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

TEST SUMMARY

Maxxam ID: HDH368
Sample ID: FIELD BLANK
Matrix: AIR

Collected: 2018/07/03
Relinquished: 2018/07/03
Received: 2018/07/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	5629549	N/A	2018/07/13	Yao Liang Sun
Canister Pressure (TO-15)	PRES	5629440	N/A	2018/07/13	Yao Liang Sun
Volatile Organics in Air (ug/m3)	GC/MS	5616470	N/A	2018/07/14	Automated Statchk
Volatile Organics in Air (TO-15)	GC/MS	5627561	N/A	2018/07/13	Yao Liang Sun

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Maxxam Job #: B8G6792
Report Date: 2018/07/18

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

GENERAL COMMENTS

Results relate only to the items tested.

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Maxxam Job #: B8G6792
Report Date: 2018/07/18

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5627561	LSY	Method Blank	Bromochloromethane	2018/07/13		96	%	60 - 140
			D5-Chlorobenzene	2018/07/13		93	%	60 - 140
			Difluorobenzene	2018/07/13		98	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2018/07/13	<0.20		ppbv	
			1,2-Dichlorotetrafluoroethane	2018/07/13	<0.17		ppbv	
			Chloromethane	2018/07/13	<0.30		ppbv	
			Vinyl Chloride	2018/07/13	<0.10		ppbv	
			Chloroethane	2018/07/13	<0.30		ppbv	
			1,3-Butadiene	2018/07/13	<0.50		ppbv	
			Trichlorofluoromethane (FREON 11)	2018/07/13	<0.20		ppbv	
			Ethanol (ethyl alcohol)	2018/07/13	<1.0		ppbv	
			Trichlorotrifluoroethane	2018/07/13	<0.15		ppbv	
			2-propanol	2018/07/13	<1.0		ppbv	
			2-Propanone	2018/07/13	<0.80		ppbv	
			Methyl Ethyl Ketone (2-Butanone)	2018/07/13	<1.0		ppbv	
			Methyl Isobutyl Ketone	2018/07/13	<1.0		ppbv	
			Methyl Butyl Ketone (2-Hexanone)	2018/07/13	<1.0		ppbv	
			Methyl t-butyl ether (MTBE)	2018/07/13	<0.20		ppbv	
			Ethyl Acetate	2018/07/13	<1.0		ppbv	
			1,1-Dichloroethylene	2018/07/13	<0.10		ppbv	
			cis-1,2-Dichloroethylene	2018/07/13	<0.10		ppbv	
			trans-1,2-Dichloroethylene	2018/07/13	<0.10		ppbv	
			Methylene Chloride(Dichloromethane)	2018/07/13	<0.80		ppbv	
			Chloroform	2018/07/13	<0.10		ppbv	
			Carbon Tetrachloride	2018/07/13	<0.10		ppbv	
			1,1-Dichloroethane	2018/07/13	<0.10		ppbv	
			1,2-Dichloroethane	2018/07/13	<0.10		ppbv	
			Ethylene Dibromide	2018/07/13	<0.10		ppbv	
			1,1,1-Trichloroethane	2018/07/13	<0.10		ppbv	
			1,1,2-Trichloroethane	2018/07/13	<0.10		ppbv	
			1,1,2,2-Tetrachloroethane	2018/07/13	<0.10		ppbv	
			cis-1,3-Dichloropropene	2018/07/13	<0.10		ppbv	
			trans-1,3-Dichloropropene	2018/07/13	<0.10		ppbv	
			1,2-Dichloropropane	2018/07/13	<0.10		ppbv	
			Bromomethane	2018/07/13	<0.10		ppbv	
			Bromoform	2018/07/13	<0.20		ppbv	
			Bromodichloromethane	2018/07/13	<0.20		ppbv	
			Dibromochloromethane	2018/07/13	<0.20		ppbv	
			Trichloroethylene	2018/07/13	<0.10		ppbv	
			Tetrachloroethylene	2018/07/13	<0.10		ppbv	
			Benzene	2018/07/13	<0.10		ppbv	
			Toluene	2018/07/13	<0.10		ppbv	
			Ethylbenzene	2018/07/13	<0.10		ppbv	
			p+m-Xylene	2018/07/13	<0.20		ppbv	
			o-Xylene	2018/07/13	<0.10		ppbv	
			Styrene	2018/07/13	<0.10		ppbv	
			4-ethyltoluene	2018/07/13	<0.50		ppbv	
			1,3,5-Trimethylbenzene	2018/07/13	<0.50		ppbv	
			1,2,4-Trimethylbenzene	2018/07/13	<0.50		ppbv	
			Chlorobenzene	2018/07/13	<0.10		ppbv	
			Benzyl chloride	2018/07/13	<0.50		ppbv	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,3-Dichlorobenzene	2018/07/13	<0.40		ppbv	
			1,4-Dichlorobenzene	2018/07/13	<0.10		ppbv	
			1,2-Dichlorobenzene	2018/07/13	<0.10		ppbv	
			1,2,4-Trichlorobenzene	2018/07/13	<0.50		ppbv	
			Hexachlorobutadiene	2018/07/13	<0.50		ppbv	
			Hexane	2018/07/13	<0.30		ppbv	
			Heptane	2018/07/13	<0.30		ppbv	
			Cyclohexane	2018/07/13	<0.20		ppbv	
			Tetrahydrofuran	2018/07/13	<0.40		ppbv	
			1,4-Dioxane	2018/07/13	<1.0		ppbv	
			Naphthalene	2018/07/13	<0.50		ppbv	
			Total Xylenes	2018/07/13	<0.30		ppbv	
			1,1,1,2-Tetrachloroethane	2018/07/13	<0.10		ppbv	
			Vinyl Bromide	2018/07/13	<0.20		ppbv	
			Propene	2018/07/13	<0.50		ppbv	
			2,2,4-Trimethylpentane	2018/07/13	<0.20		ppbv	
			Carbon Disulfide	2018/07/13	<0.50		ppbv	
			Vinyl Acetate	2018/07/13	<0.20		ppbv	
5629549	LSY	Method Blank	F1-BTEX, C6-C10 (as Toluene)	2018/07/13	<5.0		ug/m3	
			F2, C10-C16 (as Decane)	2018/07/13	<5.0		ug/m3	
5627561	LSY	LCS	Bromochloromethane	2018/07/13		105	%	60 - 140
			D5-Chlorobenzene	2018/07/13		104	%	60 - 140
			Difluorobenzene	2018/07/13		106	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2018/07/13		96	%	70 - 130
			1,2-Dichlorotetrafluoroethane	2018/07/13		88	%	70 - 130
			Chloromethane	2018/07/13		88	%	70 - 130
			Vinyl Chloride	2018/07/13		85	%	70 - 130
			Chloroethane	2018/07/13		90	%	70 - 130
			1,3-Butadiene	2018/07/13		106	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2018/07/13		102	%	70 - 130
			Ethanol (ethyl alcohol)	2018/07/13		83	%	70 - 130
			Trichlorotrifluoroethane	2018/07/13		94	%	70 - 130
			2-propanol	2018/07/13		98	%	70 - 130
			2-Propanone	2018/07/13		108	%	70 - 130
			Methyl Ethyl Ketone (2-Butanone)	2018/07/13		115	%	70 - 130
			Methyl Isobutyl Ketone	2018/07/13		106	%	70 - 130
			Methyl Butyl Ketone (2-Hexanone)	2018/07/13		111	%	70 - 130
			Methyl t-butyl ether (MTBE)	2018/07/13		100	%	70 - 130
			Ethyl Acetate	2018/07/13		108	%	70 - 130
			1,1-Dichloroethylene	2018/07/13		95	%	70 - 130
			cis-1,2-Dichloroethylene	2018/07/13		95	%	70 - 130
			trans-1,2-Dichloroethylene	2018/07/13		105	%	70 - 130
			Methylene Chloride(Dichloromethane)	2018/07/13		87	%	70 - 130
			Chloroform	2018/07/13		100	%	70 - 130
			Carbon Tetrachloride	2018/07/13		107	%	70 - 130
			1,1-Dichloroethane	2018/07/13		95	%	70 - 130
			1,2-Dichloroethane	2018/07/13		95	%	70 - 130
			Ethylene Dibromide	2018/07/13		101	%	70 - 130
			1,1,1-Trichloroethane	2018/07/13		90	%	70 - 130
			1,1,2-Trichloroethane	2018/07/13		100	%	70 - 130
			1,1,2,2-Tetrachloroethane	2018/07/13		101	%	70 - 130

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Maxxam Job #: B8G6792
Report Date: 2018/07/18

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			cis-1,3-Dichloropropene	2018/07/13		94	%	70 - 130
			trans-1,3-Dichloropropene	2018/07/13		98	%	70 - 130
			1,2-Dichloropropane	2018/07/13		97	%	70 - 130
			Bromomethane	2018/07/13		101	%	70 - 130
			Bromoform	2018/07/13		131 (1)	%	70 - 130
			Bromodichloromethane	2018/07/13		118	%	70 - 130
			Dibromochloromethane	2018/07/13		118	%	70 - 130
			Trichloroethylene	2018/07/13		94	%	70 - 130
			Tetrachloroethylene	2018/07/13		93	%	70 - 130
			Benzene	2018/07/13		101	%	70 - 130
			Toluene	2018/07/13		104	%	70 - 130
			Ethylbenzene	2018/07/13		102	%	70 - 130
			p+m-Xylene	2018/07/13		99	%	70 - 130
			o-Xylene	2018/07/13		97	%	70 - 130
			Styrene	2018/07/13		99	%	70 - 130
			4-ethyltoluene	2018/07/13		114	%	70 - 130
			1,3,5-Trimethylbenzene	2018/07/13		91	%	70 - 130
			1,2,4-Trimethylbenzene	2018/07/13		93	%	70 - 130
			Chlorobenzene	2018/07/13		102	%	70 - 130
			Benzyl chloride	2018/07/13		113	%	70 - 130
			1,3-Dichlorobenzene	2018/07/13		97	%	70 - 130
			1,4-Dichlorobenzene	2018/07/13		94	%	70 - 130
			1,2-Dichlorobenzene	2018/07/13		94	%	70 - 130
			1,2,4-Trichlorobenzene	2018/07/13		98	%	70 - 130
			Hexachlorobutadiene	2018/07/13		87	%	70 - 130
			Hexane	2018/07/13		98	%	70 - 130
			Heptane	2018/07/13		98	%	70 - 130
			Cyclohexane	2018/07/13		99	%	70 - 130
			Tetrahydrofuran	2018/07/13		95	%	70 - 130
			1,4-Dioxane	2018/07/13		104	%	70 - 130
			Naphthalene	2018/07/13		106	%	70 - 130
			Total Xylenes	2018/07/13		98	%	70 - 130
			Vinyl Bromide	2018/07/13		122	%	70 - 130
			Propene	2018/07/13		97	%	70 - 130
			2,2,4-Trimethylpentane	2018/07/13		116	%	70 - 130
			Carbon Disulfide	2018/07/13		114	%	70 - 130
			Vinyl Acetate	2018/07/13		102	%	70 - 130

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

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Maxxam Job #: B8G6792
Report Date: 2018/07/18

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Angel Guerrero, Team Leader, VOC Air

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Phone: (905) 817-5700
Fax: (905) 817-5779
Toll Free: 1-800-563-6266

EXXONMOBIL/IMPERIAL OIL - MAXXAM
AIR CHAIN OF CUSTODY RECORD

C of C # 79744

INVOICE INFORMATION	REPORT INFORMATION
Company Name: ☒ Imperial Oil ☐ ExxonMobil	Company Name: Golder Associates
Contact Name: IOL Accounts Payable (Golder)	Contact Name: Brandon Mcpherson
Address: 102, 2535 - 3rd Avenue SE Calgary, AB T2A 7W5	Address: 1931 Robertson Rd. Ottawa, ON K2H 5B7
Email: IOL Accounts_Payable@golder.com	Email: bmcpherson@golder.com
Ph: 403 299 5600	Ph: 613 880 4891
Sampler Name (Print): Leandra Mariani	Consultant Project #: 1791706-1155

	FIELD SAMPLE ID	Canister Serial #	Flow Regulator Serial #	Sample Collection DATE (YYY/MM/DD)	Sample Collection TIME (24 HR)	Media Type (See Legend)	FLOW RATE (L/min)	LENGTH OF SAMPLING (minutes)	BTEX	Aromatic/Aliphatic Hydrocarbon Fractionations	F1 (C6-C10) - F2 (C10-C16)	VOC (TO15)
1	Field Blank	6562	FX0567	2018/07/03	13:01	S	0.2	7	X		X	X
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												

IOL SITE LOCATION: 1660 Merivale Rd. Ottawa, ON

IOL PROJECT # (if applicable): N/A

MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM: 1791706-1155-7777

REGULATORY CRITERIA / DETECTION LIMITS: (PLEASE SPECIFY): N/A Used ✓

SPECIAL INSTRUCTIONS: IES A2601436 SAP 8800016027 Unused equipment included in shipment.

LEGEND: S - Summa Can; T - Tube; TB - Tedlar Bag; O - Other(Specify); *TEMP N/A for SUMMA CAN

TURNAROUND TIME: Standard (10 days) ☒; Rush (9 days) ☐; (6 days) ☐; (3 days) ☐; Date Required

	YES	NO	COOLER ID #				YES	NO	COOLER ID #				YES	NO	COOLER ID #			
SEAL PRESENT	✓		TEMP °C	1	2	3	SEAL PRESENT		TEMP °C	1	2	3	SEAL PRESENT		TEMP °C	1	2	3
SEAL INTACT	✓						SEAL INTACT						SEAL INTACT					
COOLING MEDIA PRESENT		✓					COOLING MEDIA PRESENT						COOLING MEDIA PRESENT					

RELINQUISHED BY:		DATE:	TIME (24 HR)	RECEIVED BY:		DATE:	TIME (24 HR)
1.	Leandra Mariani	2018/07/03	16:04	1.	HARJIT ZHW	2018/07/05	08:00
2.				2.			
3.				3.			

LAB USE ONLY
MAXXAM JOB # B8G6792

SAMPLES: LABELED BY: HGL; VERIFIED BY: YKI

IOL COC-AIR-(04/2016) White: Maxxam Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: July 3, 2018

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Maxxam Analytics Mississauga

Consultant Project Number: 1791706-1155

Sample Submission Number: B8G6792

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within
Extraction Surrogate Recovery			X	acceptance criteria.
Method Blank Concentration	X			
Matrix Duplicate RPD			X	
Matrix Spike Recovery			X	
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration		X		Field blank sample exceeded alert limits for
Trip Blank Concentration			X	2-propanone, hexane, F1 and F2. All remaining field
Field Duplicate RPD			X	QC samples are within alert limits.

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	n/a

Is data considered to be reliable (Yes/No/Suspect)?: Suspect

If answer is "No", describe and provide rationale: Please see QA/QC appendix.

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): Amanda Newberry

Date: July 18, 2018

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Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155
Your C.O.C. #: 677696-05-01

Attention: Brandon McParlan

Golder Associates Ltd
1931 Robertson Road
Ottawa, ON
Canada K2H 5B7

Report Date: 2018/08/23
Report #: R5370057
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8L1946
Received: 2018/08/17, 08:04

Sample Matrix: Water
Samples Received: 2

Analyses	Quantity	Laboratory Method	Primary Reference
Petroleum Hydro. CCME F1 & BTEX in Water	2	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1)	2	CAM SOP-00316	CCME PHC-CWS m
Dissolved Metals by ICPMS	2	CAM SOP-00447	EPA 6020B m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard. All samples were analyzed within hold time unless otherwise flagged.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following "Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003". Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

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Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155
Your C.O.C. #: 677696-05-01

Attention: Brandon McParlan

Golder Associates Ltd
1931 Robertson Road
Ottawa, ON
Canada K2H 5B7

Report Date: 2018/08/23
Report #: R5370057
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8L1946
Received: 2018/08/17, 08:04

Encryption Key

Kyle Reinhart
Project Manager - Environmental
Customer Service
23 Aug 2018 16:19:10

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kyle Reinhart, Project Manager - Environmental Customer Service
Email: kreinhart@maxxam.ca
Phone# (905) 817-5700

==========

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Maxxam Job #: B8L1946
Report Date: 2018/08/23

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

LEAD (DISSOLVED) IN WATER

Maxxam ID		HMW098	HMW098	HMW099		
Sampling Date		2018/08/15 23:17	2018/08/15 23:17	2018/08/16 00:32		
COC Number		677696-05-01	677696-05-01	677696-05-01		
	UNITS	**TH101**	**TH101 Lab-Dup**	**MW16-01**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	3.8	3.6	0.53	0.50	5687269

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B8L1946
Report Date: 2018/08/23

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

O.REG 153 PHCS IN WATER (WATER)

Maxxam ID		HMW098		HMW099		
Sampling Date		2018/08/15 23:17		2018/08/16 00:32		
COC Number		677696-05-01		677696-05-01		
	UNITS	**TH101**	**RDL**	**MW16-01**	**RDL**	**QC Batch**
Benzene	ug/L	110	1.0	15	0.20	5688089
Toluene	ug/L	9.2	1.0	0.39	0.20	5688089
Ethylbenzene	ug/L	1200	1.0	30	0.20	5688089
o-Xylene	ug/L	18	1.0	0.35	0.20	5688089
p+m-Xylene	ug/L	110	2.0	0.46	0.40	5688089
Total Xylenes	ug/L	130	2.0	0.81	0.40	5688089
F1 (C6-C10)	ug/L	7300	130	130	25	5688089
F1 (C6-C10) - BTEX	ug/L	5900	130	88	25	5688089
F2 (C10-C16 Hydrocarbons)	ug/L	1700	100	<100	100	5692984
F3 (C16-C34 Hydrocarbons)	ug/L	<200	200	260	200	5692984
F4 (C34-C50 Hydrocarbons)	ug/L	<200	200	<200	200	5692984
Reached Baseline at C50	ug/L	Yes		Yes		5692984
Extraction Surrogate Recovery (%)						
o-Terphenyl	%	97		98		5692984
Instrument Surrogate Recovery (%)						
1,4-Difluorobenzene	%	100		101		5688089
4-Bromofluorobenzene	%	104		103		5688089
D10-Ethylbenzene	%	108		101		5688089
D4-1,2-Dichloroethane	%	96		98		5688089

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8L1946
Report Date: 2018/08/23

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

TEST SUMMARY

Maxxam ID: HMW098
Sample ID: TH101
Matrix: Water

Collected: 2018/08/15
Relinquished: 2018/08/16
Received: 2018/08/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5688089	N/A	2018/08/20	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5692984	2018/08/22	2018/08/22	Jeevaraj Jeevaratrnam
Dissolved Metals by ICPMS	ICP/MS	5687269	N/A	2018/08/21	Thao Nguyen

Maxxam ID: HMW098 Dup
Sample ID: TH101
Matrix: Water

Collected: 2018/08/15
Relinquished: 2018/08/16
Received: 2018/08/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Metals by ICPMS	ICP/MS	5687269	N/A	2018/08/21	Thao Nguyen

Maxxam ID: HMW099
Sample ID: MW16-01
Matrix: Water

Collected: 2018/08/16
Relinquished: 2018/08/16
Received: 2018/08/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5688089	N/A	2018/08/20	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5692984	2018/08/22	2018/08/22	Jeevaraj Jeevaratrnam
Dissolved Metals by ICPMS	ICP/MS	5687269	N/A	2018/08/21	Thao Nguyen

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Maxxam Job #: B8L1946
Report Date: 2018/08/23

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	1.0°C

Results relate only to the items tested.

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Maxxam Job #: B8L1946
Report Date: 2018/08/23

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5687269	TNG	Method Blank	Dissolved Lead (Pb)	2018/08/21	<0.50		ug/L	
5688089	LRA	Method Blank	1,4-Difluorobenzene	2018/08/20		100	%	70 - 130
			4-Bromofluorobenzene	2018/08/20		98	%	70 - 130
			D10-Ethylbenzene	2018/08/20		103	%	70 - 130
			D4-1,2-Dichloroethane	2018/08/20		100	%	70 - 130
			Benzene	2018/08/20	<0.20		ug/L	
			Toluene	2018/08/20	<0.20		ug/L	
			Ethylbenzene	2018/08/20	<0.20		ug/L	
			o-Xylene	2018/08/20	<0.20		ug/L	
			p+m-Xylene	2018/08/20	<0.40		ug/L	
			Total Xylenes	2018/08/20	<0.40		ug/L	
			F1 (C6-C10)	2018/08/20	<25		ug/L	
			F1 (C6-C10) - BTEX	2018/08/20	<25		ug/L	
5692984	JJE	Method Blank	o-Terphenyl	2018/08/22		100	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2018/08/22	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2018/08/22	<200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2018/08/22	<200		ug/L	
5687269	TNG	RPD [HMW098-03]	Dissolved Lead (Pb)	2018/08/21	3.2		%	20
5687269	TNG	Matrix Spike [HMW098-03]	Dissolved Lead (Pb)	2018/08/22		88	%	80 - 120
5687269	TNG	LCS	Dissolved Lead (Pb)	2018/08/21		96	%	80 - 120
5688089	LRA	LCS	1,4-Difluorobenzene	2018/08/20		100	%	70 - 130
			4-Bromofluorobenzene	2018/08/20		103	%	70 - 130
			D10-Ethylbenzene	2018/08/20		99	%	70 - 130
			D4-1,2-Dichloroethane	2018/08/20		98	%	70 - 130
			Benzene	2018/08/20		96	%	70 - 130
			Toluene	2018/08/20		95	%	70 - 130
			Ethylbenzene	2018/08/20		93	%	70 - 130
			o-Xylene	2018/08/20		89	%	70 - 130
			p+m-Xylene	2018/08/20		93	%	70 - 130
			F1 (C6-C10)	2018/08/20		95	%	70 - 130
5692984	JJE	LCS	o-Terphenyl	2018/08/22		100	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2018/08/22		103	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2018/08/22		108	%	60 - 130
			F4 (C34-C50 Hydrocarbons)	2018/08/22		104	%	60 - 130

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B8L1946
Report Date: 2018/08/23

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Service Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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6740 Campobello Road
Mississauga, Ontario L5N 2L8
www.maxxam.ca

Phone: (905) 817-5700
Fax: (905) 817-5777
Toll Free: 800-563-6266

EXXONMOBIL/IMPERIAL OIL - MAXXAM
CHAIN-OF-CUSTODY RECORD
ANALYSIS REQUESTED

C of C # 677696-05-01

677696

INVOICE INFORMATION	REPORT INFORMATION
Company Name: Imperial Oil Ltd - Golder Associates Ltd	Company Name: Golder Associates Ltd
Contact Name: IOL Accounts Payable	Contact Name: Brandon McParlan
Address: 102, 2535-3rd Avenue SE, Calgary AB T2A 7W5	Address: 1931 Robertson Road, Ottawa ON K2H 5B7
Email: IOLAccounts_Payable@golder.com	Email: Brandon_McParlan@golder.com, IOL_1390@go
Phone: (403) 299-5600	Phone: (613) 592-9600
Sampler Name (Print): Leandra Mariani & Catherine Chiarest	Consultant Project #: 1791706-1155

	FIELD SAMPLE ID	MATRIX: GROUND WATER	MATRIX: SURFACE WATER	MATRIX: SOIL	MATRIX: OTHER	# CONTAINERS	SAMPLING: DATE (YYYY/MM/DD)	SAMPLING: TIME (24 HR)	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	F1/BTEX	F2-F4	Lead
1	TH101	X				7	2018/08/15	23:17	X		X	X	X
2	MW16-01	X				7	2018/08/16	00:32	X		X	X	X
3													
4													
5													
6													
7													
8													
9													
10													

IOL SITE LOCATION: 1660 Merivale Road, Ottawa, ON

IOL PROJECT # (if applicable): N/A

MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM: 1791706-1155-7777-

REGULATORY CRITERIA / DETECTION LIMITS:
☒ REG 153 Table 3 ☐ 2004 ☒ 2011 ☐ RSC
(Please indicate which Reg. version and if RSC required)
☐ ODWS ☐ PWQO
☐ Other

SPECIAL INSTRUCTIONS:
IES: A2601436
SAP: 8800162?
Samples may contain headspace.

JARS USED AND NOT SUBMITTED Enter N/A for Water: N/A

TURNAROUND TIME
Standard (5 days) ☒
Rush (3 days) ☐
(2 days) ☐
(1 day) ☐
(same day) ☐
Date Required

	YES	NO	COOLER ID: 1			YES	NO	COOLER ID:				YES	NO	COOLER ID:			
SEAL PRESENT	✓																
SEAL INTACT	✓		TEMP °C	1	0	2		TEMP °C	1	2	3			TEMP °C	1	2	3
COOLING MEDIA PRESENT				1	2	3											

LAB USE ONLY
MAXXAM JOB # B8L1946

* RELINQUISHED BY:		DATE:	TIME (24 HR)	RECEIVED BY:		DATE:	TIME (24 HR)
1.	Leandra Mariani	2018/08/16	15:58	1.		2018/08/17	08:04
2.				2.			
3.				3.			

SAMPLES
LABELED BY: DSG
VERIFIED BY: GID

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXXAM'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.MAXXAM.CA/TERMS.

COC – 1012 (2016) IOL – ON White: Maxxam Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: August 15 and 16, 2018

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Maxxam Analytics Mississauga

Consultant Project Number: 1791706-1155

Sample Submission Number: B8L1946

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within
Extraction Surrogate Recovery	X			acceptance criteria.
Method Blank Concentration	X			
Matrix Duplicate RPD	X			
Matrix Spike Recovery	X			
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	No field QC samples were collected.
Trip Blank Concentration			X	
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Anita Colbert

Data Reviewed by (Signature): Anita Colbert

Date: August 24, 2018

Maxxam
A Bureau Veritas Group Company

Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155
Your C.O.C. #: 677696-04-01

Attention: Brandon McParlan

Golder Associates Ltd
1931 Robertson Road
Ottawa, ON
Canada K2H 5B7

Report Date: 2018/08/23
Report #: R5370558
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8L1962
Received: 2018/08/17, 08:04

Sample Matrix: Water
Samples Received: 2

Analyses	Quantity	Laboratory Method	Primary Reference
Petroleum Hydro. CCME F1 & BTEX in Water	2	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1)	2	CAM SOP-00316	CCME PHC-CWS m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard. All samples were analyzed within hold time unless otherwise flagged.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following "Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003". Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam
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Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155
Your C.O.C. #: 677696-04-01

Attention: Brandon McParlan

Golder Associates Ltd
1931 Robertson Road
Ottawa, ON
Canada K2H 5B7

Report Date: 2018/08/23
Report #: R5370558
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8L1962
Received: 2018/08/17, 08:04

Encryption Key

Kyle Reinhart
Project Manager - Environmental
Customer Service
23 Aug 2018 21:55:48

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kyle Reinhart, Project Manager - Environmental Customer Service
Email: kreinhart@maxxam.ca
Phone# (905) 817-5700

==========

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Maxxam Job #: B8L1962
Report Date: 2018/08/23

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

O.REG 153 PHCS IN WATER (WATER)

Maxxam ID		HMW139	HMW140		
Sampling Date		2018/08/16 11:30	2018/08/16 14:00		
COC Number		677696-04-01	677696-04-01		
	UNITS	**FIELD BLANK**	**TRIP BLANK**	**RDL**	**QC Batch**
Benzene	ug/L	<0.20	<0.20	0.20	5691604
Toluene	ug/L	<0.20	<0.20	0.20	5691604
Ethylbenzene	ug/L	<0.20	<0.20	0.20	5691604
o-Xylene	ug/L	<0.20	<0.20	0.20	5691604
p+m-Xylene	ug/L	<0.40	<0.40	0.40	5691604
Total Xylenes	ug/L	<0.40	<0.40	0.40	5691604
F1 (C6-C10)	ug/L	<25	<25	25	5691604
F1 (C6-C10) - BTEX	ug/L	<25	<25	25	5691604
F2 (C10-C16 Hydrocarbons)	ug/L	<100	<100	100	5693419
F3 (C16-C34 Hydrocarbons)	ug/L	<200	<200	200	5693419
F4 (C34-C50 Hydrocarbons)	ug/L	<200	<200	200	5693419
Reached Baseline at C50	ug/L	Yes	Yes		5693419
Extraction Surrogate Recovery (%)					
o-Terphenyl	%	92	89		5693419
Instrument Surrogate Recovery (%)					
1,4-Difluorobenzene	%	100	99		5691604
4-Bromofluorobenzene	%	94	95		5691604
D10-Ethylbenzene	%	99	95		5691604
D4-1,2-Dichloroethane	%	94	96		5691604

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8L1962
Report Date: 2018/08/23

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

TEST SUMMARY

Maxxam ID: HMW139
Sample ID: FIELD BLANK
Matrix: Water

Collected: 2018/08/16
Relinquished: 2018/08/16
Received: 2018/08/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5691604	N/A	2018/08/22	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5693419	2018/08/22	2018/08/23	Zhiyue (Frank) Zhu

Maxxam ID: HMW140
Sample ID: TRIP BLANK
Matrix: Water

Collected: 2018/08/16
Relinquished: 2018/08/16
Received: 2018/08/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5691604	N/A	2018/08/22	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5693419	2018/08/22	2018/08/23	Zhiyue (Frank) Zhu

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B8L1962
Report Date: 2018/08/23

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	1.0°C

Note: Bottles received but not listed on the COC. For sample Trip Blank we received 3 containers but the COC said 4.

Results relate only to the items tested.

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Maxxam Job #: B8L1962
Report Date: 2018/08/23

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5691604	AAI	Method Blank	1,4-Difluorobenzene	2018/08/22		99	%	70 - 130
			4-Bromofluorobenzene	2018/08/22		91	%	70 - 130
			D10-Ethylbenzene	2018/08/22		97	%	70 - 130
			D4-1,2-Dichloroethane	2018/08/22		96	%	70 - 130
			Benzene	2018/08/22	<0.20		ug/L	
			Toluene	2018/08/22	<0.20		ug/L	
			Ethylbenzene	2018/08/22	<0.20		ug/L	
			o-Xylene	2018/08/22	<0.20		ug/L	
			p+m-Xylene	2018/08/22	<0.40		ug/L	
			Total Xylenes	2018/08/22	<0.40		ug/L	
			F1 (C6-C10)	2018/08/22	<25		ug/L	
			F1 (C6-C10) - BTEX	2018/08/22	<25		ug/L	
5693419	ZZ	Method Blank	o-Terphenyl	2018/08/23		96	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2018/08/23	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2018/08/23	<200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2018/08/23	<200		ug/L	
5691604	AAI	LCS	1,4-Difluorobenzene	2018/08/22		100	%	70 - 130
			4-Bromofluorobenzene	2018/08/22		97	%	70 - 130
			D10-Ethylbenzene	2018/08/22		99	%	70 - 130
			D4-1,2-Dichloroethane	2018/08/22		96	%	70 - 130
			Benzene	2018/08/22		96	%	70 - 130
			Toluene	2018/08/22		96	%	70 - 130
			Ethylbenzene	2018/08/22		93	%	70 - 130
			o-Xylene	2018/08/22		91	%	70 - 130
			p+m-Xylene	2018/08/22		93	%	70 - 130
			F1 (C6-C10)	2018/08/22		88	%	70 - 130
5693419	ZZ	LCS	o-Terphenyl	2018/08/23		97	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2018/08/23		99	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2018/08/23		102	%	60 - 130
			F4 (C34-C50 Hydrocarbons)	2018/08/23		99	%	60 - 130

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

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Maxxam Job #: B8L1962
Report Date: 2018/08/23

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Service Specialist

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Maxxam

6740 Campobello Road
Mississauga, Ontario L5N 2L8
www.maxxam.ca

Phone: (905) 817-5700
Fax: (905) 817-5777
Toll Free: 800-563-6266

EXXONMOBIL/IMPERIAL OIL - MAXXAM
CHAIN-OF-CUSTODY RECORD
ANALYSIS REQUESTED

C of C # 677696-04-01

677696

INVOICE INFORMATION	REPORT INFORMATION
Company Name: Imperial Oil Ltd - Golder Associates Ltd	Company Name: Golder Associates Ltd
Contact Name: IOL Accounts Payable	Contact Name: Brandon McParlan
Address: 102, 2535-3rd Avenue SE, Calgary AB T2A 7W5	Address: 1931 Robertson Road, Ottawa ON K2H 5B7
Email: IOLAccounts_Payable@golder.com	Email: Brandon_McParlan@golder.com, IOL_1390@go
Phone: (403) 299-5600	Phone: (613) 592-9600
Sampler Name (Print): CATHERINE CHAREST	Consultant Project #: 1791706-1155

	FIELD SAMPLE ID	MATRIX: GROUND WATER	MATRIX: SURFACE WATER	MATRIX: SOIL	MATRIX: OTHER	# CONTAINERS	SAMPLING: DATE (YYYY/MM/DD)	SAMPLING: TIME (24 HR)	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	F1/BTEX	F2-F4	Lead
1	FIELD BLANK				X	6	2018/08/16	11:30			X	X	
2	TRIP BLANK				X	4	2018/08/16	14:00			X	X	
3													
4													
5													
6													
7													
8													
9													
10													

IOL SITE LOCATION:
1660 Merivale Road, Ottawa, ON

IOL PROJECT # (if applicable):
N/A

MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM:
1791706-1155-7777-

REGULATORY CRITERIA / DETECTION LIMITS:
☒ REG 153 Table 3 ☐ 2004 ☒ 2011 ☐ RSC
(Please indicate which Reg. version and if RSC required)
☐ ODWS ☐ PWQO
☐ Other

SPECIAL INSTRUCTIONS:
- MATRIX "OTHER" : BLANK
- IES A2601436
- Upload to 88001627
- Presence of headspace possible

JARS USED AND NOT SUBMITTED Enter N/A for Water: N/A

TURNAROUND TIME
Standard (5 days) ☒
Rush (3 days) ☐
(2 days) ☐
(1 day) ☐
(same day) ☐
Date Required

	YES	NO	COOLER ID:				YES	NO	COOLER ID:				YES	NO	COOLER ID:			
SEAL PRESENT	✓																	
SEAL INTACT	✓		TEMP °C	1	0	2			TEMP °C						TEMP °C			
COOLING MEDIA PRESENT	✓		1	2	3				1	2	3				1	2	3	

LAB USE ONLY
MAXXAM JOB # B8L1962

* RELINQUISHED BY:		DATE:	TIME (24 HR)	RECEIVED BY:		DATE:	TIME (24 HR)
1.	CATHERINE CHAREST	2018/08/16	14:05	1.	MARIE MCKAY	2018/08/17	08:04
2.				2.			
3.				3.			

SAMPLES
LABELED BY: DSG
VERIFIED BY:

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXXAM'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.MAXXAM.CA/TERMS.

COC – 1012 (2016) IOL – ON White: Maxxam Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: August 16, 2018

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Maxxam Analytics Mississauga

Consultant Project Number: 1791706-1155

Sample Submission Number: B8L1962

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within
Extraction Surrogate Recovery	X			acceptance criteria.
Method Blank Concentration	X			
Matrix Duplicate RPD			X	
Matrix Spike Recovery			X	
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration	X			All field QC samples are within
Trip Blank Concentration	X			alert limits.
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Anita Colbert

Data Reviewed by (Signature): Anita Colbert

Date: August 24, 2018

Maxxam
A Bureau Veritas Group Company

Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155
Your C.O.C. #: 677696-02-01

Attention: Brandon McParlan

Golder Associates Ltd
1931 Robertson Road
Ottawa, ON
Canada K2H 5B7

Report Date: 2018/08/23
Report #: R5370058
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8L1982
Received: 2018/08/17, 08:04

Sample Matrix: Water
Samples Received: 5

Analyses	Quantity	Laboratory Method	Primary Reference
Petroleum Hydro. CCME F1 & BTEX in Water	5	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1)	5	CAM SOP-00316	CCME PHC-CWS m
Dissolved Metals by ICPMS	5	CAM SOP-00447	EPA 6020B m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard. All samples were analyzed within hold time unless otherwise flagged.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following "Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003". Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam
A Bureau Veritas Group Company

Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155
Your C.O.C. #: 677696-02-01

Attention: Brandon McParlan

Golder Associates Ltd
1931 Robertson Road
Ottawa, ON
Canada K2H 5B7

Report Date: 2018/08/23
Report #: R5370058
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8L1982
Received: 2018/08/17, 08:04

Encryption Key

Kyle Reinhart
Project Manager - Environmental
Customer Service
23 Aug 2018 15:58:27

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kyle Reinhart, Project Manager - Environmental Customer Service
Email: kreinhart@maxxam.ca
Phone# (905) 817-5700

==========

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Maxxam Job #: B8L1982
Report Date: 2018/08/23

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

LEAD (DISSOLVED) IN WATER

Maxxam ID		HMW191	HMW192	HMW193	HMW194	HMW195		
Sampling Date		2018/08/15 16:38	2018/08/16 12:12	2018/08/16 13:30	2018/08/16 13:45	2018/08/16 13:45		
COC Number		677696-02-01	677696-02-01	677696-02-01	677696-02-01	677696-02-01		
	UNITS	**TH2**	**TH1**	**TH5**	**TH4**	**DUP B**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	<0.50	<0.50	2.6	30	32	0.50	5687590

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8L1982
Report Date: 2018/08/23

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

O.REG 153 PHCS IN WATER (WATER)

Maxxam ID		HMW191			HMW191			HMW192		HMW193		
Sampling Date		2018/08/15 16:38			2018/08/15 16:38			2018/08/16 12:12		2018/08/16 13:30		
COC Number		677696-02-01			677696-02-01			677696-02-01		677696-02-01		
	UNITS	**TH2**	**RDL**	**QC Batch**	**TH2 Lab-Dup**	**RDL**	**QC Batch**	**TH1**	**RDL**	**TH5**	**RDL**	**QC Batch**
Benzene	ug/L	<0.20	0.20	5691604	<0.20	0.20	5691604	<0.20	0.20	510	4.0	5691604
Toluene	ug/L	<0.20	0.20	5691604	<0.20	0.20	5691604	<0.20	0.20	37	4.0	5691604
Ethylbenzene	ug/L	<0.20	0.20	5691604	<0.20	0.20	5691604	<0.20	0.20	1400	4.0	5691604
o-Xylene	ug/L	<0.20	0.20	5691604	<0.20	0.20	5691604	<0.20	0.20	65	4.0	5691604
p+m-Xylene	ug/L	<0.40	0.40	5691604	<0.40	0.40	5691604	<0.40	0.40	2500	8.0	5691604
Total Xylenes	ug/L	<0.40	0.40	5691604	<0.40	0.40	5691604	<0.40	0.40	2600	8.0	5691604
F1 (C6-C10)	ug/L	<25	25	5691604	<25	25	5691604	<25	25	11000	500	5691604
F1 (C6-C10) - BTEX	ug/L	<25	25	5691604	<25	25	5691604	<25	25	6700	500	5691604
F2 (C10-C16 Hydrocarbons)	ug/L	<100	100	5692984				<100	100	3300	100	5692984
F3 (C16-C34 Hydrocarbons)	ug/L	<200	200	5692984				<200	200	300	200	5692984
F4 (C34-C50 Hydrocarbons)	ug/L	<200	200	5692984				<200	200	<200	200	5692984
Reached Baseline at C50	ug/L	Yes		5692984				Yes		Yes		5692984
Extraction Surrogate Recovery (%)												
o-Terphenyl	%	98		5692984				98		99		5692984
Instrument Surrogate Recovery (%)												
1,4-Difluorobenzene	%	98		5691604	98		5691604	100		99		5691604
4-Bromofluorobenzene	%	94		5691604	94		5691604	94		97		5691604
D10-Ethylbenzene	%	97		5691604	97		5691604	98		99		5691604
D4-1,2-Dichloroethane	%	96		5691604	96		5691604	98		97		5691604

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B8L1982
Report Date: 2018/08/23

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

O.REG 153 PHCS IN WATER (WATER)

Maxxam ID		HMW194	HMW195		
Sampling Date		2018/08/16 13:45	2018/08/16 13:45		
COC Number		677696-02-01	677696-02-01		
	UNITS	**TH4**	**DUP B**	**RDL**	**QC Batch**
Benzene	ug/L	400	420	2.0	5691604
Toluene	ug/L	14	14	2.0	5691604
Ethylbenzene	ug/L	860	890	2.0	5691604
o-Xylene	ug/L	48	47	2.0	5691604
p+m-Xylene	ug/L	3400	3500	4.0	5691604
Total Xylenes	ug/L	3400	3500	4.0	5691604
F1 (C6-C10)	ug/L	7800	7600	250	5691604
F1 (C6-C10) - BTEX	ug/L	3100	2800	250	5691604
F2 (C10-C16 Hydrocarbons)	ug/L	1300	1200	100	5692984
F3 (C16-C34 Hydrocarbons)	ug/L	250	260	200	5692984
F4 (C34-C50 Hydrocarbons)	ug/L	<200	210	200	5692984
Reached Baseline at C50	ug/L	Yes	Yes		5692984
Extraction Surrogate Recovery (%)					
o-Terphenyl	%	100	98		5692984
Instrument Surrogate Recovery (%)					
1,4-Difluorobenzene	%	100	97		5691604
4-Bromofluorobenzene	%	104	105		5691604
D10-Ethylbenzene	%	107	109		5691604
D4-1,2-Dichloroethane	%	101	101		5691604

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8L1982
Report Date: 2018/08/23

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

TEST SUMMARY

Maxxam ID: HMW191
Sample ID: TH2
Matrix: Water

Collected: 2018/08/15
Relinquished: 2018/08/16
Received: 2018/08/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5691604	N/A	2018/08/22	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5692984	2018/08/22	2018/08/22	Jeevaraj Jeevaratrnam
Dissolved Metals by ICPMS	ICP/MS	5687590	N/A	2018/08/21	Arefa Dabhad

Maxxam ID: HMW191 Dup
Sample ID: TH2
Matrix: Water

Collected: 2018/08/15
Relinquished: 2018/08/16
Received: 2018/08/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5691604	N/A	2018/08/22	Abdikarim Ali

Maxxam ID: HMW192
Sample ID: TH1
Matrix: Water

Collected: 2018/08/16
Relinquished: 2018/08/16
Received: 2018/08/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5691604	N/A	2018/08/22	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5692984	2018/08/22	2018/08/22	Jeevaraj Jeevaratrnam
Dissolved Metals by ICPMS	ICP/MS	5687590	N/A	2018/08/21	Arefa Dabhad

Maxxam ID: HMW193
Sample ID: TH5
Matrix: Water

Collected: 2018/08/16
Relinquished: 2018/08/16
Received: 2018/08/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5691604	N/A	2018/08/22	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5692984	2018/08/22	2018/08/22	Jeevaraj Jeevaratrnam
Dissolved Metals by ICPMS	ICP/MS	5687590	N/A	2018/08/21	Arefa Dabhad

Maxxam ID: HMW194
Sample ID: TH4
Matrix: Water

Collected: 2018/08/16
Relinquished: 2018/08/16
Received: 2018/08/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5691604	N/A	2018/08/22	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5692984	2018/08/22	2018/08/22	Jeevaraj Jeevaratrnam
Dissolved Metals by ICPMS	ICP/MS	5687590	N/A	2018/08/21	Arefa Dabhad

Maxxam ID: HMW195
Sample ID: DUP B
Matrix: Water

Collected: 2018/08/16
Relinquished: 2018/08/16
Received: 2018/08/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5691604	N/A	2018/08/22	Abdikarim Ali

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Maxxam Job #: B8L1982
Report Date: 2018/08/23

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

TEST SUMMARY

Maxxam ID: HMW195
Sample ID: DUP B
Matrix: Water

Collected: 2018/08/16
Relinquished: 2018/08/16
Received: 2018/08/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5692984	2018/08/22	2018/08/23	Jeevaraj Jeevaratrnam
Dissolved Metals by ICPMS	ICP/MS	5687590	N/A	2018/08/21	Arefa Dabhad

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Maxxam Job #: B8L1982
Report Date: 2018/08/23

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	1.0°C

Results relate only to the items tested.

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Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5687590	ADA	Method Blank	Dissolved Lead (Pb)	2018/08/21	<0.50		ug/L	
5691604	AAI	Method Blank	1,4-Difluorobenzene	2018/08/22		99	%	70 - 130
			4-Bromofluorobenzene	2018/08/22		91	%	70 - 130
			D10-Ethylbenzene	2018/08/22		97	%	70 - 130
			D4-1,2-Dichloroethane	2018/08/22		96	%	70 - 130
			Benzene	2018/08/22	<0.20		ug/L	
			Toluene	2018/08/22	<0.20		ug/L	
			Ethylbenzene	2018/08/22	<0.20		ug/L	
			o-Xylene	2018/08/22	<0.20		ug/L	
			p+m-Xylene	2018/08/22	<0.40		ug/L	
			Total Xylenes	2018/08/22	<0.40		ug/L	
			F1 (C6-C10)	2018/08/22	<25		ug/L	
			F1 (C6-C10) - BTEX	2018/08/22	<25		ug/L	
5692984	JJE	Method Blank	o-Terphenyl	2018/08/22		100	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2018/08/22	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2018/08/22	<200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2018/08/22	<200		ug/L	
5691604	AAI	RPD [HMW191-04]	Benzene	2018/08/22	NC		%	30
			Toluene	2018/08/22	NC		%	30
			Ethylbenzene	2018/08/22	NC		%	30
			o-Xylene	2018/08/22	NC		%	30
			p+m-Xylene	2018/08/22	NC		%	30
			Total Xylenes	2018/08/22	NC		%	30
			F1 (C6-C10)	2018/08/22	NC		%	30
			F1 (C6-C10) - BTEX	2018/08/22	NC		%	30
5691604	AAI	Matrix Spike [HMW191-04]	1,4-Difluorobenzene	2018/08/22		99	%	70 - 130
			4-Bromofluorobenzene	2018/08/22		97	%	70 - 130
			D10-Ethylbenzene	2018/08/22		101	%	70 - 130
			D4-1,2-Dichloroethane	2018/08/22		94	%	70 - 130
			Benzene	2018/08/22		100	%	70 - 130
			Toluene	2018/08/22		96	%	70 - 130
			Ethylbenzene	2018/08/22		93	%	70 - 130
			o-Xylene	2018/08/22		92	%	70 - 130
			p+m-Xylene	2018/08/22		91	%	70 - 130
			F1 (C6-C10)	2018/08/22		75	%	70 - 130
5687590	ADA	LCS	Dissolved Lead (Pb)	2018/08/21		105	%	80 - 120
5691604	AAI	LCS	1,4-Difluorobenzene	2018/08/22		100	%	70 - 130
			4-Bromofluorobenzene	2018/08/22		97	%	70 - 130
			D10-Ethylbenzene	2018/08/22		99	%	70 - 130
			D4-1,2-Dichloroethane	2018/08/22		96	%	70 - 130
			Benzene	2018/08/22		96	%	70 - 130
			Toluene	2018/08/22		96	%	70 - 130
			Ethylbenzene	2018/08/22		93	%	70 - 130
			o-Xylene	2018/08/22		91	%	70 - 130
			p+m-Xylene	2018/08/22		93	%	70 - 130
			F1 (C6-C10)	2018/08/22		88	%	70 - 130
5692984	JJE	LCS	o-Terphenyl	2018/08/22		100	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2018/08/22		103	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2018/08/22		108	%	60 - 130

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Maxxam Job #: B8L1982
Report Date: 2018/08/23

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			F4 (C34-C50 Hydrocarbons)	2018/08/22		104	%	60 - 130

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

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Maxxam Job #: B8L1982
Report Date: 2018/08/23

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Service Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam

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Toll Free: 800-563-6266

EXXONMOBIL/IMPERIAL OIL - MAXXAM
CHAIN-OF-CUSTODY RECORD
ANALYSIS REQUESTED

C of C # 677696-02-01

677696

INVOICE INFORMATION	REPORT INFORMATION
Company Name: Imperial Oil Ltd - Golder Associates Ltd	Company Name: Golder Associates Ltd
Contact Name: IOL Accounts Payable	Contact Name: Brandon McParlan
Address: 102, 2535-3rd Avenue SE Calgary AB T2A 7W5	Address: 1931 Robertson Road Ottawa ON K2H 5B7
Email: IOLAccounts_Payable@golder.com	Email: Brandon_McParlan@golder.com, IOL_1390@go
Phone: (403) 299-5600	Phone: (613) 592-9600
Sampler Name (Print): CATHERINE CHAREST	Consultant Project #: 1791706-1155

	FIELD SAMPLE ID	MATRIX: GROUND WATER	MATRIX: SURFACE WATER	MATRIX: SOIL	MATRIX: OTHER	# CONTAINERS	SAMPLING: DATE (YYYY/MM/DD)	SAMPLING: TIME (24 HR)	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	F1/BTEX	F2-F4	Lead
1	TH2	X				7	2018/08/15	16:38	X		X	X	X
2	TH1	X				7	2018/08/16	12:12	X		X	X	X
3	TH5	X				7	2018/08/16	13:30	X		X	X	X
4	TH4	X				7	2018/08/16	13:45	X		X	X	X
5	DUP B	X				7	2018/08/16	13:45	X		X	X	X
6													
7													
8													
9													
10													

IOL SITE LOCATION:
1660 Merivale Road, Ottawa, ON

IOL PROJECT # (if applicable):
N/A

MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM:
1791706-1155-7777-

REGULATORY CRITERIA / DETECTION LIMITS:
☒ REG 153 Table 3 ☐ 2004 ☒ 2011 ☐ RSC
(Please indicate which Reg. version and if RSC required)
☐ ODWS ☐ PWQO
☐ Other

SPECIAL INSTRUCTIONS:
- IES A2601436
- upload to 8800162 7
- Presence of headspace possible

JARS USED AND NOT SUBMITTED Enter N/A for Water: N/A

TURNAROUND TIME
Standard (5 days) ☒
Rush (3 days) ☐
(2 days) ☐
(1 day) ☐
(same day) ☐
Date Required

	YES	NO	COOLER ID:			
SEAL PRESENT	✓					
SEAL INTACT	✓		TEMP °C	1	1	1
COOLING MEDIA PRESENT	✓			1	2	3

	YES	NO	COOLER ID:			
SEAL PRESENT						
SEAL INTACT			TEMP °C	1	2	3
COOLING MEDIA PRESENT						

	YES	NO	COOLER ID:			
SEAL PRESENT						
SEAL INTACT			TEMP °C	1	2	3
COOLING MEDIA PRESENT						

* RELINQUISHED BY:		DATE:	TIME (24 HR)	RECEIVED BY:		DATE:	TIME (24 HR)
1.	CATHERINE CHAREST	2018/08/16	13:55	1.	IMRAN USMAN	2018/08/17	08:04
2.				2.			
3.				3.			

LAB USE ONLY
MAXXAM JOB #: B8L1982
SAMPLES
LABELED BY: DSG
VERIFIED BY: GTD

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXXAM'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.MAXXAM.CA/TERMS.

COC – 1012 (2016) IOL – ON White: Maxxam Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: August 15 and 16, 2018

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Maxxam Analytics Mississauga

Consultant Project Number: 1791706-1155

Sample Submission Number: B8L1982

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within
Extraction Surrogate Recovery	X			acceptance criteria.
Method Blank Concentration	X			
Matrix Duplicate RPD	X			
Matrix Spike Recovery	X			
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	All field QC samples are within
Trip Blank Concentration			X	alert limits.
Field Duplicate RPD	X			

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Anita Colbert

Data Reviewed by (Signature): Anita Colbert

Date: August 24, 2018

Maxxam
A Bureau Veritas Group Company

Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155
Your C.O.C. #: 677696-03-01

Attention: Brandon McParlan

Golder Associates Ltd
1931 Robertson Road
Ottawa, ON
Canada K2H 5B7

Report Date: 2018/08/24
Report #: R5372624
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8L2045
Received: 2018/08/17, 08:04

Sample Matrix: Water
Samples Received: 4

Analyses	Quantity	Laboratory Method	Primary Reference
Petroleum Hydro. CCME F1 & BTEX in Water	4	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1)	4	CAM SOP-00316	CCME PHC-CWS m
F4G (CCME Hydrocarbons Gravimetric)	1	CAM SOP-00326	CCME PHC-CWS m
Dissolved Metals by ICPMS	4	CAM SOP-00447	EPA 6020B m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard. All samples were analyzed within hold time unless otherwise flagged.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following "Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003". Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam
A Bureau Veritas Group Company

Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155
Your C.O.C. #: 677696-03-01

Attention: Brandon McParlan

Golder Associates Ltd
1931 Robertson Road
Ottawa, ON
Canada K2H 5B7

Report Date: 2018/08/24
Report #: R5372624
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8L2045
Received: 2018/08/17, 08:04

Encryption Key

Kyle Reinhart
Project Manager - Environmental
Customer Service
24 Aug 2018 20:48:01

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kyle Reinhart, Project Manager - Environmental Customer Service
Email: kreinhart@maxxam.ca
Phone# (905) 817-5700

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam Job #: B8L2045
Report Date: 2018/08/24

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

LEAD (DISSOLVED) IN WATER

Maxxam ID		HMW381	HMW381	HMW382		HMW383		HMW384		
Sampling Date		2018/08/15 20:21	2018/08/15 20:21	2018/08/15 20:21		2018/08/15 20:31		2018/08/15 21:53		
COC Number		677696-03-01	677696-03-01	677696-03-01		677696-03-01		677696-03-01		
	UNITS	**TH8**	**TH8 Lab-Dup**	**DUP A**	**RDL**	**TH9**	**RDL**	**TH100**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	<2.5	<2.5	<2.5	2.5	<0.50	0.50	<2.5	2.5	5687591

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B8L2045
Report Date: 2018/08/24

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

O.REG 153 PHCS IN WATER (WATER)

Maxxam ID		HMW381	HMW382	HMW382	HMW383	HMW384		
Sampling Date		2018/08/15 20:21	2018/08/15 20:21	2018/08/15 20:21	2018/08/15 20:31	2018/08/15 21:53		
COC Number		677696-03-01	677696-03-01	677696-03-01	677696-03-01	677696-03-01		
	UNITS	**TH8**	**DUP A**	**DUP A Lab-Dup**	**TH9**	**TH100**	**RDL**	**QC Batch**
Benzene	ug/L	0.99	1.0	1.0	12	<0.20	0.20	5688089
Toluene	ug/L	<0.20	<0.20	<0.20	0.69	<0.20	0.20	5688089
Ethylbenzene	ug/L	0.80	0.78	0.76	78	<0.20	0.20	5688089
o-Xylene	ug/L	<0.20	<0.20	<0.20	1.3	<0.20	0.20	5688089
p+m-Xylene	ug/L	<0.40	<0.40	<0.40	47	<0.40	0.40	5688089
Total Xylenes	ug/L	<0.40	<0.40	<0.40	49	<0.40	0.40	5688089
F1 (C6-C10)	ug/L	<25	26	31	880	<25	25	5688089
F1 (C6-C10) - BTEX	ug/L	<25	<25	29	740	<25	25	5688089
F2 (C10-C16 Hydrocarbons)	ug/L	<100	<100	<100	190	<100	100	5693419
F3 (C16-C34 Hydrocarbons)	ug/L	<200	<200	<200	350	<200	200	5693419
F4 (C34-C50 Hydrocarbons)	ug/L	<200	<200	<200	310	<200	200	5693419
Reached Baseline at C50	ug/L	Yes	Yes	Yes	No	Yes		5693419
Extraction Surrogate Recovery (%)								
o-Terphenyl	%	91	92	96	91	94		5693419
Instrument Surrogate Recovery (%)								
1,4-Difluorobenzene	%	99	99	98	101	100		5688089
4-Bromofluorobenzene	%	99	98	101	102	99		5688089
D10-Ethylbenzene	%	101	98	99	105	101		5688089
D4-1,2-Dichloroethane	%	97	97	100	97	96		5688089

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B8L2045
Report Date: 2018/08/24

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		HMW383		
Sampling Date		2018/08/15 20:31		
COC Number		677696-03-01		
	UNITS	**TH9**	**RDL**	**QC Batch**
F4G-sg (Grav. Heavy Hydrocarbons)	ug/L	1600	500	5696943

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8L2045
Report Date: 2018/08/24

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

TEST SUMMARY

Maxxam ID: HMW381
Sample ID: TH8
Matrix: Water

Collected: 2018/08/15
Relinquished: 2018/08/16
Received: 2018/08/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5688089	N/A	2018/08/20	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5693419	2018/08/22	2018/08/23	Zhiyue (Frank) Zhu
Dissolved Metals by ICPMS	ICP/MS	5687591	N/A	2018/08/22	Thao Nguyen

Maxxam ID: HMW381 Dup
Sample ID: TH8
Matrix: Water

Collected: 2018/08/15
Relinquished: 2018/08/16
Received: 2018/08/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Metals by ICPMS	ICP/MS	5687591	N/A	2018/08/22	Thao Nguyen

Maxxam ID: HMW382
Sample ID: DUP A
Matrix: Water

Collected: 2018/08/15
Relinquished: 2018/08/16
Received: 2018/08/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5688089	N/A	2018/08/20	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5693419	2018/08/22	2018/08/23	Zhiyue (Frank) Zhu
Dissolved Metals by ICPMS	ICP/MS	5687591	N/A	2018/08/22	Thao Nguyen

Maxxam ID: HMW382 Dup
Sample ID: DUP A
Matrix: Water

Collected: 2018/08/15
Relinquished: 2018/08/16
Received: 2018/08/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5688089	N/A	2018/08/20	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5693419	2018/08/22	2018/08/23	Zhiyue (Frank) Zhu

Maxxam ID: HMW383
Sample ID: TH9
Matrix: Water

Collected: 2018/08/15
Relinquished: 2018/08/16
Received: 2018/08/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5688089	N/A	2018/08/20	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5693419	2018/08/22	2018/08/23	Zhiyue (Frank) Zhu
F4G (CCME Hydrocarbons Gravimetric)	BAL	5696943	2018/08/24	2018/08/24	Francis Afonso
Dissolved Metals by ICPMS	ICP/MS	5687591	N/A	2018/08/22	Thao Nguyen

Maxxam ID: HMW384
Sample ID: TH100
Matrix: Water

Collected: 2018/08/15
Relinquished: 2018/08/16
Received: 2018/08/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5688089	N/A	2018/08/20	Lincoln Ramdahin

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Maxxam Job #: B8L2045
Report Date: 2018/08/24

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

TEST SUMMARY

Maxxam ID: HMW384
Sample ID: TH100
Matrix: Water

Collected: 2018/08/15
Relinquished: 2018/08/16
Received: 2018/08/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5693419	2018/08/22	2018/08/23	Zhiyue (Frank) Zhu
Dissolved Metals by ICPMS	ICP/MS	5687591	N/A	2018/08/22	Thao Nguyen

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Maxxam Job #: B8L2045
Report Date: 2018/08/24

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	0.0°C

Sample HMW381 [TH8] : Metal Analysis:Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

Sample HMW382 [DUP A] : Metal Analysis:Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

Sample HMW384 [TH100] : Metal Analysis:Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

Results relate only to the items tested.

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Maxxam Job #: B8L2045
Report Date: 2018/08/24

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5687591	TNG	Method Blank	Dissolved Lead (Pb)	2018/08/22	<0.50		ug/L	
5688089	LRA	Method Blank	1,4-Difluorobenzene	2018/08/20		100	%	70 - 130
			4-Bromofluorobenzene	2018/08/20		98	%	70 - 130
			D10-Ethylbenzene	2018/08/20		103	%	70 - 130
			D4-1,2-Dichloroethane	2018/08/20		100	%	70 - 130
			Benzene	2018/08/20	<0.20		ug/L	
			Toluene	2018/08/20	<0.20		ug/L	
			Ethylbenzene	2018/08/20	<0.20		ug/L	
			o-Xylene	2018/08/20	<0.20		ug/L	
			p+m-Xylene	2018/08/20	<0.40		ug/L	
			Total Xylenes	2018/08/20	<0.40		ug/L	
			F1 (C6-C10)	2018/08/20	<25		ug/L	
			F1 (C6-C10) - BTEX	2018/08/20	<25		ug/L	
5693419	ZZ	Method Blank	o-Terphenyl	2018/08/23		96	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2018/08/23	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2018/08/23	<200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2018/08/23	<200		ug/L	
5696943	FA	Method Blank	F4G-sg (Grav. Heavy Hydrocarbons)	2018/08/24	<500		ug/L	
5696943	FA	RPD	F4G-sg (Grav. Heavy Hydrocarbons)	2018/08/24	0		%	20
5687591	TNG	RPD [HMW381-03]	Dissolved Lead (Pb)	2018/08/22	NC		%	20
5688089	LRA	RPD [HMW382-04]	Benzene	2018/08/20	0.58		%	30
			Toluene	2018/08/20	NC		%	30
			Ethylbenzene	2018/08/20	2.0		%	30
			o-Xylene	2018/08/20	NC		%	30
			p+m-Xylene	2018/08/20	NC		%	30
			Total Xylenes	2018/08/20	NC		%	30
			F1 (C6-C10)	2018/08/20	19		%	30
			F1 (C6-C10) - BTEX	2018/08/20	16		%	30
5693419	ZZ	RPD [HMW382-02]	F2 (C10-C16 Hydrocarbons)	2018/08/23	NC		%	30
			F3 (C16-C34 Hydrocarbons)	2018/08/23	NC		%	30
			F4 (C34-C50 Hydrocarbons)	2018/08/23	NC		%	30
5687591	TNG	Matrix Spike [HMW381-03]	Dissolved Lead (Pb)	2018/08/22		92	%	80 - 120
5688089	LRA	Matrix Spike [HMW382-04]	1,4-Difluorobenzene	2018/08/20		97	%	70 - 130
			4-Bromofluorobenzene	2018/08/20		102	%	70 - 130
			D10-Ethylbenzene	2018/08/20		104	%	70 - 130
			D4-1,2-Dichloroethane	2018/08/20		100	%	70 - 130
			Benzene	2018/08/20		100	%	70 - 130
			Toluene	2018/08/20		100	%	70 - 130
			Ethylbenzene	2018/08/20		97	%	70 - 130
			o-Xylene	2018/08/20		94	%	70 - 130
			p+m-Xylene	2018/08/20		98	%	70 - 130
			F1 (C6-C10)	2018/08/20		86	%	70 - 130
5693419	ZZ	Matrix Spike [HMW381-02]	o-Terphenyl	2018/08/23		99	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2018/08/23		102	%	50 - 130
			F3 (C16-C34 Hydrocarbons)	2018/08/23		104	%	50 - 130
			F4 (C34-C50 Hydrocarbons)	2018/08/23		102	%	50 - 130
5687591	TNG	LCS	Dissolved Lead (Pb)	2018/08/22		98	%	80 - 120
5688089	LRA	LCS	1,4-Difluorobenzene	2018/08/20		100	%	70 - 130

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Maxxam Job #: B8L2045
Report Date: 2018/08/24

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			4-Bromofluorobenzene	2018/08/20		103	%	70 - 130
			D10-Ethylbenzene	2018/08/20		99	%	70 - 130
			D4-1,2-Dichloroethane	2018/08/20		98	%	70 - 130
			Benzene	2018/08/20		96	%	70 - 130
			Toluene	2018/08/20		95	%	70 - 130
			Ethylbenzene	2018/08/20		93	%	70 - 130
			o-Xylene	2018/08/20		89	%	70 - 130
			p+m-Xylene	2018/08/20		93	%	70 - 130
			F1 (C6-C10)	2018/08/20		95	%	70 - 130
5693419	ZZ	LCS	o-Terphenyl	2018/08/23		97	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2018/08/23		99	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2018/08/23		102	%	60 - 130
			F4 (C34-C50 Hydrocarbons)	2018/08/23		99	%	60 - 130
5696943	FA	LCS	F4G-sg (Grav. Heavy Hydrocarbons)	2018/08/24		91	%	65 - 135

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B8L2045
Report Date: 2018/08/24

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Service Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Mississauga, Ontario L5N 2L8
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Phone: (905) 817-5700
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Toll Free: 800-563-6266

EXXONMOBIL/IMPERIAL OIL - MAXXAM
CHAIN-OF-CUSTODY RECORD
ANALYSIS REQUESTED

C of C # 677696-03-01

677696

INVOICE INFORMATION	REPORT INFORMATION
Company Name: Imperial Oil Ltd - Golder Associates Ltd	Company Name: Golder Associates Ltd
Contact Name: IOL Accounts Payable	Contact Name: Brandon McParlan
Address: 102, 2535-3rd Avenue SE, Calgary AB T2A 7W5	Address: 1931 Robertson Road, Ottawa ON K2H 5B7
Email: IOLAccounts_Payable@golder.com	Email: Brandon_McParlan@golder.com, IOL_1390@go
Phone: (403) 299-5600	Phone: (613) 592-9600
Sampler Name (Print): LEANDRA MARIANI & Catherine Charest	Consultant Project #: 1791706-1155

	FIELD SAMPLE ID	MATRIX: GROUND WATER	MATRIX: SURFACE WATER	MATRIX: SOIL	MATRIX: OTHER	# CONTAINERS	SAMPLING: DATE (YYYY/MM/DD)	SAMPLING: TIME (24 HR)	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	F1/BTEX	F2-F4	Lead
1	TH8	X				7	2018/08/15	20:21	X		X	X	X
2	DUP A	X				7	2018/08/15	20:21	X		X	X	X
3	TH9	X				7	2018/08/15	20:31	X		X	X	X
4	TH 100	X				7	2018/08/15	21:53	X		X	X	X
5	TH 101	X				7	2018/08/15	23:17	X		X	X	X
6	MW 16-01	X				7	2018/08/16	00:32	X		X	X	X
7													
8													
9													
10													

IOL SITE LOCATION:
1660 Merivale Road, Ottawa, ON

IOL PROJECT # (if applicable):
N/A

MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM:
1791706-1155-7777-

REGULATORY CRITERIA / DETECTION LIMITS:
☒ REG 153 Table 3 ☐ 2004 ☒ 2011 ☐ RSC
(Please indicate which Reg. version and if RSC required)
☐ ODWS ☐ PWQO
☐ Other

SPECIAL INSTRUCTIONS:
- IES A2601436
- upload to 8800/627
- Presence of headspace possible

JARS USED AND NOT SUBMITTED Enter N/A for Water: N/A

TURNAROUND TIME
Standard (5 days) ☒
Rush (3 days) ☐
(2 days) ☐
(1 day) ☐
(same day) ☐
Date Required

	YES	NO	COOLER ID: 1				YES	NO	COOLER ID:				YES	NO	COOLER ID:			
SEAL PRESENT	✓																	
SEAL INTACT	✓		TEMP °C	0 (1)	0 (2)	0 (3)			TEMP °C	1	2	3			TEMP °C	1	2	3
COOLING MEDIA PRESENT	✓																	

* RELINQUISHED BY:		DATE:	TIME (24 HR)	RECEIVED BY:		DATE:	TIME (24 HR)
1.	CATHERINE CHAREST	2018/08/16	11:30	1.	[illegible]	2018/08/17	08:04
2.				2.			
3.				3.			

LAB USE ONLY
MAXXAM JOB #: B8L2045
SAMPLES
LABELED BY: DSG
VERIFIED BY: FCN

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXXAM'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.MAXXAM.CA/TERMS.

COC – 1012 (2016) IOL – ON White: Maxxam Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: August 15, 2018

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Maxxam Analytics Mississauga

Consultant Project Number: 1791706-1155

Sample Submission Number: B8L2045

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within
Extraction Surrogate Recovery	X			acceptance criteria.
Method Blank Concentration	X			
Matrix Duplicate RPD	X			
Matrix Spike Recovery	X			
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	All field QC samples are within
Trip Blank Concentration			X	alert limits.
Field Duplicate RPD	X			

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Anita Colbert

Data Reviewed by (Signature): Anita Colbert

Date: August 27, 2018

Maxxam
A Bureau Veritas Group Company

Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: B/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155
Your C.O.C. #: 677696-01-01

Attention: Brandon McParlan

Golder Associates Ltd
1931 Robertson Road
Ottawa, ON
Canada K2H 5B7

Report Date: 2018/08/23
Report #: R5370556
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8L2047
Received: 2018/08/17, 08:04

Sample Matrix: Water
Samples Received: 5

Analyses	Quantity	Laboratory Method	Primary Reference
Petroleum Hydro. CCME F1 & BTEX in Water	5	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1)	5	CAM SOP-00316	CCME PHC-CWS m
Dissolved Metals by ICPMS	5	CAM SOP-00447	EPA 6020B m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard. All samples were analyzed within hold time unless otherwise flagged.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following "Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003". Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

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Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: B/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155
Your C.O.C. #: 677696-01-01

Attention: Brandon McParlan

Golder Associates Ltd
1931 Robertson Road
Ottawa, ON
Canada K2H 5B7

Report Date: 2018/08/23
Report #: R5370556
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8L2047
Received: 2018/08/17, 08:04

Encryption Key

Kyle Reinhart
Project Manager - Environmental
Customer Service
23 Aug 2018 21:44:06

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kyle Reinhart, Project Manager - Environmental Customer Service
Email: kreinhart@maxxam.ca
Phone# (905) 817-5700

==========

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Maxxam Job #: B8L2047
Report Date: 2018/08/23

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: B/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

LEAD (DISSOLVED) IN WATER

Maxxam ID		HMW397	HMW398	HMW399	HMW400	HMW401		
Sampling Date		2018/08/14 15:26	2018/08/14 15:51	2018/08/14 15:05	2018/08/15 15:43	2018/08/15 14:33		
COC Number		677696-01-01	677696-01-01	677696-01-01	677696-01-01	677696-01-01		
	UNITS	**TH6**	**TH7**	**MW15-02**	**MW15-01**	**TH3**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	<0.50	<0.50	<0.50	<0.50	0.76	0.50	5687590

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8L2047
Report Date: 2018/08/23

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: B/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

O.REG 153 PHCS IN WATER (WATER)

Maxxam ID		HMW397	HMW398	HMW399	HMW400	HMW401		
Sampling Date		2018/08/14 15:26	2018/08/14 15:51	2018/08/14 15:05	2018/08/15 15:43	2018/08/15 14:33		
COC Number		677696-01-01	677696-01-01	677696-01-01	677696-01-01	677696-01-01		
	UNITS	**TH6**	**TH7**	**MW15-02**	**MW15-01**	**TH3**	**RDL**	**QC Batch**
Benzene	ug/L	<0.20	22	2.0	<0.20	7.4	0.20	5691604
Toluene	ug/L	<0.20	0.53	<0.20	<0.20	<0.20	0.20	5691604
Ethylbenzene	ug/L	<0.20	8.8	<0.20	<0.20	7.2	0.20	5691604
o-Xylene	ug/L	<0.20	<0.20	<0.20	<0.20	0.29	0.20	5691604
p+m-Xylene	ug/L	<0.40	0.60	<0.40	<0.40	3.1	0.40	5691604
Total Xylenes	ug/L	<0.40	0.60	<0.40	<0.40	3.3	0.40	5691604
F1 (C6-C10)	ug/L	<25	100	<25	<25	330	25	5691604
F1 (C6-C10) - BTEX	ug/L	<25	68	<25	<25	310	25	5691604
F2 (C10-C16 Hydrocarbons)	ug/L	<100	<100	<100	<100	<100	100	5693419
F3 (C16-C34 Hydrocarbons)	ug/L	<200	<200	<200	<200	<200	200	5693419
F4 (C34-C50 Hydrocarbons)	ug/L	<200	<200	<200	<200	<200	200	5693419
Reached Baseline at C50	ug/L	Yes	Yes	Yes	Yes	Yes		5693419
Extraction Surrogate Recovery (%)								
o-Terphenyl	%	99	93	94	97	96		5693419
Instrument Surrogate Recovery (%)								
1,4-Difluorobenzene	%	107	102	99	99	100		5691604
4-Bromofluorobenzene	%	99	99	92	94	97		5691604
D10-Ethylbenzene	%	101	100	98	96	99		5691604
D4-1,2-Dichloroethane	%	101	101	96	98	97		5691604

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8L2047
Report Date: 2018/08/23

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: B/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

TEST SUMMARY

Maxxam ID: HMW397
Sample ID: TH6
Matrix: Water

Collected: 2018/08/14
Relinquished: 2018/08/16
Received: 2018/08/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5691604	N/A	2018/08/22	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5693419	2018/08/22	2018/08/23	Zhiyue (Frank) Zhu
Dissolved Metals by ICPMS	ICP/MS	5687590	N/A	2018/08/21	Arefa Dabhad

Maxxam ID: HMW398
Sample ID: TH7
Matrix: Water

Collected: 2018/08/14
Relinquished: 2018/08/16
Received: 2018/08/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5691604	N/A	2018/08/22	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5693419	2018/08/22	2018/08/23	Zhiyue (Frank) Zhu
Dissolved Metals by ICPMS	ICP/MS	5687590	N/A	2018/08/21	Arefa Dabhad

Maxxam ID: HMW399
Sample ID: MW15-02
Matrix: Water

Collected: 2018/08/14
Relinquished: 2018/08/16
Received: 2018/08/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5691604	N/A	2018/08/22	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5693419	2018/08/22	2018/08/23	Zhiyue (Frank) Zhu
Dissolved Metals by ICPMS	ICP/MS	5687590	N/A	2018/08/21	Arefa Dabhad

Maxxam ID: HMW400
Sample ID: MW15-01
Matrix: Water

Collected: 2018/08/15
Relinquished: 2018/08/16
Received: 2018/08/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5691604	N/A	2018/08/22	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5693419	2018/08/22	2018/08/23	Zhiyue (Frank) Zhu
Dissolved Metals by ICPMS	ICP/MS	5687590	N/A	2018/08/21	Arefa Dabhad

Maxxam ID: HMW401
Sample ID: TH3
Matrix: Water

Collected: 2018/08/15
Relinquished: 2018/08/16
Received: 2018/08/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5691604	N/A	2018/08/22	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5693419	2018/08/22	2018/08/23	Zhiyue (Frank) Zhu
Dissolved Metals by ICPMS	ICP/MS	5687590	N/A	2018/08/21	Arefa Dabhad

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Maxxam Job #: B8L2047
Report Date: 2018/08/23

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: B/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	4.7°C

Results relate only to the items tested.

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Maxxam Job #: B8L2047
Report Date: 2018/08/23

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: B/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5687590	ADA	Method Blank	Dissolved Lead (Pb)	2018/08/21	<0.50		ug/L	
5691604	AAI	Method Blank	1,4-Difluorobenzene	2018/08/22		99	%	70 - 130
			4-Bromofluorobenzene	2018/08/22		91	%	70 - 130
			D10-Ethylbenzene	2018/08/22		97	%	70 - 130
			D4-1,2-Dichloroethane	2018/08/22		96	%	70 - 130
			Benzene	2018/08/22	<0.20		ug/L	
			Toluene	2018/08/22	<0.20		ug/L	
			Ethylbenzene	2018/08/22	<0.20		ug/L	
			o-Xylene	2018/08/22	<0.20		ug/L	
			p+m-Xylene	2018/08/22	<0.40		ug/L	
			Total Xylenes	2018/08/22	<0.40		ug/L	
			F1 (C6-C10)	2018/08/22	<25		ug/L	
			F1 (C6-C10) - BTEX	2018/08/22	<25		ug/L	
5693419	ZZ	Method Blank	o-Terphenyl	2018/08/23		96	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2018/08/23	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2018/08/23	<200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2018/08/23	<200		ug/L	
5687590	ADA	LCS	Dissolved Lead (Pb)	2018/08/21		105	%	80 - 120
5691604	AAI	LCS	1,4-Difluorobenzene	2018/08/22		100	%	70 - 130
			4-Bromofluorobenzene	2018/08/22		97	%	70 - 130
			D10-Ethylbenzene	2018/08/22		99	%	70 - 130
			D4-1,2-Dichloroethane	2018/08/22		96	%	70 - 130
			Benzene	2018/08/22		96	%	70 - 130
			Toluene	2018/08/22		96	%	70 - 130
			Ethylbenzene	2018/08/22		93	%	70 - 130
			o-Xylene	2018/08/22		91	%	70 - 130
			p+m-Xylene	2018/08/22		93	%	70 - 130
			F1 (C6-C10)	2018/08/22		88	%	70 - 130
5693419	ZZ	LCS	o-Terphenyl	2018/08/23		97	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2018/08/23		99	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2018/08/23		102	%	60 - 130
			F4 (C34-C50 Hydrocarbons)	2018/08/23		99	%	60 - 130

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

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Maxxam Job #: B8L2047
Report Date: 2018/08/23

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: B/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Service Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam

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EXXONMOBIL/IMPERIAL OIL - MAXXAM
CHAIN-OF-CUSTODY RECORD
ANALYSIS REQUESTED

Page 1 of 1
C of C # 677696-01-01
677696

INVOICE INFORMATION	REPORT INFORMATION
Company Name: Imperial Oil Ltd - Golder Associates Ltd	Company Name: Golder Associates Ltd
Contact Name: IOL Accounts Payable	Contact Name: Brandon McParlan
Address: 102, 2535-3rd Avenue SE, Calgary AB T2A 7W5	Address: 1931 Robertson Road, Ottawa ON K2H 5B7
Email: IOLAccounts_Payable@golder.com	Email: Brandon_McParlan@golder.com, IOL_1390@go
Phone: (403) 299-5600	Phone: (613) 592-9600
Sampler Name (Print): LEANDRA MARIANI	Consultant Project #: 1791706-1155

	FIELD SAMPLE ID	MATRIX: GROUND WATER	SURFACE WATER	SOIL	OTHER	# CONTAINERS	SAMPLING: DATE (YYYY/MM/DD)	TIME (24 HR)	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	F1/BTEX	F2-F4	Lead
1	TH6	X				7	2018/08/14	15:26	X		X	X	X
2	TH7	X				7	2018/08/14	15:51	X		X	X	X
3	MW15-02	X				7	2018/08/14	15:05	X		X	X	X
4	MW15-01	X				7	2018/08/15	15:43	X		X	X	X
5	TH3	X				7	2018/08/15	14:33	X		X	X	X
6													
7													
8													
9													
10													

IOL SITE LOCATION: 1660 Merivale Road, Ottawa, ON

IOL PROJECT # (if applicable): N/A

MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM: 1791706-1155-7777-

REGULATORY CRITERIA / DETECTION LIMITS:
[X] REG 153 Table 3 [ ] 2004 [X] 2011 [ ] RSC
(Please indicate which Reg. version and if RSC required)
[ ] ODWS [ ] PWQO
[ ] Other

SPECIAL INSTRUCTIONS:
- IES A2601436
- upload to 88001627
- Presence of headspace possible

JARS USED AND NOT SUBMITTED Enter N/A for Water: N/A

TURNAROUND TIME
Standard (5 days) [X]
Rush (3 days) [ ]
(2 days) [ ]
(1 day) [ ]
(same day) [ ]
Date Required

	YES	NO	COOLER ID: 1				YES	NO	COOLER ID:				YES	NO	COOLER ID:			
SEAL PRESENT	✓		TEMP °C	3	8	3	SEAL PRESENT			TEMP °C			SEAL PRESENT			TEMP °C		
SEAL INTACT	✓			1	2	3	SEAL INTACT				1	2	3	SEAL INTACT			1	2	3
COOLING MEDIA PRESENT	✓						COOLING MEDIA PRESENT							COOLING MEDIA PRESENT				

* RELINQUISHED BY:		DATE:	TIME (24 HR)	RECEIVED BY:		DATE:	TIME (24 HR)
1. [signature]	CATHERINE CHAREST	2018/08/16	13:56	1. [signature]	MARK FERNER	2018/08/17	08:04
2.				2.			
3.				3.			

LAB USE ONLY
MAXXAM JOB # B8L2047
SAMPLES
LABELED BY: DSG
VERIFIED BY: FCN

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXXAM'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.MAXXAM.CA/TERMS.

COC – 1012 (2016) IOL – ON White: Maxxam Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: August 14 and 15, 2018

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Maxxam Analytics Mississauga

Consultant Project Number: 1791706-1155

Sample Submission Number: B8L2047

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within
Extraction Surrogate Recovery	X			acceptance criteria.
Method Blank Concentration	X			
Matrix Duplicate RPD			X	
Matrix Spike Recovery			X	
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	No field QC samples were collected.
Trip Blank Concentration			X	
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Anita Colbert

Data Reviewed by (Signature): Anita Colbert

Date: August 24, 2018

Maxxam
A Bureau Veritas Group Company

Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023
Your C.O.C. #: 80764

Attention: Brandon McParlan

Golder Associates Ltd
1931 Robertson Road
Ottawa, ON
Canada K2H 5B7

Report Date: 2018/11/14
Report #: R5483580
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8S9743
Received: 2018/10/31, 10:30

Sample Matrix: AIR
Samples Received: 3

Analyses	Quantity	Laboratory Method	Primary Reference
BTEX and CCME Compounds in Air(TO-15mod)	3	BRL SOP-00304	EPA TO-15 m
BTEX Fractionation in Air (TO-15mod)	3	BRL SOP-00304	EPA TO-15 m
Canister Pressure (TO-15)	3	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (ug/m3)	3	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (TO-15) (1)	3	BRL SOP-00304	EPA TO-15 m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard. All samples were analyzed within hold time unless otherwise flagged.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Air sampling canisters have been cleaned in accordance with U.S. EPA Method TO15. At the end of the cleaning, evacuation, and pressurization cycles, one canister was selected and was pressurized with Zero Air. This canister was then analyzed via TO15 on a GC/MS. The canister must have been found to contain <0.2 ppbv concentration of all target analytes in order for the batch to have been considered clean. Each canister also underwent a leak check prior to shipment.

Please Note: SUMMA® canister samples will be retained by Maxxam for a period of 5 calendar days or as contractually agreed from the date of this report, after which time they will be cleaned for reuse. If you require a longer sample storage period, please contact your service representative.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam
A Bureau Veritas Group Company

Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023
Your C.O.C. #: 80764

Attention: Brandon McParlan

Golder Associates Ltd
1931 Robertson Road
Ottawa, ON
Canada K2H 5B7

Report Date: 2018/11/14
Report #: R5483580
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8S9743
Received: 2018/10/31, 10:30

Encryption Key

Kyle Reinhart
Project Manager - Environmental
Customer Service
14 Nov 2018 10:38:53

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kyle Reinhart, Project Manager - Environmental Customer Service
Email: kreinhart@maxxam.ca
Phone# (905) 817-5700

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B8S9743
Report Date: 2018/11/14

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023

RESULTS OF ANALYSES OF AIR

Maxxam ID		IED332	IED333	IED334	
Sampling Date		2018/10/30 12:21	2018/10/30 12:21	2018/10/30 11:08	
COC Number		80764	80764	80764	
	UNITS	**SV16-01**	**DUPA**	**SV16-02**	**QC Batch**
Pressure on Receipt	psig	(-2.9)	(-2.9)	(-2.2)	5830202
QC Batch = Quality Control Batch					

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Maxxam Job #: B8S9743
Report Date: 2018/11/14

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		IED332	IED333	IED334		
Sampling Date		2018/10/30 12:21	2018/10/30 12:21	2018/10/30 11:08		
COC Number		80764	80764	80764		
	UNITS	**SV16-01**	**DUPA**	**SV16-02**	**RDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ppbv	0.98	0.92	0.85	0.20	5829464
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	<0.17	<0.17	0.17	5829464
Chloromethane	ppbv	<0.30	<0.30	<0.30	0.30	5829464
Vinyl Chloride	ppbv	<0.10	<0.10	<0.10	0.10	5829464
Chloroethane	ppbv	<0.30	<0.30	<0.30	0.30	5829464
1,3-Butadiene	ppbv	<0.50	<0.50	<0.50	0.50	5829464
Trichlorofluoromethane (FREON 11)	ppbv	0.21	0.21	<0.20	0.20	5829464
Ethanol (ethyl alcohol)	ppbv	2.8	1.3	<1.0	1.0	5829464
Trichlorotrifluoroethane	ppbv	<0.15	<0.15	<0.15	0.15	5829464
2-propanol	ppbv	<1.0	<1.0	<1.0	1.0	5829464
2-Propanone	ppbv	3.16	3.29	2.33	0.80	5829464
Methyl Ethyl Ketone (2-Butanone)	ppbv	<1.0	<1.0	<1.0	1.0	5829464
Methyl Isobutyl Ketone	ppbv	<1.0	<1.0	<1.0	1.0	5829464
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	<1.0	<1.0	1.0	5829464
Methyl t-butyl ether (MTBE)	ppbv	<0.20	<0.20	<0.20	0.20	5829464
Ethyl Acetate	ppbv	<1.0	<1.0	<1.0	1.0	5829464
1,1-Dichloroethylene	ppbv	<0.10	<0.10	<0.10	0.10	5829464
cis-1,2-Dichloroethylene	ppbv	<0.10	<0.10	<0.10	0.10	5829464
trans-1,2-Dichloroethylene	ppbv	<0.10	<0.10	<0.10	0.10	5829464
Methylene Chloride(Dichloromethane)	ppbv	<0.80	<0.80	<0.80	0.80	5829464
Chloroform	ppbv	37.2	32.6	<0.10	0.10	5829464
Carbon Tetrachloride	ppbv	<0.10	<0.10	<0.10	0.10	5829464
1,1-Dichloroethane	ppbv	<0.10	<0.10	<0.10	0.10	5829464
1,2-Dichloroethane	ppbv	<0.10	<0.10	<0.10	0.10	5829464
Ethylene Dibromide	ppbv	<0.10	<0.10	<0.10	0.10	5829464
1,1,1-Trichloroethane	ppbv	<0.10	<0.10	<0.10	0.10	5829464
1,1,2-Trichloroethane	ppbv	<0.10	<0.10	<0.10	0.10	5829464
1,1,2,2-Tetrachloroethane	ppbv	<0.10	<0.10	<0.10	0.10	5829464
cis-1,3-Dichloropropene	ppbv	<0.10	<0.10	<0.10	0.10	5829464
trans-1,3-Dichloropropene	ppbv	<0.10	<0.10	<0.10	0.10	5829464
1,2-Dichloropropane	ppbv	<0.10	<0.10	<0.10	0.10	5829464
Bromomethane	ppbv	<0.10	<0.10	<0.10	0.10	5829464
Bromoform	ppbv	<0.20	<0.20	<0.20	0.20	5829464
Bromodichloromethane	ppbv	<0.20	<0.20	<0.20	0.20	5829464

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B8S9743
Report Date: 2018/11/14

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		IED332	IED333	IED334		
Sampling Date		2018/10/30 12:21	2018/10/30 12:21	2018/10/30 11:08		
COC Number		80764	80764	80764		
	UNITS	**SV16-01**	**DUPA**	**SV16-02**	**RDL**	**QC Batch**
Dibromochloromethane	ppbv	<0.20	<0.20	<0.20	0.20	5829464
Trichloroethylene	ppbv	<0.10	<0.10	0.39	0.10	5829464
Tetrachloroethylene	ppbv	0.45	0.39	<0.10	0.10	5829464
Benzene	ppbv	<0.10	<0.10	<0.10	0.10	5829464
Toluene	ppbv	0.35	0.35	<0.10	0.10	5829464
Ethylbenzene	ppbv	0.33	0.29	<0.10	0.10	5829464
p+m-Xylene	ppbv	0.80	0.71	<0.20	0.20	5829464
o-Xylene	ppbv	0.26	0.23	<0.10	0.10	5829464
Styrene	ppbv	<0.10	<0.10	<0.10	0.10	5829464
4-ethyltoluene	ppbv	<0.50	<0.50	<0.50	0.50	5829464
1,3,5-Trimethylbenzene	ppbv	<0.50	<0.50	<0.50	0.50	5829464
1,2,4-Trimethylbenzene	ppbv	<0.50	<0.50	<0.50	0.50	5829464
Chlorobenzene	ppbv	<0.10	<0.10	<0.10	0.10	5829464
Benzyl chloride	ppbv	<0.50	<0.50	<0.50	0.50	5829464
1,3-Dichlorobenzene	ppbv	<0.40	<0.40	<0.40	0.40	5829464
1,4-Dichlorobenzene	ppbv	<0.10	<0.10	<0.10	0.10	5829464
1,2-Dichlorobenzene	ppbv	<0.10	<0.10	<0.10	0.10	5829464
1,2,4-Trichlorobenzene	ppbv	<0.50	<0.50	<0.50	0.50	5829464
Hexachlorobutadiene	ppbv	<0.50	<0.50	<0.50	0.50	5829464
Hexane	ppbv	<0.30	0.34	<0.30	0.30	5829464
Heptane	ppbv	<0.30	<0.30	<0.30	0.30	5829464
Cyclohexane	ppbv	<0.20	<0.20	<0.20	0.20	5829464
Tetrahydrofuran	ppbv	<0.40	<0.40	<0.40	0.40	5829464
1,4-Dioxane	ppbv	<1.0	<1.0	<1.0	1.0	5829464
Naphthalene	ppbv	<0.50	<0.50	<0.50	0.50	5829464
Total Xylenes	ppbv	1.07	0.94	<0.30	0.30	5829464
1,1,1,2-Tetrachloroethane	ppbv	<0.10	<0.10	<0.10	0.10	5829464
Vinyl Bromide	ppbv	<0.20	<0.20	<0.20	0.20	5829464
Propene	ppbv	<0.50	<0.50	<0.50	0.50	5829464
2,2,4-Trimethylpentane	ppbv	<0.20	<0.20	<0.20	0.20	5829464
Carbon Disulfide	ppbv	0.64	0.56	<0.50	0.50	5829464
Vinyl Acetate	ppbv	<0.20	<0.20	<0.20	0.20	5829464

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B8S9743
Report Date: 2018/11/14

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		IED332	IED333	IED334		
Sampling Date		2018/10/30 12:21	2018/10/30 12:21	2018/10/30 11:08		
COC Number		80764	80764	80764		
	UNITS	**SV16-01**	**DUPA**	**SV16-02**	**RDL**	**QC Batch**
Instrument Surrogate Recovery (%)						
Bromochloromethane	%	97	97	98		5829464
D5-Chlorobenzene	%	88	88	87		5829464
Difluorobenzene	%	95	95	96		5829464

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8S9743
Report Date: 2018/11/14

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023

CALCULATED VOLATILE ORGANICS (AIR)

Maxxam ID		IED332	IED333	IED334		
Sampling Date		2018/10/30 12:21	2018/10/30 12:21	2018/10/30 11:08		
COC Number		80764	80764	80764		
	UNITS	**SV16-01**	**DUPA**	**SV16-02**	**RDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ug/m3	4.85	4.54	4.19	0.99	5815960
1,2-Dichlorotetrafluoroethane	ug/m3	<1.2	<1.2	<1.2	1.2	5815960
Chloromethane	ug/m3	<0.62	<0.62	<0.62	0.62	5815960
Vinyl Chloride	ug/m3	<0.26	<0.26	<0.26	0.26	5815960
Chloroethane	ug/m3	<0.79	<0.79	<0.79	0.79	5815960
1,3-Butadiene	ug/m3	<1.1	<1.1	<1.1	1.1	5815960
Trichlorofluoromethane (FREON 11)	ug/m3	1.2	1.2	<1.1	1.1	5815960
Ethanol (ethyl alcohol)	ug/m3	5.4	2.5	<1.9	1.9	5815960
Trichlorotrifluoroethane	ug/m3	<1.2	<1.2	<1.2	1.2	5815960
2-propanol	ug/m3	<2.5	<2.5	<2.5	2.5	5815960
2-Propanone	ug/m3	7.5	7.8	5.5	1.9	5815960
Methyl Ethyl Ketone (2-Butanone)	ug/m3	<2.9	<2.9	<2.9	2.9	5815960
Methyl Isobutyl Ketone	ug/m3	<4.1	<4.1	<4.1	4.1	5815960
Methyl Butyl Ketone (2-Hexanone)	ug/m3	<4.1	<4.1	<4.1	4.1	5815960
Methyl t-butyl ether (MTBE)	ug/m3	<0.72	<0.72	<0.72	0.72	5815960
Ethyl Acetate	ug/m3	<3.6	<3.6	<3.6	3.6	5815960
1,1-Dichloroethylene	ug/m3	<0.40	<0.40	<0.40	0.40	5815960
cis-1,2-Dichloroethylene	ug/m3	<0.40	<0.40	<0.40	0.40	5815960
trans-1,2-Dichloroethylene	ug/m3	<0.40	<0.40	<0.40	0.40	5815960
Methylene Chloride(Dichloromethane)	ug/m3	<2.8	<2.8	<2.8	2.8	5815960
Chloroform	ug/m3	182	159	<0.49	0.49	5815960
Carbon Tetrachloride	ug/m3	<0.63	<0.63	<0.63	0.63	5815960
1,1-Dichloroethane	ug/m3	<0.40	<0.40	<0.40	0.40	5815960
1,2-Dichloroethane	ug/m3	<0.40	<0.40	<0.40	0.40	5815960
Ethylene Dibromide	ug/m3	<0.77	<0.77	<0.77	0.77	5815960
1,1,1-Trichloroethane	ug/m3	<0.55	<0.55	<0.55	0.55	5815960
1,1,2-Trichloroethane	ug/m3	<0.55	<0.55	<0.55	0.55	5815960
1,1,2,2-Tetrachloroethane	ug/m3	<0.69	<0.69	<0.69	0.69	5815960
cis-1,3-Dichloropropene	ug/m3	<0.45	<0.45	<0.45	0.45	5815960
trans-1,3-Dichloropropene	ug/m3	<0.45	<0.45	<0.45	0.45	5815960
1,2-Dichloropropane	ug/m3	<0.46	<0.46	<0.46	0.46	5815960
Bromomethane	ug/m3	<0.39	<0.39	<0.39	0.39	5815960
Bromoform	ug/m3	<2.1	<2.1	<2.1	2.1	5815960
Bromodichloromethane	ug/m3	<1.3	<1.3	<1.3	1.3	5815960

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B8S9743
Report Date: 2018/11/14

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023

CALCULATED VOLATILE ORGANICS (AIR)

Maxxam ID		IED332	IED333	IED334		
Sampling Date		2018/10/30 12:21	2018/10/30 12:21	2018/10/30 11:08		
COC Number		80764	80764	80764		
	UNITS	**SV16-01**	**DUPA**	**SV16-02**	**RDL**	**QC Batch**
Dibromochloromethane	ug/m3	<1.7	<1.7	<1.7	1.7	5815960
Trichloroethylene	ug/m3	<0.54	<0.54	2.12	0.54	5815960
Tetrachloroethylene	ug/m3	3.07	2.66	<0.68	0.68	5815960
Benzene	ug/m3	<0.32	<0.32	<0.32	0.32	5815960
Toluene	ug/m3	1.31	1.33	<0.38	0.38	5815960
Ethylbenzene	ug/m3	1.45	1.27	<0.43	0.43	5815960
p+m-Xylene	ug/m3	3.49	3.08	<0.87	0.87	5815960
o-Xylene	ug/m3	1.15	1.01	<0.43	0.43	5815960
Styrene	ug/m3	<0.43	<0.43	<0.43	0.43	5815960
4-ethyltoluene	ug/m3	<2.5	<2.5	<2.5	2.5	5815960
1,3,5-Trimethylbenzene	ug/m3	<2.5	<2.5	<2.5	2.5	5815960
1,2,4-Trimethylbenzene	ug/m3	<2.5	<2.5	<2.5	2.5	5815960
Chlorobenzene	ug/m3	<0.46	<0.46	<0.46	0.46	5815960
Benzyl chloride	ug/m3	<2.6	<2.6	<2.6	2.6	5815960
1,3-Dichlorobenzene	ug/m3	<2.4	<2.4	<2.4	2.4	5815960
1,4-Dichlorobenzene	ug/m3	<0.60	<0.60	<0.60	0.60	5815960
1,2-Dichlorobenzene	ug/m3	<0.60	<0.60	<0.60	0.60	5815960
1,2,4-Trichlorobenzene	ug/m3	<3.7	<3.7	<3.7	3.7	5815960
Hexachlorobutadiene	ug/m3	<5.3	<5.3	<5.3	5.3	5815960
Hexane	ug/m3	<1.1	1.2	<1.1	1.1	5815960
Heptane	ug/m3	<1.2	<1.2	<1.2	1.2	5815960
Cyclohexane	ug/m3	<0.69	<0.69	<0.69	0.69	5815960
Tetrahydrofuran	ug/m3	<1.2	<1.2	<1.2	1.2	5815960
1,4-Dioxane	ug/m3	<3.6	<3.6	<3.6	3.6	5815960
Naphthalene	ug/m3	<2.6	<2.6	<2.6	2.6	5815960
Total Xylenes	ug/m3	4.6	4.1	<1.3	1.3	5815960
1,1,1,2-Tetrachloroethane	ug/m3	<0.69	<0.69	<0.69	0.69	5815960
Vinyl Bromide	ug/m3	<0.87	<0.87	<0.87	0.87	5815960
Propene	ug/m3	<0.86	<0.86	<0.86	0.86	5815960
2,2,4-Trimethylpentane	ug/m3	<0.93	<0.93	<0.93	0.93	5815960
Carbon Disulfide	ug/m3	2.0	1.8	<1.6	1.6	5815960
Vinyl Acetate	ug/m3	<0.70	<0.70	<0.70	0.70	5815960

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B8S9743
Report Date: 2018/11/14

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023

VOLATILE ORGANIC HYDROCARBONS BY GC/MS (AIR)

Maxxam ID		IED332	IED333	IED334		
Sampling Date		2018/10/30 12:21	2018/10/30 12:21	2018/10/30 11:08		
COC Number		80764	80764	80764		
	UNITS	**SV16-01**	**DUPA**	**SV16-02**	**RDL**	**QC Batch**
F1-BTEX, C6-C10 (as Toluene)	ug/m3	224	188	36.4	5.0	5832186
F2, C10-C16 (as Decane)	ug/m3	1220	1040	400	5.0	5832186
Aliphatic >C5-C6	ug/m3	<5.0	<5.0	<5.0	5.0	5832223
Aliphatic >C6-C8	ug/m3	<5.0	<5.0	<5.0	5.0	5832223
Aliphatic >C8-C10	ug/m3	61.7	52.6	16.6	5.0	5832223
Aliphatic >C10-C12	ug/m3	666	551	229	5.0	5832223
Aliphatic >C12-C16	ug/m3	9.4	13.9	9.3	5.0	5832223
Aromatic >C7-C8 (TEX Excluded)	ug/m3	<5.0	<5.0	<5.0	5.0	5832223
Aromatic >C8-C10	ug/m3	<5.0	<5.0	<5.0	5.0	5832223
Aromatic >C10-C12	ug/m3	<5.0	<5.0	<5.0	5.0	5832223
Aromatic >C12-C16	ug/m3	<5.0	<5.0	<5.0	5.0	5832223

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B8S9743
Report Date: 2018/11/14

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023

TEST SUMMARY

Maxxam ID: IED332
Sample ID: SV16-01
Matrix: AIR

Collected: 2018/10/30
Relinquished: 2018/10/30
Received: 2018/10/31

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	5832186	N/A	2018/11/09	Nicholas Smith
BTEX Fractionation in Air (TO-15mod)	GC/MS	5832223	N/A	2018/11/09	Nicholas Smith
Canister Pressure (TO-15)	PRES	5830202	N/A	2018/11/09	Nicholas Smith
Volatile Organics in Air (ug/m3)	GC/MS	5815960	N/A	2018/11/11	Maureen Smith
Volatile Organics in Air (TO-15)	GC/MS	5829464	N/A	2018/11/09	Nicholas Smith

Maxxam ID: IED333
Sample ID: DUPA
Matrix: AIR

Collected: 2018/10/30
Relinquished: 2018/10/30
Received: 2018/10/31

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	5832186	N/A	2018/11/09	Nicholas Smith
BTEX Fractionation in Air (TO-15mod)	GC/MS	5832223	N/A	2018/11/09	Nicholas Smith
Canister Pressure (TO-15)	PRES	5830202	N/A	2018/11/09	Nicholas Smith
Volatile Organics in Air (ug/m3)	GC/MS	5815960	N/A	2018/11/11	Maureen Smith
Volatile Organics in Air (TO-15)	GC/MS	5829464	N/A	2018/11/09	Nicholas Smith

Maxxam ID: IED334
Sample ID: SV16-02
Matrix: AIR

Collected: 2018/10/30
Relinquished: 2018/10/30
Received: 2018/10/31

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	5832186	N/A	2018/11/09	Nicholas Smith
BTEX Fractionation in Air (TO-15mod)	GC/MS	5832223	N/A	2018/11/09	Nicholas Smith
Canister Pressure (TO-15)	PRES	5830202	N/A	2018/11/09	Nicholas Smith
Volatile Organics in Air (ug/m3)	GC/MS	5815960	N/A	2018/11/11	Automated Statchk
Volatile Organics in Air (TO-15)	GC/MS	5829464	N/A	2018/11/09	Nicholas Smith

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Maxxam Job #: B8S9743
Report Date: 2018/11/14

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023

GENERAL COMMENTS

Note: Incorrect Task Order/Contract Number. IES contract number missing from the COC.

VOLATILE ORGANICS BY GC/MS (AIR)

Volatile Organics in Air (TO-15): Carbon tetrachloride was less than 60% recovery in the reference standard. The continuing calibration standard was acceptable therefore there should be no effect on the data.

Results relate only to the items tested.

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Maxxam Job #: B8S9743
Report Date: 2018/11/14

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5829464	NS2	Method Blank	Bromochloromethane	2018/11/09		100	%	60 - 140
			D5-Chlorobenzene	2018/11/09		87	%	60 - 140
			Difluorobenzene	2018/11/09		101	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2018/11/09	<0.20		ppbv	
			1,2-Dichlorotetrafluoroethane	2018/11/09	<0.17		ppbv	
			Chloromethane	2018/11/09	<0.30		ppbv	
			Vinyl Chloride	2018/11/09	<0.10		ppbv	
			Chloroethane	2018/11/09	<0.30		ppbv	
			1,3-Butadiene	2018/11/09	<0.50		ppbv	
			Trichlorofluoromethane (FREON 11)	2018/11/09	<0.20		ppbv	
			Ethanol (ethyl alcohol)	2018/11/09	<1.0		ppbv	
			Trichlorotrifluoroethane	2018/11/09	<0.15		ppbv	
			2-propanol	2018/11/09	<1.0		ppbv	
			2-Propanone	2018/11/09	<0.80		ppbv	
			Methyl Ethyl Ketone (2-Butanone)	2018/11/09	<1.0		ppbv	
			Methyl Isobutyl Ketone	2018/11/09	<1.0		ppbv	
			Methyl Butyl Ketone (2-Hexanone)	2018/11/09	<1.0		ppbv	
			Methyl t-butyl ether (MTBE)	2018/11/09	<0.20		ppbv	
			Ethyl Acetate	2018/11/09	<1.0		ppbv	
			1,1-Dichloroethylene	2018/11/09	<0.10		ppbv	
			cis-1,2-Dichloroethylene	2018/11/09	<0.10		ppbv	
			trans-1,2-Dichloroethylene	2018/11/09	<0.10		ppbv	
			Methylene Chloride(Dichloromethane)	2018/11/09	<0.80		ppbv	
			Chloroform	2018/11/09	<0.10		ppbv	
			Carbon Tetrachloride	2018/11/09	<0.10		ppbv	
			1,1-Dichloroethane	2018/11/09	<0.10		ppbv	
			1,2-Dichloroethane	2018/11/09	<0.10		ppbv	
			Ethylene Dibromide	2018/11/09	<0.10		ppbv	
			1,1,1-Trichloroethane	2018/11/09	<0.10		ppbv	
			1,1,2-Trichloroethane	2018/11/09	<0.10		ppbv	
			1,1,2,2-Tetrachloroethane	2018/11/09	<0.10		ppbv	
			cis-1,3-Dichloropropene	2018/11/09	<0.10		ppbv	
			trans-1,3-Dichloropropene	2018/11/09	<0.10		ppbv	
			1,2-Dichloropropane	2018/11/09	<0.10		ppbv	
			Bromomethane	2018/11/09	<0.10		ppbv	
			Bromoform	2018/11/09	<0.20		ppbv	
			Bromodichloromethane	2018/11/09	<0.20		ppbv	
			Dibromochloromethane	2018/11/09	<0.20		ppbv	
			Trichloroethylene	2018/11/09	<0.10		ppbv	
			Tetrachloroethylene	2018/11/09	<0.10		ppbv	
			Benzene	2018/11/09	<0.10		ppbv	
			Toluene	2018/11/09	<0.10		ppbv	
			Ethylbenzene	2018/11/09	<0.10		ppbv	
			p+m-Xylene	2018/11/09	<0.20		ppbv	
			o-Xylene	2018/11/09	<0.10		ppbv	
			Styrene	2018/11/09	<0.10		ppbv	
			4-ethyltoluene	2018/11/09	<0.50		ppbv	
			1,3,5-Trimethylbenzene	2018/11/09	<0.50		ppbv	
			1,2,4-Trimethylbenzene	2018/11/09	<0.50		ppbv	
			Chlorobenzene	2018/11/09	<0.10		ppbv	
			Benzyl chloride	2018/11/09	<0.50		ppbv	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,3-Dichlorobenzene	2018/11/09	<0.40		ppbv	
			1,4-Dichlorobenzene	2018/11/09	<0.10		ppbv	
			1,2-Dichlorobenzene	2018/11/09	<0.10		ppbv	
			1,2,4-Trichlorobenzene	2018/11/09	<0.50		ppbv	
			Hexachlorobutadiene	2018/11/09	<0.50		ppbv	
			Hexane	2018/11/09	<0.30		ppbv	
			Heptane	2018/11/09	<0.30		ppbv	
			Cyclohexane	2018/11/09	<0.20		ppbv	
			Tetrahydrofuran	2018/11/09	<0.40		ppbv	
			1,4-Dioxane	2018/11/09	<1.0		ppbv	
			Naphthalene	2018/11/09	<0.50		ppbv	
			Total Xylenes	2018/11/09	<0.30		ppbv	
			1,1,1,2-Tetrachloroethane	2018/11/09	<0.10		ppbv	
			Vinyl Bromide	2018/11/09	<0.20		ppbv	
			Propene	2018/11/09	<0.50		ppbv	
			2,2,4-Trimethylpentane	2018/11/09	<0.20		ppbv	
			Carbon Disulfide	2018/11/09	<0.50		ppbv	
			Vinyl Acetate	2018/11/09	<0.20		ppbv	
5832186	NS2	Method Blank	F1-BTEX, C6-C10 (as Toluene)	2018/11/09	<5.0		ug/m3	
			F2, C10-C16 (as Decane)	2018/11/09	<5.0		ug/m3	
5832223	NS2	Method Blank	Aliphatic >C5-C6	2018/11/09	<5.0		ug/m3	
			Aliphatic >C6-C8	2018/11/09	<5.0		ug/m3	
			Aliphatic >C8-C10	2018/11/09	<5.0		ug/m3	
			Aliphatic >C10-C12	2018/11/09	<5.0		ug/m3	
			Aliphatic >C12-C16	2018/11/09	<5.0		ug/m3	
			Aromatic >C7-C8 (TEX Excluded)	2018/11/09	<5.0		ug/m3	
			Aromatic >C8-C10	2018/11/09	<5.0		ug/m3	
			Aromatic >C10-C12	2018/11/09	<5.0		ug/m3	
			Aromatic >C12-C16	2018/11/09	<5.0		ug/m3	
5829464	NS2	LCS	Bromochloromethane	2018/11/09		95	%	60 - 140
			D5-Chlorobenzene	2018/11/09		96	%	60 - 140
			Difluorobenzene	2018/11/09		94	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2018/11/09		92	%	70 - 130
			1,2-Dichlorotetrafluoroethane	2018/11/09		85	%	70 - 130
			Chloromethane	2018/11/09		92	%	70 - 130
			Vinyl Chloride	2018/11/09		90	%	70 - 130
			Chloroethane	2018/11/09		93	%	70 - 130
			1,3-Butadiene	2018/11/09		98	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2018/11/09		99	%	70 - 130
			Ethanol (ethyl alcohol)	2018/11/09		121	%	70 - 130
			Trichlorotrifluoroethane	2018/11/09		94	%	70 - 130
			2-propanol	2018/11/09		91	%	70 - 130
			2-Propanone	2018/11/09		96	%	70 - 130
			Methyl Ethyl Ketone (2-Butanone)	2018/11/09		101	%	70 - 130
			Methyl Isobutyl Ketone	2018/11/09		96	%	70 - 130
			Methyl Butyl Ketone (2-Hexanone)	2018/11/09		96	%	70 - 130
			Methyl t-butyl ether (MTBE)	2018/11/09		99	%	70 - 130
			Ethyl Acetate	2018/11/09		96	%	70 - 130
			1,1-Dichloroethylene	2018/11/09		110	%	70 - 130
			cis-1,2-Dichloroethylene	2018/11/09		96	%	70 - 130
			trans-1,2-Dichloroethylene	2018/11/09		98	%	70 - 130

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Methylene Chloride(Dichloromethane)	2018/11/09		88	%	70 - 130
			Chloroform	2018/11/09		96	%	70 - 130
			Carbon Tetrachloride	2018/11/09		58 (1)	%	70 - 130
			1,1-Dichloroethane	2018/11/09		94	%	70 - 130
			1,2-Dichloroethane	2018/11/09		95	%	70 - 130
			Ethylene Dibromide	2018/11/09		99	%	70 - 130
			1,1,1-Trichloroethane	2018/11/09		90	%	70 - 130
			1,1,2-Trichloroethane	2018/11/09		96	%	70 - 130
			1,1,2,2-Tetrachloroethane	2018/11/09		104	%	70 - 130
			cis-1,3-Dichloropropene	2018/11/09		97	%	70 - 130
			trans-1,3-Dichloropropene	2018/11/09		99	%	70 - 130
			1,2-Dichloropropane	2018/11/09		101	%	70 - 130
			Bromomethane	2018/11/09		105	%	70 - 130
			Bromoform	2018/11/09		97	%	70 - 130
			Bromodichloromethane	2018/11/09		99	%	70 - 130
			Dibromochloromethane	2018/11/09		100	%	70 - 130
			Trichloroethylene	2018/11/09		93	%	70 - 130
			Tetrachloroethylene	2018/11/09		96	%	70 - 130
			Benzene	2018/11/09		100	%	70 - 130
			Toluene	2018/11/09		101	%	70 - 130
			Ethylbenzene	2018/11/09		101	%	70 - 130
			p+m-Xylene	2018/11/09		96	%	70 - 130
			o-Xylene	2018/11/09		100	%	70 - 130
			Styrene	2018/11/09		99	%	70 - 130
			4-ethyltoluene	2018/11/09		93	%	70 - 130
			1,3,5-Trimethylbenzene	2018/11/09		98	%	70 - 130
			1,2,4-Trimethylbenzene	2018/11/09		90	%	70 - 130
			Chlorobenzene	2018/11/09		103	%	70 - 130
			Benzyl chloride	2018/11/09		94	%	70 - 130
			1,3-Dichlorobenzene	2018/11/09		96	%	70 - 130
			1,4-Dichlorobenzene	2018/11/09		92	%	70 - 130
			1,2-Dichlorobenzene	2018/11/09		94	%	70 - 130
			1,2,4-Trichlorobenzene	2018/11/09		98	%	70 - 130
			Hexachlorobutadiene	2018/11/09		114	%	70 - 130
			Hexane	2018/11/09		91	%	70 - 130
			Heptane	2018/11/09		99	%	70 - 130
			Cyclohexane	2018/11/09		97	%	70 - 130
			Tetrahydrofuran	2018/11/09		98	%	70 - 130
			1,4-Dioxane	2018/11/09		96	%	70 - 130
			Naphthalene	2018/11/09		90	%	70 - 130
			Total Xylenes	2018/11/09		98	%	70 - 130
			Vinyl Bromide	2018/11/09		98	%	70 - 130
			Propene	2018/11/09		97	%	70 - 130
			2,2,4-Trimethylpentane	2018/11/09		103	%	70 - 130
			Carbon Disulfide	2018/11/09		107	%	70 - 130
			Vinyl Acetate	2018/11/09		78	%	70 - 130

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

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Maxxam Job #: B8S9743
Report Date: 2018/11/14

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Maureen Smith, Supervisor, Volatiles

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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EXXONMOBIL/IMPERIAL OIL - MAXXAM AIR CHAIN OF CUSTODY RECORD

Page 1 of 1

C of C # 80764

INVOICE INFORMATION

Company Name: ☒ Imperial Oil ☐ ExxonMobil
Contact Name: IOL Accounts Payable (Golder)
Address: 102, 2535 - 3rd Ave SE, Calgary, AB T2A 7W5
Email: IOL_Accounts_Payable@golder.com
Ph: 4032995600

REPORT INFORMATION

Company Name: Golder
Contact Name: Brandon McFarlan
Address: 1931 Robertson Rd. Ottawa, ON.
Email: bmcfarlan@golder.com
Ph: 613 8804891

Sampler Name (Print): Leandra Maviani, Jeremy Eckert
Consultant Project #: 1791706-1155-2023

	FIELD SAMPLE ID	Canister Serial #	Flow Regulator Serial #	Sample Collection DATE (YYYY/MM/DD)	Sample Collection TIME (24 HR)	Media Type (See Legend)	FLOW RATE (L/min)	LENGTH OF SAMPLING (minutes)	BTEX	Aromatic/Aliphatic Hydrocarbon Fractionations	F1 (C6-C10) - F2 (C10-C16)	VOC (TO15)
1	SVI6-01	1397	FX0576	2018/10/30	12:21	S	0.08	18	X	X	X	X
2	DUPA	1230	FX0576	↓	12:21	S	0.08	18	X	X	X	X
3	SVI6-02	3602	FX0877	↓	11:08	S	0.18	8	X	X	X	X
4												
5												
6												
7												
8												
9												
10												
11												

IOL SITE LOCATION: 1660 Merivale Rd Ottawa, ON

IOL PROJECT # (if applicable): NA

MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM: 1791706-1155-7777

REGULATORY CRITERIA / DETECTION LIMITS: (PLEASE SPECIFY): N/A

SPECIAL INSTRUCTIONS: SAP: 88001627
Used canister (2544) and regulators in box with samples. Do not test 2544

LEGEND
S - Summa Can
T - Tube
TB - Tedlar Bag
O - Other(Specify)
*TEMP N/A for SUMMA CAN

TURNAROUND TIME
Standard (10 days) ☒
Rush (9 days) ☐
(6 days) ☐
(3 days) ☐
Date Required

	YES	NO	COOLER ID # 1				YES	NO	COOLER ID #				YES	NO	COOLER ID #			
SEAL PRESENT	✓		TEMP °C	1	2	3			TEMP °C	1	2	3			TEMP °C	1	2	3
SEAL INTACT	✓																	
COOLING MEDIA PRESENT		✓																

LAB USE ONLY
MAXXAM JOB # B859743

RELINQUISHED BY:	DATE:	TIME (24 HR)	RECEIVED BY:	DATE:	TIME (24 HR)
1. Leandra Maviani	2018/10/30	14:10	1. KHUSHBOO KAPOOR	2018/10/31	10:30
2.			2.		
3.			3.		

SAMPLES
LABELED BY: KK
VERIFIED BY: LOR

IOL COC-AIR-(04/2016) White: Maxxam Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: October 30, 2018

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Maxxam Analytics Mississauga

Consultant Project Number: 1791706-1155

Sample Submission Number: B8S9743

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within
Extraction Surrogate Recovery			X	acceptance criteria.
Method Blank Concentration	X			
Matrix Duplicate RPD			X	
Matrix Spike Recovery			X	
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	All field QC samples are within
Trip Blank Concentration			X	alert limits.
Field Duplicate RPD	X			

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	n/a

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): 

Date: November 14, 2018

Maxxam
A Bureau Veritas Group Company

Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023
Your C.O.C. #: 80763

Attention: Brandon McParlan

Golder Associates Ltd
1931 Robertson Road
Ottawa, ON
Canada K2H 5B7

Report Date: 2018/11/12
Report #: R5480093
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8S9747
Received: 2018/10/31, 10:30

Sample Matrix: AIR
Samples Received: 1

Analyses	Quantity	Laboratory Method	Primary Reference
BTEX and CCME Compounds in Air(TO-15mod)	1	BRL SOP-00304	EPA TO-15 m
BTEX Fractionation in Air (TO-15mod)	1	BRL SOP-00304	EPA TO-15 m
Canister Pressure (TO-15)	1	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (ug/m3)	1	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (TO-15) (1)	1	BRL SOP-00304	EPA TO-15 m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard. All samples were analyzed within hold time unless otherwise flagged.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Air sampling canisters have been cleaned in accordance with U.S. EPA Method TO15. At the end of the cleaning, evacuation, and pressurization cycles, one canister was selected and was pressurized with Zero Air. This canister was then analyzed via TO15 on a GC/MS. The canister must have been found to contain <0.2 ppbv concentration of all target analytes in order for the batch to have been considered clean. Each canister also underwent a leak check prior to shipment.

Please Note: SUMMA® canister samples will be retained by Maxxam for a period of 5 calendar days or as contractually agreed from the date of this report, after which time they will be cleaned for reuse. If you require a longer sample storage period, please contact your service representative.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam
A Bureau Veritas Group Company

Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023
Your C.O.C. #: 80763

Attention: Brandon McParlan

Golder Associates Ltd
1931 Robertson Road
Ottawa, ON
Canada K2H 5B7

Report Date: 2018/11/12
Report #: R5480093
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8S9747
Received: 2018/10/31, 10:30

Encryption Key

Kyle Reinhart
Project Manager - Environmental
Customer Service
12 Nov 2018 13:47:29

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kyle Reinhart, Project Manager - Environmental Customer Service
Email: kreinhart@maxxam.ca
Phone# (905) 817-5700

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam Job #: B8S9747
Report Date: 2018/11/12

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023

RESULTS OF ANALYSES OF AIR

Maxxam ID		IED346	
Sampling Date		2018/10/30 11:16	
COC Number		80763	
	UNITS	**FIELD BLANK**	**QC Batch**
Pressure on Receipt	psig	(-0.7)	5827667

QC Batch = Quality Control Batch

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Maxxam Job #: B8S9747
Report Date: 2018/11/12

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		IED346	IED346		
Sampling Date		2018/10/30 11:16	2018/10/30 11:16		
COC Number		80763	80763		
	UNITS	**FIELD BLANK**	**FIELD BLANK Lab-Dup**	**RDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ppbv	0.50	0.53	0.20	5827418
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	<0.17	0.17	5827418
Chloromethane	ppbv	0.44	0.45	0.30	5827418
Vinyl Chloride	ppbv	<0.10	<0.10	0.10	5827418
Chloroethane	ppbv	<0.30	<0.30	0.30	5827418
1,3-Butadiene	ppbv	<0.50	<0.50	0.50	5827418
Trichlorofluoromethane (FREON 11)	ppbv	0.23	0.24	0.20	5827418
Ethanol (ethyl alcohol)	ppbv	1.2	1.6	1.0	5827418
Trichlorotrifluoroethane	ppbv	<0.15	<0.15	0.15	5827418
2-propanol	ppbv	<1.0	<1.0	1.0	5827418
2-Propanone	ppbv	1.65	1.71	0.80	5827418
Methyl Ethyl Ketone (2-Butanone)	ppbv	<1.0	<1.0	1.0	5827418
Methyl Isobutyl Ketone	ppbv	<1.0	<1.0	1.0	5827418
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	<1.0	1.0	5827418
Methyl t-butyl ether (MTBE)	ppbv	<0.20	<0.20	0.20	5827418
Ethyl Acetate	ppbv	<1.0	<1.0	1.0	5827418
1,1-Dichloroethylene	ppbv	<0.10	<0.10	0.10	5827418
cis-1,2-Dichloroethylene	ppbv	<0.10	<0.10	0.10	5827418
trans-1,2-Dichloroethylene	ppbv	<0.10	<0.10	0.10	5827418
Methylene Chloride(Dichloromethane)	ppbv	<0.80	<0.80	0.80	5827418
Chloroform	ppbv	<0.10	<0.10	0.10	5827418
Carbon Tetrachloride	ppbv	<0.10	<0.10	0.10	5827418
1,1-Dichloroethane	ppbv	<0.10	<0.10	0.10	5827418
1,2-Dichloroethane	ppbv	<0.10	<0.10	0.10	5827418
Ethylene Dibromide	ppbv	<0.10	<0.10	0.10	5827418
1,1,1-Trichloroethane	ppbv	<0.10	<0.10	0.10	5827418
1,1,2-Trichloroethane	ppbv	<0.10	<0.10	0.10	5827418
1,1,2,2-Tetrachloroethane	ppbv	<0.10	<0.10	0.10	5827418
cis-1,3-Dichloropropene	ppbv	<0.10	<0.10	0.10	5827418
trans-1,3-Dichloropropene	ppbv	<0.10	<0.10	0.10	5827418
1,2-Dichloropropane	ppbv	<0.10	<0.10	0.10	5827418

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

Maxxam Job #: B8S9747
Report Date: 2018/11/12

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		IED346	IED346		
Sampling Date		2018/10/30 11:16	2018/10/30 11:16		
COC Number		80763	80763		
	UNITS	**FIELD BLANK**	**FIELD BLANK Lab-Dup**	**RDL**	**QC Batch**
Bromomethane	ppbv	<0.10	<0.10	0.10	5827418
Bromoform	ppbv	<0.20	<0.20	0.20	5827418
Bromodichloromethane	ppbv	<0.20	<0.20	0.20	5827418
Dibromochloromethane	ppbv	<0.20	<0.20	0.20	5827418
Trichloroethylene	ppbv	<0.10	<0.10	0.10	5827418
Tetrachloroethylene	ppbv	<0.10	<0.10	0.10	5827418
Benzene	ppbv	<0.10	<0.10	0.10	5827418
Toluene	ppbv	<0.10	<0.10	0.10	5827418
Ethylbenzene	ppbv	<0.10	<0.10	0.10	5827418
p+m-Xylene	ppbv	<0.20	<0.20	0.20	5827418
o-Xylene	ppbv	<0.10	<0.10	0.10	5827418
Styrene	ppbv	<0.10	<0.10	0.10	5827418
4-ethyltoluene	ppbv	<0.50	<0.50	0.50	5827418
1,3,5-Trimethylbenzene	ppbv	<0.50	<0.50	0.50	5827418
1,2,4-Trimethylbenzene	ppbv	<0.50	<0.50	0.50	5827418
Chlorobenzene	ppbv	<0.10	<0.10	0.10	5827418
Benzyl chloride	ppbv	<0.50	<0.50	0.50	5827418
1,3-Dichlorobenzene	ppbv	<0.40	<0.40	0.40	5827418
1,4-Dichlorobenzene	ppbv	<0.10	<0.10	0.10	5827418
1,2-Dichlorobenzene	ppbv	<0.10	<0.10	0.10	5827418
1,2,4-Trichlorobenzene	ppbv	<0.50	<0.50	0.50	5827418
Hexachlorobutadiene	ppbv	<0.50	<0.50	0.50	5827418
Hexane	ppbv	<0.30	<0.30	0.30	5827418
Heptane	ppbv	<0.30	<0.30	0.30	5827418
Cyclohexane	ppbv	<0.20	<0.20	0.20	5827418
Tetrahydrofuran	ppbv	0.46	0.43	0.40	5827418
1,4-Dioxane	ppbv	<1.0	<1.0	1.0	5827418
Naphthalene	ppbv	<0.50	<0.50	0.50	5827418
Total Xylenes	ppbv	<0.30	<0.30	0.30	5827418
1,1,1,2-Tetrachloroethane	ppbv	<0.10	<0.10	0.10	5827418
Vinyl Bromide	ppbv	<0.20	<0.20	0.20	5827418

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

Maxxam Job #: B8S9747
Report Date: 2018/11/12

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		IED346	IED346		
Sampling Date		2018/10/30 11:16	2018/10/30 11:16		
COC Number		80763	80763		
	UNITS	**FIELD BLANK**	**FIELD BLANK Lab-Dup**	**RDL**	**QC Batch**
Propene	ppbv	<0.60	<0.60	0.60	5827418
2,2,4-Trimethylpentane	ppbv	<0.20	<0.20	0.20	5827418
Carbon Disulfide	ppbv	<0.50	<0.50	0.50	5827418
Vinyl Acetate	ppbv	<0.20	<0.20	0.20	5827418
Instrument Surrogate Recovery (%)					
Bromochloromethane	%	93	81		5827418
D5-Chlorobenzene	%	87	76		5827418
Difluorobenzene	%	94	81		5827418

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B8S9747
Report Date: 2018/11/12

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023

CALCULATED VOLATILE ORGANICS (AIR)

Maxxam ID		IED346	IED346		
Sampling Date		2018/10/30 11:16	2018/10/30 11:16		
COC Number		80763	80763		
	UNITS	**FIELD BLANK**	**FIELD BLANK Lab-Dup**	**RDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ug/m3	2.49	2.60	0.99	5815960
1,2-Dichlorotetrafluoroethane	ug/m3	<1.2	<1.2	1.2	5815960
Chloromethane	ug/m3	0.90	0.93	0.62	5815960
Vinyl Chloride	ug/m3	<0.26	<0.26	0.26	5815960
Chloroethane	ug/m3	<0.79	<0.79	0.79	5815960
1,3-Butadiene	ug/m3	<1.1	<1.1	1.1	5815960
Trichlorofluoromethane (FREON 11)	ug/m3	1.3	1.3	1.1	5815960
Ethanol (ethyl alcohol)	ug/m3	2.2	3.0	1.9	5815960
Trichlorotrifluoroethane	ug/m3	<1.2	<1.2	1.2	5815960
2-propanol	ug/m3	<2.5	<2.5	2.5	5815960
2-Propanone	ug/m3	3.9	4.1	1.9	5815960
Methyl Ethyl Ketone (2-Butanone)	ug/m3	<2.9	<2.9	2.9	5815960
Methyl Isobutyl Ketone	ug/m3	<4.1	<4.1	4.1	5815960
Methyl Butyl Ketone (2-Hexanone)	ug/m3	<4.1	<4.1	4.1	5815960
Methyl t-butyl ether (MTBE)	ug/m3	<0.72	<0.72	0.72	5815960
Ethyl Acetate	ug/m3	<3.6	<3.6	3.6	5815960
1,1-Dichloroethylene	ug/m3	<0.40	<0.40	0.40	5815960
cis-1,2-Dichloroethylene	ug/m3	<0.40	<0.40	0.40	5815960
trans-1,2-Dichloroethylene	ug/m3	<0.40	<0.40	0.40	5815960
Methylene Chloride(Dichloromethane)	ug/m3	<2.8	<2.8	2.8	5815960
Chloroform	ug/m3	<0.49	<0.49	0.49	5815960
Carbon Tetrachloride	ug/m3	<0.63	<0.63	0.63	5815960
1,1-Dichloroethane	ug/m3	<0.40	<0.40	0.40	5815960
1,2-Dichloroethane	ug/m3	<0.40	<0.40	0.40	5815960
Ethylene Dibromide	ug/m3	<0.77	<0.77	0.77	5815960
1,1,1-Trichloroethane	ug/m3	<0.55	<0.55	0.55	5815960
1,1,2-Trichloroethane	ug/m3	<0.55	<0.55	0.55	5815960
1,1,2,2-Tetrachloroethane	ug/m3	<0.69	<0.69	0.69	5815960
cis-1,3-Dichloropropene	ug/m3	<0.45	<0.45	0.45	5815960
trans-1,3-Dichloropropene	ug/m3	<0.45	<0.45	0.45	5815960
1,2-Dichloropropane	ug/m3	<0.46	<0.46	0.46	5815960

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

Maxxam Job #: B8S9747
Report Date: 2018/11/12

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023

CALCULATED VOLATILE ORGANICS (AIR)

Maxxam ID		IED346	IED346		
Sampling Date		2018/10/30 11:16	2018/10/30 11:16		
COC Number		80763	80763		
	UNITS	**FIELD BLANK**	**FIELD BLANK Lab-Dup**	**RDL**	**QC Batch**
Bromomethane	ug/m3	<0.39	<0.39	0.39	5815960
Bromoform	ug/m3	<2.1	<2.1	2.1	5815960
Bromodichloromethane	ug/m3	<1.3	<1.3	1.3	5815960
Dibromochloromethane	ug/m3	<1.7	<1.7	1.7	5815960
Trichloroethylene	ug/m3	<0.54	<0.54	0.54	5815960
Tetrachloroethylene	ug/m3	<0.68	<0.68	0.68	5815960
Benzene	ug/m3	<0.32	<0.32	0.32	5815960
Toluene	ug/m3	<0.38	<0.38	0.38	5815960
Ethylbenzene	ug/m3	<0.43	<0.43	0.43	5815960
p+m-Xylene	ug/m3	<0.87	<0.87	0.87	5815960
o-Xylene	ug/m3	<0.43	<0.43	0.43	5815960
Styrene	ug/m3	<0.43	<0.43	0.43	5815960
4-ethyltoluene	ug/m3	<2.5	<2.5	2.5	5815960
1,3,5-Trimethylbenzene	ug/m3	<2.5	<2.5	2.5	5815960
1,2,4-Trimethylbenzene	ug/m3	<2.5	<2.5	2.5	5815960
Chlorobenzene	ug/m3	<0.46	<0.46	0.46	5815960
Benzyl chloride	ug/m3	<2.6	<2.6	2.6	5815960
1,3-Dichlorobenzene	ug/m3	<2.4	<2.4	2.4	5815960
1,4-Dichlorobenzene	ug/m3	<0.60	<0.60	0.60	5815960
1,2-Dichlorobenzene	ug/m3	<0.60	<0.60	0.60	5815960
1,2,4-Trichlorobenzene	ug/m3	<3.7	<3.7	3.7	5815960
Hexachlorobutadiene	ug/m3	<5.3	<5.3	5.3	5815960
Hexane	ug/m3	<1.1	<1.1	1.1	5815960
Heptane	ug/m3	<1.2	<1.2	1.2	5815960
Cyclohexane	ug/m3	<0.69	<0.69	0.69	5815960
Tetrahydrofuran	ug/m3	1.4	1.3	1.2	5815960
1,4-Dioxane	ug/m3	<3.6	<3.6	3.6	5815960
Naphthalene	ug/m3	<2.6	<2.6	2.6	5815960
Total Xylenes	ug/m3	<1.3	<1.3	1.3	5815960
1,1,1,2-Tetrachloroethane	ug/m3	<0.69	<0.69	0.69	5815960
Vinyl Bromide	ug/m3	<0.87	<0.87	0.87	5815960

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B8S9747
Report Date: 2018/11/12

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023

CALCULATED VOLATILE ORGANICS (AIR)

Maxxam ID		IED346	IED346		
Sampling Date		2018/10/30 11:16	2018/10/30 11:16		
COC Number		80763	80763		
	UNITS	**FIELD BLANK**	**FIELD BLANK Lab-Dup**	**RDL**	**QC Batch**
Propene	ug/m3	<1.0	<1.0	1.0	5815960
2,2,4-Trimethylpentane	ug/m3	<0.93	<0.93	0.93	5815960
Carbon Disulfide	ug/m3	<1.6	<1.6	1.6	5815960
Vinyl Acetate	ug/m3	<0.70	<0.70	0.70	5815960

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B8S9747
Report Date: 2018/11/12

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023

VOLATILE ORGANIC HYDROCARBONS BY GC/MS (AIR)

Maxxam ID		IED346	IED346		
Sampling Date		2018/10/30 11:16	2018/10/30 11:16		
COC Number		80763	80763		
	UNITS	**FIELD BLANK**	**FIELD BLANK Lab-Dup**	**RDL**	**QC Batch**
F1-BTEX, C6-C10 (as Toluene)	ug/m3	9.3	10.7	5.0	5828125
F2, C10-C16 (as Decane)	ug/m3	8.9	8.4	5.0	5828125
Aliphatic >C5-C6	ug/m3	<5.0	<5.0	5.0	5829230
Aliphatic >C6-C8	ug/m3	<5.0	<5.0	5.0	5829230
Aliphatic >C8-C10	ug/m3	<5.0	<5.0	5.0	5829230
Aliphatic >C10-C12	ug/m3	<5.0	<5.0	5.0	5829230
Aliphatic >C12-C16	ug/m3	<5.0	<5.0	5.0	5829230
Aromatic >C7-C8 (TEX Excluded)	ug/m3	<5.0	<5.0	5.0	5829230
Aromatic >C8-C10	ug/m3	<5.0	<5.0	5.0	5829230
Aromatic >C10-C12	ug/m3	<5.0	<5.0	5.0	5829230
Aromatic >C12-C16	ug/m3	<5.0	<5.0	5.0	5829230

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B8S9747
Report Date: 2018/11/12

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023

TEST SUMMARY

Maxxam ID: IED346
Sample ID: FIELD BLANK
Matrix: AIR

Collected: 2018/10/30
Relinquished: 2018/10/30
Received: 2018/10/31

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	5828125	N/A	2018/11/08	Yao Liang Sun
BTEX Fractionation in Air (TO-15mod)	GC/MS	5829230	N/A	2018/11/08	Yao Liang Sun
Canister Pressure (TO-15)	PRES	5827667	N/A	2018/11/08	Yao Liang Sun
Volatile Organics in Air (ug/m3)	GC/MS	5815960	N/A	2018/11/09	Automated Statchk
Volatile Organics in Air (TO-15)	GC/MS	5827418	N/A	2018/11/08	Yao Liang Sun

Maxxam ID: IED346 Dup
Sample ID: FIELD BLANK
Matrix: AIR

Collected: 2018/10/30
Relinquished: 2018/10/30
Received: 2018/10/31

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	5828125	N/A	2018/11/08	Yao Liang Sun
BTEX Fractionation in Air (TO-15mod)	GC/MS	5829230	N/A	2018/11/08	Yao Liang Sun
Volatile Organics in Air (ug/m3)	GC/MS	5815960	N/A	2018/11/09	Automated Statchk
Volatile Organics in Air (TO-15)	GC/MS	5827418	N/A	2018/11/08	Yao Liang Sun

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Maxxam Job #: B8S9747
Report Date: 2018/11/12

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023

GENERAL COMMENTS

Note: Incorrect Task Order/Contract Number. IES contract number missing from the COC.

Sample IED346 [FIELD BLANK] : Increased DL for propene due to interference from propane.

Results relate only to the items tested.

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Maxxam Job #: B8S9747
Report Date: 2018/11/12

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5827418	LSY	Method Blank	Bromochloromethane	2018/11/08		101	%	60 - 140
			D5-Chlorobenzene	2018/11/08		97	%	60 - 140
			Difluorobenzene	2018/11/08		104	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2018/11/08	<0.20		ppbv	
			1,2-Dichlorotetrafluoroethane	2018/11/08	<0.17		ppbv	
			Chloromethane	2018/11/08	<0.30		ppbv	
			Vinyl Chloride	2018/11/08	<0.10		ppbv	
			Chloroethane	2018/11/08	<0.30		ppbv	
			1,3-Butadiene	2018/11/08	<0.50		ppbv	
			Trichlorofluoromethane (FREON 11)	2018/11/08	<0.20		ppbv	
			Ethanol (ethyl alcohol)	2018/11/08	<1.0		ppbv	
			Trichlorotrifluoroethane	2018/11/08	<0.15		ppbv	
			2-propanol	2018/11/08	<1.0		ppbv	
			2-Propanone	2018/11/08	<0.80		ppbv	
			Methyl Ethyl Ketone (2-Butanone)	2018/11/08	<1.0		ppbv	
			Methyl Isobutyl Ketone	2018/11/08	<1.0		ppbv	
			Methyl Butyl Ketone (2-Hexanone)	2018/11/08	<1.0		ppbv	
			Methyl t-butyl ether (MTBE)	2018/11/08	<0.20		ppbv	
			Ethyl Acetate	2018/11/08	<1.0		ppbv	
			1,1-Dichloroethylene	2018/11/08	<0.10		ppbv	
			cis-1,2-Dichloroethylene	2018/11/08	<0.10		ppbv	
			trans-1,2-Dichloroethylene	2018/11/08	<0.10		ppbv	
			Methylene Chloride(Dichloromethane)	2018/11/08	<0.80		ppbv	
			Chloroform	2018/11/08	<0.10		ppbv	
			Carbon Tetrachloride	2018/11/08	<0.10		ppbv	
			1,1-Dichloroethane	2018/11/08	<0.10		ppbv	
			1,2-Dichloroethane	2018/11/08	<0.10		ppbv	
			Ethylene Dibromide	2018/11/08	<0.10		ppbv	
			1,1,1-Trichloroethane	2018/11/08	<0.10		ppbv	
			1,1,2-Trichloroethane	2018/11/08	<0.10		ppbv	
			1,1,2,2-Tetrachloroethane	2018/11/08	<0.10		ppbv	
			cis-1,3-Dichloropropene	2018/11/08	<0.10		ppbv	
			trans-1,3-Dichloropropene	2018/11/08	<0.10		ppbv	
			1,2-Dichloropropane	2018/11/08	<0.10		ppbv	
			Bromomethane	2018/11/08	<0.10		ppbv	
			Bromoform	2018/11/08	<0.20		ppbv	
			Bromodichloromethane	2018/11/08	<0.20		ppbv	
			Dibromochloromethane	2018/11/08	<0.20		ppbv	
			Trichloroethylene	2018/11/08	<0.10		ppbv	
			Tetrachloroethylene	2018/11/08	<0.10		ppbv	
			Benzene	2018/11/08	<0.10		ppbv	
			Toluene	2018/11/08	<0.10		ppbv	
			Ethylbenzene	2018/11/08	<0.10		ppbv	
			p+m-Xylene	2018/11/08	<0.20		ppbv	
			o-Xylene	2018/11/08	<0.10		ppbv	
			Styrene	2018/11/08	<0.10		ppbv	
			4-ethyltoluene	2018/11/08	<0.50		ppbv	
			1,3,5-Trimethylbenzene	2018/11/08	<0.50		ppbv	
			1,2,4-Trimethylbenzene	2018/11/08	<0.50		ppbv	
			Chlorobenzene	2018/11/08	<0.10		ppbv	
			Benzyl chloride	2018/11/08	<0.50		ppbv	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,3-Dichlorobenzene	2018/11/08	<0.40		ppbv	
			1,4-Dichlorobenzene	2018/11/08	<0.10		ppbv	
			1,2-Dichlorobenzene	2018/11/08	<0.10		ppbv	
			1,2,4-Trichlorobenzene	2018/11/08	<0.50		ppbv	
			Hexachlorobutadiene	2018/11/08	<0.50		ppbv	
			Hexane	2018/11/08	<0.30		ppbv	
			Heptane	2018/11/08	<0.30		ppbv	
			Cyclohexane	2018/11/08	<0.20		ppbv	
			Tetrahydrofuran	2018/11/08	<0.40		ppbv	
			1,4-Dioxane	2018/11/08	<1.0		ppbv	
			Naphthalene	2018/11/08	<0.50		ppbv	
			Total Xylenes	2018/11/08	<0.30		ppbv	
			1,1,1,2-Tetrachloroethane	2018/11/08	<0.10		ppbv	
			Vinyl Bromide	2018/11/08	<0.20		ppbv	
			Propene	2018/11/08	<0.50		ppbv	
			2,2,4-Trimethylpentane	2018/11/08	<0.20		ppbv	
			Carbon Disulfide	2018/11/08	<0.50		ppbv	
			Vinyl Acetate	2018/11/08	<0.20		ppbv	
5828125	LSY	Method Blank	F1-BTEX, C6-C10 (as Toluene)	2018/11/08	<5.0		ug/m3	
			F2, C10-C16 (as Decane)	2018/11/08	<5.0		ug/m3	
5829230	LSY	Method Blank	Aliphatic >C5-C6	2018/11/08	<5.0		ug/m3	
			Aliphatic >C6-C8	2018/11/08	<5.0		ug/m3	
			Aliphatic >C8-C10	2018/11/08	<5.0		ug/m3	
			Aliphatic >C10-C12	2018/11/08	<5.0		ug/m3	
			Aliphatic >C12-C16	2018/11/08	<5.0		ug/m3	
			Aromatic >C7-C8 (TEX Excluded)	2018/11/08	<5.0		ug/m3	
			Aromatic >C8-C10	2018/11/08	<5.0		ug/m3	
			Aromatic >C10-C12	2018/11/08	<5.0		ug/m3	
			Aromatic >C12-C16	2018/11/08	<5.0		ug/m3	
5815960	ASC	RPD [IED346-01]	Dichlorodifluoromethane (FREON 12)	2018/11/09	4.4		%	25
			1,2-Dichlorotetrafluoroethane	2018/11/09	NC		%	25
			Chloromethane	2018/11/09	3.4		%	25
			Vinyl Chloride	2018/11/09	NC		%	25
			Chloroethane	2018/11/09	NC		%	25
			1,3-Butadiene	2018/11/09	NC		%	25
			Trichlorofluoromethane (FREON 11)	2018/11/09	1.4		%	25
			Ethanol (ethyl alcohol)	2018/11/09	NC		%	25
			Trichlorotrifluoroethane	2018/11/09	NC		%	25
			2-propanol	2018/11/09	NC		%	25
			2-Propanone	2018/11/09	3.4		%	25
			Methyl Ethyl Ketone (2-Butanone)	2018/11/09	NC		%	25
			Methyl Isobutyl Ketone	2018/11/09	NC		%	25
			Methyl Butyl Ketone (2-Hexanone)	2018/11/09	NC		%	25
			Methyl t-butyl ether (MTBE)	2018/11/09	NC		%	25
			Ethyl Acetate	2018/11/09	NC		%	25
			1,1-Dichloroethylene	2018/11/09	NC		%	25
			cis-1,2-Dichloroethylene	2018/11/09	NC		%	25
			trans-1,2-Dichloroethylene	2018/11/09	NC		%	25
			Methylene Chloride(Dichloromethane)	2018/11/09	NC		%	25
			Chloroform	2018/11/09	NC		%	25
			Carbon Tetrachloride	2018/11/09	NC		%	25

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,1-Dichloroethane	2018/11/09	NC		%	25
			1,2-Dichloroethane	2018/11/09	NC		%	25
			Ethylene Dibromide	2018/11/09	NC		%	25
			1,1,1-Trichloroethane	2018/11/09	NC		%	25
			1,1,2-Trichloroethane	2018/11/09	NC		%	25
			1,1,2,2-Tetrachloroethane	2018/11/09	NC		%	25
			cis-1,3-Dichloropropene	2018/11/09	NC		%	25
			trans-1,3-Dichloropropene	2018/11/09	NC		%	25
			1,2-Dichloropropane	2018/11/09	NC		%	25
			Bromomethane	2018/11/09	NC		%	25
			Bromoform	2018/11/09	NC		%	25
			Bromodichloromethane	2018/11/09	NC		%	25
			Dibromochloromethane	2018/11/09	NC		%	25
			Trichloroethylene	2018/11/09	NC		%	25
			Tetrachloroethylene	2018/11/09	NC		%	25
			Benzene	2018/11/09	NC		%	25
			Toluene	2018/11/09	NC		%	25
			Ethylbenzene	2018/11/09	NC		%	25
			p+m-Xylene	2018/11/09	NC		%	25
			o-Xylene	2018/11/09	NC		%	25
			Styrene	2018/11/09	NC		%	25
			4-ethyltoluene	2018/11/09	NC		%	25
			1,3,5-Trimethylbenzene	2018/11/09	NC		%	25
			1,2,4-Trimethylbenzene	2018/11/09	NC		%	25
			Chlorobenzene	2018/11/09	NC		%	25
			Benzyl chloride	2018/11/09	NC		%	25
			1,3-Dichlorobenzene	2018/11/09	NC		%	25
			1,4-Dichlorobenzene	2018/11/09	NC		%	25
			1,2-Dichlorobenzene	2018/11/09	NC		%	25
			1,2,4-Trichlorobenzene	2018/11/09	NC		%	25
			Hexachlorobutadiene	2018/11/09	NC		%	25
			Hexane	2018/11/09	NC		%	25
			Heptane	2018/11/09	NC		%	25
			Cyclohexane	2018/11/09	NC		%	25
			Tetrahydrofuran	2018/11/09	6.2		%	25
			1,4-Dioxane	2018/11/09	NC		%	25
			Naphthalene	2018/11/09	NC		%	25
			Total Xylenes	2018/11/09	NC		%	25
			1,1,1,2-Tetrachloroethane	2018/11/09	NC		%	25
			Vinyl Bromide	2018/11/09	NC		%	25
			Propene	2018/11/09	NC		%	25
			2,2,4-Trimethylpentane	2018/11/09	NC		%	25
			Carbon Disulfide	2018/11/09	NC		%	25
			Vinyl Acetate	2018/11/09	NC		%	25
5827418	LSY	RPD [IED346-01]	Dichlorodifluoromethane (FREON 12)	2018/11/08	4.4		%	25
			1,2-Dichlorotetrafluoroethane	2018/11/08	NC		%	25
			Chloromethane	2018/11/08	3.4		%	25
			Vinyl Chloride	2018/11/08	NC		%	25
			Chloroethane	2018/11/08	NC		%	25
			1,3-Butadiene	2018/11/08	NC		%	25
			Trichlorofluoromethane (FREON 11)	2018/11/08	1.4		%	25

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Ethanol (ethyl alcohol)	2018/11/08	NC		%	25
			Trichlorotrifluoroethane	2018/11/08	NC		%	25
			2-propanol	2018/11/08	NC		%	25
			2-Propanone	2018/11/08	3.4		%	25
			Methyl Ethyl Ketone (2-Butanone)	2018/11/08	NC		%	25
			Methyl Isobutyl Ketone	2018/11/08	NC		%	25
			Methyl Butyl Ketone (2-Hexanone)	2018/11/08	NC		%	25
			Methyl t-butyl ether (MTBE)	2018/11/08	NC		%	25
			Ethyl Acetate	2018/11/08	NC		%	25
			1,1-Dichloroethylene	2018/11/08	NC		%	25
			cis-1,2-Dichloroethylene	2018/11/08	NC		%	25
			trans-1,2-Dichloroethylene	2018/11/08	NC		%	25
			Methylene Chloride(Dichloromethane)	2018/11/08	NC		%	25
			Chloroform	2018/11/08	NC		%	25
			Carbon Tetrachloride	2018/11/08	NC		%	25
			1,1-Dichloroethane	2018/11/08	NC		%	25
			1,2-Dichloroethane	2018/11/08	NC		%	25
			Ethylene Dibromide	2018/11/08	NC		%	25
			1,1,1-Trichloroethane	2018/11/08	NC		%	25
			1,1,2-Trichloroethane	2018/11/08	NC		%	25
			1,1,2,2-Tetrachloroethane	2018/11/08	NC		%	25
			cis-1,3-Dichloropropene	2018/11/08	NC		%	25
			trans-1,3-Dichloropropene	2018/11/08	NC		%	25
			1,2-Dichloropropane	2018/11/08	NC		%	25
			Bromomethane	2018/11/08	NC		%	25
			Bromoform	2018/11/08	NC		%	25
			Bromodichloromethane	2018/11/08	NC		%	25
			Dibromochloromethane	2018/11/08	NC		%	25
			Trichloroethylene	2018/11/08	NC		%	25
			Tetrachloroethylene	2018/11/08	NC		%	25
			Benzene	2018/11/08	NC		%	25
			Toluene	2018/11/08	NC		%	25
			Ethylbenzene	2018/11/08	NC		%	25
			p+m-Xylene	2018/11/08	NC		%	25
			o-Xylene	2018/11/08	NC		%	25
			Styrene	2018/11/08	NC		%	25
			4-ethyltoluene	2018/11/08	NC		%	25
			1,3,5-Trimethylbenzene	2018/11/08	NC		%	25
			1,2,4-Trimethylbenzene	2018/11/08	NC		%	25
			Chlorobenzene	2018/11/08	NC		%	25
			Benzyl chloride	2018/11/08	NC		%	25
			1,3-Dichlorobenzene	2018/11/08	NC		%	25
			1,4-Dichlorobenzene	2018/11/08	NC		%	25
			1,2-Dichlorobenzene	2018/11/08	NC		%	25
			1,2,4-Trichlorobenzene	2018/11/08	NC		%	25
			Hexachlorobutadiene	2018/11/08	NC		%	25
			Hexane	2018/11/08	NC		%	25
			Heptane	2018/11/08	NC		%	25
			Cyclohexane	2018/11/08	NC		%	25
			Tetrahydrofuran	2018/11/08	6.2		%	25
			1,4-Dioxane	2018/11/08	NC		%	25

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Naphthalene	2018/11/08	NC		%	25
			Total Xylenes	2018/11/08	NC		%	25
			1,1,1,2-Tetrachloroethane	2018/11/08	NC		%	25
			Vinyl Bromide	2018/11/08	NC		%	25
			Propene	2018/11/08	NC		%	25
			2,2,4-Trimethylpentane	2018/11/08	NC		%	25
			Carbon Disulfide	2018/11/08	NC		%	25
			Vinyl Acetate	2018/11/08	NC		%	25
5828125	LSY	RPD [IED346-01]	F1-BTEX, C6-C10 (as Toluene)	2018/11/08	14		%	25
			F2, C10-C16 (as Decane)	2018/11/08	5.6		%	25
5829230	LSY	RPD [IED346-01]	Aliphatic >C5-C6	2018/11/08	NC		%	25
			Aliphatic >C6-C8	2018/11/08	NC		%	25
			Aliphatic >C8-C10	2018/11/08	NC		%	25
			Aliphatic >C10-C12	2018/11/08	NC		%	25
			Aliphatic >C12-C16	2018/11/08	NC		%	25
			Aromatic >C7-C8 (TEX Excluded)	2018/11/08	NC		%	25
			Aromatic >C8-C10	2018/11/08	NC		%	25
			Aromatic >C10-C12	2018/11/08	NC		%	25
			Aromatic >C12-C16	2018/11/08	NC		%	25
5827418	LSY	LCS	Bromochloromethane	2018/11/08		113	%	60 - 140
			D5-Chlorobenzene	2018/11/08		113	%	60 - 140
			Difluorobenzene	2018/11/08		117	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2018/11/08		94	%	70 - 130
			1,2-Dichlorotetrafluoroethane	2018/11/08		89	%	70 - 130
			Chloromethane	2018/11/08		100	%	70 - 130
			Vinyl Chloride	2018/11/08		94	%	70 - 130
			Chloroethane	2018/11/08		95	%	70 - 130
			1,3-Butadiene	2018/11/08		105	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2018/11/08		96	%	70 - 130
			Ethanol (ethyl alcohol)	2018/11/08		138 (1)	%	70 - 130
			Trichlorotrifluoroethane	2018/11/08		93	%	70 - 130
			2-propanol	2018/11/08		97	%	70 - 130
			2-Propanone	2018/11/08		102	%	70 - 130
			Methyl Ethyl Ketone (2-Butanone)	2018/11/08		121	%	70 - 130
			Methyl Isobutyl Ketone	2018/11/08		101	%	70 - 130
			Methyl Butyl Ketone (2-Hexanone)	2018/11/08		102	%	70 - 130
			Methyl t-butyl ether (MTBE)	2018/11/08		98	%	70 - 130
			Ethyl Acetate	2018/11/08		105	%	70 - 130
			1,1-Dichloroethylene	2018/11/08		107	%	70 - 130
			cis-1,2-Dichloroethylene	2018/11/08		96	%	70 - 130
			trans-1,2-Dichloroethylene	2018/11/08		102	%	70 - 130
			Methylene Chloride(Dichloromethane)	2018/11/08		94	%	70 - 130
			Chloroform	2018/11/08		95	%	70 - 130
			Carbon Tetrachloride	2018/11/08		83	%	70 - 130
			1,1-Dichloroethane	2018/11/08		95	%	70 - 130
			1,2-Dichloroethane	2018/11/08		94	%	70 - 130
			Ethylene Dibromide	2018/11/08		95	%	70 - 130
			1,1,1-Trichloroethane	2018/11/08		86	%	70 - 130
			1,1,2-Trichloroethane	2018/11/08		97	%	70 - 130
			1,1,2,2-Tetrachloroethane	2018/11/08		97	%	70 - 130
			cis-1,3-Dichloropropene	2018/11/08		95	%	70 - 130

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			trans-1,3-Dichloropropene	2018/11/08		99	%	70 - 130
			1,2-Dichloropropane	2018/11/08		102	%	70 - 130
			Bromomethane	2018/11/08		95	%	70 - 130
			Bromoform	2018/11/08		99	%	70 - 130
			Bromodichloromethane	2018/11/08		102	%	70 - 130
			Dibromochloromethane	2018/11/08		101	%	70 - 130
			Trichloroethylene	2018/11/08		86	%	70 - 130
			Tetrachloroethylene	2018/11/08		90	%	70 - 130
			Benzene	2018/11/08		99	%	70 - 130
			Toluene	2018/11/08		100	%	70 - 130
			Ethylbenzene	2018/11/08		96	%	70 - 130
			p+m-Xylene	2018/11/08		92	%	70 - 130
			o-Xylene	2018/11/08		96	%	70 - 130
			Styrene	2018/11/08		97	%	70 - 130
			4-ethyltoluene	2018/11/08		101	%	70 - 130
			1,3,5-Trimethylbenzene	2018/11/08		96	%	70 - 130
			1,2,4-Trimethylbenzene	2018/11/08		91	%	70 - 130
			Chlorobenzene	2018/11/08		93	%	70 - 130
			Benzyl chloride	2018/11/08		101	%	70 - 130
			1,3-Dichlorobenzene	2018/11/08		96	%	70 - 130
			1,4-Dichlorobenzene	2018/11/08		92	%	70 - 130
			1,2-Dichlorobenzene	2018/11/08		92	%	70 - 130
			1,2,4-Trichlorobenzene	2018/11/08		90	%	70 - 130
			Hexachlorobutadiene	2018/11/08		94	%	70 - 130
			Hexane	2018/11/08		94	%	70 - 130
			Heptane	2018/11/08		109	%	70 - 130
			Cyclohexane	2018/11/08		100	%	70 - 130
			Tetrahydrofuran	2018/11/08		107	%	70 - 130
			1,4-Dioxane	2018/11/08		97	%	70 - 130
			Naphthalene	2018/11/08		88	%	70 - 130
			Total Xylenes	2018/11/08		92	%	70 - 130
			Vinyl Bromide	2018/11/08		95	%	70 - 130
			Propene	2018/11/08		109	%	70 - 130
			2,2,4-Trimethylpentane	2018/11/08		109	%	70 - 130
			Carbon Disulfide	2018/11/08		109	%	70 - 130
			Vinyl Acetate	2018/11/08		82	%	70 - 130

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

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Maxxam Job #: B8S9747
Report Date: 2018/11/12

Golder Associates Ltd
Task Order#: 1791706-1155-7777
Site#: N/A
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1791706-1155-2023

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Maureen Smith, Supervisor, Volatiles

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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EXXONMOBIL/IMPERIAL OIL - MAXXAM AIR CHAIN OF CUSTODY RECORD

Page 1 of 1

C of C # 80763

INVOICE INFORMATION	REPORT INFORMATION
Company Name: ☒ Imperial Oil ☐ ExxonMobil	Company Name: Golder
Contact Name: Golder IOL Accounts Payable	Contact Name: Brandon McParlan
Address: 102, 2535-3rd Ave SE Calgary, AB T2A 7W5	Address: 1931 Robertson Rd Ottawa, ON
Email: IOLAccounts_Payable@golder.com	Email: bmcparlan@golder.com
Ph: 403 299 5600	Ph: 613 380 4891
Sampler Name (Print): Leandra Mariani, Jeremy Eckert	Consultant Project #: 1791706-1155-2023

FIELD SAMPLE ID	Canister Serial #	Flow Regulator Serial #	Sample Collection DATE (YYYY/MM/DD)	Sample Collection TIME (24 HR)	Media Type (See Legend)	FLOW RATE (L/min)	LENGTH OF SAMPLING (minutes)	BTEX	Aromatic/Aliphatic Hydrocarbon Fractionations	F1 (C6-C10) - F2 (C10-C16)	VOC (TO15)
1 Field Blank	1170	FX1097	2018/10/30	11:16	S	0.07	19	X	X	X	X
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											

IOL SITE LOCATION: 1660 Merivale Rd. Ottawa, ON

IOL PROJECT # (if applicable): NA

MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM: 1791706-1155-7777

REGULATORY CRITERIA / DETECTION LIMITS: (PLEASE SPECIFY): N/A

SPECIAL INSTRUCTIONS: SAP: 8800 1627

LEGEND
S - Summa Can
T - Tube
TB - Tedlar Bag
O - Other(Specify)
*TEMP N/A for SUMMA CAN

TURNAROUND TIME
Standard (10 days) ☒
Rush (9 days) ☐
(6 days) ☐
(3 days) ☐
Date Required

	YES	NO	COOLER ID #	TEMP °C 1	2	3
SEAL PRESENT	✓					
SEAL INTACT	✓					
COOLING MEDIA PRESENT		✓				

	YES	NO	COOLER ID #	TEMP °C 1	2	3
SEAL PRESENT						
SEAL INTACT						
COOLING MEDIA PRESENT						

	YES	NO	COOLER ID #	TEMP °C 1	2	3
SEAL PRESENT						
SEAL INTACT						
COOLING MEDIA PRESENT						

LAB USE ONLY
MAXXAM JOB # B859747

RELINQUISHED BY:		DATE:	TIME (24 HR)	RECEIVED BY:	DATE:	TIME (24 HR)
1.	Jeremy Eckert	2018/10/30	14:12	1. Khushboo Kapoor	2018/10/31	10:30
2.				2.		
3.				3.		

SAMPLES
LABELED BY: KK
VERIFIED BY: LOR

IOL COC-AIR-(04/2016) White: Maxxam Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: October 30, 2018

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Maxxam Analytics Mississauga

Consultant Project Number: 1791706-1155

Sample Submission Number: B8S9747

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			Lab control sample recovery for Ethanol (ethyl
Extraction Surrogate Recovery			X	alcohol) (138%) exceeded the acceptance criteria of
Method Blank Concentration	X			(70-130%).
Matrix Duplicate RPD	X			All remaining laboratory QC results are within
Matrix Spike Recovery			X	acceptance criteria.
Lab Control Sample Recovery		X		

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration	X			All field QC samples are within
Trip Blank Concentration			X	alert limits.
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	n/a

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Anita Colbert

Data Reviewed by (Signature): Anita Colbert

Date: November 14, 2018

APPENDIX B

Quality Control/Quality Assurance

QUALITY ASSURANCE/QUALITY CONTROL

In conjunction with the field investigations completed to date, a Quality Assurance/Quality Control (QA/QC) program was implemented to ensure the integrity of the soil and groundwater sampling and analytical testing results.

1.0 FIELD PROGRAM

All sampling activities were completed in accordance with Golder's Technical Field Procedures by trained Golder personnel. All field activities were documented in field notes and results were recorded on standard field forms. All reusable field equipment involved in the sampling and monitoring of soil and groundwater was decontaminated between sampling locations in accordance with Golder's Technical Procedures. Soil samples were collected using appropriate handling protocols and were placed in sample containers provided by Maxxam Analytics Inc. (Maxxam).

Groundwater and soil vapour samples are placed in laboratory-supplied container suitable for the analytes and, where applicable, the appropriate laboratory-supplied preservative is added to the samples as outlined in the following table.

Analyte	Laboratory Containers	Preservative	Field Filtered
Groundwater Samples			
BTEX and PHC Fraction F1	2 x 44 mL clear glass vials	Sodium bisulphate	No
PHC Fraction F2 to F4	2 x 100 mL amber glass	Sodium bisulphate	No
Dissolved metals	125 mL HDPE	Nitric acid	Yes
Soil Vapour Samples			
BTEX and PHC Fractions F1 and F2 (aromatic and aliphatic hydrocarbons)	1.4 litre Summa Canister	No preservative	n/a

Notes: BTEX - benzene, toluene, ethylbenzene, xylenes; HDPE - high density polyethylene; PHC F1, F2, F3 and F4 – petroleum hydrocarbon fractions F1, F2, F3 and F4

Groundwater and soil vapour samples were given unique identification numbers and the sampling containers were preserved in ice-filled coolers to maintain temperatures below 10°C. Samples were logged onto formal chain-of-custody documents and transported to Maxxam for chemical analysis. Maxxam is accredited by the Canadian Association for Laboratory Accreditation Inc.

Blind field duplicate groundwater and soil vapour samples are submitted for analysis. Trip and field blanks are submitted for analysis, as necessary, to evaluate the potential for cross-contamination during the sampling and transportation of the samples. Submission of blind field duplicate QC samples was at a minimum rate of 10% of total samples.

2.0 SOIL VAPOUR

Field QA/QC for soil vapour sample collection included:

- using new, dedicated High Density Polyethylene (HDPE) tubing for each sample to avoid cross contamination;
- calibrating field instruments prior to use;

- conducting a helium leak tracer test for each probe;
- constructing bentonite seals around each soil gas probe above the filter pack and at ground surface;
- sealing all probes when not in use;
- storing all sampling materials away from potential sources of contamination;
- following chain-of-custody procedures during all sampling events; and
- monitoring of the Summa canister vacuums in the field before and after sampling using a pressure gauge supplied by Maxxam.

3.0 LABORATORY PROGRAM

The laboratory QA/QC program included adherence to laboratory sampling and analysis protocols (e.g., hold times, sample containers, preservatives, detection limits and approved methodology) and the analysis of laboratory method blanks, laboratory control sample (blank spike), laboratory sample duplicates, surrogate recovery and matrix spikes.

Laboratory method blank samples are free of the target analytes and are analyzed through the same analytical method than the test samples. Method blank results are used to detect interferences or impurities introduced by the laboratory equipment, reagents, or solvents.

Laboratory control samples are fortified with a known concentration of the select target analytes and then analyzed through the same analytical method than the test samples. Laboratory control samples are used to monitor the analyte recovery and validate the calibration of the instrumentation.

For laboratory duplicate samples, a second aliquot from a randomly selected sample within an analytical batch is processed through the same analytical method. Laboratory duplicate sample results are used to evaluate the reproducibility of the analytical method.

Surrogate recovery is analyzed for organics parameters by spiking samples with known quantities of surrogate chemicals which have similar chemical properties to the parameters being analyzed. The reported recovery provides an indication of the analytical method accuracy for that sample.

Matrix spikes were conducted by adding known concentrations of the analyte of interest to a sample to evaluate the effects of the sample matrix on the analytical method.

3.1 Soil Vapour

The Summa canisters were batch certified as clean before delivery to the Site. The Summa canister vacuums measured between -25.0 to -30 inches Hg [vac] before sampling and were measured at -5.0 to -10.0 inches Hg [vac] after sampling.

The laboratory QA/QC included the analyses of method blanks, laboratory control samples and continuing calibration verification standards.

4.0 DATA RECEPTION

Once laboratory analytical results were received, Golder completed a review of field and laboratory quality. This included review of laboratory QC performance to confirm results are within acceptance criteria, as well as evaluation of field duplicate and blank results to confirm they were within alert limits. Upon receipt of the analytical

results, Relative Percent Difference (RPD) values between the original samples and their blind field duplicates were calculated as follows:

$$RPD\% = \frac{|S - D|}{\frac{1}{2}(S + D)} \times 100$$

Where: RPD = relative percent difference
S = sample value
D = blind field duplicate or replicate value

Since analytical error increases near the Reportable Detection Limit (RDL), an RPD was only calculated where the concentrations of both the original and blind field duplicate samples were greater than five times the RDL. The calculated RPDs were then compared to parameter specific alert limits.

Exceedances of the QC acceptance or alert criteria were investigated with the laboratory and, if warranted, a corrective action report was requested from the laboratory.

5.0 DATA QUALITY REVIEW RESULTS

Results of the data quality review are summarized in Table B1. The RPD calculations and QC results are presented in Tables B2 to B5.

Two duplicates, one field blank and one trip blank were also submitted to the laboratory as part of the groundwater QC program. One duplicate and one field blank was submitted to the laboratory as part of the soil vapour program.

Based on the data quality review, four data quality issues have been identified. The field blank for the July soil vapour sampling event, exceeded the alert limit for 2-propanone, F1-BTEX and C6-C10 (as toluene), F2 and C10-C16 (as decane), and hexane, the data for this sample and associated data should be considered suspect. Concentrations are likely present from variables associated with the Site. All samples associated with this field blank may be biased high, and should be considered suspect. All other data, field duplicate, and field blank concentrations were within acceptable RPD alert limits. Data presented in this report are considered to be reliable. These issues did not have a material effect on the reliability of the data presented in this report. These issues are discussed in detail in Table B1.

6.0 SUMMARY OF RESULTS

Based on the review of the laboratory and field QA/QC results, the data presented in this report are considered to be reliable with the exception of the field blank for the July soil vapour sampling event, which exceeded the alert limit for 2-propanone, F1-BTEX and C6-C10, F2 and C10-C16, and hexane, the data for this sample are considered to be suspect. Although the QA/QC data were biased high for 2-propanone, F1-BTEX and C6-C10, F2 and C10-C16, and hexane, the sample data were well below the Soil Vapour Screening Levels, and therefore there will not be a material effect on the interpretation of the results.

Table B1
Summary of Quality Control Sample Results
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Maxxam Job Number	Data Quality Waiver Issued (Yes/No)	Data Quality Waiver Number	Matrix	Maxxam Sample ID Affected	Test Affected	Data Quality Issue	Comments
B8G6788	No	n/a	Soil Vapour	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
B8G6792	No	n/a	Soil Vapour	HDH368	2-Propanone	Field blank sample exceeded alert limits for 2-propanone.	The field blank sample was prepared from ambient air present on Site. Therefore, the concentrations are likely present from variables associated with the Site. All samples associated with this field blank may be biased high for 2-propanone. Thus, this 2-propanone data associated should be considered suspect.
B8G6792	No	n/a	Soil Vapour	HDH368	F1-BTEX, C6-C10 (as Toluene)	Field blank sample exceeded alert limits for F1.	The field blank sample was prepared from ambient air present on Site. Therefore, the concentrations are likely present from variables associated with the Site. All samples associated with this field blank may be biased high for F1. Thus, this F1 data associated should be considered suspect.
B8G6792	No	n/a	Soil Vapour	HDH368	F2, C10-C16 (as Decane)	Field blank sample exceeded alert limits for F2.	The field blank sample was prepared from ambient air present on Site. Therefore, the concentrations are likely present from variables associated with the Site. All samples associated with this field blank may be biased high for F2. Thus, this F2 data associated should be considered suspect.
	No	n/a	Soil Vapour	HDH368	Hexane	Field blank sample exceeded alert limits for hexane.	The field blank sample was prepared from ambient air present on Site. Therefore, the concentrations are likely present from variables associated with the Site. All samples associated with this field blank may be biased high for hexane. Thus, this hexane data associated should be considered suspect.
B8L1946	No	n/a	Groundwater	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
B8L1962	No	n/a	Water	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
B8L1982	No	n/a	Groundwater	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
B8L2045	No	n/a	Groundwater	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
B8L2047	No	n/a	Groundwater	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
B8S9743	No	n/a	Soil Vapour	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
B8S9747	No	n/a	Air	LCS	Ethanol (ethyl alcohol)	Lab control sample recovery for Ethanol (ethyl alcohol) (138%) exceeded the acceptance criteria of (70-130%) for batch 5827418.	This data quality issue may represent a potential high bias for this sample. Ethanol (ethyl alcohol) concentration in the sample and laboratory duplicate were below the regulatory standard, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the Ethanol (ethyl alcohol) data reported can be considered reliable.

Notes:
BTEX - benzene, toluene, ethylbenzene, xylenes
F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3 and 4
n/a - not applicable

Table B2
Summary of Field Duplicate Sample Results - Petroleum Hydrocarbons and Dissolved Lead
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location	Units	Alert Limit	RDL	TH8	DUP A	RPD %	RDL	TH4	DUP B	RPD %
Sample Collection Date				15-Aug-18	15-Aug-18			16-Aug-18	16-Aug-18	
Maxxam Sample ID				HMW381	HMW382			HMW194	HMW195	
Benzene	µg/L	>80%	0.2	0.99	1	n/c	2	400	420	5
Toluene	µg/L	>80%	0.2	<0.20	<0.20	n/c	2	14	14	0
Ethylbenzene	µg/L	>80%	0.2	0.8	0.78	n/c	2	860	890	3
o-Xylene	µg/L	>80%	0.2	<0.20	<0.20	n/c	2	48	47	2
p+m-Xylene	µg/L	>80%	0.4	<0.40	<0.40	n/c	4	3,400	3,500	3
Total Xylenes	µg/L	>80%	0.4	<0.40	<0.40	n/c	4	3,400	3,500	3
F1 (C6-C10)	µg/L	>80%	25	<25	26	n/c	250	7,800	7,600	3
F1 (C6-C10) - BTEX	µg/L	>80%	25	<25	<25	n/c	250	3,100	2,800	10
F2 (C10-C16 Hydrocarbons)	µg/L	>80%	100	<100	<100	n/c	100	1,300	1,200	8
F3 (C16-C34 Hydrocarbons)	µg/L	>80%	200	<200	<200	n/c	200	250	260	n/c
F4 (C34-C50 Hydrocarbons)	µg/L	>80%	200	<200	<200	n/c	200	<200	210	n/c
Dissolved Lead (Pb)	µg/L	>50%	2.5	<2.5	<2.5	n/c	0.5	30	32	6

Notes:

Bold/Underlined - value exceeds alert limit

BTEX - benzene, toluene, ethylbenzene, xylenes

F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3 and 4

n/c - not calculated

RDL - reportable detection limit

RPD - relative percent difference

µg/L - micrograms per litre

> - greater than

< - less than

RPD is not calculated if either the original or field duplicate sample has a result of less than 5X the RDL

Table B3
Summary of Field Blank and Trip Blank Results - Petroleum Hydrocarbons
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Parameter	Units	Alert Limit	RDL	Field Blank	Do the results exceed the Alert Limit?	Trip Blank	Do the results exceed the Alert Limit?
Sample Collection Date				16-Aug-18		16-Aug-18	
Maxxam Sample ID				HMW139		HMW140	
Benzene	µg/L	>5X RDL	0.2	<0.20	no	<0.20	no
Toluene	µg/L	>5X RDL	0.2	<0.20	no	<0.20	no
Ethylbenzene	µg/L	>5X RDL	0.2	<0.20	no	<0.20	no
o-Xylene	µg/L	>5X RDL	0.2	<0.20	no	<0.20	no
p+m-Xylene	µg/L	>5X RDL	0.4	<0.40	no	<0.40	no
Total Xylenes	µg/L	>5X RDL	0.4	<0.40	no	<0.40	no
F1 (C6-C10)	µg/L	>2X RDL	25	<25	no	<25	no
F1 (C6-C10) - BTEX	µg/L	>2X RDL	25	<25	no	<25	no
F2 (C10-C16 Hydrocarbons)	µg/L	>2X RDL	100	<100	no	<100	no
F3 (C16-C34 Hydrocarbons)	µg/L	>2X RDL	200	<200	no	<200	no
F4 (C34-C50 Hydrocarbons)	µg/L	>2X RDL	200	<200	no	<200	no

Notes:

Bold/Underlined - value exceeds alert limit

BTEX - benzene, toluene, ethylbenzene, xylenes

F1, F2 - petroleum hydrocarbon fractions 1 and 2

RDL - reportable detection limit

µg/L - micrograms per litre

> - greater than

< - less than

Alert limit is 5X the RDL for BTEX and 2X the RDL for F1 and F2

Table B4
Summary of Field Duplicate Sample Results - Soil Vapour Volatile Organic Hydrocarbon Parameters
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location	Units	Alert Limit	RDL	SV16-01	DUP A	RPD %	SV16-01	DUP A	RPD %
Sample Collection Date				03-Jul-18	03-Jul-18		30-Oct-18	30-Oct-18	
Maxxam Sample ID				HDH356	HDH358		IED332	IED333	
Dichlorodifluoromethane (FREON 12)	µg/m^3	>50%	0.99	8.19	9.31	13	4.85	4.54	n/c
1,2-Dichlorotetrafluoroethane	µg/m^3	>50%	1.2	<1.2	<1.2	n/c	<1.2	<1.2	n/c
Chloromethane	µg/m^3	>50%	0.62	<0.62	<0.62	n/c	<0.62	<0.62	n/c
Vinyl Chloride	µg/m^3	>50%	0.26	<0.26	<0.26	n/c	<0.26	<0.26	n/c
Chloroethane	µg/m^3	>50%	0.79	<0.79	<0.79	n/c	<0.79	<0.79	n/c
1,3-Butadiene	µg/m^3	>50%	1.1	<1.1	<1.1	n/c	<1.1	<1.1	n/c
Trichlorofluoromethane (FREON 11)	µg/m^3	>50%	1.1	1.6	1.7	n/c	1.2	1.2	n/c
Ethanol (ethyl alcohol)	µg/m^3	>50%	1.9	6.7	6.9	n/c	5.4	2.5	n/c
Trichlorotrifluoroethane	µg/m^3	>50%	1.2	<1.2	<1.2	n/c	<1.2	<1.2	n/c
2-propanol	µg/m^3	>50%	2.5	<2.5	<2.5	n/c	<2.5	<2.5	n/c
2-Propanone	µg/m^3	>50%	1.9	89.5	103	14.03	7.5	7.8	n/c
Methyl Ethyl Ketone (2-Butanone)	µg/m^3	>50%	2.9	7.6	9	n/c	<2.9	<2.9	n/c
Methyl Isobutyl Ketone	µg/m^3	>50%	4.1	<4.1	<4.1	n/c	<4.1	<4.1	n/c
Methyl Butyl Ketone (2-Hexanone)	µg/m^3	>50%	4.1	<4.1	<4.1	n/c	<4.1	<4.1	n/c
Methyl t-butyl ether (MTBE)	µg/m^3	>50%	0.72	<0.72	<0.72	n/c	<0.72	<0.72	n/c
Ethyl Acetate	µg/m^3	>50%	3.6	<3.6	<3.6	n/c	<3.6	<3.6	n/c
1,1-Dichloroethylene	µg/m^3	>50%	0.4	<0.40	<0.40	n/c	<0.40	<0.40	n/c
cis-1,2-Dichloroethylene	µg/m^3	>50%	0.4	<0.40	<0.40	n/c	<0.40	<0.40	n/c
trans-1,2-Dichloroethylene	µg/m^3	>50%	0.4	<0.40	<0.40	n/c	<0.40	<0.40	n/c
Methylene Chloride(Dichloromethane)	µg/m^3	>50%	2.8	<2.8	<2.8	n/c	<2.8	<2.8	n/c
Chloroform	µg/m^3	>50%	0.49	0.74	0.93	n/c	182	159	13.49
Carbon Tetrachloride	µg/m^3	>50%	0.63	<0.63	<0.63	n/c	<0.63	<0.63	n/c
1,1-Dichloroethane	µg/m^3	>50%	0.4	<0.40	<0.40	n/c	<0.40	<0.40	n/c
1,2-Dichloroethane	µg/m^3	>50%	0.4	<0.40	<0.40	n/c	<0.40	<0.40	n/c
Ethylene Dibromide	µg/m^3	>50%	0.77	<0.77	<0.77	n/c	<0.77	<0.77	n/c
1,1,1-Trichloroethane	µg/m^3	>50%	0.55	<0.55	<0.55	n/c	<0.55	<0.55	n/c
1,1,2-Trichloroethane	µg/m^3	>50%	0.55	<0.55	<0.55	n/c	<0.55	<0.55	n/c
1,1,2,2-Tetrachloroethane	µg/m^3	>50%	0.69	<0.69	<0.69	n/c	<0.69	<0.69	n/c
cis-1,3-Dichloropropene	µg/m^3	>50%	0.45	<0.45	<0.45	n/c	<0.45	<0.45	n/c
trans-1,3-Dichloropropene	µg/m^3	>50%	0.45	<0.45	<0.45	n/c	<0.45	<0.45	n/c
1,2-Dichloropropane	µg/m^3	>50%	0.46	<0.46	<0.46	n/c	<0.46	<0.46	n/c
Bromomethane	µg/m^3	>50%	0.39	<0.39	<0.39	n/c	<0.39	<0.39	n/c
Bromoform	µg/m^3	>50%	2.1	<2.1	<2.1	n/c	<2.1	<2.1	n/c
Bromodichloromethane	µg/m^3	>50%	1.3	<1.3	<1.3	n/c	<1.3	<1.3	n/c
Dibromochloromethane	µg/m^3	>50%	1.7	<1.7	<1.7	n/c	<1.7	<1.7	n/c
Trichloroethylene	µg/m^3	>50%	0.54	<0.54	<0.54	n/c	<0.54	<0.54	n/c
Tetrachloroethylene	µg/m^3	>50%	0.68	3.98	4.9	21	3.07	2.66	n/c

Notes:

Bold/Underlined - value exceeds alert limit

BTEX - benzene, toluene, ethylbenzene, xylenes

F1, F2 - petroleum hydrocarbon fractions 1 and 2

n/a - not analysed

n/c - not calculated

RDL - reportable detection limit

RPD - relative percent difference

µg/m^3 - micrograms per cubic metre

> - greater than

< - less than

RPD is not calculated if either the original or field duplicate sample has a result of less than 5X the RDL

Table B4
Summary of Field Duplicate Sample Results - Soil Vapour Volatile Organic Hydrocarbon Parameters
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location	Units	Alert Limit	RDL	SV16-01	DUP A	RPD %	SV16-01	DUP A	RPD %
Sample Collection Date				03-Jul-18	03-Jul-18		30-Oct-18	30-Oct-18	
Maxxam Sample ID				HDH356	HDH358		IED332	IED333	
Benzene	µg/m^3	>50%	0.32	<0.32	<0.32	n/c	<0.32	<0.32	n/c
Toluene	µg/m^3	>50%	0.38	1.59	1.71	n/c	1.31	1.33	n/c
Ethylbenzene	µg/m^3	>50%	0.43	1.92	2.35	n/c	1.45	1.27	n/c
p+m-Xylene	µg/m^3	>50%	0.87	5.64	7.09	22.78	3.49	3.08	n/c
o-Xylene	µg/m^3	>50%	0.43	1.93	2.35	n/c	1.15	1.01	n/c
Styrene	µg/m^3	>50%	0.43	<0.43	<0.43	n/c	<0.43	<0.43	n/c
4-ethyltoluene	µg/m^3	>50%	2.5	<2.5	<2.5	n/c	<2.5	<2.5	n/c
1,3,5-Trimethylbenzene	µg/m^3	>50%	2.5	<2.5	<2.5	n/c	<2.5	<2.5	n/c
1,2,4-Trimethylbenzene	µg/m^3	>50%	2.5	6.3	7.7	n/c	<2.5	<2.5	n/c
Chlorobenzene	µg/m^3	>50%	0.46	<0.46	<0.46	n/c	<0.46	<0.46	n/c
Benzyl chloride	µg/m^3	>50%	2.6	<2.6	<2.6	n/c	<2.6	<2.6	n/c
1,3-Dichlorobenzene	µg/m^3	>50%	2.4	<2.4	<2.4	n/c	<2.4	<2.4	n/c
1,4-Dichlorobenzene	µg/m^3	>50%	0.6	0.67	0.83	n/c	<0.60	<0.60	n/c
1,2-Dichlorobenzene	µg/m^3	>50%	0.6	<0.60	<0.60	n/c	<0.60	<0.60	n/c
1,2,4-Trichlorobenzene	µg/m^3	>50%	3.7	<3.7	<3.7	n/c	<3.7	<3.7	n/c
Hexachlorobutadiene	µg/m^3	>50%	5.3	<5.3	<5.3	n/c	<5.3	<5.3	n/c
Hexane	µg/m^3	>50%	1.1	9.1	10.4	13.33	<1.1	1.2	n/c
Heptane	µg/m^3	>50%	1.2	2.7	4.7	n/c	<1.2	<1.2	n/c
Cyclohexane	µg/m^3	>50%	0.69	1	2.44	n/c	<0.69	<0.69	n/c
Tetrahydrofuran	µg/m^3	>50%	1.2	<1.2	<1.2	n/c	<1.2	<1.2	n/c
1,4-Dioxane	µg/m^3	>50%	3.6	<3.6	<3.6	n/c	<3.6	<3.6	n/c
Naphthalene	µg/m^3	>50%	2.6	<2.6	<2.6	n/c	<2.6	<2.6	n/c
Total Xylenes	µg/m^3	>50%	1.3	7.6	9.4	21.18	4.6	4.1	n/c
1,1,1,2-Tetrachloroethane	µg/m^3	>50%	0.69	<0.69	<0.69	n/c	<0.69	<0.69	n/c
Vinyl Bromide	µg/m^3	>50%	0.87	<0.87	<0.87	n/c	<0.87	<0.87	n/c
Propene	µg/m^3	>50%	0.86	0.95	1.27	n/c	<0.86	<0.86	n/c
2,2,4-Trimethylpentane	µg/m^3	>50%	0.93	2.26	2.32	n/c	<0.93	<0.93	n/c
Carbon Disulfide	µg/m^3	>50%	1.6	27	41.6	42.57	2	1.8	n/c
Vinyl Acetate	µg/m^3	>50%	0.7	<0.70	<0.70	n/c	<0.70	<0.70	n/c
F1-BTEX, C6-C10 (as Toluene)	µg/m^3	>50%	5	715	832	15	224	188	17.48
F2, C10-C16 (as Decane)	µg/m^3	>50%	5	2,880	3,400	17	1,220	1,040	15.93
Aliphatic >C5-C6	µg/m3	>50%	5	n/a	n/a	n/a	<5.0	<5.0	n/c
Aliphatic >C6-C8	µg/m3	>50%	5	n/a	n/a	n/a	<5.0	<5.0	n/c
Aliphatic >C8-C10	µg/m3	>50%	5	n/a	n/a	n/a	61.7	52.6	15.92
Aliphatic >C10-C12	µg/m3	>50%	5	n/a	n/a	n/a	666	551	18.90
Aliphatic >C12-C16	µg/m3	>50%	5	n/a	n/a	n/a	9.4	13.9	n/c
Aromatic >C7-C8 (TEX Excluded)	µg/m3	>50%	5	n/a	n/a	n/a	<5.0	<5.0	n/c
Aromatic >C8-C10	µg/m3	>50%	5	n/a	n/a	n/a	<5.0	<5.0	n/c
Aromatic >C10-C12	µg/m3	>50%	5	n/a	n/a	n/a	<5.0	<5.0	n/c
Aromatic >C12-C16	µg/m3	>50%	5	n/a	n/a	n/a	<5.0	<5.0	n/c

Notes:

Bold/Underlined - value exceeds alert limit

BTEX - benzene, toluene, ethylbenzene, xylenes

F1, F2 - petroleum hydrocarbon fractions 1 and 2

n/a - not analysed

n/c - not calculated

RDL - reportable detection limit

RPD - relative percent difference

µg/m^3 - micrograms per cubic metre

> - greater than

< - less than

RPD is not calculated if either the original or field duplicate sample has a result of less than 5X the RDL

Table B5
Summary of Soil Vapour Field Blank Sample Results
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Parameter / Sample Collection Date / Maxxam Sample ID	Units	Alert Limit	RDL	Field Blank 03-Jul-18 HDH368	Do the results exceed the Alert Limit?	Field Blank 30-Oct-18 IED346	Do the results exceed the Alert Limit?
Dichlorodifluoromethane (FREON 12)	µg/m^3	>5X RDL	0.99	2.24	no	2.49	no
1,2-Dichlorotetrafluoroethane	µg/m^3	>5X RDL	1.2	<1.2	no	<1.2	no
Chloromethane	µg/m^3	>5X RDL	0.62	0.76	no	0.90	no
Vinyl Chloride	µg/m^3	>5X RDL	0.26	<0.26	no	<0.26	no
Chloroethane	µg/m^3	>5X RDL	0.79	<0.79	no	<0.79	no
1,3-Butadiene	µg/m^3	>5X RDL	1.1	<1.1	no	<1.1	no
Trichlorofluoromethane (FREON 11)	µg/m^3	>5X RDL	1.1	1.3	no	1.30	no
Ethanol (ethyl alcohol)	µg/m^3	>5X RDL	1.9	5.2	no	2.20	no
Trichlorotrifluoroethane	µg/m^3	>5X RDL	1.2	<1.2	no	<1.2	no
2-propanol	µg/m^3	>5X RDL	2.5	<2.5	no	<2.5	no
2-Propanone	µg/m^3	>5X RDL	1.9	11.4	**yes**	3.90	no
Methyl Ethyl Ketone (2-Butanone)	µg/m^3	>5X RDL	2.9	<2.9	no	<2.9	no
Methyl Isobutyl Ketone	µg/m^3	>5X RDL	4.1	<4.1	no	<4.1	no
Methyl Butyl Ketone (2-Hexanone)	µg/m^3	>5X RDL	4.1	<4.1	no	<4.1	no
Methyl t-butyl ether (MTBE)	µg/m^3	>5X RDL	0.72	<0.72	no	<0.72	no
Ethyl Acetate	µg/m^3	>5X RDL	3.6	<3.6	no	<3.6	no
1,1-Dichloroethylene	µg/m^3	>5X RDL	0.4	<0.40	no	<0.40	no
cis-1,2-Dichloroethylene	µg/m^3	>5X RDL	0.4	<0.40	no	<0.40	no
trans-1,2-Dichloroethylene	µg/m^3	>5X RDL	0.4	<0.40	no	<0.40	no
Methylene Chloride(Dichloromethane)	µg/m^3	>5X RDL	2.8	<2.8	no	<2.8	no
Chloroform	µg/m^3	>5X RDL	0.49	<0.49	no	<0.49	no
Carbon Tetrachloride	µg/m^3	>5X RDL	0.63	<0.63	no	<0.63	no
1,1-Dichloroethane	µg/m^3	>5X RDL	0.4	<0.40	no	<0.40	no
1,2-Dichloroethane	µg/m^3	>5X RDL	0.4	<0.40	no	<0.40	no
Ethylene Dibromide	µg/m^3	>5X RDL	0.77	<0.77	no	<0.77	no
1,1,1-Trichloroethane	µg/m^3	>5X RDL	0.55	<0.55	no	<0.55	no
1,1,2-Trichloroethane	µg/m^3	>5X RDL	0.55	<0.55	no	<0.55	no
1,1,2,2-Tetrachloroethane	µg/m^3	>5X RDL	0.69	<0.69	no	<0.69	no
cis-1,3-Dichloropropene	µg/m^3	>5X RDL	0.45	<0.45	no	<0.45	no
trans-1,3-Dichloropropene	µg/m^3	>5X RDL	0.45	<0.45	no	<0.45	no
1,2-Dichloropropane	µg/m^3	>5X RDL	0.46	<0.46	no	<0.46	no
Bromomethane	µg/m^3	>5X RDL	0.39	<0.39	no	<0.39	no
Bromoform	µg/m^3	>5X RDL	2.1	<2.1	no	<2.1	no
Bromodichloromethane	µg/m^3	>5X RDL	1.3	<1.3	no	<1.3	no
Dibromochloromethane	µg/m^3	>5X RDL	1.7	<1.7	no	<1.7	no
Trichloroethylene	µg/m^3	>5X RDL	0.54	<0.54	no	<0.54	no
Tetrachloroethylene	µg/m^3	>5X RDL	0.68	<0.68	no	<0.68	no

Notes:

Bold/Underlined - value exceeds alert limit

BTEX - benzene, toluene, ethylbenzene, xylenes

F1, F2 - petroleum hydrocarbon fractions 1 and 2

NA - not analyzed

n/c - not calculated

RDL - reportable detection limit

RPD - relative percent difference

µg/m^3 - micrograms per cubic metre

> - greater than

< - less than

RPD is not calculated if either the original or field duplicate sample has a result of less than 5X the RDL

Table B5
Summary of Soil Vapour Field Blank Sample Results
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Parameter	Units	Alert Limit	RDL	Field Blank	Do the results exceed the Alert Limit?	Field Blank	Do the results exceed the Alert Limit?
Sample Collection Date				03-Jul-18		30-Oct-18	
Maxxam Sample ID				HDH368		IED346	
Benzene	µg/m^3	>5X RDL	0.32	<0.32	no	<0.32	no
Toluene	µg/m^3	>5X RDL	0.38	0.71	no	<0.38	no
Ethylbenzene	µg/m^3	>5X RDL	0.43	<0.43	no	<0.43	no
p+m-Xylene	µg/m^3	>5X RDL	0.87	<0.87	no	<0.87	no
o-Xylene	µg/m^3	>5X RDL	0.43	<0.43	no	<0.43	no
Styrene	µg/m^3	>5X RDL	0.43	<0.43	no	<0.43	no
4-ethyltoluene	µg/m^3	>5X RDL	2.5	<2.5	no	<2.5	no
1,3,5-Trimethylbenzene	µg/m^3	>5X RDL	2.5	<2.5	no	<2.5	no
1,2,4-Trimethylbenzene	µg/m^3	>5X RDL	2.5	<2.5	no	<2.5	no
Chlorobenzene	µg/m^3	>5X RDL	0.46	<0.46	no	<0.46	no
Benzyl chloride	µg/m^3	>5X RDL	2.6	<2.6	no	<2.6	no
1,3-Dichlorobenzene	µg/m^3	>5X RDL	2.4	<2.4	no	<2.4	no
1,4-Dichlorobenzene	µg/m^3	>5X RDL	0.6	<0.60	no	<0.60	no
1,2-Dichlorobenzene	µg/m^3	>5X RDL	0.6	<0.60	no	<0.60	no
1,2,4-Trichlorobenzene	µg/m^3	>5X RDL	3.7	<3.7	no	<3.7	no
Hexachlorobutadiene	µg/m^3	>5X RDL	5.3	<5.3	no	<5.3	no
Hexane	µg/m^3	>5X RDL	1.1	8.5	**yes**	<1.1	no
Heptane	µg/m^3	>5X RDL	1.2	3	no	<1.2	no
Cyclohexane	µg/m^3	>5X RDL	0.69	2	no	<0.69	no
Tetrahydrofuran	µg/m^3	>5X RDL	1.2	<1.2	no	1.40	no
1,4-Dioxane	µg/m^3	>5X RDL	3.6	<3.6	no	<3.6	no
Naphthalene	µg/m^3	>5X RDL	2.6	<2.6	no	<2.6	no
Total Xylenes	µg/m^3	>5X RDL	1.3	<1.3	no	<1.3	no
1,1,1,2-Tetrachloroethane	µg/m^3	>5X RDL	0.69	<0.69	no	<0.69	no
Vinyl Bromide	µg/m^3	>5X RDL	0.87	<0.87	no	<0.87	no
Propene	µg/m^3	>5X RDL	1	<0.86	no	<1.0	no
2,2,4-Trimethylpentane	µg/m^3	>5X RDL	0.93	2.34	no	<0.93	no
Carbon Disulfide	µg/m^3	>5X RDL	1.6	3.9	no	<1.6	no
Vinyl Acetate	µg/m^3	>5X RDL	0.7	<0.70	no	<0.70	no
F1-BTEX, C6-C10 (as Toluene)	µg/m^3	>5X RDL	5	616.0	**yes**	9.3	no
F2, C10-C16 (as Decane)	µg/m^3	>5X RDL	5	89.6	**yes**	8.9	no
Aliphatic >C5-C6	µg/m^3	>5X RDL	5	n/a	n/c	<5.0	no
Aliphatic >C6-C8	µg/m^3	>5X RDL	5	n/a	n/c	<5.0	no
Aliphatic >C8-C10	µg/m^3	>5X RDL	5	n/a	n/c	<5.0	no
Aliphatic >C10-C12	µg/m^3	>5X RDL	5	n/a	n/c	<5.0	no
Aliphatic >C12-C16	µg/m^3	>5X RDL	5	n/a	n/c	<5.0	no
Aromatic >C7-C8 (TEX Excluded)	µg/m^3	>5X RDL	5	n/a	n/c	<5.0	no
Aromatic >C8-C10	µg/m^3	>5X RDL	5	n/a	n/c	<5.0	no
Aromatic >C10-C12	µg/m^3	>5X RDL	5	n/a	n/c	<5.0	no
Aromatic >C12-C16	µg/m^3	>5X RDL	5	n/a	n/c	<5.0	no

Notes:

Bold/Underlined - value exceeds alert limit

BTEX - benzene, toluene, ethylbenzene, xylenes

F1, F2 - petroleum hydrocarbon fractions 1 and 2

NA - not analyzed

n/c - not calculated

RDL - reportable detection limit

RPD - relative percent difference

µg/m^3 - micrograms per cubic metre

> - greater than

< - less than

RPD is not calculated if either the original or field duplicate sample has a result of less than 5X the RDL

TECHNICAL STANDARDS and SAFETY AUTHORITY

345 Carlingview Drive
Toronto, Ontario M9W 6N9
Toll free 1-877-682-8772
www.tssa.org

FS Inspection Report

Service Request #	**2314718**
Inspection Report #	**7541990**

Inspection Address: **1660 MERIVALE RD** **NEPEAN;ON** **CA K2G 3K4**	Reference Number(s): **000203342**	Inspection Completion Date: **DEC 10, 2018**
	Facility Type: **FS Gasoline Station - Self Serve**	Equipment Type:
Customer Name and Address: **CANADIAN TIRE CORPORATION, LIMITED** **2180 YONGE ST PO BOX 770 STN K** **TORONTO;ON** **CA M4P 2V8**	Task Type: FS-Follow up LF Inspect **The facility/equipment is inspected in accordance with Ontario's Technical Standards & Safety Act and the appropriate regulations and codes. When an Inspector's order is issued, time limits for compliance reflect the severity of the violation and serve to avoid disruption of service.**	

Orders Issued To: CANADIAN TIRE CORPORATION, LIMITED

Task Notes

TSSA Inspector David Barclay travelled to 1660 Merivale Rd; Ottawa (Canadian Tire) on Dec. 10th, 2018 to conduct a follow up inspection regarding Order issued.

During the Inspection this Inspector has found a new 6" whip hose installed on dispenser #4, the Order has been complied with.

Inspection complete.

Cost recovery fees will be billed to the above named client by Authority of Section 19 of the TSSAct, 2011 and according to TSSA billing policy.

Customer Signature & Position / Date:		**Inspector Name:** Barclay, David	**Inspector Contact Number:** 613-808-2727
Report Received By: Hassan Araji via: 1126.nepean@ctpagent.ca	**Customer Contact Number:** (613) 226-2207	**Inspector Email**: dbarclay@tssa.org	**Inspector Fax**: 647-789-2129

As a not-for-profit regulatory authority, TSSA operates on a cost recovery basis. An Invoice will be issued for the Total Charges Incurred.
(Note: This is not an invoice)

TECHNICAL STANDARDS and SAFETY AUTHORITY

345 Carlingview Drive
Toronto, Ontario M9W 6N9
Toll free 1-877-682-8772
www.tssa.org

FS Inspection Report

Service Request #	**2314718**
Inspection Report #	**7465619**

Inspection Address: **1660 MERIVALE RD** **NEPEAN;ON** **CA K2G 3K4**	Reference Number(s): **000203342**	Inspection Completion Date: **NOV 01, 2018**
	Facility Type: **FS Gasoline Station - Self Serve**	Equipment Type:
Customer Name and Address: **CANADIAN TIRE CORPORATION, LIMITED** **2180 YONGE ST PO BOX 770 STN K** **TORONTO;ON** **CA M4P 2V8**	Task Type: FS-Follow up LF Inspect **The facility/equipment is inspected in accordance with Ontario's Technical Standards & Safety Act and the appropriate regulations and codes. When an Inspector's order is issued, time limits for compliance reflect the severity of the violation and serve to avoid disruption of service.**	

Orders Issued To: CANADIAN TIRE CORPORATION, LIMITED

Line	Reference and Order(s)	Compliance Date
834476-2	Liquid Fuels Handling Code 2017 Clause 1.3.4 Every retail outlet, marina, private outlet, bulk plant, and highway tank shall be maintained in a safe operating condition by the authorization holder and shall be operated safely. Any defective equipment or component shall be repaired or replaced. The following Order is issued Sept. 27th, 2018. TSSA Inspection has determined this facility does not comply with this code (6" whip hose at dispenser # 4 has developed cracks). Pursuant to my Authority under Section 21(1) of the Technical Standards and Safety Act, 2000, s.o. 2000, I order you to comply with the above Order and make the necessary correction by the compliance date issued.	NOV 30, 2018

Task Notes

TSSA Inspector David Barclay travelled to 1660 Merivale Rd; Ottawa (Canadian Tire) on November 1st, 2018 to conduct a follow up inspection of the petroleum facility regarding Orders issued Oct. 1st, 2018.

Consulted with Mr. Araji on site during inspection. Mr. Araji provided a copy of the report regarding the maintenance and testing of the shear valves and leak detection system. This Inspector found the Order regarding the cracked 6" whip hose at dispenser #4 had not been resolved and advised Mr. Araji. A new compliance date and follow up inspection of Nov. 30th, 2018 has been issued.

Cost recovery fees will be billed to the above named client by Authority of Section 19 of the TSSAct, 2011 and according to TSSA billing policy.

Pursuant to my Authority under Section 21(1) of the Technical Standards and Safety Act, 2000, s.o. 2000, I order you to comply with the above Order.

Customer Signature & Position / Date:		**Inspector Name:** Barclay, David	**Inspector Contact Number:** 613-808-2727
Report Received By: Hassan Araji via: 1126.nepean@ctpagent.ca	**Customer Contact Number:** (613) 226-2207	**Inspector Email**: dbarclay@tssa.org	**Inspector Fax**: 647-789-2129

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FS Inspection Report

Service Request #	**2314718**
Inspection Report #	**7465619**

Inspection Address: **1660 MERIVALE RD** **NEPEAN;ON** **CA K2G 3K4**	Reference Number(s): **000203342**	Inspection Completion Date: **NOV 01, 2018**
	Facility Type: **FS Gasoline Station - Self Serve**	Equipment Type:
Customer Name and Address: **CANADIAN TIRE CORPORATION, LIMITED** **2180 YONGE ST PO BOX 770 STN K** **TORONTO;ON** **CA M4P 2V8**	Task Type: FS-Follow up LF Inspect	
	The facility/equipment is inspected in accordance with Ontario's Technical Standards & Safety Act and the appropriate regulations and codes. When an Inspector's order is issued, time limits for compliance reflect the severity of the violation and serve to avoid disruption of service.	

Customer Signature & Position / Date:		**Inspector Name:** Barclay, David	**Inspector Contact Number:** 613-808-2727
Report Received By: Hassan Araji via: 1126.nepean@ctpagent.ca	**Customer Contact Number:** (613) 226-2207	**Inspector Email**: dbarclay@tssa.org	**Inspector Fax**: 647-789-2129

As a not-for-profit regulatory authority, TSSA operates on a cost recovery basis. An Invoice will be issued for the Total Charges Incurred.
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TECHNICAL STANDARDS and SAFETY AUTHORITY

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FS Inspection Report

Service Request #	**2314718**
Inspection Report #	**7286437**

Inspection Address: **1660 MERIVALE RD** **NEPEAN;ON** **CA K2G 3K4**	Reference Number(s): **000203342**	Inspection Completion Date: **OCT 01, 2018**
	Facility Type: **FS Gasoline Station - Self Serve**	Equipment Type:
Customer Name and Address: **CANADIAN TIRE CORPORATION, LIMITED** **2180 YONGE ST PO BOX 770 STN K** **TORONTO;ON** **CA M4P 2V8**	Task Type: FS-Periodic LF Inspection **The facility/equipment is inspected in accordance with Ontario's Technical Standards & Safety Act and the appropriate regulations and codes. When an Inspector's order is issued, time limits for compliance reflect the severity of the violation and serve to avoid disruption of service.**	

Orders Issued To: CANADIAN TIRE CORPORATION, LIMITED

Line	Reference and Order(s)	Compliance Date
834476-1	Liquid Fuels Handling Code 2017 Clause 4.6.9 Shear valves and leak detection systems shall be maintained and tested at least once per year or in accordance with the manufacturer's instructions and a written record of the maintenance and testing shall be retained. The following Order is issued Sept.27th, 2018. During this Inspection a copy of the petroleum contractor's annual report regarding the maintenance and testing of the shear valves and leak detection system was not available for review by this Inspector. Pursuant to my Authority under Section 21(1) of the Technical Standards and Safety Act, 2000, s.o. 2000, I order you to comply with the above Order and provide to this Inspector a copy of the petroleum contractor's annual report regarding the maintenance and testing of the shear valves and leak detection system, by the compliance date issued.	OCT 31, 2018
834476-2	Liquid Fuels Handling Code 2017 Clause 1.3.4 Every retail outlet, marina, private outlet, bulk plant, and highway tank shall be maintained in a safe operating condition by the authorization holder and shall be operated safely. Any defective equipment or component shall be repaired or replaced. The following Order is issued Sept. 27th, 2018. TSSA Inspection has determined this facility does not comply with this code (6" whip hose at dispenser # 4 has developed cracks). Pursuant to my Authority under Section 21(1) of the Technical Standards and Safety Act, 2000, s.o. 2000, I order you to comply with the above Order and make the necessary correction by the compliance date issued.	OCT 31, 2018

Task Notes

TSSA Inspector David Barclay travelled to 1660 Merivale Rd; Ottawa (Canadian Tire) on Sept. 27th, 2018 to conduct a periodic inspection of the gas station facility.

Consulted with Mr. David Araji - Manager on site during site inspection of the gas station and propane facility licenses, signage, fire extinguishers, fill and vent pipes, dispensing equipment, hoses, visual inspection of dispenser and STP sumps and leak detection sensors, testing of intercom, cameras, emergency breakaways, spill kit, vehicular protection, Veederoot system, emergency shut off, and found the following deficiencies:

* 6" whip hose on dispenser #4 has developed cracks.

*Provide a copy of your report from your petroleum contractor regarding the annual maintenance and testing of the shear valves and leak detection system to this Inspector by the compliance date issued.

Customer Signature & Position / Date:		**Inspector Name:** Barclay, David	**Inspector Contact Number:** 613-808-2727
Report Received By: David Araji via: dave@araji.com	**Customer Contact Number:** (613) 226-2207	**Inspector Email**: dbarclay@tssa.org	**Inspector Fax**: 647-789-2129

As a not-for-profit regulatory authority, TSSA operates on a cost recovery basis. An Invoice will be issued for the Total Charges Incurred.
(Note: This is not an invoice)

TECHNICAL STANDARDS and SAFETY AUTHORITY

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FS Inspection Report

Service Request #	**2314718**
Inspection Report #	**7286437**

Inspection Address: **1660 MERIVALE RD** **NEPEAN;ON** **CA K2G 3K4**	Reference Number(s): **000203342**	Inspection Completion Date: **OCT 01, 2018**
	Facility Type: **FS Gasoline Station - Self Serve**	Equipment Type:
Customer Name and Address: **CANADIAN TIRE CORPORATION, LIMITED** **2180 YONGE ST PO BOX 770 STN K** **TORONTO;ON** **CA M4P 2V8**	Task Type: FS-Periodic LF Inspection **The facility/equipment is inspected in accordance with Ontario's Technical Standards & Safety Act and the appropriate regulations and codes. When an Inspector's order is issued, time limits for compliance reflect the severity of the violation and serve to avoid disruption of service.**	

Cost recovery fees will be billed to the above named client by Authority of Section 19 of the TSSAct, 2011 and according to TSSA billing policy.

Pursuant to my Authority under Section 21 of the TSSAct, 2011, you are hereby Ordered to comply with the above Orders forthwith.

Customer Signature & Position / Date:		**Inspector Name:** Barclay, David	**Inspector Contact Number:** 613-808-2727
Report Received By: David Araji via: dave@araji.com	**Customer Contact Number:** (613) 226-2207	**Inspector Email**: dbarclay@tssa.org	**Inspector Fax**: 647-789-2129

As a not-for-profit regulatory authority, TSSA operates on a cost recovery basis. An Invoice will be issued for the Total Charges Incurred.
(Note: This is not an invoice)

April 10, 2018

Project No. 1791706-1155

Farzana Islam - Fuels Safety Program
TSSA
345 Carlingview Drive
Toronto, Ontario
M9W 6N9

THIS REPORT CONTAINS PROVISIONS LIMITING LIABILITY, THE SCOPE OF THE REPORT AND THIRD PARTY RELIANCE

These documents and the information contained therein are confidential property of Imperial Oil Limited and any disclosure of same is governed by the provisions of each of the applicable provincial and territorial freedom of information legislation, the Privacy Act (Canada) 1980-81-83, c.111, Sch. II"1", and the Access to Information Act (Canada) 1980-81-82-83, c.111, Sch.I"1", as such, legislation may be amended from time to time.

RE: RESPONSE TO: TSSA SERVICE REQUEST #791084 DATED FEBRUARY 28, 2018
FORMER IMPERIAL RETAIL FUEL OUTLET
1660 MERIVALE ROAD
OTTAWA, ONTARIO

Dear Farzana Islam

Golder Associates Ltd. ("Golder") has been retained by Imperial Oil Company Limited ("Imperial") to complete groundwater monitoring and sampling at the former bulk fuel retail outlet located at 1660 Merivale Road in Ottawa, Ontario ("the Site"). The purpose of this letter is to respond to comments provided by the Technical Standards Safety Authority (TSSA) in a letter dated February 28, 2018.

TSSA Requirement 1

"The complete delineation of all identified petroleum hydrocarbon impacts, both on-site and where practical and applicable, off-site."

Golder Response: Upon review of historical on/off-Site assessments, the full extent of on/off-Site soil petroleum related impacts in the overburden soil have been delineated and no further soil assessment work will be completed.

The TSSA suggests groundwater impacts are not delineated from on-Site monitoring wells TH5 and TH7 and off-Site monitoring wells TH9, TH102 and MW16-01 (replaced TH10 in 2016). All wells were screened within the shallow bedrock approximately between 3.3 and 4.9 mbgs. Golder is in agreement that groundwater has not been delineated to the north or the east but it should be noted that groundwater flows to the south toward the Imperial property; however, a Screening Level Risk Assessment (SLRA) was carried out by Golder in 2016 to assess the risk of the existing off-Site groundwater impacts in the right of way. Considering the inferred groundwater flow direction is to the southwest, it is assumed that the preferential pathway for petroleum hydrocarbon migration was likely the underground utility corridors encountered in the Merivale Road right-of-way. The furthest up-gradient monitoring well present, TH100, has shown consistent results below the applicable standards for all petroleum hydrocarbon parameters analyzed since its installation in 2014, confirming groundwater delineation to the north-east.

As indicated above, the off-Site impacts were evaluated as part of a SLRA which concluded that the petroleum related parameters exceeding the applicable Ministry of the Environment and Climate Change (MOECC) Table 3 Standards for a commercial property use are considered to not pose risk to human receptors and pathways for ecological receptors were considered to be incomplete; therefore, no risks were identified within the right-of-way.

Golder Associates Ltd.
30 Hannover Drive, Building A, Suite 203, St. Catharines, Ontario, Canada L2W 1A4
Tel: +1 (905) 688 8217 Fax: +1 (905) 688 4227 www.golder.com

Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

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Based on available information, the easterly extent of the contaminant plume is unknown at this time; therefore, it is Golder's recommendation to install soil vapour probes on the east side of Merivale Road, parallel to monitoring wells TH101 and TH102, to assess the potential risk to Merivale High School. Soil vapour sampling would be completed during two different season events (e.g. spring/summer and fall/winter) and the results would be compared to residential soil vapour screening levels. Annual groundwater monitoring and sampling will continue on/off-Site with the trigger for further assessment work being any future evidence of sheen or LNAPL or soil vapour sampling exceedances.

TSSA Requirement 2

"The City must be provided with copies of reports in regard to the groundwater monitoring and sampling results for the offsite monitoring wells (TH8, TH9, TH100, MW16-01, TH102, TH101 and TH12) located on the City's properties. TSSA must be copied and/or provided with copies of all correspondences between the City and Imperial Oil;

Golder Response: Annual off-Site reports have been provided to the City of Ottawa by Imperial, future monitoring reports will continue to be submitted to the City of Ottawa and the TSSA copied on all correspondences.

TSSA Requirement 3

"Following the complete delineation, TSSA requires the submission of a formal Contaminant Management Plan (CMP) if further remedial work is not carried out to remove the impacted soil and/or groundwater"

Golder Response: An off-Site CMP is currently with the City of Ottawa for review. Discussions with the City are on-going, once the CMP is finalized a copy will be submitted to the TSSA.

TSSA Requirement 4

"Until complete delineation is achieved, please continue the groundwater monitoring and sampling program on seventeen (17) monitoring wells (TH1 through TH9, TH11, TH12, TH100 through TH102, MW15-01, MW15-02 and MW16-01) an annual basis (in spring or fall) with annual report submission to the TSSA."

Golder Response: Acknowledged.

We trust this meets your requirements at this time. If you have any further questions, please do not hesitate to contact the undersigned.

Yours truly

GOLDER ASSOCIATES LTD.



Ian Sosney, B.Sc.
Project Manager

Sandra Carrelas, M.E.Sc., P.Eng.
Associate, Senior Geo-environmental Engineer

IS/SC

CC: Mr. John Koo, Imperial Oil Limited

Attachment: TSSA Letters

ATTACHMENT: TSSA Letters

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October 2, 2017

Mr. John Koo
Imperial Oil Limited
505 Quarry Park Blvd S.E.
Calgary, Alberta
T2C 5N1

Tank Replacement Program – 1660 Merivale Road, Ottawa, Ontario
TSSA Service Request # 791084

Dear Mr. Scott,

Thank you for submitting the following reports:

- "*Phase II Environmental Assessment – 1660 Merivale Road, Ottawa, Ontario*", prepared by exp Energy Services Ltd. (EXP), dated December 5, 2013;
- "*2013 Ground Water Monitoring and Sampling Program Report, 1660 Merivale Road, Ottawa, Ontario*", prepared by EXP, dated July 22, 2013.

The December 2013 Phase II ESA report provides the following information:

- Five (5) boreholes (TH8 to TH12) were advanced to a maximum depth of approximately 5.0 metres below ground surface (mbgs) between August 28 and 33, 2012. Two boreholes (TH8 and TH9) were advanced along the road allowance of Merivale Road and three boreholes were advanced along the road allowance of Viewmount Drive. All boreholes were completed as monitoring wells.
- The boreholes were advanced in the bedrock. The boreholes were daylighted to a maximum depth of approximately 2.1 mbgs using a hydrovacuum truck.
- Six (6) soil samples (one collected from each borehole) were submitted to Maxxam Analytics Inc. (Maxxam), an accredited laboratory by the Canadian Association for Laboratory Accreditation Inc. (CALA). Soil samples were submitted for laboratory analysis of benzene, toluene, ethylbenzene, xylenes (BTEX), petroleum hydrocarbon fractions F1 to F4 (PHC F1-F4), polycyclic aromatic hydrocarbons (PAHs) and lead.
- EXP selected the Ontario Ministry of the Environment (MOE) Table 3 full depth generic Site Condition Standards (SCS) for industrial/commercial/community property use in a non-potable groundwater condition with medium to fine textured soils as being applicable for use at this site.
- The analytical results of the submitted soil samples were reported by EXP to be below the selected MOE Table 3 SCS for all analyzed parameters.
- One coring water sample (W1) was also submitted to Maxxam for laboratory analysis of BTEX, hexane and PHC F1-F4. The analytical results of the submitted water sample were reported by EXP to be below the selected MOE Table 3 SCS for all analyzed parameters.
- The newly installed monitoring wells were monitored on June 10, 2013 for depth to groundwater, petroleum vapour concentrations and presence or absence of liquid petroleum hydrocarbon (LPH).
- The depth to groundwater ranged from 2.75 mbgs (TH12) to 3.03 mbgs (TH10). The groundwater flow direction was interpreted to be southerly.
- Headspace vapour concentrations ranged from 50 parts per million (ppm) to 18% lower explosive limit of hexane (LEL). LPH was not detected in any monitoring wells.
- Groundwater samples were collected from the four (4) offsite monitoring wells (TH8, TH10, TH11 and TH12) on June 10-11, 2013. The groundwater samples were submitted to Maxxam for

laboratory analysis of BTEX and PHC F1-F4. The analytical results of the submitted groundwater samples were reported by EXP to be above the selected MOE Table 3 SCS for concentrations of PHC F1-F2 with the exception of the sample collected from TH8, which satisfied the selected MOE Table 3 SCS.

The July 2013 Onsite groundwater monitoring report provides the following information:

- Seven (7) onsite monitoring wells (TH1 through TH7) were monitored on June 12, 2013 for depth to groundwater, petroleum vapour concentrations and presence or absence of LPH.
- The depth to groundwater measured in the monitoring wells ranged from 3.49 mbgs (in TH1) to 3.06 mbgs (in TH3). The groundwater flow direction was not interpreted to be south.
- Headspace vapour concentrations ranged from non-detect to 290 ppm in TH5.
- LPH was not detected in any monitoring wells.
- EXP selected the Ontario Ministry of the Environment (MOE) Table 3 full depth generic Site Condition Standards (SCS) for all types of property use in a non-potable groundwater condition, and medium to fine textured soils as being applicable for use at this site.
- Groundwater samples were collected from the seven onsite monitoring wells (TH1 through TH7) on June 13, 2013. The groundwater samples were submitted to Maxxam for laboratory analysis of BTEX, PHC F1-F4, Hexane and lead.
- The analytical results of the submitted groundwater samples were reported by Golder to be below the selected MOE Table 3 SCS for all analyzed parameters with the exception of the samples collected from TH3, TH4, TH5 and TH7, which exceeded for concentrations of one or more of benzene, xylenes, PHC F1-F4.

Our review of the above information indicates that the petroleum hydrocarbon (PHC) impacts identified in groundwater at the locations of onsite monitoring well TH7 and at the locations of offsite monitoring wells TH10, TH11 and TH12 have not been delineated. We understand that additional investigation and further groundwater monitoring program was carried out at the site in 2014, 2015, 2016 and 2017. Our comments will be provided under a separate letter that will follow.

Should you have any further questions, please do not hesitate to contact me directly.

Yours truly,

Farzana Islam

Farzana Islam, P. Eng.
Fuels Safety Program
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October 2, 2017

Mr. John Koo
Imperial Oil Limited
505 Quarry Park Blvd S.E.
Calgary, Alberta
T2C 5N1

Groundwater Monitoring Program – 1660 Merivale Road, Ottawa, Ontario
TSSA Service Request # 791084

Dear Mr. Koo,

Thank you for submitting the following reports:

- *"Supplemental Phase II Environmental Assessment – 1660 Merivale Road, Ottawa, Ontario"*, prepared by EXP, dated November 20, 2014;
- *"2014 Groundwater Monitoring and Sampling Program Report, Site Address: 1660 Merivale Road, Ottawa, Ontario"*, prepared by exp Energy Services Ltd. (EXP), dated October 8, 2014;
- "*Interim Contaminant Management Plan, 1660 Merivale Road, Ottawa, Ontario"*, prepared by EXP, dated April 2, 2015; and

The November 2014 Supplemental Phase II ESA report provides the following information:

- Three (3) boreholes (TH100 to TH102) were advanced to a maximum depth of approximately 5.0 mbgs from September 16 to 19, 2014. The boreholes were advanced along the road allowance of Merivale Road (TH102 and TH101) and along the road allowance of Viewmount Drive (TH100). The boreholes were advanced in the bedrock.
- EXP selected the MOE Table 3 SCS for industrial/commercial/community property use in a non-potable groundwater condition with medium to fine textured soils as being applicable for use at this site.
- Three (3) soil samples (one collected from each borehole) were submitted to Maxxam for laboratory analysis of BTEX, PHC F1-F4, methyl-t-butyl-ether (MTBE), hexane and lead. The analytical results of the submitted soil samples were reported by EXP to be below the selected MOE Table 3 SCS for all analyzed parameters
- The three (3) newly installed monitoring wells (TH100 to TH102) and five previously installed monitoring wells ((TH8, TH9, TH10, TH11 and TH12) were monitored on October 6, 2013 for depth to groundwater, petroleum vapour concentrations and presence or absence of LPH.
- The depth to groundwater ranged from 2.75 mbgs (TH12) to 3.60 mbgs (TH100). The groundwater flow direction was interpreted to be towards southwest.
- Headspace vapour concentrations ranged from 200 ppm (in TH100) to 100% LEL (in TH9). LPH was not detected in any monitoring wells.
- Groundwater samples were collected from the four (4) offsite monitoring wells (TH9, TH100, TH101 and TH102) on October 6, 2014. The groundwater samples were submitted to Maxxam for laboratory analysis of BTEX, PHC F1-F4, MTBE, Hexane and lead. The analytical results of the submitted groundwater samples were reported by EXP to be above the selected MOE Table 3 SCS for concentrations of one or more of PHC F1-F3 with the exception of the sample collected from TH100, which satisfied the selected MOE Table 3 SCS.

The October 2014 groundwater monitoring report provides the following information:

- Seven (7) onsite monitoring wells (TH1 through TH7) were monitored on August 26, 2014 for depth to groundwater, petroleum vapour concentrations and presence or absence of liquid petroleum hydrocarbon (LPH).
- EXP selected the Ontario Ministry of the Environment (MOE) Table 3 full depth generic Site Condition Standards (SCS) for industrial/commercial/community property use in a non-potable groundwater condition with medium to fine textured soils as being applicable for use at this site.
- The depth to groundwater ranged from 3.03 mbgs (in TH4) to 4.05 mbgs (in TH7). The groundwater flow direction was interpreted to be southeasterly.
- Headspace vapour concentrations ranged from non-detect (at various locations) to 30% lower explosive limit of hexane (LEL) (in TH4).
- LPH was not detected in any monitoring wells.
- Groundwater samples were collected from the seven (7) onsite monitoring wells (TH1 through TH7) on August 26-27, 2014. The groundwater samples were submitted to Maxxam Analytics Inc. (Maxxam), an accredited laboratory by the Canadian Association for Laboratory Accreditation Inc. (CALA). Groundwater samples were submitted for laboratory analysis of benzene, toluene, ethylbenzene, xylenes (BTEX), petroleum hydrocarbon fractions F1 to F4 (PHC F1-F4), Hexane and lead.
- The analytical results of the submitted groundwater samples were reported by EXP to be below the selected MOE Table 3 SCS for all analyzed parameters with the exception of the samples collected from TH3, TH4, TH5 and TH7, which exceeded for concentrations of one or more of benzene, and/or PHC F1-F2.

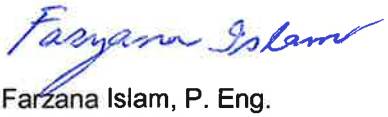
The April 2015 Contaminant Management Plan (CMP) proposes the following:

- On an annual basis, the onsite monitoring wells (TH1 to TH7) and the offsite monitoring wells (TH8 to TH12 and TH100 to TH102) will be monitored for depth to groundwater, subsurface vapour concentrations and presence or absence of LPH.
- On an annual basis, the onsite monitoring wells (TH1 to TH7) and the offsite monitoring wells (TH8 to TH12 and TH100 to TH102) will be sampled for BTEX and PHC F1-F4.
- On an annual basis, a report summarizing the findings from the onsite monitoring wells will be submitted to the TSSA.
- On an annual basis, a report summarizing the findings from the offsite monitoring wells will be submitted to the TSSA and the City of Ottawa (the City). TSSA will be copied on all correspondence with the municipality.
- Up to three additional test holes are to be installed to further delineate the offsite ground water impacts to the north and east of the subject property. The completion of this work will depend on the access permission from the third party.
- Up to two additional test holes are to be installed to further delineate the ground water impacts to the south of TH7. The completion of this work has been planned for 2015.

Our review of the information provided in the 2014 reports indicates that the petroleum hydrocarbon (PHC) impacts identified in groundwater at the locations of onsite monitoring well TH7 and at the locations of offsite monitoring wells TH9, TH101 and TH102 have not been completely delineated. We understand that further groundwater impact delineation work was planned to be completed in 2015. The delineation work on the City of Ottawa's right-of-way is pending the access permission and the City's concurrence to the offsite CMP proposal. We understand that additional investigation and further groundwater monitoring program was carried out at the site in 2015, 2016 and in 2017. Our comments will be provided under a separate letter that will follow.

Should you have any further questions, please do not hesitate to contact me directly.

Yours truly,



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February 27, 2018

Mr. John Koo
Imperial Oil Limited
505 Quarry Park Blvd S.E.
Calgary, Alberta
T2C 5N1

Groundwater Monitoring Program – 1660 Merivale Road, Ottawa, Ontario
TSSA Service Request # 791084

Dear Mr. Koo,

Thank you for submitting the following reports:

- *"2015 Supplemental Subsurface, Groundwater Monitoring and Sampling Investigation, 1660 Merivale Road, Ottawa, Ontario"*, prepared by Golder Associates Ltd. (Golder), dated May 6, 2016;
- *"2016 Groundwater Monitoring and Sampling Report, Adjacent to 1660 Merivale Road, Ottawa, ON"*, prepared by Golder, dated November 21, 2016; and
- *"2016 Groundwater Monitoring and Sampling Report, Former Imperial Oil Retail Fuel Outlet, 1660 Merivale Road, Ottawa, ON"*, prepared by Golder, dated January 31, 2017.

The May 2016 subsurface investigation report provides the following information:

- Two (2) boreholes (MW15-01 and MW15-02) were advanced to depths 6.0 metres below ground surface (mbgs) and 4.9 mbgs, respectively on September 9, 2015. Both the boreholes were completed as monitoring wells MW15-01 and MW15-02.
- Golder selected the Ontario Ministry of the Environment (MOE) Table 3 full depth generic Site Condition Standards (SCS) for all types of property use in a non-potable groundwater condition, and medium to fine textured soils as being applicable for use at this site.
- Four (4) soil samples (recovered from the boreholes) were submitted to Maxxam for laboratory analysis of BTEX, PHC F1-F4, n-Hexane and lead. The analytical results of the submitted soil samples were reported by Golder to be below the selected MOE Table 3 SCS for all analyzed parameters
- The two (2) newly installed monitoring wells (MW15-01 and MW15-02) and seven (7) onsite monitoring wells (TH1 through TH7) were monitored on November 17, 2015 for depth to groundwater, petroleum vapour concentrations and presence or absence of LPH.
- The depth to groundwater measured in the monitoring wells ranged from 2.41 mbgs (in MW15-01) to 3.94 mbgs (TH6). The groundwater flow direction is to the south.
- Headspace vapour concentrations measured in the monitoring wells ranged from 5 ppm (in TH2) to 1250 ppm (in TH6). LPH was not detected in any monitoring wells.
- Groundwater samples were collected from the two (2) newly installed monitoring wells (MW15-01 and MW15-02) and seven (7) onsite monitoring wells (TH1 through TH7) on October 28, 2015 or on November 17, 2017. The groundwater samples were submitted to Maxxam Analytics Inc. (Maxxam), an accredited laboratory by the Canadian Association for Laboratory Accreditation Inc. (CALA). The groundwater samples were submitted for laboratory analysis of benzene, toluene, ethylbenzene, xylenes (BTEX), petroleum hydrocarbon fractions F1 to F4 (PHC F1-F4), n-Hexane and lead.

- The analytical results of the submitted groundwater samples were reported by Golder to be below the selected MOE Table 3 SCS for all analyzed parameters with the exceptions of the samples collected from TH4, TH5 and TH7 and MW15-02 which exceeded for PHC F1-F2.

The November 2016 Offsite groundwater monitoring report provides the following information:

- Eight (8) offsite monitoring wells (TH8, TH9, TH10, TH11, TH12, TH100, TH101 and TH102) were monitored on August 10, 2016 for depth to groundwater, petroleum vapour concentrations and presence or absence of liquid petroleum hydrocarbon (LPH). Golder reports that the monitoring well TH10 was decommissioned on August 24, 2016, and was replaced with a newly installed monitoring well MW16-01.
- The depth to groundwater measured in the monitoring wells ranged from 2.88 metres below ground surface (mbgs) (in TH12) to 3.68 mbgs (in TH9). The groundwater flow direction was not interpreted.
- Headspace vapour concentrations ranged from non-detect (in TH12 and TH100) to 100% lower explosive limit of hexane (LEL) (in TH9).
- LPH was not detected in any monitoring wells.
- Golder selected the Ontario Ministry of the Environment (MOE) Table 3 full depth generic Site Condition Standards (SCS) for all types of property use in a non-potable groundwater condition, and medium to fine textured soils as being applicable for use at this site.
- Groundwater samples were collected from the eight (8) offsite monitoring wells (TH8, TH9, MW16-01, TH11, TH12, TH100, TH101 and TH102) on August 10-31, 2016. The groundwater samples were submitted to Maxxam Analytics Inc. (Maxxam), an accredited laboratory by the Canadian Association for Laboratory Accreditation Inc. (CALA). Groundwater samples were submitted for laboratory analysis of benzene, toluene, ethylbenzene, xylenes (BTEX), petroleum hydrocarbon fractions F1 to F4 (PHC F1-F4), n-Hexane and lead.
- The analytical results of the submitted groundwater samples were reported by Golder to be below the selected MOE Table 3 SCS for all analyzed parameters with the exceptions of the samples collected from TH9, TH11, TH12, TH101, TH102, which exceeded for concentrations of one or more of PHC F1-F4.

The January 2017 Onsite groundwater monitoring report provides the following information:

- Nine (9) onsite monitoring wells (TH1 through TH7, MW15-01 and MW15-02) were monitored on August 9, 2016 for depth to groundwater, petroleum vapour concentrations and presence or absence of LPH.
- The depth to groundwater measured in the monitoring wells ranged from 2.50 mbgs (in MW15-01) to 4.17 mbgs (in TH7). The groundwater flow direction was not interpreted to be south.
- Headspace vapour concentrations ranged from non-detect (in various wells) to 85 ppm in TH3.
- LPH was not detected in any monitoring wells.
- Golder selected the Ontario Ministry of the Environment (MOE) Table 3 full depth generic Site Condition Standards (SCS) for all types of property use in a non-potable groundwater condition, and medium to fine textured soils as being applicable for use at this site.
- Groundwater samples were collected from the nine onsite monitoring wells (TH1 through TH7, MW15-01 and MW15-02) on August 9-10, 2016. The groundwater samples were submitted to Maxxam for laboratory analysis of BTEX, PHC F1-F4, n-Hexane and lead.
- The analytical results of the submitted groundwater samples were reported by Golder to be below the selected MOE Table 3 SCS for all analyzed parameters with the exceptions of the samples collected from TH4, TH5 and MW15-02, which exceeded for concentrations of one or more of PHC F1-F4.

Our review of the above reports indicates that petroleum hydrocarbon (PHC) impacts were identified in groundwater both onsite (TH4, TH5 and MW15-02) and offsite (TH9, TH11, TH12, TH101, TH102). In addition, the PHC impacts identified at the locations of MW15-02 (onsite) and TH9, TH101 and TH102 (offsite) have not been delineated. We understand additional groundwater sampling program was carried out in 2017 and our comments will be provided in the letter that will follow.

Should you have any further questions, please do not hesitate to contact me directly.

Yours truly,

Farzana Islam

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February 28, 2018

Mr. John Koo
Imperial Oil Limited
505 Quarry Park Blvd S.E.
Calgary, Alberta
T2C 5N1

Groundwater Monitoring Program – 1660 Merivale Road, Ottawa, Ontario
TSSA Service Request # 791084

Dear Mr. Koo,

Thank you for submitting the following reports:

- *"2017 Groundwater and Soil Vapour Probe Monitoring and Sampling Report, Former Imperial Retail Fuel Outlet, 1660 Merivale Road, Ottawa, Ontario"*, prepared by Golder Associates Ltd. (Golder), dated February 16, 2018.

The 2017 groundwater monitoring report provides the following information:

- Seventeen (17) monitoring wells (TH1 through TH9, TH11 to TH12, TH100 through TH102, MW15-01, MW15-02, MW16-01) were monitored on June 20, 2017 for depth to groundwater, petroleum vapour concentrations and presence or absence of liquid petroleum hydrocarbon (LPH) on June20-21, 2017. Golder reports that the monitoring well TH10 was decommissioned on August 24, 2016, and was replaced with a newly installed monitoring well MW16-01.
- The depth to groundwater measured in the monitoring wells ranged from 2.31 metres below ground surface (mbgs) (in MW15-01) to 3.68 mbgs (in TH6). The inferred groundwater flow direction is to the south.
- The headspace vapour concentrations measured in the monitoring wells ranged from 677 parts per million by volume (ppmv) to 1,668 ppmv.
- LPH was not detected in any monitoring wells.
- Golder selected the Ontario Ministry of the Environment (MOE) Table 3 full depth generic Site Condition Standards (SCS) for all types of property use in a non-potable groundwater condition, and medium to fine textured soils as being applicable for use at this site.
- Groundwater samples were collected from fifteen (15) monitoring wells (TH1, TH2, TH3, TH4, TH5, TH6, TH7, TH9, TH12, TH100, TH101, TH102, MW15-01, MW15-02 and MW16-01) on June 20-22, 2017. The groundwater samples were submitted to Maxxam Analytics Inc. (Maxxam), an accredited laboratory by the Canadian Association for Laboratory Accreditation Inc. (CALA). Groundwater samples were submitted for laboratory analysis of benzene, toluene, ethylbenzene, xylenes (BTEX), petroleum hydrocarbon fractions F1 to F4 (PHC F1-F4) and lead.
- The analytical results of the submitted groundwater samples were reported by Golder to be below the selected MOE Table 3 SCS for all analyzed parameters with the exceptions of the groundwater samples collected from TH4, TH5, TH7, TH9, TH12, TH101, TH102 and MW16-01, which exceeded for concentrations of one or more of PHC F1-F3.
- Golder also reports that two soil vapour probes (SV16-01 and SV16-02) were installed on December 5, 2016. Soil vapour samples were submitted for the analysis of BTEX, PHC F1-F4 and volatile organic compounds (VOCs). The analytical results of the soil vapour samples were reported by Golder to have no have no exceedances.

Please note, the soil vapour intrusion assessment guidance document titled "*Draft Technical Guidance: Soil Vapour Intrusion Assessment, September 2013*" has not been finalized by the Ministry of the Environment (MOE). It also has not been made available to public for use and is not in effect to date. As such, TSSA cannot provide comments on the soil vapour monitoring and sampling results.

Our review of the 2017 groundwater monitoring/sampling report indicates that the petroleum hydrocarbon (PHC) impacts were identified in groundwater both onsite (TH4, TH5 and TH7) and offsite (TH9, TH12, TH101, TH102 and MW16-01). Our review also indicates that the identified PHC impacts in groundwater in the vicinity of TH9, MW16-01, TH102, TH10, TH5 and TH7 have not been completely delineated.

On February 27, 2018, an email correspondence between Imperial Oil and the TSSA indicates that the discussion regarding offsite delineation and contamination management plan (CMP) on the City of Ottawa's (the City) properties along the road allowances of the Merivale Road and the Viewmount Drive is still ongoing.

Based on the information provided to date, TSSA requires the following:

- The complete delineation of all identified petroleum hydrocarbon impacts, both on-site and where practical and applicable, off-site;
- The City must be provided with copies of reports in regard to the groundwater monitoring and sampling results for the offsite monitoring wells (TH8, TH9, TH100, MW16-01, TH102, TH101 and TH12) located on the City's properties. TSSA must be copied and/or provided with copies of all correspondences between the City and Imperial Oil;
- Following the complete delineation, TSSA requires the submission of a formal Contaminant Management Plan (CMP) if further remedial work is not carried out to remove the impacted soil and/or groundwater;
- Until complete delineation is achieved, please continue the groundwater monitoring and sampling program on seventeen (17) monitoring wells (TH1 through TH9, TH11, TH12, TH100 through TH102, MW15-01, MW15-02 and MW16-01) an annual basis (in spring or fall) with annual report submission to the TSSA.

Please submit an action plan to this office by April 16, 2018 addressing the above issues.

Should you have any further questions, please do not hesitate to contact me directly. For general enquiries, please contact a Customer Service Advisor at 1.877.682.TSSA (8772) or e-mail customerservices@tssa.org. When contacting TSSA regarding this file, please refer to the Service Request number provided above.

Yours truly,

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February 28, 2018

Mr. John Koo
Imperial Oil Limited
505 Quarry Park Blvd S.E.
Calgary, Alberta
T2C 5N1

Groundwater Monitoring Program – 1660 Merivale Road, Ottawa, Ontario
TSSA Service Request # 791084

Dear Mr. Koo,

Thank you for submitting the following reports:

- *"2017 Groundwater and Soil Vapour Probe Monitoring and Sampling Report, Former Imperial Retail Fuel Outlet, 1660 Merivale Road, Ottawa, Ontario"*, prepared by Golder Associates Ltd. (Golder), dated February 16, 2018.

The 2017 groundwater monitoring report provides the following information:

- Seventeen (17) monitoring wells (TH1 through TH9, TH11 to TH12, TH100 through TH102, MW15-01, MW15-02, MW16-01) were monitored on June 20, 2017 for depth to groundwater, petroleum vapour concentrations and presence or absence of liquid petroleum hydrocarbon (LPH) on June20-21, 2017. Golder reports that the monitoring well TH10 was decommissioned on August 24, 2016, and was replaced with a newly installed monitoring well MW16-01.
- The depth to groundwater measured in the monitoring wells ranged from 2.31 metres below ground surface (mbgs) (in MW15-01) to 3.68 mbgs (in TH6). The inferred groundwater flow direction is to the south.
- The headspace vapour concentrations measured in the monitoring wells ranged from 677 parts per million by volume (ppmv) to 1,668 ppmv.
- LPH was not detected in any monitoring wells.
- Golder selected the Ontario Ministry of the Environment (MOE) Table 3 full depth generic Site Condition Standards (SCS) for all types of property use in a non-potable groundwater condition, and medium to fine textured soils as being applicable for use at this site.
- Groundwater samples were collected from fifteen (15) monitoring wells (TH1, TH2, TH3, TH4, TH5, TH6, TH7, TH9, TH12, TH100, TH101, TH102, MW15-01, MW15-02 and MW16-01) on June 20-22, 2017. The groundwater samples were submitted to Maxxam Analytics Inc. (Maxxam), an accredited laboratory by the Canadian Association for Laboratory Accreditation Inc. (CALA). Groundwater samples were submitted for laboratory analysis of benzene, toluene, ethylbenzene, xylenes (BTEX), petroleum hydrocarbon fractions F1 to F4 (PHC F1-F4) and lead.
- The analytical results of the submitted groundwater samples were reported by Golder to be below the selected MOE Table 3 SCS for all analyzed parameters with the exceptions of the groundwater samples collected from TH4, TH5, TH7, TH9, TH12, TH101, TH102 and MW16-01, which exceeded for concentrations of one or more of PHC F1-F3.
- Golder also reports that two soil vapour probes (SV16-01 and SV16-02) were installed on December 5, 2016. Soil vapour samples were submitted for the analysis of BTEX, PHC F1-F4 and volatile organic compounds (VOCs). The analytical results of the soil vapour samples were reported by Golder to have no have no exceedances.

Please note, the soil vapour intrusion assessment guidance document titled "*Draft Technical Guidance: Soil Vapour Intrusion Assessment, September 2013*" has not been finalized by the Ministry of the Environment (MOE). It also has not been made available to public for use and is not in effect to date. As such, TSSA cannot provide comments on the soil vapour monitoring and sampling results.

Our review of the 2017 groundwater monitoring/sampling report indicates that the petroleum hydrocarbon (PHC) impacts were identified in groundwater both onsite (TH4, TH5 and TH7) and offsite (TH9, TH12, TH101, TH102 and MW16-01). Our review also indicates that the identified PHC impacts in groundwater in the vicinity of TH9, MW16-01, TH102, TH10, TH5 and TH7 have not been completely delineated.

On February 27, 2018, an email correspondence between Imperial Oil and the TSSA indicates that the discussion regarding offsite delineation and contamination management plan (CMP) on the City of Ottawa's (the City) properties along the road allowances of the Merivale Road and the Viewmount Drive is still ongoing.

Based on the information provided to date, TSSA requires the following:

- The complete delineation of all identified petroleum hydrocarbon impacts, both on-site and where practical and applicable, off-site;
- The City must be provided with copies of reports in regard to the groundwater monitoring and sampling results for the offsite monitoring wells (TH8, TH9, TH100, MW16-01, TH102, TH101 and TH12) located on the City's properties. TSSA must be copied and/or provided with copies of all correspondences between the City and Imperial Oil;
- Following the complete delineation, TSSA requires the submission of a formal Contaminant Management Plan (CMP) if further remedial work is not carried out to remove the impacted soil and/or groundwater;
- Until complete delineation is achieved, please continue the groundwater monitoring and sampling program on seventeen (17) monitoring wells (TH1 through TH9, TH11, TH12, TH100 through TH102, MW15-01, MW15-02 and MW16-01) an annual basis (in spring or fall) with annual report submission to the TSSA.

Please submit an action plan to this office by April 16, 2018 addressing the above issues.

Should you have any further questions, please do not hesitate to contact me directly. For general enquiries, please contact a Customer Service Advisor at 1.877.682.TSSA (8772) or e-mail customerservices@tssa.org. When contacting TSSA regarding this file, please refer to the Service Request number provided above.

Yours truly,

Farzana Islam

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February 27, 2018

Mr. John Koo
Imperial Oil Limited
505 Quarry Park Blvd S.E.
Calgary, Alberta
T2C 5N1

Groundwater Monitoring Program – 1660 Merivale Road, Ottawa, Ontario
TSSA Service Request # 791084

Dear Mr. Koo,

Thank you for submitting the following reports:

- *"2015 Supplemental Subsurface, Groundwater Monitoring and Sampling Investigation, 1660 Merivale Road, Ottawa, Ontario"*, prepared by Golder Associates Ltd. (Golder), dated May 6, 2016;
- *"2016 Groundwater Monitoring and Sampling Report, Adjacent to 1660 Merivale Road, Ottawa, ON"*, prepared by Golder, dated November 21, 2016; and
- *"2016 Groundwater Monitoring and Sampling Report, Former Imperial Oil Retail Fuel Outlet, 1660 Merivale Road, Ottawa, ON"*, prepared by Golder, dated January 31, 2017.

The May 2016 subsurface investigation report provides the following information:

- Two (2) boreholes (MW15-01 and MW15-02) were advanced to depths 6.0 metres below ground surface (mbgs) and 4.9 mbgs, respectively on September 9, 2015. Both the boreholes were completed as monitoring wells MW15-01 and MW15-02.
- Golder selected the Ontario Ministry of the Environment (MOE) Table 3 full depth generic Site Condition Standards (SCS) for all types of property use in a non-potable groundwater condition, and medium to fine textured soils as being applicable for use at this site.
- Four (4) soil samples (recovered from the boreholes) were submitted to Maxxam for laboratory analysis of BTEX, PHC F1-F4, n-Hexane and lead. The analytical results of the submitted soil samples were reported by Golder to be below the selected MOE Table 3 SCS for all analyzed parameters
- The two (2) newly installed monitoring wells (MW15-01 and MW15-02) and seven (7) onsite monitoring wells (TH1 through TH7) were monitored on November 17, 2015 for depth to groundwater, petroleum vapour concentrations and presence or absence of LPH.
- The depth to groundwater measured in the monitoring wells ranged from 2.41 mbgs (in MW15-01) to 3.94 mbgs (TH6). The groundwater flow direction is to the south.
- Headspace vapour concentrations measured in the monitoring wells ranged from 5 ppm (in TH2) to 1250 ppm (in TH6). LPH was not detected in any monitoring wells.
- Groundwater samples were collected from the two (2) newly installed monitoring wells (MW15-01 and MW15-02) and seven (7) onsite monitoring wells (TH1 through TH7) on October 28, 2015 or on November 17, 2017. The groundwater samples were submitted to Maxxam Analytics Inc. (Maxxam), an accredited laboratory by the Canadian Association for Laboratory Accreditation Inc. (CALA). The groundwater samples were submitted for laboratory analysis of benzene, toluene, ethylbenzene, xylenes (BTEX), petroleum hydrocarbon fractions F1 to F4 (PHC F1-F4), n-Hexane and lead.

- The analytical results of the submitted groundwater samples were reported by Golder to be below the selected MOE Table 3 SCS for all analyzed parameters with the exceptions of the samples collected from TH4, TH5 and TH7 and MW15-02 which exceeded for PHC F1-F2.

The November 2016 Offsite groundwater monitoring report provides the following information:

- Eight (8) offsite monitoring wells (TH8, TH9, TH10, TH11, TH12, TH100, TH101 and TH102) were monitored on August 10, 2016 for depth to groundwater, petroleum vapour concentrations and presence or absence of liquid petroleum hydrocarbon (LPH). Golder reports that the monitoring well TH10 was decommissioned on August 24, 2016, and was replaced with a newly installed monitoring well MW16-01.
- The depth to groundwater measured in the monitoring wells ranged from 2.88 metres below ground surface (mbgs) (in TH12) to 3.68 mbgs (in TH9). The groundwater flow direction was not interpreted.
- Headspace vapour concentrations ranged from non-detect (in TH12 and TH100) to 100% lower explosive limit of hexane (LEL) (in TH9).
- LPH was not detected in any monitoring wells.
- Golder selected the Ontario Ministry of the Environment (MOE) Table 3 full depth generic Site Condition Standards (SCS) for all types of property use in a non-potable groundwater condition, and medium to fine textured soils as being applicable for use at this site.
- Groundwater samples were collected from the eight (8) offsite monitoring wells (TH8, TH9, MW16-01, TH11, TH12, TH100, TH101 and TH102) on August 10-31, 2016. The groundwater samples were submitted to Maxxam Analytics Inc. (Maxxam), an accredited laboratory by the Canadian Association for Laboratory Accreditation Inc. (CALA). Groundwater samples were submitted for laboratory analysis of benzene, toluene, ethylbenzene, xylenes (BTEX), petroleum hydrocarbon fractions F1 to F4 (PHC F1-F4), n-Hexane and lead.
- The analytical results of the submitted groundwater samples were reported by Golder to be below the selected MOE Table 3 SCS for all analyzed parameters with the exceptions of the samples collected from TH9, TH11, TH12, TH101, TH102, which exceeded for concentrations of one or more of PHC F1-F4.

The January 2017 Onsite groundwater monitoring report provides the following information:

- Nine (9) onsite monitoring wells (TH1 through TH7, MW15-01 and MW15-02) were monitored on August 9, 2016 for depth to groundwater, petroleum vapour concentrations and presence or absence of LPH.
- The depth to groundwater measured in the monitoring wells ranged from 2.50 mbgs (in MW15-01) to 4.17 mbgs (in TH7). The groundwater flow direction was not interpreted to be south.
- Headspace vapour concentrations ranged from non-detect (in various wells) to 85 ppm in TH3.
- LPH was not detected in any monitoring wells.
- Golder selected the Ontario Ministry of the Environment (MOE) Table 3 full depth generic Site Condition Standards (SCS) for all types of property use in a non-potable groundwater condition, and medium to fine textured soils as being applicable for use at this site.
- Groundwater samples were collected from the nine onsite monitoring wells (TH1 through TH7, MW15-01 and MW15-02) on August 9-10, 2016. The groundwater samples were submitted to Maxxam for laboratory analysis of BTEX, PHC F1-F4, n-Hexane and lead.
- The analytical results of the submitted groundwater samples were reported by Golder to be below the selected MOE Table 3 SCS for all analyzed parameters with the exceptions of the samples collected from TH4, TH5 and MW15-02, which exceeded for concentrations of one or more of PHC F1-F4.

Our review of the above reports indicates that petroleum hydrocarbon (PHC) impacts were identified in groundwater both onsite (TH4, TH5 and MW15-02) and offsite (TH9, TH11, TH12, TH101, TH102). In addition, the PHC impacts identified at the locations of MW15-02 (onsite) and TH9, TH101 and TH102 (offsite) have not been delineated. We understand additional groundwater sampling program was carried out in 2017 and our comments will be provided in the letter that will follow.

Should you have any further questions, please do not hesitate to contact me directly.

Yours truly,

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February 16, 2018

Project No. 1669090-1155

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THIS REPORT CONTAINS PROVISIONS LIMITING LIABILITY, THE SCOPE OF THE REPORT AND THIRD PARTY RELIANCE

These documents and the information contained therein are confidential property of Imperial Oil Limited and any disclosure of same is governed by the provisions of each of the applicable provincial and territorial freedom of information legislation, the Privacy Act (Canada) 1980-81-83, c.111, Sch. II"1", and the Access to Information Act (Canada) 1980-81-82-83, c.111, Sch.I"1", as such, legislation may be amended from time to time.

2017 GROUNDWATER AND SOIL VAPOUR PROBE MONITORING AND SAMPLING REPORT
FORMER IMPERIAL RETAIL FUEL OUTLET
1660 MERIVALE ROAD, OTTAWA, ONTARIO
(SAP NO. 88001627)

INTRODUCTION

Golder Associates Ltd. (Golder) was retained by Imperial Oil Limited (Imperial) to conduct a groundwater and soil vapour probe monitoring and sampling program at the former retail fuel outlet at 1660 Merivale Road, Ottawa, Ontario (the Site) (Figures 1 to 2). The fieldwork was conducted on December 5 and 13, 2016, June 20 to 22, July 21 and November 21, 2017. Limitation of liability, scope of report and third-party Reliance are provided in Appendix A.

SCOPE OF WORK

- Monitoring 17 existing on- and off-site groundwater monitoring wells for vapour concentrations, depth to groundwater and the thickness, if present, of Light Non-Aqueous Phase Liquid (LNAPL);
- Collecting groundwater samples from 17 monitoring wells using a low-flow sampling method for laboratory analysis of Benzene, Toluene, Ethylbenzene, Xylenes (BTEX), Petroleum Hydrocarbon (PHC) Fractions F1 to F4 and dissolved lead;
- Hydrovacing two boreholes to a maximum depth of 1.87 metres below ground surface (mbgs) and completing both as soil vapour (SV) probes (SV16-01 and SV16-02);
- Monitoring the two SV probes and collecting samples for laboratory analysis of BTEX, PHC Fractions F1 and F2 and Volatile Organic Compounds (VOCs).
- Comparing the groundwater and SV analytical results to the following guidelines:
  - Comparison of the groundwater analytical results for BTEX, PHC Fractions F1 to F4 and dissolved lead to the Ontario Ministry of the Environment and Climate Change's (MOECC's) Table 3 Full Depth Generic Site Condition Standards for groundwater in medium and fine textured soil in a non-potable groundwater condition under all types of property use (MOECC 2011);

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Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

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- Comparison of the soil vapour analytical results to the applicable soil vapour screening levels (SVSL) generated using the MOECC *Modified Generic Risk Assessment (Tier 2) Spreadsheet Model* (April 15, 2011) (MGRA) for BTEX, PHC Fractions F1 and F2 and VOCs.

GROUNDWATER METHODOLOGY

Combustible Gas Detector Calibrations and Headspace Concentrations

- Headspace vapour concentrations were measured using an RKI Eagle® Combustible Organic Vapour Monitor (OVM) with methane elimination. The OVM was bump tested daily to 15% lower explosive limit (LEL) using a hexane standard. If the bump test differed more than 10% from the stated concentration of the standard, the OVM was adjusted to match the stated concentration of the calibration gas. Calibrations were logged at the start of each day.

- Vapour concentrations were taken from inside each well casing by placing the OVM nozzle about 15 to 30 cm below the Top Of Casing (TOC). The OVM reading was taken immediately after the cap had been removed from the top of the monitoring well casing, in order to reduce the potential loss of volatiles from within the casing. The peak OVM reading was recorded.

Depth to Groundwater and LNAPL Thickness

- Depth to groundwater and, if present, the thickness of LNAPL were measured using a Heron oil/water interface probe. If LNAPL was detected, then its presence was visually confirmed using a bailer. Prior to use in each well, the interface probe was cleaned using a phosphate-free detergent and water solution and rinsed with distilled water to reduce the potential for cross-contamination. Depth to groundwater measurements were taken from the TOC.

Low-Flow Sampling

- Groundwater samples were collected using a low-flow sampling method. Water was pumped from each well, at a rate of 0.1 to 1 L/min, using Waterra® High Density Polyethylene (HDPE) tubing connected to a peristaltic pump with a portion of silicone rubber tubing. Water quality indicator parameters including Electrical Conductivity (EC), pH and temperature were measured during pumping using a YSI 556® Multiprobe System (YSI) and flow through cell. Calibration of the YSI was completed per the manufacturer's instructions. Purged water was retained on-site in a 205-L barrel for future off-site disposal.

- Nineteen samples, including two duplicates, a field blank, a trip blank and fifteen groundwater samples, were collected.

Laboratory Analysis of Groundwater Samples

- The samples were submitted under chain-of-custody to Maxxam Analytics Inc. (Maxxam) in Mississauga, Ontario for analysis of BTEX, PHC Fractions F1 to F4 and dissolved lead.

- Groundwater samples for BTEX and PHC Fraction F1 analysis were placed in 44-millilitre (mL) clear glass vials provided by the laboratory and preserved with sodium bisulphate as a microbial inhibitor. The groundwater samples for PHC Fractions F2 to F4 analysis were placed in 250-mL amber glass bottles and preserved with sodium bisulphate.

- The groundwater samples for dissolved lead analysis were placed in 120-mL High-Density Polyethylene (HDPE) bottles, field-filtered and preserved with nitric acid.
- Sampling containers were preserved in coolers with ice and transported to Maxxam for chemical analysis.

Waste Purge Water Removal

Badger Daylighting of Ottawa, Ontario, a MOECC licensed waste hauler, was used to recover 100 litres (L) of waste purged groundwater from the Site on July 4, 2017. The liquid was disposed of at Tomlinson Environmental Services in Ottawa, Ontario, an MOECC-approved waste receiver.

Quality Assurance and Quality Control

A Quality Assurance and Quality Control (QA/QC) program was followed to reduce the potential for, and to quantify, effects on the sample results that may have been influenced by sample collection, handling, shipping and analysis. As part of the QA/QC program, sampling protocols included reducing sample handling to the extent practicable, submitting field QA/QC samples, using dedicated sampling equipment, using sample-specific identification and labelling procedures, and using chain-of-custody records.

SOIL VAPOUR METHODOLOGY

Soil Vapour: Soil Vapour Probe Installation

Two soil vapour probes (SV16-01 and SV16-02) were installed in daylighted boreholes on December 5, 2016. Each soil vapour probe was constructed of 15-millimetre (mm) diameter, 0.10-metre (m) long metal screen that was connected to high-density polyethylene (HDPE) with polyester yarn-reinforced sample tubing. Soil vapour probes were connected to 6.35 mm diameter Teflon tubing which was sealed above grade with a ball valve to prevent soil vapour leakage and ambient air intrusion. The annulus surrounding the screened section of each soil vapour probe was backfilled with clean sand up to approximately 0.10 m above the top of the screened section of the soil vapour probes. A 0.3 m layer of dry powdered bentonite (Benseal) was placed on top of the sand, followed by a powdered Benseal slurry seal placed in the borehole in 0.3 m lifts until a depth of approximately 0.3 mbgs was reached, to accommodate the installation of a flush-mounted road box. Hydrated bentonite was tamped flat during the installation of the lifts to create an airtight seal, and placed around the tubing to just below grade. A protective valve box was installed at ground surface. The location of the newly installed soil vapour probes (SV16-01 and SV16-02) are shown on Figure 2. Schematic logs for the soil vapour probes are provided in Appendix B.

Soil Vapour: Sampling

Weather Conditions during Sampling

Weather conditions[1] on July 17, 2017 were overcast. The outdoor air temperature was 22 degrees Celsius (°C). The relative humidity was 73 percent (%). The barometric pressure was measured at 100.9 kilopascals (kPa) (Environment Canada 2017[2]).

Weather conditions on November 21, 2017 were clear. The outdoor air temperature was -4°C. The relative humidity was 93%. The barometric pressure was measured at 100.7 kPa (Environment Canada 2017[2]).

[1] Weather information was taken from the meteorological station, Ottawa, Ontario *(2017 Hourly Data Report)* located closest to the Site.

[2] Environment Canada, 2017, https://weather.gc.ca/

Probe Leak Testing

The soil vapour probe sample locations (SV16-01 and SV16-02) were leak tested on December 13, 2016, July 17 and November 21, 2017, to assess whether ambient air was penetrating the ground surface (e.g., along the outside of the tubing) and mixing with soil vapours during sampling.

To conduct leak testing, a plastic shroud was placed over the probe and the HDPE tubing leading from the probe exited through a sealed hole in the top of the shroud. The shroud was then filled with helium from a cylinder. The helium concentration inside the shroud was measured using a helium detector. Once helium concentrations inside the shroud reached at least 18 percent helium by volume, the helium flow was turned off. The helium detector was then connected to the HDPE tubing from the soil vapour probe. The helium detector sampling flow rate was 0.5 litres per minute (L/min) as confirmed through the use of a digital flow reader. The helium detector was used to sample the soil vapour probe for one minute and the maximum helium concentrations were recorded.

Soil Vapour Sampling

Prior to sample collection, at least three probe volumes of soil gas were purged from the probes. An organic vapour detection system was used to measure organic vapour concentrations in the soil vapour collected in the Tedlar bags.

Following purging and leak testing, soil vapour samples from the two soil vapour probes (SV16-01 and SV16-02) were collected following procedures outlined in the United States Environmental Protection Agency (USEPA) Method TO-15. A flow regulator supplied by Maxxam, was used to regulate the volumetric soil vapour flow into the Summa canister at a rate of 70 millilitres per minute (mL/min) during a 20-minute sampling period. A 1.4 litre (L) Summa canister, batch certified by Maxxam to be free of contaminants, was fitted with a vacuum gauge for sample collection. Prior to use, the initial Summa canister pressure was confirmed to be less than or equal to -27 inches of mercury when gauged.

The soil vapour samples were collected and submitted to the Mississauga facility of Maxxam, a Standards Council of Canada (SCC) accredited laboratory, for analysis of BTEX, PHC Fractions F1 and F2, and VOCs. During the December 2016, and July and November 2017 sampling events, 11 samples, including three field duplicates, two field blanks and six soil vapour probe samples were submitted to Maxxam for analysis.

Quality Assurance and Quality Control

A Quality Assurance and Quality Control (QA/QC) program was followed to reduce the potential for, and to quantify, impacts introduced during sample collection, handling, shipping and analysis. As part of the QA/QC program, sampling protocols included reducing sample handling to the extent practical, submitting field QA/QC samples, using dedicated sampling equipment, using sample-specific identification and labelling procedures, and using chain-of-custody records.

RESULTS

Monitoring Well Headspace Vapour (Date; Range)

- June 20 and 21, 2017; Not detected to 100% LEL (Table 1).

LNAPL Occurrence (Date; Observations)

- June 20 and 21, 2017; Not detected in any of the accessible monitoring wells (Table 1).

Groundwater Monitoring (Date; Stratigraphic Unit and Depth to Groundwater Range; Groundwater Direction)

- June 20 and 21, 2017; Depth to groundwater levels ranged from 2.31 to 3.68 mbgs (Table 1); South (Figure 3).

Groundwater Analytical Results (Date; Parameters; No. of wells)

- June 21 to 22, 2017; BTEX and PHC parameters; Exceedances identified in 8 locations (Figure 4 and Table 2).

Probe Leak Test Results (Date; Well; Result expressed as % helium)

- December 13, 2016; SV16-01 and SV16-02; 0 to 0.44% (Table 3).
- July 21, 2017; SV16-01 and SV16-02; 0% (Table 3).
- November 21, 2017; SV16-01 and SV16-02; 0% (Table 3).

Field Organic Vapour Results

- December 13, 2016; Organic vapour concentrations, 197 parts per billion by volume (ppbv) to 240 ppbv (Table 3).
- July 21, 2017; Organic vapour concentrations, 677 parts per million by volume (ppmv) to 1,668 ppmv (Table 3).
- November 21, 2017; Organic vapour concentrations, 13.73 ppmv to 24.92 ppmv (Table 3).

Soil Vapour Analytical Results (Date; Parameters; No. of wells)

- December 13, 2016; BTEX, PHC and VOC parameters; No exceedances (Figure 5 and Table 4)
- July 21, 2017; 1 BTEX, PHC and VOC parameters; No exceedances (Figure 5 and Table 4)
- November 21, 2017; BTEX, PHC and VOC parameters; No exceedances (Figure 5 and Table 4)

QUALITY ASSURANCE/QUALITY CONTROL

- Copies of the associated laboratory certificates of analysis are provided in Appendix C.
- Two data quality issues were identified but did not have a material effect on the reliability of the data in this report. The data are considered reliable (Appendix D).

REFERENCES

MOECC (Ontario Ministry of the Environment and Climate Change). 2011. *Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act*. Dated March 9, 2004, amended as of July 1, 2011. Toronto, Ontario: Government of Ontario.

CLOSURE

We trust the information presented in this report meets your current requirements. Please contact the undersigned if you require additional information.

Yours truly,

GOLDER ASSOCIATES LTD.

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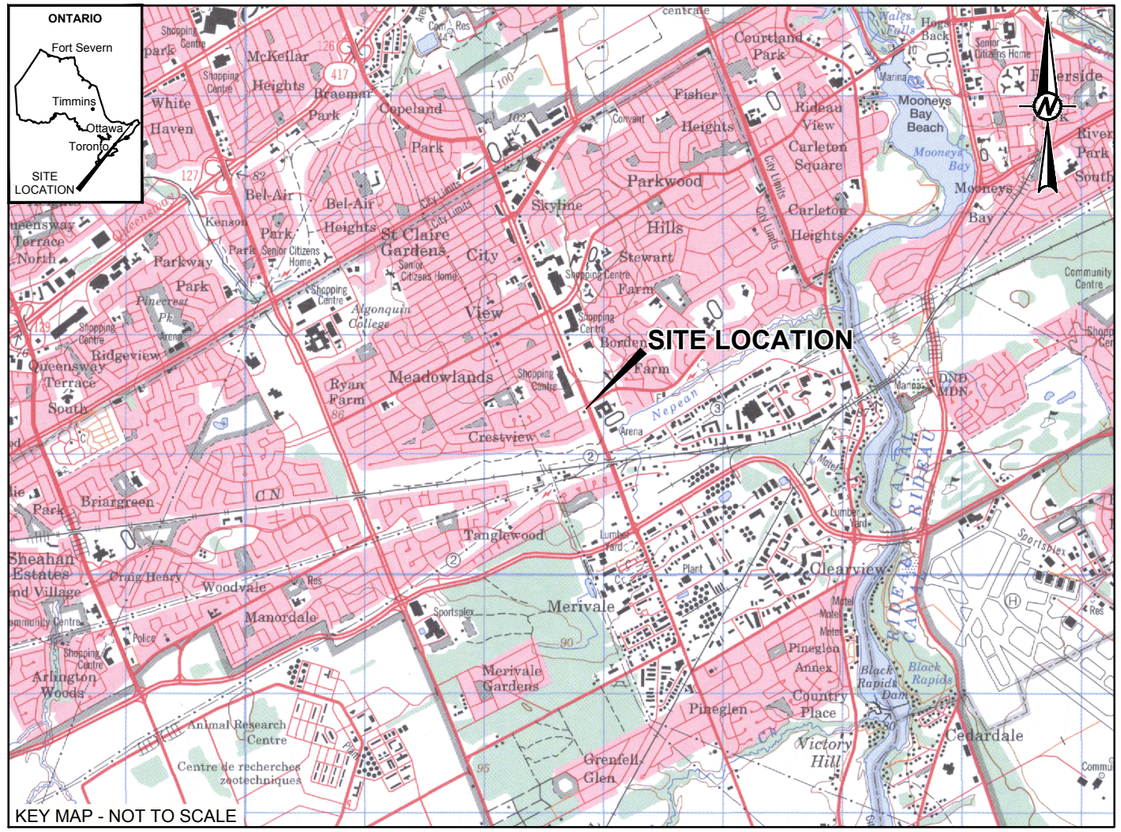
Attachments: Figures
Tables
Appendix A: Limitation of Liability, Scope of Report and Third Party Reliance
Appendix B: Soil Vapour Probe Logs
Appendix C: Laboratory Certificates of Analysis and Data Quality Review Checklists
Appendix D: Quality Assurance/Quality Control

FIGURES





LEGEND

PROPERTY BOUNDARY

REFERENCE

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No: 11010-SITE PLAN OFFSITE-OCT14; SCALE: UNKNOWN; DATE: OCTOBER 2014.

IMAGE OBTAINED FROM GOOGLE EARTH © 2017 GOOGLE INC. USED WITH PERMISSION. GOOGLE AND GOOGLE LOGO ARE REGISTERED TRADEMARKS OF GOOGLE INC. IMAGERY DATE: MAY 9, 2016. GOOGLE EARTH IMAGE IS NOT TO SCALE. DATUM: NAD83, PROJECTION: UTM ZONE 18.

TOPOGRAPHIC MAP 31G/05 OBTAINED FROM Canmatrix. © 1998 HER MAJESTY THE QUEEN IN RIGHT OF CANADA. DEPARTMENT OF NATURAL RESOURCES. PROJECTION: TRANSVERSE MERCATOR; DATUM: NAD83; COORDINATE SYSTEM: UTM ZONE 18.

0 50 100
(APPROX.) METRES

CLIENT
IMPERIAL OIL LIMITED

CONSULTANT
Golder Associates

YYYY-MM-DD	2018-02-14
DESIGNED	TLafreniere
PREPARED	EHernandez
REVIEWED	LMcDavid
APPROVED	SDesrocher

PROJECT
FORMER RETAIL FUEL OUTLET
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
SITE LOCATION PLAN

PROJECT NO.	PHASE-TASK	REV.	FIGURE
1669090	1155-2016B	0	1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B

25 mm

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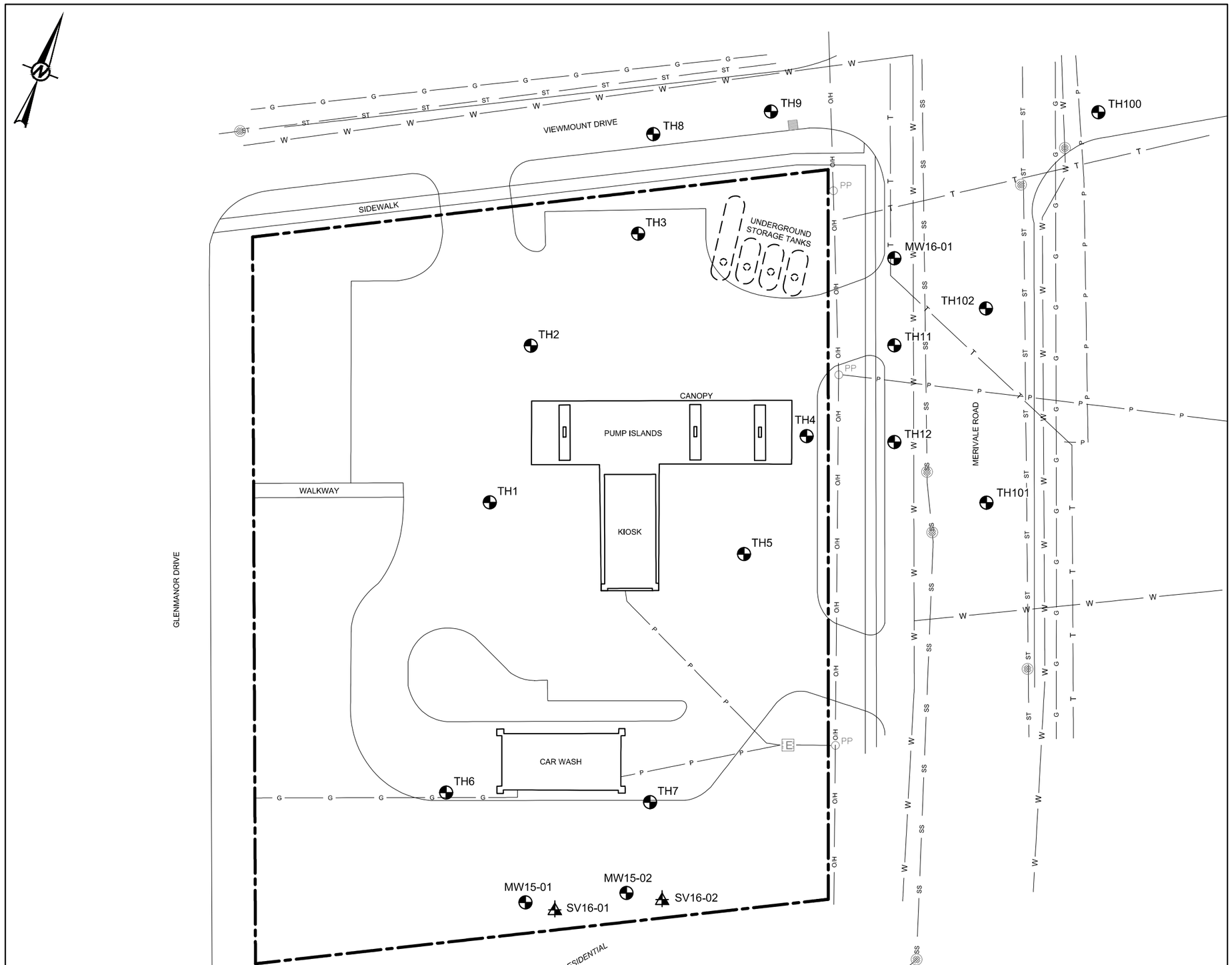

LEGEND

- PROPERTY BOUNDARY
- O/H — OVERHEAD POWER LINE
- G — UNDERGROUND GAS LINE
- P — UNDERGROUND POWER LINE
- SS — UNDERGROUND SANITARY LINE
- ST — UNDERGROUND STORM SEWER LINE
- T — UNDERGROUND TELEPHONE LINE
- W — UNDERGROUND WATERLINE
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL
- SOIL VAPOUR PROBE
- CATCH BASIN
- ELECTRICAL PEDESTAL
- MANHOLE
- PP — POWER POLE

REFERENCE

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0 10 20
(APPROX.) METRES

CLIENT
IMPERIAL OIL LIMITED

PROJECT
FORMER RETAIL FUEL OUTLET
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
SITE PLAN WITH SOIL VAPOUR AND MONITORING WELL LOCATIONS

CONSULTANT
Golder Associates

YYYY-MM-DD	2018-02-14
DESIGNED	TLafreniere
PREPARED	EHernandez
REVIEWED	LMcDavid
APPROVED	SDesrocher

PROJECT NO.	PHASE-TASK	REV.	FIGURE
1669090	1155-2016B	0	2

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B

25 mm

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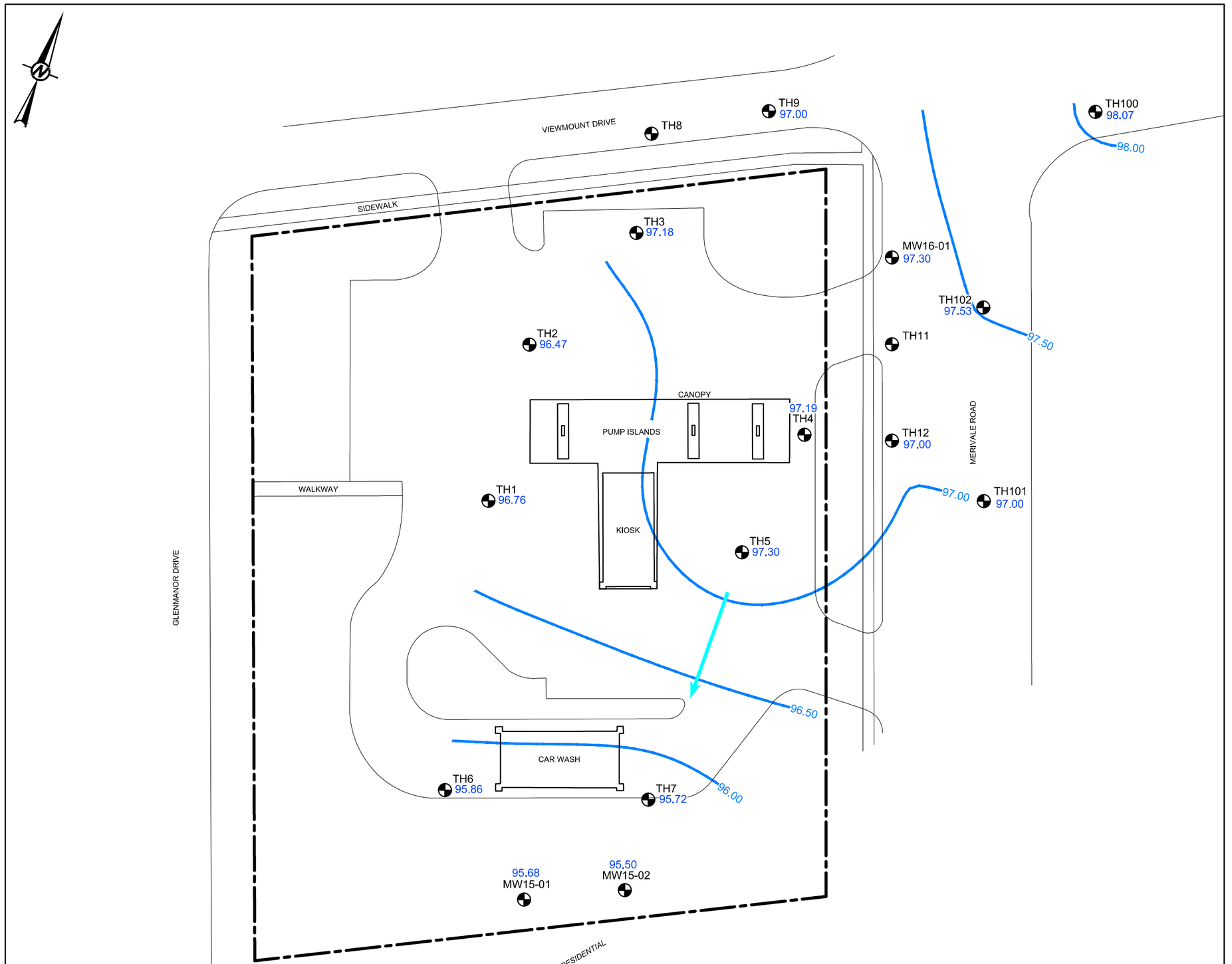

LEGEND

- PROPERTY BOUNDARY
- 97.80 GROUNDWATER CONTOUR (m)
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL
- 98.07 GROUNDWATER ELEVATION (m)
- DIRECTION OF GROUNDWATER FLOW

LIST OF APPLICABLE ABBREVIATIONS

m	METRE

NOTE

ELEVATIONS ARE BASED ON A LOCAL DATUM (GROUND SURFACE AT TH7)) WITH ASSUMED ELEVATION OF 99.66 m.

REFERENCE

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No.: 11010-SITE PLAN ONSITE-JUN14; SCALE: UNKNOWN; DATE: JUNE 2014.

0 10 20
(APPROX.) METRES

CLIENT
IMPERIAL OIL LIMITED

PROJECT
FORMER RETAIL FUEL OUTLET
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
GROUNDWATER FLOW DIRECTION
June 20 and 21, 2018

CONSULTANT
Golder Associates

YYYY-MM-DD	2018-02-14
DESIGNED	TLafreniere
PREPARED	EHernandez
REVIEWED	LMcDavid
APPROVED	SDesrocher

PROJECT NO.	PHASE-TASK	REV.	FIGURE
1669090	1155-2016B	0	3

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25 mm

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TH1									Screen Interval: 2.6 to 5.6 mbgs	
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-11	<0.20	<0.20	<0.20	<0.40	<25	<100	<100	<100	<5.0	<0.50
13-Jun-13	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	0.53
26-Aug-14	<0.20	0.75	<0.20	1.2	<25	<100	<200	<200	<5.0	<0.50
17-Nov-15	<0.20	0.27	0.28	<0.40	<25	<100	<200	<200	<5.0	<0.50
10-Aug-16	<0.20	<0.20	<0.20	<0.40	<25	<100	300	1,200[b]	<5.0	<0.50
5-Dec-16	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	NA	<0.50
21-Jun-17	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	NA	<0.50

TH2									Screen Interval: 3.2 to 4.7 mbgs	
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-11	0.77	<0.20	1.3	0.48	<25	<100	<100	<100	<5.0	<0.50
13-Jun-13	0.62	<0.20	2.2	<0.40	<25	<100	<200	<200	<5.0	<0.50
27-Aug-14	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
17-Nov-15	<0.20	0.29	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
17-Nov-15 (DUP)	<0.20	0.28	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
9-Aug-16	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	NA	<0.50
21-Jun-17	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	NA	<0.50

TH3									Screen Interval: 3.2 to 4.7 mbgs	
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-11	27	2.4	79	150	1100	430	<100	130	20	3.8
31-Aug-11	23	2.1	69	130	1100	380	<100	110	17	3.9
13-Jun-13	11	0.61	66	85	900	350	<200	<200	<5.0	3.1
26-Aug-14	14	0.28	19	5.2	520	180	<200	<200	<5.0	2.2
28-Oct-15	25	<0.20	15	0.89	450	<100	<200	<200	<5.0	2.0
10-Aug-16	42	<0.20	26	1.5	560	110	<200	<200	<5.0	0.98
21-Jun-17	19	0.29	77	20	630	140	<200	<200	NA	<0.50

TH4									Screen Interval: 3.4 to 4.9 mbgs	
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-11	610	610	3,400	19,000	26,000	17,000	360	170	540	2.6
13-Jun-13	200	35	1200	4,300	6,200	19,000	580	430	<100	5.8
26-Aug-14	500	37	1400	2600	4,700	1,400	<200	<200	58	3.0
26-Aug-14	540	40	1600	2700	400	1,400	<200	<200	62	1.9
17-Nov-15	180	18	560	930	1,900	940	240	230	<100	3.1
10-Aug-16	210	11	550	1,500	1,800	370	<200	<200	31	1.1
10-Aug-16 (DUP)	190	9.7	490	1,400	1,600	400	210	<200	27	1.7
21-Jun-17	210	28	470	1,500	2,000	930	<200	<200	NA	0.78

TH5									Screen Interval: 3.5 to 5.0 mbgs	
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-11	750	140	3,000	13,000	85,000	20,000	690	620	1,400	5.5
13-Jun-13	530	44	1600	3800	9,900	160,000	12,000	6,800	<100	8.3
13-Jun-13	550	44	1600	3800	9,200	110,000	7,000	4,300	<100	8
27-Aug-14	450	46	1600	3100	11,000	2,800	<200	<200	210	4.1
17-Nov-15	360	26	930	1,300	3,300	2,900	320	240	<100	3.7
10-Aug-16	420	43	1,500	3,700	13,000	11,000	1,100	810	240	0.81
21-Jun-17	210	25	690	1,800	4,400	3,600	420	350	NA	1.8
21-Jun-17 (DUP)	190	23	640	1,600	4,400	3,200	490	450	NA	2.2

TH6									Screen Interval: 3.6 to 5.1 mbgs	
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
20-Oct-11	<0.20	<0.20	<0.20	<0.40	<25	<100	<100	<100	<5.0	<0.50
20-Oct-11	<0.20	<0.20	<0.20	<0.40	<25	<100	<100	<100	<5.0	<0.50
13-Jun-13	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	0.6
27-Aug-14	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
28-Oct-15	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
28-Oct-15 (DUP)	<0.20	0.38	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
9-Aug-16	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	NA	<0.50
22-Jun-17	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	NA	<0.50

TH7									Screen Interval: 4.4 to 5.8 mbgs	
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
14-Nov-11	31	5.4	160	340	430	<100	<100	<100	<30	<0.5
13-Jun-13	37	2.8	140	130	550	460	<200	<200	<5.0	3.2
27-Aug-14	150	18	610	730	1,900	540	<200	<200	22	2.1
28-Oct-15	93	8.4	270	300	1,000	280	<200	<200	<5.0	1.2
9-Aug-16	62	5.8	120	140	500	150	<200	<200	<5.0	<0.50
22-Jun-17	93	8.7	240	190	800	190	<200	<200	NA	0.54

TH8									Screen Interval: 3.3 to 4.9 mbgs	
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
13-Jun-13	3.9	<0.20	4.1	0.61	48	<100	<200	<200	<0.5	1.1
27-Oct-15	4.4	<0.20	0.51	0.41	<25	<100	<200	<200	<5.0	0.82
10-Aug-16	3.0	<0.20	0.66	<0.40	70	<100	<200	<200	<5.0	0.77

TH9									Screen Interval: 3.4 to 4.9 mbgs	
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
6-Oct-14	31	3	230	290	1,000	570	610	420	15	1.1
27-Oct-15	51	7.2	390	350	2,500	1,100	220	360	35	2.6
10-Aug-16	23	1.8	250	70	1,600	350	<200	<200	11	1.1
20-Jun-17	36	5.5	460	370	4,200	1,200	<200	<200	NA	2.3

TH10									Screen Interval: 3.3 to 4.9 mbgs	
Date	B	T	E	X	F1	F2	F3	F4	H	Pb
11-Jun-13	73	58	52	200	1,400	560	<200	<200	35	1.2

TH11									Screen Interval: 3.3 to 4.9 mbgs	
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
11-Jun-13	370	34	2,200	3,400	11,000	1,400	<200	<200	130	2.6
28-Oct-15	96	8.1	710	120	4,400	2,500	1,300	820	72	4.6
11-Aug-16	100	6.3	590	160	5,000	6,700	2,200	1,300	37	6.0
11-Aug-16 (DUP)	110	7.1	610	170	4,900	7,100	2,400	1,400	43	3.3

TH12									Screen Interval: 3.3 to 4.9 mbgs	
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
11-Jun-13	380	35	2,300	3,500	11,000	3,100	<200	<200	<100	6.8
11-Jun-13 (DUP)	360	34	2,300	3,500	11,000	2,800	<200	<200	<100	6.9
28-Oct-15	95	14	620	400	4,500	1,600	540	320	140	4.5
11-Aug-16	130	17	1,100	630	6,800	1,800	900	510	120	2.1
20-Jun-17	160	11	1,200	170	7,900	2,800	750	460	NA	3.8
20-Jun-17 (DUP)	150	11	1,200	160	7,300	2,600	700	430	NA	4.5

TH100									Screen Interval: 3.0 to 4.9 mbgs	
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
6-Oct-14	<0.20	<0.20	0.31	0.91	<25	<100	<200	<200	<5.0	<0.50
27-Oct-15	<0.20	<0.20	0.94	1.1	<25	<100	<200	<200	<5.0	<0.50
27-Oct-15 (DUP)	<0.20	<0.20	0.24	<0.40	<25	<100	<200	<200	<5.0	<0.50
10-Aug-16	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
20-Jun-17	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	NA	<0.50

TH101									Screen Interval: 3.0 to 4.9 mbgs	
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
6-Oct-14	85	12	580	500	4,100	830	<200	<200	44	2.9
06-Oct-14 (DUP)	84	12	580	510	4,100	910	<200	<200	54	4.2
28-Oct-15	110	16	740	590	3,400	830	<200	<200	64	4.6
11-Aug-16	49	8.6	580	390	2,200	590	<200	<200	23	0.63
20-Jun-17	76	14	870	410	4,800	1,100	<200	<200	NA	0.84

TH102									Screen Interval: 3.0 to 4.9 mbgs	
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
6-Oct-14	0.72	0.52	16	42	360	360	<200	<200	7.2	3.9
28-Oct-15	42	1.6	100	140	970	350	<200	<200	23	1.5
11-Aug-16	8.3	<0.20	33	21	510	180	<200	<200	18	1.4
20-Jun-17	19	3.1	190	120	1,800	500	<200	<200	NA	<0.50

MW15-01									Screen Interval: 3.0 to 6.0 mbgs	
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
17-Nov-15	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
9-Aug-16	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
22-Jun-17	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	NA	<0.50

MW15-02									Screen Interval: 2.7 to 4.9 mbgs	
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
17-Nov-15	44	5.9	180	170	2,300	750	<200	<200	35	2.2
9-Aug-16	78	4.7	73	25	800	450	<200	<200	5.5	<0.50
22-Jun-17	20	1.0	1.5	2.3	190	110	<200	<200	NA	1.1

MW16-01									Screen Interval: 3.3 - 4.8 mbgs	
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-16	18	3.8	41	59	250	<100	<200	<200	NA	0.53
21-Jun-17	46	3.7	170	79	820	260	<200	<200	NA	1.2

ONTARIO STANDARDS

PARAMETERS	B	T	E	X	F1	F2	F3	F4	HA	Pb
CRITERIA[a]	430	18,000	2,300	4,200	750[b]	150	500	500	520	25
RDL	0.20	0.20	0.20	0.40	100	100	200	200	10	0.50
UNITS	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L

(a) O.REG 153 (MOECC 2011) TABLE 3 FULL DEPTH GENERIC SITE CONDITION STANDARDS FOR ALL TYPES OF PROPERTY USE FOR GROUNDWATER IN MEDIUM AND FINE TEXTURED SOIL IN A NON-POTABLE GROUNDWATER CONDITION.

(b) F1 FRACTION DOES NOT INCLUDE BTEX; HOWEVER, THE PROPONENT HAS THE CHOICE AS TO WHETHER OR NOT TO SUBTRACT BTEX FROM THE ANALYTICAL RESULT.

LEGEND

PROPERTY BOUNDARY

BOREHOLE LOCATION COMPLETED AS A MONITORING WELL

SOIL VAPOUR PROBE

LIST OF APPLICABLE ABBREVIATIONS

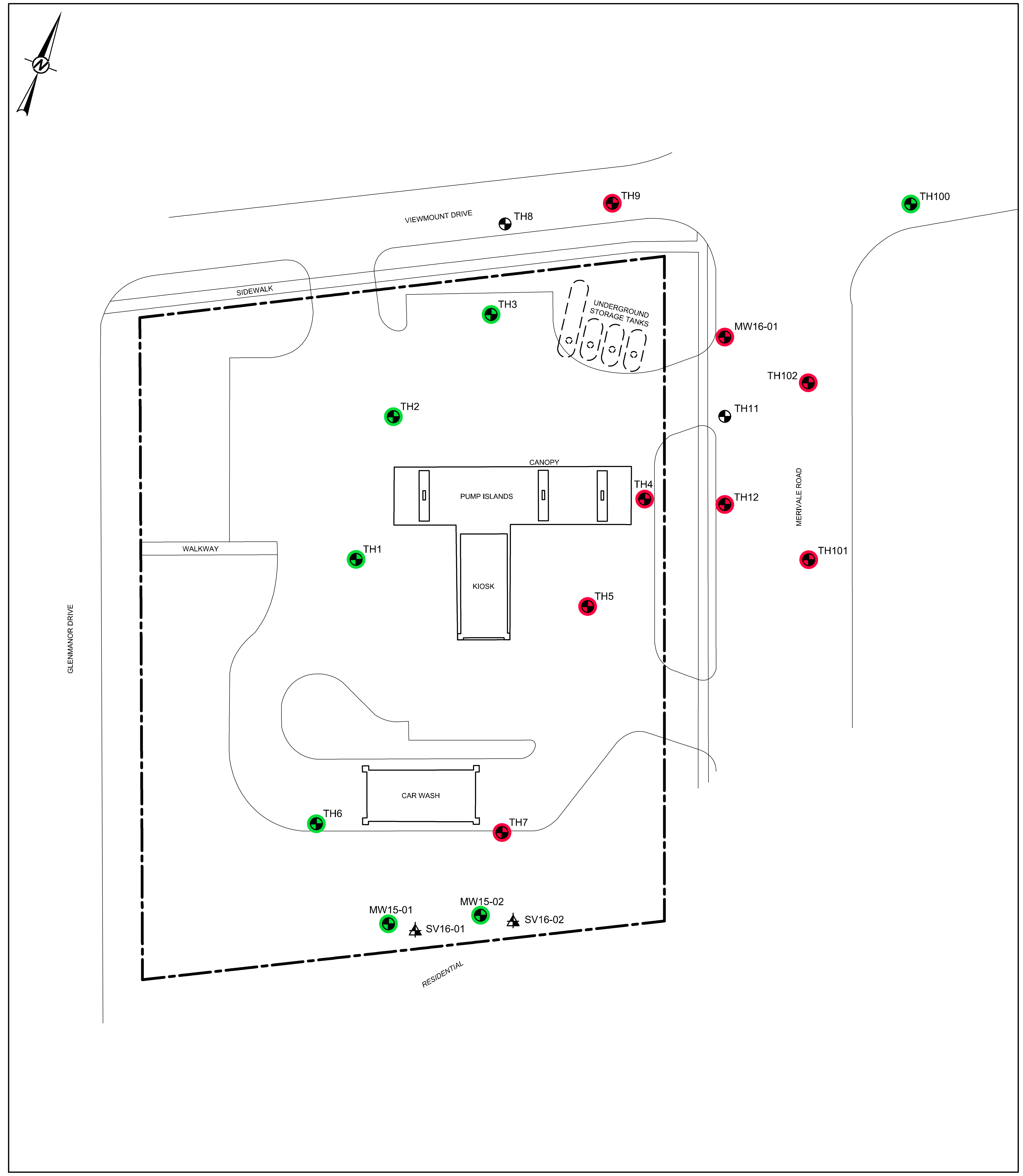
<	LESS THAN
µg/L	MICROGRAMS PER LITRE
B	BENZENE
T	TOLUENE
E	ETHYLBENZENE
X	XYLENES
F1	PETROLEUM HYDROCARBON FRACTION 1 (C_6-C_{10}) LESS BTEX
F2	PETROLEUM HYDROCARBON FRACTION 2 (C_{10}-C_{16})
F3	PETROLEUM HYDROCARBON FRACTION 3 (C_{16}-C_{21})
F4	PETROLEUM HYDROCARBON FRACTION 4 (C_{21}-C_{32})
HA	n-HEXANE
mbgs	METRES BELOW GROUND SURFACE
MOECC	MINISTRY OF THE ENVIRONMENT AND CLIMATE CHANGE
NA	NOT AVAILABLE
O.REG	ONTARIO REGULATION
RDL	REPORTABLE DETECTION LIMIT
Pb	LEAD

NOTES

1. LOCATIONS WHERE CURRENT GROUNDWATER SAMPLE MEETS APPLICABLE GUIDELINES/STANDARDS FOR ALL PARAMETERS ANALYZED SHOWN IN **GREEN.**
2. LOCATIONS WHERE CURRENT GROUNDWATER SAMPLE EXCEEDS APPLICABLE GUIDELINES/STANDARDS FOR AT LEAST ONE OF THE PARAMETERS ANALYZED SHOWN IN **RED.**
3. EXCEEDANCES OF APPLICABLE GUIDELINES/STANDARDS IN TEXT ARE SHOWN IN **RED.**
4. LOCATION WHERE NO SAMPLES WERE TAKEN IN THE CURRENT SAMPLING EVENT SHOWN IN **BLACK**.

REFERENCE

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No.: 11010-SITE PLAN ONSITE-JUN14; SCALE: UNKNOWN; DATE: JUNE 2014.



0 10 20
(APPROX.) METRES

CLIENT	IMPERIAL OIL LIMITED
CONSULTANT	Golder Associates
YYYY-MM-DD	2018-02-14
DESIGNED	TLafreniere
PREPARED	EHernandez
REVIEWED	LMcDavid
APPROVED	SDesrocher
PROJECT	FORMER RETAIL FUEL OUTLET 1660 MERIVALE ROAD OTTAWA, ONTARIO
TITLE	**GROUNDWATER ANALYTICAL RESULTS - BTEX, PHC FRACTIONS F1 - F4, n-HEXANE AND LEAD**
PROJECT NO.	1669090
PHASE-TASK	1155-2016B
REV.	0
FIGURE	4

25 mm IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI C

Path: \\golder.gds\gal\Windsor\Active\CAD\IMPERIAL_OIL\DOWNSTREAM\OTTAWA_ON_1660_MERIVALE_ROAD\99_PROJECTS\1669090\02_PRODUCTION\1155-2016B\Onsite\DWG\ | File Name: 1669090-1155-HS-0004.dwg | Last Edited By: phong Date: 2018-02-14 Time:5:21:48 PM | Printed By: DBondy Date: 2018-02-14 Time:5:17:09 PM

LEGEND

PROPERTY BOUNDARY

BOREHOLE LOCATION COMPLETED AS A MONITORING WELL

SOIL VAPOUR PROBE

LIST OF APPLICABLE ABBREVIATIONS

<	LESS THAN	F1	PETROLEUM HYDROCARBON FRACTION 1 (C_6-C_{10}) LESS BTEX
µg/m³	MICROGRAMS PER CUBIC METRES	F2	PETROLEUM HYDROCARBON FRACTION 2 (C_{10}-C_{16})
1,1-DCA	1,1-DICHLOROETHANE	F113	FREON 113
1,1-DCE	1,1-DICHLOROETHENE	F1	PETROLEUM HYDROCARBON FRACTION 1 (C_6-C_{10}) LESS BTEX
1,1,1-TCA	1,1,1-TRICHLOROETHANE	F2	PETROLEUM HYDROCARBON FRACTION 2 (C_{10}-C_{16})
1,1,1,2-TCA	1,1,1,2-TETRACHLOROETHANE	HA	n-HEXANE
1,1,2-TCA	1,1,2-TRICHLOROETHANE	HPA	HEPTANE
1,1,2,2-TCA	1,1,2,2-TETRACHLOROETHANE	HXCBDE	HEXACHLOROBUTADIENE
1,2-DBA	1,2-DIBROMOETHANE (ETHYLENE DIBROMIDE)	IPA	ISOPROPANOL
1,2-DCA	1,2-DICHLOROETHANE	mbgs	METRES BELOW GROUND SURFACE
1,2-DCB	1,2-DICHLOROBENZENE	MBK	METHYL BUTYL KETONE
1,2-DCPA	1,2-DICHLOROPROPANE	MCB	CHLOROBENZENE
1,2-DCTFA	1,2-DICHLOROTETRAFLUROACETONE	MEK	METHYL ETHYL KETONE (2-BUTANONE)
1,2,4-TCB	1,2,4-TRICHLOROBENZENE	MIBK	4-METHYL-2-PENTANONE OR METHYL ISOBUTYL KETONE
1,2,4-TMB	1,2,4-TRIMETHYLBENZENE	MOECC	MINISTRY OF THE ENVIRONMENT AND CLIMATE CHANGE
1,3-BDE	1,3-BROMINATED DIPHENYL ETHERS	MTBE	METHYL TERTIARY BUTYL ETHER
1,3-DCB	1,3-DICHLOROBENZENE	n/c	NOT CALCULATED
1,3,5-TMB	1,3,5-TRIMETHYLBENZENE	n/s	NO STANDARD
1,4-DCB	1,4-DICHLOROBENZENE	NPT	NAPHTHALENE
1,4-DOX	1,4-DIOXANE	PCE	TETRACHLOROETHENE
2,2,4-TMP	2,2,4-TRIMETHYLBENZENE	PE	PROPYLENE
4-ETT	4-ETHYLTOLUENE	RDL	REPORTABLE DETECTION LIMIT
ACTN	ACETONE	SVSL	SOIL VAPOUR SCREENING LEVEL
B	BENZENE	ST	STYRENE
BDCMA	BROMODICHLOROMETHANE	t-1,2-DCE	TRANS-1,2-DICHLOROETHENE
BF	BROMOFORM	t-1,3-DCPE	TRANS-1,3-DICHLOROPROPENE
BMA	BROMOMETHANE	T	TOLUENE
BZLC	BENZYL CHLORIDE	TCE	TRICHLOROETHENE
c-1,2-DCE	CIS-1,2-DICHLOROETHENE	TCM	CHLOROFORM
c-1,3-DCPE	CIS-1,3-DICHLOROPROPENE	TCFMA	TRICHLOROFLUOROMETHANE
CA	CHLOROETHANE	THF	TETRAHYDROFURAN
CDS	CARBON DISULFIDE	VAC	VINYL ACETATE
CMA	CHLOROMETHANE	VC	VINYL CHLORIDE
CT	CARBON TETRACHLORIDE	X	XYLENES
CYHA	CYCLOHEXANE		
DBCM	DIBROMOCHLOROMETHANE		
DCDFMA	DICHLOROFLUOROMETHANE		
DCM	DICHLOROMETHANE		
E	ETHYLBENZENE		
EAC	ETHYL ACETATE		
ETOH	ETHANOL		

NOTES

1. LOCATIONS WHERE CURRENT SOIL VAPOUR SAMPLE MEETS APPLICABLE GUIDELINES/STANDARDS FOR ALL PARAMETERS ANALYZED SHOWN IN **GREEN**.
2. LOCATIONS WHERE CURRENT SOIL VAPOUR SAMPLE EXCEEDS APPLICABLE GUIDELINES/STANDARDS FOR AT LEAST ONE OF THE PARAMETERS ANALYZED SHOWN IN **RED**.
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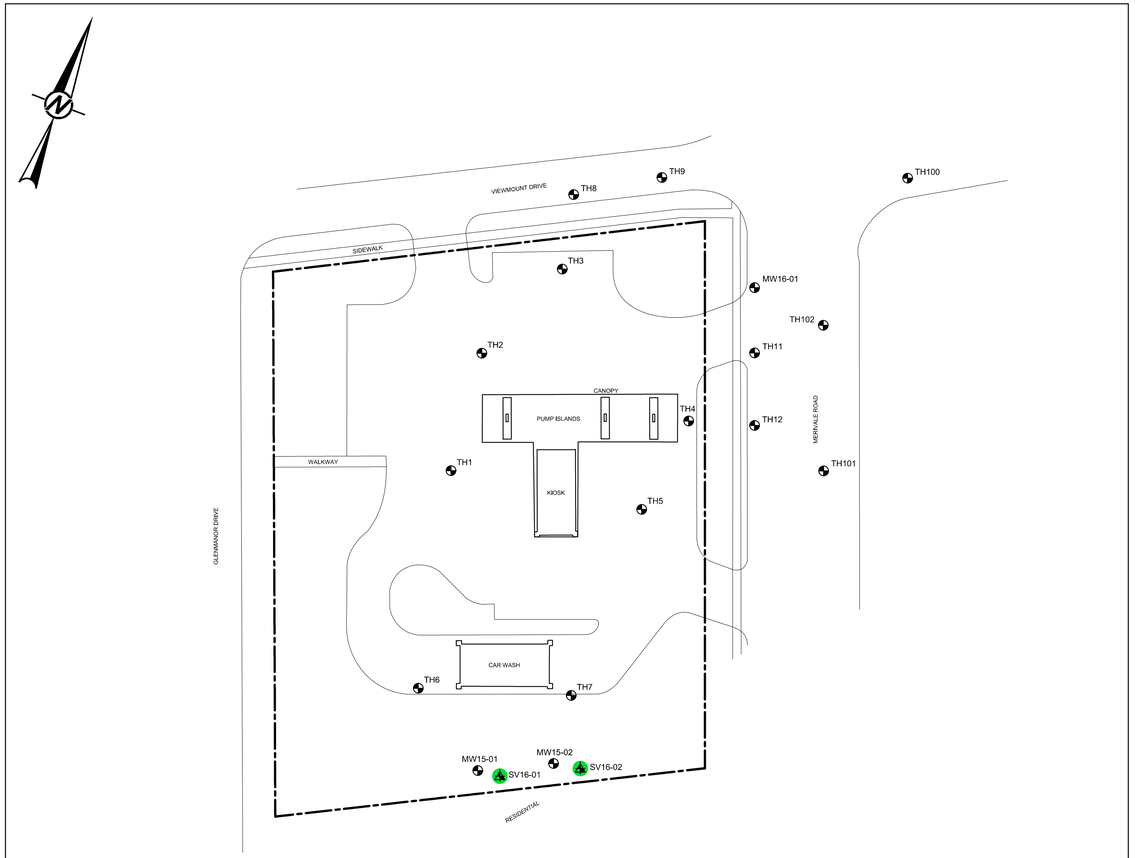

SV16-01 — Screen Interval: 1.35 - 1.50 mbgs

Date	1,3-BDE	MEK	ACTN	B	BZLC	BDCMA	BF	BMA	CDS	CT	MCB	CA	TCM	CMA	DBCM	1,3-DCB	1,1-DCA	1,1-DCE	c-1,2-DCE	t-1,2-DCE	DCDFMA	DCM	1,4-DCB	1,2-DBA	1,2-DCB	1,2-DCA	1,2-DCPA	EAC	E	F113	HXCBDE	HA	MIBK	MTBE	NPT	ST	1,1,1,2-TCA	1,1,2,2-TCA	PCE	THF	T	1,2,4-TCB	1,2,4-TMB	1,3,5-TMB	1,1,1-TCA	1,1,2-TCA	TCE	TCFMA	VAC	Vinyl Bromide	VC	X	1,2-DCTFA	1,4-DOX	2,2,4-TMP	MBK	4-ETT	c-1,3-DCPE	CYHA	ETOH	IPA	HPA	F1-BTEX, C_6-C_{10} (as Toluene)	F2, C_{10}-C_{16} (as Decane)	PE	t-1,3-DCPE
13-Dec-16	<1.1	11.7	29.3	2.13	<2.6	<1.3	<2.1	<0.39	61.2	0.72	<0.46	<0.79	8.72	<0.62	<1.7	<2.4	<0.40	<0.40	0.97	47.5	4.83	<2.8	<0.60	<0.77	<0.60	<0.40	<0.46	<3.6	4.30	1.5	<5.3	15.9	<4.1	<0.72	<2.6	<0.43	<0.69	<0.69	5.98	5.5	11.3	<3.7	3.1	<2.5	<0.55	<0.55	<0.54	2.5	1.42	<0.87	<0.26	15.4	<1.2	<3.6	1.72	<4.1	<2.5	<0.45	0.86	<1.9	3.3	3.7	449	862	<19	<0.45
21-Jul-17	<1.1	4.0	76.5	<0.32	<2.6	<1.3	<2.1	<0.39	26.8	<0.63	<0.46	<0.79	2.95	<0.62	<1.7	4.6	<0.40	<0.40	<0.40	1.33	12.9	3.2	1.31	<0.77	<0.60	<0.40	<0.46	<3.6	4.56	<1.2	<5.3	2.4	<4.1	<0.72	<2.6	<0.43	<0.69	<0.69	7.03	<1.2	3.93	<3.7	11.4	3.5	<0.55	<0.55	1.09	2.7	<0.70	<0.87	<0.26	21.7	<1.2	<3.6	<0.93	<4.1	2.8	<0.45	<0.69	2.2	<2.5	<1.2	424	6,090	<2.6	<0.45
21-Jul-17 (DUP)	<1.1	3.8	78.5	<0.32	<2.6	<1.3	<2.1	<0.39	26.3	<0.63	<0.46	<0.79	2.78	<0.62	<1.7	2.8	<0.40	<0.40	<0.40	1.34	13.5	3.6	1.20	<0.77	<0.60	<0.40	<0.46	<3.6	4.43	<1.2	<5.3	2.0	<4.1	<0.72	<2.6	<0.43	<0.69	<0.69	7.21	<1.2	5.28	<3.7	12.1	3.6	<0.55	<0.55	<0.54	2.7	<0.70	<0.87	<0.26	21.1	<1.2	<3.6	<0.93	<4.1	2.8	<0.45	<0.69	2.3	8.3	<1.6	389	5,610	<1.7	<0.45
21-Nov-17	<1.1	<2.9	2.9	<0.32	<2.6	<1.3	<2.1	<0.39	3.8	<0.63	<0.46	<0.79	1.68	<0.62	<1.7	<2.4	<0.40	<0.40	<0.40	6.05	<2.8	<0.60	<0.77	<0.60	<0.40	<0.46	<3.6	1.41	<1.2	<5.3	<1.1	<4.1	<0.72	<2.6	<0.43	<0.69	<0.69	66.1	<1.2	1.28	<3.7	<2.5	<2.5	<0.55	<0.55	<0.54	1.3	<0.70	<0.87	<0.26	5.2	<1.2	<3.6	<0.93	<4.1	<2.5	<0.45	<0.69	<1.9	<2.5	<1.2	145	501	<0.86	<0.45

SV16-02 — Screen Interval: 1.45 - 1.6 mbgs

Date	1,3-BDE	MEK	ACTN	B	BZLC	BDCMA	BF	BMA	CDS	CT	MCB	CA	TCM	CMA	DBCM	1,3-DCB	1,1-DCA	1,1-DCE	c-1,2-DCE	t-1,2-DCE	DCDFMA	DCM	1,4-DCB	1,2-DBA	1,2-DCB	1,2-DCA	1,2-DCPA	EAC	E	F113	HXCBDE	HA	MIBK	MTBE	NPT	ST	1,1,1,2-TCA	1,1,2,2-TCA	PCE	THF	T	1,2,4-TCB	1,2,4-TMB	1,3,5-TMB	1,1,1-TCA	1,1,2-TCA	TCE	TCFMA	VAC	Vinyl Bromide	VC	X	1,2-DCTFA	1,4-DOX	2,2,4-TMP	MBK	4-ETT	c-1,3-DCPE	CYHA	ETOH	IPA	HPA	F1-BTEX, C_6-C_{10} (as Toluene)	F2, C_{10}-C_{16} (as Decane)	PE	t-1,3-DCPE
13-Dec-16	<1.1	5.9	13.0	1.38	<2.6	<1.3	<2.1	<0.39	13.5	<0.63	<0.46	<0.79	10.8	<0.62	<1.7	<2.4	<0.40	<0.40	<0.40	12.6	6.46	<2.8	<0.60	<0.77	<0.60	<0.40	<0.46	<3.6	2.75	<1.2	<5.3	3.4	<4.1	<0.72	<2.6	<0.43	<0.69	<0.69	<0.68	<1.2	8.57	<3.7	2.6	<2.5	<0.55	<0.55	4.55	1.5	<0.70	<0.87	<0.26	9.6	<1.2	<3.6	<0.93	<4.1	<2.5	<0.45	<0.69	<1.9	<2.5	1.4	439	563	<1.5	<0.45
13-Dec-16 (DUP)	<1.1	6.3	14.0	1.45	<2.6	<1.3	<2.1	<0.39	13.9	<0.63	<0.46	<0.79	11.1	<0.62	<1.7	<2.4	<0.40	<0.40	<0.40	13.1	6.55	<2.8	<0.60	<0.77	<0.60	<0.40	<0.46	<3.6	2.76	<1.2	<5.3	3.7	<4.1	<0.72	<2.6	<0.43	<0.69	<0.69	<0.68	<1.2	8.70	<3.7	2.7	<2.5	<0.55	<0.55	4.94	1.4	<0.70	<0.87	<0.26	10.1	<1.2	<3.6	<0.93	<4.1	<2.5	<0.45	<0.69	<1.9	<2.5	1.5	448	599	<1.5	<0.45
21-Jul-17	<1.1	<2.9	17.6	<0.32	<2.6	<1.3	<2.1	<0.39	15.8	<0.63	<0.46	<0.79	2.56	<0.62	<1.7	<2.4	<0.40	<0.40	<0.40	<0.40	36.0	4.2	<0.60	<0.77	<0.60	<0.40	<0.46	<3.6	2.33	<1.2	<5.3	<1.1	<4.1	<0.72	<2.6	<0.43	<0.69	<0.69	1.38	<1.2	2.14	<3.7	3.4	<2.5	<0.55	<0.55	5.04	2.4	<0.70	<0.87	<0.26	10.1	<1.2	<3.6	<0.93	<4.1	<2.5	<0.45	<0.69	<1.9	<2.5	<1.2	157	2,310	<0.86	<0.45
21-Nov-17	<1.1	<2.9	<1.9	<0.32	<2.6	<1.3	<2.1	<0.39	3.3	<0.63	<0.46	<0.79	1.38	<0.62	<1.7	<2.4	<0.40	<0.40	<0.40	<0.40	13.1	<2.8	<0.60	<0.77	<0.60	<0.40	<0.46	<3.6	0.67	<1.2	<5.3	<1.1	<4.1	<0.72	<2.6	<0.43	<0.69	<0.69	81.9	<1.2	0.68	<3.7	<2.5	<2.5	<0.55	<0.55	4.27	1.2	<0.70	<0.87	<0.26	2.5	<1.2	<3.6	<0.93	<4.1	<2.5	<0.45	<0.69	<1.9	<2.5	<1.2	98.3	281	<0.86	<0.45
21-Nov-17 (DUP)	<1.1	<2.9	2.4	<0.32	<2.6	<1.3	<2.1	<0.39	3.3	<0.63	<0.46	<0.79	1.38	<0.62	<1.7	<2.4	<0.40	<0.40	<0.40	<0.40	13.0	<2.8	<0.60	<0.77	<0.60	<0.40	<0.46	<3.6	0.69	<1.2	<5.3	<1.1	<4.1	<0.72	<2.6	<0.43	<0.69	<0.69	41.4	<1.2	0.58	<3.7	<2.5	<2.5	<0.55	<0.55	4.42	1.2	<0.70	<0.87	<0.26	2.5	<1.2	<3.6	<0.93	<4.1	<2.5	<0.45	<0.69	<1.9	<2.5	<1.2	64.6	292	<0.86	<0.45

ONTARIO STANDARDS

PARAMETERS	1,3-BDE	MEK	ACTN	B	BZLC	BDCMA	BF	BMA	CDS	CT	MCB	CA	TCM	CMA	DBCM	1,3-DCB	1,1-DCA	1,1-DCE	c-1,2-DCE	t-1,2-DCE	DCDFMA	DCM	1,4-DCB	1,2-DBA	1,2-DCB	1,2-DCA	1,2-DCPA	EAC	E	F113	HXCBDE	HA	MIBK	MTBE	NPT	ST	1,1,1,2-TCA	1,1,2,2-TCA	PCE	THF	T	1,2,4-TCB	1,2,4-TMB	1,3,5-TMB	1,1,1-TCA	1,1,2-TCA	TCE	TCFMA	VAC	Vinyl Bromide	VC	X	1,2-DCTFA	1,4-DOX	2,2,4-TMP	MBK	4-ETT	c-1,3-DCPE	CYHA	ETOH	IPA	HPA	F1-BTEX, C_6-C_{10} (as Toluene)	F2, C_{10}-C_{16} (as Decane)	PE	t-1,3-DCPE
RDL	1.1	2.9	1.9	0.32	2.6	1.3	2.1	0.39	1.6	0.63	0.46	0.79	0.49	0.62	1.7	2.4	0.40	0.40	0.40	0.40	0.99	2.8	0.60	0.77	0.60	0.40	0.46	3.6	0.43	1.2	5.3	1.1	4.1	0.72	2.6	0.43	0.69	0.69	0.68	1.2	0.38	3.7	2.5	2.5	0.55	0.55	0.54	1.1	0.70	0.87	0.26	1.3	1.2	3.6	0.93	4.1	2.5	0.45	0.69	1.9	2.5	1.2	5.0	5.0	0.86	0.45
HEALTH-BASED INDOOR AIR CRITERIA(a)	n/s	1,003	2,503	n/s	n/s	n/s	n/s	1	n/s	0	209	n/s	21	n/s	n/s	n/s	34	15	31	13	n/s	48	0	0	125	0	1	n/s	209	n/s	0	521	602	4	1	54	0	0	4	n/s	1,043	2	n/s	n/s	209	0	0	n/s	n/s	n/s	0	n/s	n/s	751	n/s	n/s	n/s	0	n/s	n/s	2,491	471	n/s	0
SVSL(b)	n/c	50,137	125,143	25	n/c	n/c	n/c	50	n/c	9	10,429	n/c	1045	n/c	n/c	n/c	1720	730	1565	625	n/c	2,418	14	0	6,257	2	42	n/c	10,429	n/c	3	26,071	30,082	214	39	2,711	8	1	214	n/c	52,143	83	n/c	n/c	10450	3.48	14	n/c	n/c	n/c	6	n/c	n/c	37,543	n/c	n/c	n/c	14	n/c	n/c	n/c	n/c	n/c	124,530	23,530	n/c	14
UNITS	µg/m³	µg/m³	µg/m³

TABLES

Table 1
Summary of Groundwater Field Monitoring Results
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Well Name	Top of Casing Elevation[a][b] (masl)	Ground Elevation[a][b] (masl)	Monitoring Date	Depth to Groundwater (mbtoc)	Depth to Groundwater (mbgs)	Groundwater Elevation[a][b] (masl)	Product Thickness (mm)	Headspace Vapours (ppmv)
TH1	99.99	100.08	30-Aug-11	4.080	4.18	95.83	n/d	n/d
			20-Oct-11	n/m	n/m	n/a	n/m	n/m
			15-Nov-11	n/m	n/m	n/a	n/m	n/m
			12-Jun-13	3.391	3.48	96.60	n/d	10
			26-Aug-14	3.455	3.55	96.54	n/d	75
			17-Nov-15	3.61	3.70	96.38	n/d	15
			9-Aug-16	3.70	3.79	96.29	n/d	45
			5-Dec-16	3.69	3.78	96.31	n/d	n/m
			21-Jun-17	3.23	3.32	96.76	n/d	n/d
TH2	100.04	100.14	30-Aug-11	4.10	4.19	95.88	n/d	130
			20-Oct-11	n/m	n/m	n/a	n/m	n/m
			15-Nov-11	n/m	n/m	n/a	n/m	n/m
			12-Jun-13	3.36	3.46	96.68	n/d	75
			26-Aug-14	3.47	3.57	96.57	n/d	nd
			17-Nov-15	3.47	3.57	96.57	n/d	5
			9-Aug-16	3.62	3.71	96.43	n/d	n/d
			21-Jun-17	3.58	3.67	96.47	n/d	n/d
TH3	100.28	100.41	30-Aug-11	3.14	3.27	97.03	n/d	8%
			20-Oct-11	n/m	n/m	n/a	n/m	n/m
			15-Nov-11	n/m	n/m	n/a	n/m	n/m
			12-Jun-13	2.93	3.06	97.35	n/d	35
			26-Aug-14	3.31	3.44	96.97	n/d	n/d
			28-Oct-15	3.40	3.53	96.88	n/d	195
			9-Aug-16	3.36	3.49	96.92	n/d	85
			21-Jun-17	3.10	3.23	97.18	n/d	180
TH4	100.27	100.35	30-Aug-11	3.15	3.23	97.04	n/d	45
			20-Oct-11	n/m	n/m	n/a	n/m	n/m
			15-Nov-11	n/m	n/m	n/a	n/m	n/m
			12-Jun-13	2.99	3.07	97.28	n/d	150
			26-Aug-14	2.95	3.03	97.32	n/d	30%
			17-Nov-15	3.01	3.09	97.26	n/d	160
			9-Aug-16	3.15	3.23	97.12	n/d	75
			21-Jun-17	3.08	3.16	97.19	n/d	n/d
TH5	100.12	100.23	30-Aug-11	3.22	3.34	96.79	n/d	450
			20-Oct-11	n/m	n/m	n/a	n/m	n/m
			15-Nov-11	n/m	n/m	n/a	n/m	n/m
			12-Jun-13	3.36	3.47	96.76	n/d	290
			26-Aug-14	2.94	3.05	97.18	n/d	50
			17-Nov-15	3.09	3.20	97.03	n/d	230
			9-Aug-16	2.97	3.08	97.15	n/d	5
			21-Jun-17	2.82	2.93	97.30	n/d	n/d
TH6	99.44	99.54	20-Oct-11	5.06	5.06	n/a	n/d	n/d
			15-Nov-11	n/m	n/m	n/a	n/m	n/m
			12-Jun-13	3.31	3.22	96.32	n/d	25
			26-Aug-14	3.56	3.48	96.06	n/d	25
			28-Oct-15	3.84	3.94	95.60	n/d	1250
			9-Aug-16	3.82	3.92	95.62	n/d	45
			21-Jun-17	3.58	3.68	95.86	n/d	n/d
TH7	100.50	99.66	20-Oct-11	n/a	dry	dry	n/d	n/d
			15-Nov-11	3.77	2.93	n/a	n/d	n/d
			12-Jun-13	4.32	3.48	96.18	n/d	n/d
			26-Aug-14	4.88	4.05	95.62	n/d	n/d
			28-Oct-15	5.00	4.16	95.50	n/d	n/d
			9-Aug-16	5.01	4.17	95.49	n/d	15
			21-Jun-17	4.78	3.94	95.72	n/d	n/d
TH8	100.03	100.16	10-Jun-13	n/m	3.01	97.15	n/d	100
			6-Oct-14	3.45	n/m	n/a	n/m	n/m
			27-Oct-15	3.55	3.68	96.48	n/d	710
			10-Aug-16	n/m[c]	n/m[c]	n/m[c]	n/m[c]	10
			20-Jun-17	n/m[c]	n/m[c]	n/m[c]	n/m[c]	n/m[c]
TH9	100.46	100.59	10-Jun-13	n/m	n/m	n/a	n/m	n/m
			6-Oct-14	3.45	3.58	97.01	n/d	100%
			27-Oct-15	3.52	3.65	96.94	n/d	2,900
			10-Aug-16	3.55	3.68	96.91	n/d	100%
			20-Jun-17	3.46	3.59	97.00	n/d	100%
TH10	100.17	100.26	10-Jun-13	n/m	3.03	97.24	n/d	170
			6-Oct-14	n/m	n/m	n/a	n/m	n/m
			27-Oct-15	D	D	D	D	D
			TH10 decommissioned on August 24, 2016					
TH11	99.90	100.04	10-Jun-13	n/m	2.92	97.12	n/d	50
			6-Oct-14	n/m	n/m	n/a	n/m	n/m
			27-Oct-15	2.91	3.05	96.99	n/d	25
			10-Aug-16	2.89	3.03	97.01	n/d	320
			20-Jun-17	n/m	n/m	n/m	n/m	n/m
TH12	99.60	99.74	10-Jun-13	n/m	2.75	96.98	nd	18%
			6-Oct-14	n/m	n/m	n/a	n/m	n/m
			27-Oct-15	2.75	2.89	96.85	n/d	n/d
			10-Aug-16	2.74	2.88	96.87	n/d	n/d
			20-Jun-17	2.61	2.75	97.00	n/d	880
TH100	101.40	101.52	18-Jan-07	1.54	1.59	86	n/d	50
			6-Oct-14	3.48	3.60	97.92	n/d	200
			27-Oct-15	3.52	3.64	97.88	n/d	n/d
			10-Aug-16	3.54	3.65	97.87	n/d	n/d
			20-Jun-17	3.33	3.47	98.07	n/d	n/d
TH101	99.94	100.06	6-Oct-14	2.90	3.02	97.04	n/d	50%
			27-Oct-15	2.98	3.10	96.96	n/d	100%
			10-Aug-16	3.05	3.17	96.89	n/d	9,450
			20-Jun-17	2.94	3.06	97.00	n/d	1
TH102	100.59	100.69	6-Oct-14	3.05	3.15	97.54	n/d	10%
			27-Oct-15	3.04	3.14	97.55	n/d	2,700
			10-Aug-16	3.11	3.21	97.48	n/d	430
			20-Jun-17	3.06	3.16	97.53	n/d	420
MW15-01	97.84	97.99	17-Nov-15	2.26	2.41	95.58	n/d	n/d
			9-Aug-16	2.35	2.50	95.49	n/d	n/d
			21-Jun-17	2.16	2.31	95.68	n/d	n/d
MW15-02	98.01	98.08	17-Nov-15	2.49	2.56	95.52	n/d	n/d
			9-Aug-16	2.63	2.69	95.39	n/d	20
			21-Jun-17	2.52	2.58	95.50	n/d	n/d
MW16-01	100.19	100.30	31-Aug-16	2.87	2.97	97.32	n/d	185
			21-Jun-17	2.89	3.00	97.30	n/d	145

Notes:

[a] TH1 to TH5 and TH7 elevations are relative to local benchmark (centre of storm sewer catch basin located approximately 5 metres west of kiosk).

[b] MW15-01 , MW15-02 and TH6 elevations are relative to local benchmark (ground surface at TH7).

[c] Well was not monitored due to bentonite in the casing prohibiting interface probe to descend

D - well was destroyed

LEL - Lower explosive limit

masl - metres above sea level

mbgs - metres below ground surface

mbtoc - metres below top of casing

mm - millimetres

n/a - not available

n/d - not detected

n/m - not measured

ppmv - parts per million by volume

Table 2
Summary of Groundwater Analytical Results - Petroleum Hydrocarbons and Dissolved Lead
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

			Sample Location	**TH1**	**TH2**	**TH3**	**TH4**	**TH5**		**TH6**	**TH7**	**TH9**	**TH12**	
			Sample ID	TH1	TH2	TH3	TH4	TH5	DUP1	TH6	TH7	TH9	TH12	DUPA
			Maxxam Sample ID	EPV430	EPV429	EPV431	EPV352	EPV353	EPV354	EPV367	EPV432	EPV396	EPV392	EPV393
			Maxxam Job Number	B7D2178	B7D2178	B7D2178	B7D2158	B7D2158	B7D2158	B7D2163	B7D2178	B7D2167	B7D2167	B7D2167
			Sample Date	21-Jun-17	21-Jun-17	21-Jun-17	21-Jun-17	21-Jun-17	21-Jun-17	22-Jun-17	22-Jun-17	20-Jun-17	20-Jun-17	20-Jun-17
Parameters	**Units**	**RDL**	**Criteria[a]**											
Benzene	µg/L	0.20	430	<0.20	<0.20	19	210	210	190	<0.20	93	36	160	150
Toluene	µg/L	0.20	18,000	<0.20	<0.20	0.29	28	25	23	<0.20	8.7	5.5	11	11
Ethylbenzene	µg/L	0.20	2,300	<0.20	<0.20	77	470	690	640	<0.20	240	460	1,200	1,200
Xylenes	µg/L	0.40	4,200	<0.40	<0.40	20	1,500	1,800	1,600	<0.40	190	370	170	160
F1 (C_6-C_{10}) - BTEX	µg/L	130	750[b]	<25	<25	630	**2,000**	**4,400**	**4,400**	<25	**800**	**4,200**	**7,900**	**7,300**
F2 (C_{10}-C_{16})	µg/L	100	150	<100	<100	140	**930**	**3,600**	**3,200**	<100	**190**	**1,200**	**2,800**	**2,600**
F3 (C_{16}-C_{34})	µg/L	200	500	<200	<200	<200	<200	420	490	<200	<200	<200	**750**	**700**
F4 (C_{34}-C_{50})	µg/L	200	500	<200	<200	<200	<200	350	450	<200	<200	<200	460	430
Lead	µg/L	0.50	25	<0.50	<0.50	<0.50	0.78	1.8	2.2	<0.50	0.54	2.3	3.8	4.5

Notes:

[a] O.Reg 153 (MOECC 2011) Table 3 Full Depth Generic Site Condition Standards for all types of property use for groundwater in medium and fine textured soil in a non-potable groundwater condition

[b] F1 fraction does not include BTEX; however, the proponent has the choice as to whether or not to subtract BTEX from the analytical result.

Bold/Underlined - value exceeds criteria/standard

BTEX - benzene, toluene, ethylbenzene, xylenes

F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3 and 4

RDL - reportable detection limit

µg/L - micrograms per litre

< - less than

Table 2
Summary of Groundwater Analytical Results - Petroleum Hydrocarbons and Dissolved Lead
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

				Sample Location	**TH100**	**TH101**	**TH102**	**MW15-01**	**MW15-02**	**MW16-01**
				Sample ID	TH100	TH101	TH102	MW15-01	MW15-2	MW16-01
				Maxxam Sample ID	EPV411	EPV412	EPV413	EPV368	EPV369	EPV414
				Maxxam Job Number	B7D2173	B7D2173	B7D2173	B7D2163	B7D2163	B7D2173
				Sample Date	20-Jun-17	20-Jun-17	20-Jun-17	22-Jun-17	22-Jun-17	21-Jun-17
Parameters	**Units**	**RDL**	**Criteria[a]**							
Benzene	µg/L	0.20	430		<0.20	76	19	<0.20	20	46
Toluene	µg/L	0.20	18,000		<0.20	14	3.1	<0.20	1.0	3.7
Ethylbenzene	µg/L	0.20	2,300		<0.50	870	190	<0.20	1.5	170
Xylenes	µg/L	0.40	4,200		<25	410	120	<0.40	2.3	79
F1 (C_6-C_{10}) - BTEX	µg/L	130	750[b]		<200	**4,800**	**1,800**	<25	190	**820**
F2 (C_{10}-C_{16})	µg/L	100	150		<200	**1,100**	**500**	<100	110	**260**
F3 (C_{16}-C_{34})	µg/L	200	500		<0.20	<200	<200	<200	<200	<200
F4 (C_{34}-C_{50})	µg/L	200	500		<0.40	<200	<200	<200	<200	<200
Lead	µg/L	0.50	25		<100	0.84	<0.50	<0.50	1.1	1.2

Notes:

[a] O.Reg 153 (MOECC 2011) Table 3 Full Depth Generic Site Condition Standards for all types of property use for groundwater in medium and fine textured soil in a non-potable groundwater condition

[b] F1 fraction does not include BTEX; however, the proponent has the choice as to whether or not to subtract BTEX from the analytical result.

Bold/Underlined - value exceeds criteria/standard

BTEX - benzene, toluene, ethylbenzene, xylenes

F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3 and 4

RDL - reportable detection limit

µg/L - micrograms per litre

< - less than

Table 3
Field Screening and Leak Test Measurements
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Sampling Location	Sampling Date	Organic Vapour Concentration	Methane Concentration (%)	Carbon dioxide Concentration (%)	Oxygen Concentration (%)	Helium Concentration Inside Shroud (ppmv)	Helium Concentration in Probe (ppmv)	Helium Ratio of Below Grade/Shroud Concentration (%)	Pass Leak Test[(a)] (Y/N)
SV16-01	13-Dec-16	n/d	0	0	21.7	364,000	1,600	0.44	Y
		n/d	0.101	0	21.5	n/m	n/m	n/c	n/c
		197 ppbv	0	0	21.3	n/m	n/m	n/c	n/c
	21-Jul-17	1610 ppmv	0	0.5	18.1	129,000	0	0.00	Y
		1350 ppmv	0	0.1	19.7	n/m	n/m	n/c	n/c
		1668 ppmv	0	0.1	19.9	n/m	n/m	n/c	n/c
	21-Nov-17	24.92 ppmv	0	0.9	20.1	218,000	0	0.00	Y
		22.12 ppmv	0	0.9	20.2	n/m	n/m	n/c	n/c
		20.31 ppmv	0	0.9	20.5	n/m	n/m	n/c	n/c
SV16-02	13-Dec-16	207 ppbv	0.1	0	21.8	213,000	0	n/c	Y
		240 ppbv	0.1	0	21.6	n/m	n/m	n/c	n/c
		209 ppbv	0.1	0	21.7	n/m	n/m	n/c	n/c
	21-Jul-17	728 ppmv	0	0.5	19.6	90,000	0	0.00	Y
		677 ppmv	0	0.9	19.0	n/m	n/m	n/c	n/c
		686 ppmv	0	0.7	19.1	n/m	n/m	n/c	n/c
	21-Nov-17	20.5 ppmv	0.1	0.9	20.1	231,000	0	0.00	Y
		17.4 ppmv	0.1	0.1	20.2	n/m	n/m	n/c	n/c
		13.73 ppmv	0	0.5	19.9	n/m	n/m	n/c	n/c

Notes:

[(a)] A leak test passes if the helium ratio of below grade to shroud concentration is less than 1%

n/c - not calculated

n/d - not detected

n/m - not measured

ppbv - parts per billion by volume

ppmv - parts per million by volume

> - greater than

< - less than

Table 4
Summary of Soil Vapour Analytical Results
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

					SV16-01			
				Sample ID	SV16-01	SV16-01	DUP 1	SV16-01
				Maxxam Sample ID	DPX367	EUN919	EUN921	FPK129
				Maxxam Job Number	B6R1882	B7F6793	B7F6793	B7Q3206
				Sample Date	13-Dec-16	21-Jul-17	21-Jul-17	21-Nov-17
Parameters	**Units**	**RDL**	**Criteria[a]**	**Criteria[b]**				
1,3-Butadiene	µg/m³	1.1	n/g	n/c	<1.1	<1.1	<1.1	<1.1
2-Butanone	µg/m³	2.9	1,003	50,137	11.7	4.0	3.8	<2.9
Acetone	µg/m³	1.9	2,503	125,143	29.3	76.5	78.5	2.9
Benzene	µg/m³	0.32	1	25	2.13	<0.32	<0.32	<0.32
Benzyl Chloride	µg/m³	2.6	n/g	n/c	<2.6	<2.6	<2.6	<2.6
Bromodichloromethane	µg/m³	1.3	n/g	n/c	<1.3	<1.3	<1.3	<1.3
Bromoform	µg/m³	2.1	n/g	n/c	<2.1	<2.1	<2.1	<2.1
Bromomethane	µg/m³	0.39	1	50	<0.39	<0.39	<0.39	<0.39
Carbon Disulfide	µg/m³	1.6	n/g	n/c	61.2	26.8	26.3	3.8
Carbon Tetrachloride	µg/m³	0.63	0	9	0.72	<0.63	<0.63	<0.63
Chlorobenzene	µg/m³	0.46	209	10,429	<0.46	<0.46	<0.46	<0.46
Chloroethane	µg/m³	0.79	n/g	n/c	<0.79	<0.79	<0.79	<0.79
Chloroform	µg/m³	0.49	21	1,045	8.72	2.95	2.78	1.68
Chloromethane	µg/m³	0.62	n/g	n/c	<0.62	<0.62	<0.62	<0.62
Dibromochloromethane	µg/m³	1.7	n/g	n/c	<1.7	<1.7	<1.7	<1.7
1,3-Dichlorobenzene	µg/m³	2.4	n/g	n/c	<2.4	4.6	2.8	<2.4
1,1-Dichloroethane	µg/m³	0.40	34	1,720	<0.40	<0.40	<0.40	<0.40
1,1-Dichloroethene	µg/m³	0.40	15	730	<0.40	<0.40	<0.40	<0.40
cis-1,2-Dichloroethene	µg/m³	0.40	31	1,565	0.97	<0.40	<0.40	<0.40
trans-1,2-Dichloroethene	µg/m³	0.40	13	625	47.5	1.33	1.34	<0.40
Dichlorodifluoromethane	µg/m³	0.99	n/g	n/c	4.93	12.9	13.5	6.05
Dichloromethane (methylene chloride)	µg/m³	2.8	48	2,418	<2.8	3.2	3.6	<2.8
1,4-Dichlorobenzene	µg/m³	0.60	0	14	<0.60	1.31	1.20	<0.60
1,2-Dibromoethane	µg/m³	0.77	0	0	<0.77	<0.77	<0.77	<0.77
1,2-Dichlorobenzene	µg/m³	0.60	125	6,257	<0.60	<0.60	<0.60	<0.60
1,2-Dichloroethane	µg/m³	0.40	0	2	<0.40	<0.40	<0.40	<0.40
1,2-Dichloropropane	µg/m³	0.46	1	42	<0.46	<0.46	<0.46	<0.46
Ethyl Acetate	µg/m³	3.6	n/g	n/c	<3.6	<3.6	<3.6	<3.6
Ethylbenzene	µg/m³	0.43	209	10,429	4.30	4.56	4.43	1.41
Freon 113	µg/m³	1.2	n/g	n/c	1.5	<1.2	<1.2	<1.2
Hexachlorobutadiene	µg/m³	5.3	0	3	<5.3	<5.3	<5.3	<5.3
n-Hexane	µg/m³	1.1	521	26,071	15.9	2.4	2.0	<1.1
4-Methyl-2-pentanone or Methyl Isobutyl Ketone	µg/m³	4.1	602	30,082	<4.1	<4.1	<4.1	<4.1
MTBE	µg/m³	0.72	4	214	<0.72	<0.72	<0.72	<0.72
Naphthalene	µg/m³	2.6	1	39	<2.6	<2.6	<2.6	<2.6
Styrene	µg/m³	0.43	54	2,711	<0.43	<0.43	<0.43	<0.43
1,1,1,2-Tetrachloroethane	µg/m³	0.69	0	8	<0.69	<0.69	<0.69	<0.69
1,1,2,2-Tetrachloroethane	µg/m³	0.69	0	1	<0.69	<0.69	<0.69	<0.69
Tetrachloroethylene (PERC)	µg/m³	0.68	4	214	5.98	7.03	7.21	66.1
Tetrahydrofuran	µg/m³	1.2	n/g	n/c	5.5	<1.2	<1.2	<1.2
Toluene	µg/m³	0.38	1,043	52,143	11.3	3.93	5.28	1.28
1,2,4-Trichlorobenzene	µg/m³	3.7	2	83	<3.7	<3.7	<3.7	<3.7
1,2,4-Trimethylbenzene	µg/m³	2.5	n/g	n/c	3.1	11.4	12.1	<2.5
1,3,5-Trimethylbenzene	µg/m³	2.5	n/g	n/c	<2.5	3.5	3.6	<2.5
1,1,1-Trichloroethane	µg/m³	0.55	209	10,450	<0.55	<0.55	<0.55	<0.55
1,1,2-Trichloroethane	µg/m³	0.55	0	3.48	<0.55	<0.55	<0.55	<0.55
Trichloroethylene (TCE)	µg/m³	0.54	0	14	<0.54	1.09	<0.54	<0.54
Trichlorofluoromethane	µg/m³	1.1	n/g	n/c	2.5	2.7	2.7	1.3
Vinyl Acetate	µg/m³	0.70	n/g	n/c	1.42	<0.70	<0.70	<0.70
Vinyl Bromide	µg/m³	0.87	n/g	n/c	<0.87	<0.87	<0.87	<0.87
Vinyl Chloride	µg/m³	0.26	0	6	<0.26	<0.26	<0.26	<0.26
Xylenes, Total	µg/m³	1.3	n/g	n/c	15.4	21.7	21.1	5.2
1,2-Dichlorotetrafluoroethane	µg/m³	1.2	n/g	n/c	<1.2	<1.2	<1.2	<1.2
1,4-Dioxane	µg/m³	3.6	751	37,543	<3.6	<3.6	<3.6	<3.6
2,2,4-Trimethylpentane	µg/m³	0.93	n/g	n/c	1.72	<0.93	<0.93	<0.93
2-Hexanone or Methyl Butyl Ketone	µg/m³	4.1	n/g	n/c	<4.1	<4.1	<4.1	<4.1
4-Ethyltoluene	µg/m³	2.5	n/g	n/c	<2.5	2.8	2.8	<2.5
cis-1,3-Dichloropropene	µg/m³	0.45	0	14	<0.45	<0.45	<0.45	<0.45
Cyclohexane	µg/m³	0.69	n/g	n/c	0.86	<0.69	<0.69	<0.69
Ethanol	µg/m³	1.9	n/g	n/c	<1.9	2.2	2.3	<1.9
Isopropanol	µg/m³	2.5	n/g	n/c	3.3	<2.5	8.3	<2.5
n-Heptane	µg/m³	1.2	n/g	n/c	3.7	<1.2	<1.6	<1.2
F1-BTEX, C6-C10 (as Toluene)	µg/m³	5.0	2,491	124,530	449	424	389	145
F2, C10-C16 (as Decane)	µg/m³	5.0	471	23,530	862	6,090	5,610	501
Propylene	µg/m³	0.86	n/g	n/c	<19	<2.6	<1.7	<0.86
trans-1,3-Dichloropropene	µg/m³	0.45	0	14	<0.45	<0.45	<0.45	<0.45

Notes:

[a] Health-Based Indoor Air Criteria provided by MOECC Modified Generic Risk Assessment (Tier 2) Spreadsheet

[b] Soil Vapour Screening Levels (SVSL) for a residential building with basement (probe depth 0 - 30 centimetres

Bold/Underlined - value exceeds SVSL criteria

n/g - no guideline

n/c - not calculated

RDL - reportable detection limit

µg/m³ - micrograms per cubic metre

< - less than

Table to be read in conjunction with Laboratory Certificate of Analysis

Table 4
Summary of Soil Vapour Analytical Results
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

			Sample Location		SV16-02				
			Sample ID		SV16-02	DUP A	SV16-02	SV16-02	DUP1
			Maxxam Sample ID		DPX368	DPX369	EUN920	FPK130	FPK131
			Maxxam Job Number		B6R1882	B6R1882	B7F6793	B7Q3206	B7Q3206
			Sample Date		13-Dec-16	13-Dec-16	21-Jul-17	21-Nov-17	21-Nov-17
Parameters	**Units**	**RDL**	**Criteria[a]**	**Criteria[b]**					
1,3-Butadiene	µg/m³	1.1	n/g	n/c	<1.1	<1.1	<1.1	<1.1	<1.1
2-Butanone	µg/m³	2.9	1,003	50,137	5.9	6.3	<2.9	<2.9	<2.9
Acetone	µg/m³	1.9	2,503	125,143	13.0	14.0	17.6	<1.9	2.4
Benzene	µg/m³	0.32	1	25	1.38	1.45	<0.32	<0.32	<0.32
Benzyl Chloride	µg/m³	2.6	n/g	n/c	<2.6	<2.6	<2.6	<2.6	<2.6
Bromodichloromethane	µg/m³	1.3	n/g	n/c	<1.3	<1.3	<1.3	<1.3	<1.3
Bromoform	µg/m³	2.1	n/g	n/c	<2.1	<2.1	<2.1	<2.1	<2.1
Bromomethane	µg/m³	0.39	1	50	<0.39	<0.39	<0.39	<0.39	<0.39
Carbon Disulfide	µg/m³	1.6	n/g	n/c	13.5	13.9	15.8	3.3	3.3
Carbon Tetrachloride	µg/m³	0.63	0	9	<0.63	<0.63	<0.63	<0.63	<0.63
Chlorobenzene	µg/m³	0.46	209	10,429	<0.46	<0.46	<0.46	<0.46	<0.46
Chloroethane	µg/m³	0.79	n/g	n/c	<0.79	<0.79	<0.79	<0.79	<0.79
Chloroform	µg/m³	0.49	21	1,045	10.8	11.1	2.56	1.38	1.38
Chloromethane	µg/m³	0.62	n/g	n/c	<0.62	<0.62	<0.62	<0.62	<0.62
Dibromochloromethane	µg/m³	1.7	n/g	n/c	<1.7	<1.7	<1.7	<1.7	<1.7
1,3-Dichlorobenzene	µg/m³	2.4	n/g	n/c	<2.4	<2.4	<2.4	<2.4	<2.4
1,1-Dichloroethane	µg/m³	0.40	34	1,720	<0.40	<0.40	<0.40	<0.40	<0.40
1,1-Dichloroethene	µg/m³	0.40	15	730	<0.40	<0.40	<0.40	<0.40	<0.40
cis-1,2-Dichloroethene	µg/m³	0.40	31	1,565	<0.40	<0.40	<0.40	<0.40	<0.40
trans-1,2-Dichloroethene	µg/m³	0.40	13	625	12.6	13.1	<0.40	<0.40	<0.40
Dichlorodifluoromethane	µg/m³	0.99	n/g	n/c	6.46	6.55	36.0	13.1	13.0
Dichloromethane (methylene chloride)	µg/m³	2.8	48	2,418	<2.8	<2.8	4.2	<2.8	<2.8
1,4-Dichlorobenzene	µg/m³	0.60	0	14	<0.60	<0.60	<0.60	<0.60	<0.60
1,2-Dibromoethane	µg/m³	0.77	0	0	<0.77	<0.77	<0.77	<0.77	<0.77
1,2-Dichlorobenzene	µg/m³	0.60	125	6,257	<0.60	<0.60	<0.60	<0.60	<0.60
1,2-Dichloroethane	µg/m³	0.40	0	2	<0.40	<0.40	<0.40	<0.40	<0.40
1,2-Dichloropropane	µg/m³	0.46	1	42	<0.46	<0.46	<0.46	<0.46	<0.46
Ethyl Acetate	µg/m³	3.6	n/g	n/c	<3.6	<3.6	<3.6	<3.6	<3.6
Ethylbenzene	µg/m³	0.43	209	10,429	2.75	2.76	2.33	0.67	0.69
Freon 113	µg/m³	1.2	n/g	n/c	<1.2	<1.2	<1.2	<1.2	<1.2
Hexachlorobutadiene	µg/m³	5.3	0	3	<5.3	<5.3	<5.3	<5.3	<5.3
n-Hexane	µg/m³	1.1	521	26,071	3.4	3.7	<1.1	<1.1	<1.1
4-Methyl-2-pentanone or Methyl Isobutyl Ketone	µg/m³	4.1	602	30,082	<4.1	<4.1	<4.1	<4.1	<4.1
MTBE	µg/m³	0.72	4	214	<0.72	<0.72	<0.72	<0.72	<0.72
Naphthalene	µg/m³	2.6	1	39	<2.6	<2.6	<2.6	<2.6	<2.6
Styrene	µg/m³	0.43	54	2,711	<0.43	<0.43	<0.43	<0.43	<0.43
1,1,1,2-Tetrachloroethane	µg/m³	0.69	0	8	<0.69	<0.69	<0.69	<0.69	<0.69
1,1,2,2-Tetrachloroethane	µg/m³	0.69	0	1	<0.69	<0.69	<0.69	<0.69	<0.69
Tetrachloroethylene (PERC)	µg/m³	0.68	4	214	<0.68	<0.68	1.38	81.9	41.4
Tetrahydrofuran	µg/m³	1.2	n/g	n/c	<1.2	<1.2	<1.2	<1.2	<1.2
Toluene	µg/m³	0.38	1,043	52,143	8.57	8.70	2.14	0.68	0.58
1,2,4-Trichlorobenzene	µg/m³	3.7	2	83	<3.7	<3.7	<3.7	<3.7	<3.7
1,2,4-Trimethylbenzene	µg/m³	2.5	n/g	n/c	2.6	2.7	3.4	<2.5	<2.5
1,3,5-Trimethylbenzene	µg/m³	2.5	n/g	n/c	<2.5	<2.5	<2.5	<2.5	<2.5
1,1,1-Trichloroethane	µg/m³	0.55	209	10,450	<0.55	<0.55	<0.55	<0.55	<0.55
1,1,2-Trichloroethane	µg/m³	0.55	0	3.48	<0.55	<0.55	<0.55	<0.55	<0.55
Trichloroethylene (TCE)	µg/m³	0.54	0	14	4.55	4.94	5.04	4.27	4.42
Trichlorofluoromethane	µg/m³	1.1	n/g	n/c	1.5	1.4	2.4	1.2	1.2
Vinyl Acetate	µg/m³	0.70	n/g	n/c	<0.70	<0.70	<0.70	<0.70	<0.70
Vinyl Bromide	µg/m³	0.87	n/g	n/c	<0.87	<0.87	<0.87	<0.87	<0.87
Vinyl Chloride	µg/m³	0.26	0	6	<0.26	<0.26	<0.26	<0.26	<0.26
Xylenes, Total	µg/m³	1.3	n/g	n/c	9.6	10.1	10.1	2.5	2.5
1,2-Dichlorotetrafluoroethane	µg/m³	1.2	n/g	n/c	<1.2	<1.2	<1.2	<1.2	<1.2
1,4-Dioxane	µg/m³	3.6	751	37,543	<3.6	<3.6	<3.6	<3.6	<3.6
2,2,4-Trimethylpentane	µg/m³	0.93	n/g	n/c	<0.93	<0.93	<0.93	<0.93	<0.93
2-Hexanone or Methyl Butyl Ketone	µg/m³	4.1	n/g	n/c	<4.1	<4.1	<4.1	<4.1	<4.1
4-Ethyltoluene	µg/m³	2.5	n/g	n/c	<2.5	<2.5	<2.5	<2.5	<2.5
cis-1,3-Dichloropropene	µg/m³	0.45	0	14	<0.45	<0.45	<0.45	<0.45	<0.45
Cyclohexane	µg/m³	0.69	n/g	n/c	<0.69	<0.69	<0.69	<0.69	<0.69
Ethanol	µg/m³	1.9	n/g	n/c	<1.9	<1.9	<1.9	<1.9	<1.9
Isopropanol	µg/m³	2.5	n/g	n/c	<2.5	<2.5	<2.5	<2.5	<2.5
n-Heptane	µg/m³	1.2	n/g	n/c	1.4	1.5	<1.2	<1.2	<1.2
F1-BTEX, C6-C10 (as Toluene)	µg/m³	5.0	2,491	124,530	439	448	157	98.3	64.6
F2, C10-C16 (as Decane)	µg/m³	5.0	471	23,530	563	559	2,310	281	292
Propylene	µg/m³	0.86	n/g	n/c	<1.5	<1.5	<0.86	<0.86	<0.86
trans-1,3-Dichloropropene	µg/m³	0.45	0	14	<0.45	<0.45	<0.45	<0.45	<0.45

Notes:

[a] Health-Based Indoor Air Criteria provided by MOECC Modified Generic Risk Assessment (Tier 2) Spreadsheet

[b] Soil Vapour Screening Levels (SVSL) for a residential building with basement (probe depth 0 - 30 centimetres

Bold/Underlined - value exceeds SVSL criteria

n/g - no guideline

n/c - not calculated

RDL - reportable detection limit

µg/m³ - micrograms per cubic metre

< - less than

Table to be read in conjunction with Laboratory Certificate of Analysis

APPENDIX A LIMITATION OF LIABILITY, SCOPE OF REPORT AND THIRD PARTY RELIANCE

LIMITATION OF LIABILITY, SCOPE OF REPORT AND THIRD PARTY RELIANCE

This report has been prepared and the work referred to in this report has been undertaken by Golder Associates Ltd. for Imperial Oil Limited. It is intended for the sole and exclusive use of Imperial Oil Limited, its affiliated companies and partners and their respective insurers, agents, employees and advisors (collectively, Imperial Oil). Any use, reliance on or decision made by any person other than Imperial Oil based on this report is the sole responsibility of such other person. Imperial Oil and Golder Associates Ltd. make no representation or warranty to any other person with regard to this report and the work referred to in this report and they accept no duty of care to any other person or any liability or responsibility whatsoever for any losses, expenses, damages, fines, penalties or other harm that may be suffered or incurred by any other person as a result of the use of, reliance on, any decision made or any action taken based on this report or the work referred to in this report.

The investigation undertaken by Golder Associates Ltd. with respect to this report and any conclusions or recommendations made in this report reflect Golder Associates Ltd.'s judgement based on the site conditions observed at the time of the site inspection on the date(s) set out in this report and on information available at the time of preparation of this report. This report has been prepared for specific application to this site and it is based, in part, upon visual observation of the site, subsurface investigation at discrete locations and depths, and specific analysis of specific chemical parameters and materials during a specific time interval, all as described in this report. Unless otherwise stated, the findings cannot be extended to previous or future site conditions, portions of the site which were unavailable for direct investigation, subsurface locations which were not investigated directly, or chemical parameters, materials or analysis which were not addressed. Substances other than those addressed by the investigation described in this report may exist within the site, substances addressed by the investigation may exist in areas of the site not investigated and concentrations of substances addressed which are different than those reported may exist in areas other than the locations from which samples were taken.

If site conditions or applicable standards change or if any additional information becomes available at a future date, modifications to the findings, conclusions and recommendations in this report may be necessary.

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APPENDIX B SOIL VAPOUR PROBE LOGS

LEGEND

STRATIGRAPHY


ASPHALT


COBBLES and GRAVEL


SAND


SILTY SAND


BEDROCK


COBBLES and SAND


SAND and GRAVEL


TOPSOIL


CLAY


FILL


SHALE


CLAYEY SILT


PEAT


SILT


COAL


SANDY SILT


SILTY CLAY

WELL CONSTRUCTION DETAILS


RISER IN BENTONITE


SLOTTED SECTION


FLUSHMOUNT ROADBOX


BENTONITE


RISER IN SAND


STICKUP PIPE


SLOUGH

LIST OF APPLICABLE ABBREVIATIONS

▽	GROUNDWATER LEVEL
%LEL	LOWER EXPLOSIVE LIMIT
µS/cm	MICROSIEMENS PER CENTIMETRE
1,2-DBA	1,2-DIBROMOETHANE
1,2-DCA	1,2-DICHLOROETHANE
ARS	AIR RETURN SAMPLE
AS	AUGER SAMPLE
B	BENZENE
T	TOLUENE
E	ETHYLBENZENE
X	XYLENES
Cl	CHLORIDE
CS	CORE SAMPLE
DP	DIRECT PUSH
dS/m	DECISIEMENS PER METRE
EC	ELECTRICAL CONDUCTIVITY
EPH	EXTRACTABLE PETROLEUM HYDROCARBONS
ELEV.	ELEVATION
F1-F4	PETROLEUM HYDROCARBON FRACTION 1 TO FRACTION 4
FOC	FRACTION ORGANIC CARBON
GRAB	GRAB SAMPLE
HEPH	HEAVY EXTRACTABLE PETROLEUM HYDROCARBONS
LEPH	LIGHT EXTRACTABLE PETROLEUM HYDROCARBONS
m	METRE
mg/L	MILLIGRAMS PER LITRE
mald	METRES ABOVE LOCAL DATUM
mard	METRES ABOVE RELATIVE DATUM
masl	METRES ABOVE SEA LEVEL
mS/cm	MILLISIEMENS PER CENTIMETRE
MTBE	METHYL TERT-BUTYL ETHER
mTPH	MODIFIED TOTAL PETROLEUM HYDROCARBONS
n/a	NOT APPLICABLE
n/d	NOT DETECTED
NA	NOT AVAILABLE
Na	SODIUM
OVM	ORGANIC VAPOUR MONITOR
PAH	POLYCYCLIC AROMATIC HYDROCARBONS
Pb	LEAD
PCB	POLYCHLORINATED BIPHENYL
PHC	PETROLEUM HYDROCARBONS
PJ	PION JAR
ppmv	PARTS PER MILLION BY VOLUME
SAL	SALINITY
SPT	STANDARD PENETRATION TEST
SS	SPLIT SPOON
VPH	VOLATILE PETROLEUM HYDROCARBONS
VOC	VOLATILE ORGANIC COMPOUNDS
WS	WET SAMPLE
Zn	ZINC

\\golder.gds\CALIM\CAD\CLIENTS\Imperial Oil Limited\Templates\gINT\Coverpage-Legend\dwg files\BH_MW_Legend.dwg Aug 08, 2017 - 2:46pm

LOCATION: 1660 Merivale Road, Ottawa, Ontario
CONTRACTOR: Badger Daylighting Ltd.
EQUIPMENT USED: Hydrovac
OVM TYPE: RKI Eagle
BORING DATE: December 5, 2016

RECORD OF SOIL VAPOUR PROBE: SV16-01

DEPTH SCALE METRES	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY %	Soil Vapour Concentration (ppmv) ⊕ 50 100 150 200 / Soil Vapour Concentration (%LEL) □ 20 40 60 80	ADDITIONAL LAB TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Ground Surface								
	NO RECOVERY		0.00						Flushmount Roadbox
1									
	End of SOIL VAPOUR PROBE.		1.67						
2									
3									
4									
5									

DEPTH SCALE
1 : 25

Golder Associates

LOGGED: BM/LM
CHECKED: LM

LOCATION: 1660 Merivale Road, Ottawa, Ontario
CONTRACTOR: Badger Daylighting Ltd.
EQUIPMENT USED: Hydrovac
OVM TYPE: RKI Eagle
BORING DATE: December 5, 2016

RECORD OF SOIL VAPOUR PROBE: SV16-02

DEPTH SCALE METRES	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY %	Soil Vapour Concentration (ppmv) ⊕ 50 100 150 200 / Soil Vapour Concentration (%LEL) □ 20 40 60 80	ADDITIONAL LAB TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Ground Surface								
	NO RECOVERY		0.00						Flushmount Roadbox
1									
	End of SOIL VAPOUR PROBE.		1.87						
2									
3									
4									
5									

DEPTH SCALE
1 : 25

Golder Associates

LOGGED: BM/LM
CHECKED: LM

APPENDIX C LABORATORY CERTIFICATES OF ANALYSIS AND DATA QUALITY REVIEW CHECKLISTS

Maxxam
A Bureau Veritas Group Company

Task Order#: 4410393424
Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2023
Your C.O.C. #: 81256

Attention:Leon Burger

Golder Associates Ltd.
6925 Century Avenue
Suite #100
Mississauga, ON
Canada L5N 7K2

Report Date: 2016/12/21
Report #: R4297271
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B6R1882
Received: 2016/12/14, 10:07

Sample Matrix: AIR
Samples Received: 4

Analyses	Quantity	Laboratory Method	Primary Reference
BTEX and CCME Compounds in Air(TO-15mod)	4	BRL SOP-00304	EPA TO-15 m
Canister Pressure (TO-15)	4	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (ug/m3)	4	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (TO-15) (1)	4	BRL SOP-00304	EPA TO-15 m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported: unless indicated otherwise, associated sample data are not blank corrected. All samples were analyzed within hold time unless otherwise flagged.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods. Results relate to samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Air sampling canisters have been cleaned in accordance with U.S. EPA Method TO14A. At the end of the cleaning, evacuation, and pressurization cycles, one canister was selected and was pressurized with Zero Air. This canister was then analyzed via TO14A on a GC/MS. The canister must have been found to contain <0.2 ppbv concentration of all target analytes in order for the batch to have been considered clean. Each canister also underwent a leak check prior to shipment.

Please Note: SUMMA® canister samples will be retained by Maxxam for a period of 5 calendar days or as contractually agreed from the date of this report, after which time they will be cleaned for reuse. If you require a longer sample storage period, please contact your service representative.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam
A Bureau Veritas Group Company

Task Order#: 4410393424
Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2023
Your C.O.C. #: 81256

Attention:Leon Burger

Golder Associates Ltd.
6925 Century Avenue
Suite #100
Mississauga, ON
Canada L5N 7K2

Report Date: 2016/12/21
Report #: R4297271
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B6R1882
Received: 2016/12/14, 10:07

Encryption Key

Kyle Reinhart
Project Manager - Environmental Customer Service
21 Dec 2016 14:20:45

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kyle Reinhart, Project Manager - Environmental Customer Service
Email: kreinhart@maxxam.ca
Phone# (905) 817-5700

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6R1882
Report Date: 2016/12/21

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2023

RESULTS OF ANALYSES OF AIR

Maxxam ID		DPX367	DPX368	DPX369	DPX370	
Sampling Date		2016/12/13 11:00	2016/12/13 11:55	2016/12/13 11:58	2016/12/13 11:34	
COC Number		81256	81256	81256	81256	
	UNITS	**SV16-01**	**SV16-02**	**DUP A**	**AIR**	**QC Batch**
Pressure on Receipt	psig	(-1.7)	(-3.0)	(-1.4)	0	4796074
QC Batch = Quality Control Batch						

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Maxxam Job #: B6R1882
Report Date: 2016/12/21

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2023

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		DPX367	DPX367		DPX368	DPX369	DPX370		
Sampling Date		2016/12/13 11:00	2016/12/13 11:00		2016/12/13 11:55	2016/12/13 11:58	2016/12/13 11:34		
COC Number		81256	81256		81256	81256	81256		
	UNITS	**SV16-01**	**SV16-01 Lab-Dup**	**RDL**	**SV16-02**	**DUP A**	**AIR**	**RDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ppbv	1.00	0.91	0.20	1.31	1.32	0.59	0.20	4795923
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	<0.17	0.17	<0.17	<0.17	<0.17	0.17	4795923
Chloromethane	ppbv	<0.30	<0.30	0.30	<0.30	<0.30	0.55	0.30	4795923
Vinyl Chloride	ppbv	<0.10	<0.10	0.10	<0.10	<0.10	<0.10	0.10	4795923
Chloroethane	ppbv	<0.30	<0.30	0.30	<0.30	<0.30	<0.30	0.30	4795923
1,3-Butadiene	ppbv	<0.50	<0.50	0.50	<0.50	<0.50	<0.50	0.50	4795923
Trichlorofluoromethane (FREON 11)	ppbv	0.44	0.41	0.20	0.26	0.25	0.25	0.20	4795923
Ethanol (ethyl alcohol)	ppbv	<1.0	<1.0	1.0	<1.0	<1.0	1.4	1.0	4795923
Trichlorotrifluoroethane	ppbv	0.20	0.19	0.15	<0.15	<0.15	<0.15	0.15	4795923
2-propanol	ppbv	1.3	1.1	1.0	<1.0	<1.0	<1.0	1.0	4795923
2-Propanone	ppbv	12.4	12.4	0.80	5.46	5.90	1.73	0.80	4795923
Methyl Ethyl Ketone (2-Butanone)	ppbv	4.0	4.1	1.0	2.0	2.1	<1.0	1.0	4795923
Methyl Isobutyl Ketone	ppbv	<1.0	<1.0	1.0	<1.0	<1.0	<1.0	1.0	4795923
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	<1.0	1.0	<1.0	<1.0	<1.0	1.0	4795923
Methyl t-butyl ether (MTBE)	ppbv	<0.20	<0.20	0.20	<0.20	<0.20	<0.20	0.20	4795923
Ethyl Acetate	ppbv	<1.0	<1.0	1.0	<1.0	<1.0	<1.0	1.0	4795923
1,1-Dichloroethylene	ppbv	<0.10	<0.10	0.10	<0.10	<0.10	<0.10	0.10	4795923
cis-1,2-Dichloroethylene	ppbv	0.25	0.11	0.10	<0.10	<0.10	<0.10	0.10	4795923
trans-1,2-Dichloroethylene	ppbv	12.0	11.4	0.10	3.18	3.30	<0.10	0.10	4795923
Methylene Chloride(Dichloromethane)	ppbv	<0.80	<0.80	0.80	<0.80	<0.80	<0.80	0.80	4795923
Chloroform	ppbv	1.79	1.80	0.10	2.22	2.28	<0.10	0.10	4795923
Carbon Tetrachloride	ppbv	0.11	0.13	0.10	<0.10	<0.10	<0.10	0.10	4795923
1,1-Dichloroethane	ppbv	<0.10	<0.10	0.10	<0.10	<0.10	<0.10	0.10	4795923
1,2-Dichloroethane	ppbv	<0.10	<0.10	0.10	<0.10	<0.10	<0.10	0.10	4795923
Ethylene Dibromide	ppbv	<0.10	<0.10	0.10	<0.10	<0.10	<0.10	0.10	4795923
1,1,1-Trichloroethane	ppbv	<0.10	<0.10	0.10	<0.10	<0.10	<0.10	0.10	4795923
1,1,2-Trichloroethane	ppbv	<0.10	<0.10	0.10	<0.10	<0.10	<0.10	0.10	4795923
1,1,2,2-Tetrachloroethane	ppbv	<0.10	<0.10	0.10	<0.10	<0.10	<0.10	0.10	4795923
cis-1,3-Dichloropropene	ppbv	<0.10	<0.10	0.10	<0.10	<0.10	<0.10	0.10	4795923
trans-1,3-Dichloropropene	ppbv	<0.10	<0.10	0.10	<0.10	<0.10	<0.10	0.10	4795923
1,2-Dichloropropane	ppbv	<0.10	<0.10	0.10	<0.10	<0.10	<0.10	0.10	4795923
Bromomethane	ppbv	<0.10	<0.10	0.10	<0.10	<0.10	<0.10	0.10	4795923
Bromoform	ppbv	<0.20	<0.20	0.20	<0.20	<0.20	<0.20	0.20	4795923

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B6R1882
Report Date: 2016/12/21

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2023

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		DPX367	DPX367		DPX368	DPX369	DPX370		
Sampling Date		2016/12/13 11:00	2016/12/13 11:00		2016/12/13 11:55	2016/12/13 11:58	2016/12/13 11:34		
COC Number		81256	81256		81256	81256	81256		
	UNITS	**SV16-01**	**SV16-01 Lab-Dup**	**RDL**	**SV16-02**	**DUP A**	**AIR**	**RDL**	**QC Batch**
Bromodichloromethane	ppbv	<0.20	<0.20	0.20	<0.20	<0.20	<0.20	0.20	4795923
Dibromochloromethane	ppbv	<0.20	<0.20	0.20	<0.20	<0.20	<0.20	0.20	4795923
Trichloroethylene	ppbv	<0.10	<0.10	0.10	0.85	0.92	<0.10	0.10	4795923
Tetrachloroethylene	ppbv	0.88	0.88	0.10	<0.10	<0.10	<0.10	0.10	4795923
Benzene	ppbv	0.67	0.71	0.10	0.43	0.45	0.19	0.10	4795923
Toluene	ppbv	3.01	3.15	0.10	2.28	2.31	0.18	0.10	4795923
Ethylbenzene	ppbv	0.99	0.95	0.10	0.63	0.64	<0.10	0.10	4795923
p+m-Xylene	ppbv	2.63	2.44	0.20	1.61	1.73	<0.20	0.20	4795923
o-Xylene	ppbv	0.91	0.84	0.10	0.61	0.59	<0.10	0.10	4795923
Styrene	ppbv	<0.10	<0.10	0.10	<0.10	<0.10	<0.10	0.10	4795923
4-ethyltoluene	ppbv	<0.50	<0.50	0.50	<0.50	<0.50	<0.50	0.50	4795923
1,3,5-Trimethylbenzene	ppbv	<0.50	<0.50	0.50	<0.50	<0.50	<0.50	0.50	4795923
1,2,4-Trimethylbenzene	ppbv	0.64	0.62	0.50	0.54	0.54	<0.50	0.50	4795923
Chlorobenzene	ppbv	<0.10	<0.10	0.10	<0.10	<0.10	<0.10	0.10	4795923
Benzyl chloride	ppbv	<0.50	<0.50	0.50	<0.50	<0.50	<0.50	0.50	4795923
1,3-Dichlorobenzene	ppbv	<0.40	<0.40	0.40	<0.40	<0.40	<0.40	0.40	4795923
1,4-Dichlorobenzene	ppbv	<0.10	<0.10	0.10	<0.10	<0.10	<0.10	0.10	4795923
1,2-Dichlorobenzene	ppbv	<0.10	<0.10	0.10	<0.10	<0.10	<0.10	0.10	4795923
1,2,4-Trichlorobenzene	ppbv	<0.50	<0.50	0.50	<0.50	<0.50	<0.50	0.50	4795923
Hexachlorobutadiene	ppbv	<0.50	<0.50	0.50	<0.50	<0.50	<0.50	0.50	4795923
Hexane	ppbv	4.50	4.60	0.30	0.97	1.04	<0.30	0.30	4795923
Heptane	ppbv	0.90	1.02	0.30	0.35	0.37	<0.30	0.30	4795923
Cyclohexane	ppbv	0.25	0.31	0.20	<0.20	<0.20	<0.20	0.20	4795923
Tetrahydrofuran	ppbv	1.86	1.86	0.40	<0.40	<0.40	<0.40	0.40	4795923
1,4-Dioxane	ppbv	<1.0	<1.0	1.0	<1.0	<1.0	<1.0	1.0	4795923
Naphthalene	ppbv	<0.50	<0.50	0.50	<0.50	<0.50	<0.50	0.50	4795923
Total Xylenes	ppbv	3.54	3.29	0.30	2.22	2.32	<0.30	0.30	4795923
1,1,1,2-Tetrachloroethane	ppbv	<0.10	<0.10	0.10	<0.10	<0.10	<0.10	0.10	4795923
Vinyl Bromide	ppbv	<0.20	<0.20	0.20	<0.20	<0.20	<0.20	0.20	4795923
Propene	ppbv	<11	<11	11	<0.90	<0.90	<0.90	0.90	4795923
2,2,4-Trimethylpentane	ppbv	0.37	0.39	0.20	<0.20	<0.20	<0.20	0.20	4795923
Carbon Disulfide	ppbv	19.6	18.8	0.50	4.34	4.47	<0.50	0.50	4795923
Vinyl Acetate	ppbv	0.40	0.41	0.20	<0.20	<0.20	<0.20	0.20	4795923

RDL = Reportable Detection Limit
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Maxxam Job #: B6R1882
Report Date: 2016/12/21

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2023

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		DPX367	DPX367		DPX368	DPX369	DPX370		
Sampling Date		2016/12/13 11:00	2016/12/13 11:00		2016/12/13 11:55	2016/12/13 11:58	2016/12/13 11:34		
COC Number		81256	81256		81256	81256	81256		
	UNITS	**SV16-01**	**SV16-01 Lab-Dup**	**RDL**	**SV16-02**	**DUP A**	**AIR**	**RDL**	**QC Batch**
Instrument Surrogate Recovery (%)									
Bromochloromethane	%	82	76		78	78	79		4795923
D5-Chlorobenzene	%	66	65		67	66	66		4795923
Difluorobenzene	%	79	73		76	76	77		4795923

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Maxxam Job #: B6R1882
Report Date: 2016/12/21

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2023

CALCULATED VOLATILE ORGANICS (AIR)

Maxxam ID		DPX367	DPX367		DPX368	DPX369	DPX370		
Sampling Date		2016/12/13 11:00	2016/12/13 11:00		2016/12/13 11:55	2016/12/13 11:58	2016/12/13 11:34		
COC Number		81256	81256		81256	81256	81256		
	UNITS	**SV16-01**	**SV16-01 Lab-Dup**	**RDL**	**SV16-02**	**DUP A**	**AIR**	**RDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ug/m3	4.93	4.50	0.99	6.46	6.55	2.91	0.99	4792553
1,2-Dichlorotetrafluoroethane	ug/m3	<1.2	<1.2	1.2	<1.2	<1.2	<1.2	1.2	4792553
Chloromethane	ug/m3	<0.62	<0.62	0.62	<0.62	<0.62	1.13	0.62	4792553
Vinyl Chloride	ug/m3	<0.26	<0.26	0.26	<0.26	<0.26	<0.26	0.26	4792553
Chloroethane	ug/m3	<0.79	<0.79	0.79	<0.79	<0.79	<0.79	0.79	4792553
1,3-Butadiene	ug/m3	<1.1	<1.1	1.1	<1.1	<1.1	<1.1	1.1	4792553
Trichlorofluoromethane (FREON 11)	ug/m3	2.5	2.3	1.1	1.5	1.4	1.4	1.1	4792553
Ethanol (ethyl alcohol)	ug/m3	<1.9	<1.9	1.9	<1.9	<1.9	2.7	1.9	4792553
Trichlorotrifluoroethane	ug/m3	1.5	1.5	1.2	<1.2	<1.2	<1.2	1.2	4792553
2-propanol	ug/m3	3.3	2.8	2.5	<2.5	<2.5	<2.5	2.5	4792553
2-Propanone	ug/m3	29.3	29.4	1.9	13.0	14.0	4.1	1.9	4792553
Methyl Ethyl Ketone (2-Butanone)	ug/m3	11.7	12.0	2.9	5.9	6.3	<2.9	2.9	4792553
Methyl Isobutyl Ketone	ug/m3	<4.1	<4.1	4.1	<4.1	<4.1	<4.1	4.1	4792553
Methyl Butyl Ketone (2-Hexanone)	ug/m3	<4.1	<4.1	4.1	<4.1	<4.1	<4.1	4.1	4792553
Methyl t-butyl ether (MTBE)	ug/m3	<0.72	<0.72	0.72	<0.72	<0.72	<0.72	0.72	4792553
Ethyl Acetate	ug/m3	<3.6	<3.6	3.6	<3.6	<3.6	<3.6	3.6	4792553
1,1-Dichloroethylene	ug/m3	<0.40	<0.40	0.40	<0.40	<0.40	<0.40	0.40	4792553
cis-1,2-Dichloroethylene	ug/m3	0.97	0.44	0.40	<0.40	<0.40	<0.40	0.40	4792553
trans-1,2-Dichloroethylene	ug/m3	47.5	45.4	0.40	12.6	13.1	<0.40	0.40	4792553
Methylene Chloride(Dichloromethane)	ug/m3	<2.8	<2.8	2.8	<2.8	<2.8	<2.8	2.8	4792553
Chloroform	ug/m3	8.72	8.80	0.49	10.8	11.1	<0.49	0.49	4792553
Carbon Tetrachloride	ug/m3	0.72	0.82	0.63	<0.63	<0.63	<0.63	0.63	4792553
1,1-Dichloroethane	ug/m3	<0.40	<0.40	0.40	<0.40	<0.40	<0.40	0.40	4792553
1,2-Dichloroethane	ug/m3	<0.40	<0.40	0.40	<0.40	<0.40	<0.40	0.40	4792553
Ethylene Dibromide	ug/m3	<0.77	<0.77	0.77	<0.77	<0.77	<0.77	0.77	4792553
1,1,1-Trichloroethane	ug/m3	<0.55	<0.55	0.55	<0.55	<0.55	<0.55	0.55	4792553
1,1,2-Trichloroethane	ug/m3	<0.55	<0.55	0.55	<0.55	<0.55	<0.55	0.55	4792553
1,1,2,2-Tetrachloroethane	ug/m3	<0.69	<0.69	0.69	<0.69	<0.69	<0.69	0.69	4792553
cis-1,3-Dichloropropene	ug/m3	<0.45	<0.45	0.45	<0.45	<0.45	<0.45	0.45	4792553
trans-1,3-Dichloropropene	ug/m3	<0.45	<0.45	0.45	<0.45	<0.45	<0.45	0.45	4792553
1,2-Dichloropropane	ug/m3	<0.46	<0.46	0.46	<0.46	<0.46	<0.46	0.46	4792553
Bromomethane	ug/m3	<0.39	<0.39	0.39	<0.39	<0.39	<0.39	0.39	4792553
Bromoform	ug/m3	<2.1	<2.1	2.1	<2.1	<2.1	<2.1	2.1	4792553

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B6R1882
Report Date: 2016/12/21

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2023

CALCULATED VOLATILE ORGANICS (AIR)

Maxxam ID		DPX367	DPX367		DPX368	DPX369	DPX370		
Sampling Date		2016/12/13 11:00	2016/12/13 11:00		2016/12/13 11:55	2016/12/13 11:58	2016/12/13 11:34		
COC Number		81256	81256		81256	81256	81256		
	UNITS	**SV16-01**	**SV16-01 Lab-Dup**	**RDL**	**SV16-02**	**DUP A**	**AIR**	**RDL**	**QC Batch**
Bromodichloromethane	ug/m3	<1.3	<1.3	1.3	<1.3	<1.3	<1.3	1.3	4792553
Dibromochloromethane	ug/m3	<1.7	<1.7	1.7	<1.7	<1.7	<1.7	1.7	4792553
Trichloroethylene	ug/m3	<0.54	<0.54	0.54	4.55	4.94	<0.54	0.54	4792553
Tetrachloroethylene	ug/m3	5.98	5.96	0.68	<0.68	<0.68	<0.68	0.68	4792553
Benzene	ug/m3	2.13	2.26	0.32	1.38	1.45	0.62	0.32	4792553
Toluene	ug/m3	11.3	11.8	0.38	8.57	8.70	0.68	0.38	4792553
Ethylbenzene	ug/m3	4.30	4.11	0.43	2.75	2.76	<0.43	0.43	4792553
p+m-Xylene	ug/m3	11.4	10.6	0.87	6.99	7.51	<0.87	0.87	4792553
o-Xylene	ug/m3	3.96	3.65	0.43	2.64	2.57	<0.43	0.43	4792553
Styrene	ug/m3	<0.43	<0.43	0.43	<0.43	<0.43	<0.43	0.43	4792553
4-ethyltoluene	ug/m3	<2.5	<2.5	2.5	<2.5	<2.5	<2.5	2.5	4792553
1,3,5-Trimethylbenzene	ug/m3	<2.5	<2.5	2.5	<2.5	<2.5	<2.5	2.5	4792553
1,2,4-Trimethylbenzene	ug/m3	3.1	3.0	2.5	2.6	2.7	<2.5	2.5	4792553
Chlorobenzene	ug/m3	<0.46	<0.46	0.46	<0.46	<0.46	<0.46	0.46	4792553
Benzyl chloride	ug/m3	<2.6	<2.6	2.6	<2.6	<2.6	<2.6	2.6	4792553
1,3-Dichlorobenzene	ug/m3	<2.4	<2.4	2.4	<2.4	<2.4	<2.4	2.4	4792553
1,4-Dichlorobenzene	ug/m3	<0.60	<0.60	0.60	<0.60	<0.60	<0.60	0.60	4792553
1,2-Dichlorobenzene	ug/m3	<0.60	<0.60	0.60	<0.60	<0.60	<0.60	0.60	4792553
1,2,4-Trichlorobenzene	ug/m3	<3.7	<3.7	3.7	<3.7	<3.7	<3.7	3.7	4792553
Hexachlorobutadiene	ug/m3	<5.3	<5.3	5.3	<5.3	<5.3	<5.3	5.3	4792553
Hexane	ug/m3	15.9	16.2	1.1	3.4	3.7	<1.1	1.1	4792553
Heptane	ug/m3	3.7	4.2	1.2	1.4	1.5	<1.2	1.2	4792553
Cyclohexane	ug/m3	0.86	1.07	0.69	<0.69	<0.69	<0.69	0.69	4792553
Tetrahydrofuran	ug/m3	5.5	5.5	1.2	<1.2	<1.2	<1.2	1.2	4792553
1,4-Dioxane	ug/m3	<3.6	<3.6	3.6	<3.6	<3.6	<3.6	3.6	4792553
Naphthalene	ug/m3	<2.6	<2.6	2.6	<2.6	<2.6	<2.6	2.6	4792553
Total Xylenes	ug/m3	15.4	14.3	1.3	9.6	10.1	<1.3	1.3	4792553
1,1,1,2-Tetrachloroethane	ug/m3	<0.69	<0.69	0.69	<0.69	<0.69	<0.69	0.69	4792553
Vinyl Bromide	ug/m3	<0.87	<0.87	0.87	<0.87	<0.87	<0.87	0.87	4792553
Propene	ug/m3	<19	<19	19	<1.5	<1.5	<1.5	1.5	4792553
2,2,4-Trimethylpentane	ug/m3	1.72	1.81	0.93	<0.93	<0.93	<0.93	0.93	4792553
Carbon Disulfide	ug/m3	61.2	58.5	1.6	13.5	13.9	<1.6	1.6	4792553
Vinyl Acetate	ug/m3	1.42	1.45	0.70	<0.70	<0.70	<0.70	0.70	4792553

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B6R1882
Report Date: 2016/12/21

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2023

VOLATILE ORGANIC HYDROCARBONS BY GC/MS (AIR)

Maxxam ID		DPX367	DPX367	DPX368	DPX369	DPX370		
Sampling Date		2016/12/13 11:00	2016/12/13 11:00	2016/12/13 11:55	2016/12/13 11:58	2016/12/13 11:34		
COC Number		81256	81256	81256	81256	81256		
	UNITS	**SV16-01**	**SV16-01 Lab-Dup**	**SV16-02**	**DUP A**	**AIR**	**RDL**	**QC Batch**
F1-BTEX, C6-C10 (as Toluene)	ug/m3	449	478	439	448	<5.0	5.0	4796490
F2, C10-C16 (as Decane)	ug/m3	862	893	563	559	<5.0	5.0	4796490

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B6R1882
Report Date: 2016/12/21

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2023

TEST SUMMARY

Maxxam ID: DPX367
Sample ID: SV16-01
Matrix: AIR

Collected: 2016/12/13
Relinquished: 2016/12/13
Received: 2016/12/14

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4796490	N/A	2016/12/16	Kethumali (Ubayarathna) Mendis
Canister Pressure (TO-15)	PRES	4796074	N/A	2016/12/16	Kethumali (Ubayarathna) Mendis
Volatile Organics in Air (ug/m3)	GC/MS	4792553	N/A	2016/12/19	Maureen Smith
Volatile Organics in Air (TO-15)	GC/MS	4795923	N/A	2016/12/16	Kethumali (Ubayarathna) Mendis

Maxxam ID: DPX367 Dup
Sample ID: SV16-01
Matrix: AIR

Collected: 2016/12/13
Relinquished: 2016/12/13
Received: 2016/12/14

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4796490	N/A	2016/12/16	Kethumali (Ubayarathna) Mendis
Volatile Organics in Air (ug/m3)	GC/MS	4792553	N/A	2016/12/21	Maureen Smith
Volatile Organics in Air (TO-15)	GC/MS	4795923	N/A	2016/12/16	Kethumali (Ubayarathna) Mendis

Maxxam ID: DPX368
Sample ID: SV16-02
Matrix: AIR

Collected: 2016/12/13
Relinquished: 2016/12/13
Received: 2016/12/14

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4796490	N/A	2016/12/16	Kethumali (Ubayarathna) Mendis
Canister Pressure (TO-15)	PRES	4796074	N/A	2016/12/16	Kethumali (Ubayarathna) Mendis
Volatile Organics in Air (ug/m3)	GC/MS	4792553	N/A	2016/12/19	Maureen Smith
Volatile Organics in Air (TO-15)	GC/MS	4795923	N/A	2016/12/16	Kethumali (Ubayarathna) Mendis

Maxxam ID: DPX369
Sample ID: DUP A
Matrix: AIR

Collected: 2016/12/13
Relinquished: 2016/12/13
Received: 2016/12/14

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4796490	N/A	2016/12/16	Kethumali (Ubayarathna) Mendis
Canister Pressure (TO-15)	PRES	4796074	N/A	2016/12/16	Kethumali (Ubayarathna) Mendis
Volatile Organics in Air (ug/m3)	GC/MS	4792553	N/A	2016/12/19	Maureen Smith
Volatile Organics in Air (TO-15)	GC/MS	4795923	N/A	2016/12/16	Kethumali (Ubayarathna) Mendis

Maxxam ID: DPX370
Sample ID: AIR
Matrix: AIR

Collected: 2016/12/13
Relinquished: 2016/12/13
Received: 2016/12/14

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	4796490	N/A	2016/12/16	Kethumali (Ubayarathna) Mendis
Canister Pressure (TO-15)	PRES	4796074	N/A	2016/12/16	Kethumali (Ubayarathna) Mendis
Volatile Organics in Air (ug/m3)	GC/MS	4792553	N/A	2016/12/19	Automated Statchk
Volatile Organics in Air (TO-15)	GC/MS	4795923	N/A	2016/12/16	Kethumali (Ubayarathna) Mendis

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Maxxam Job #: B6R1882
Report Date: 2016/12/21

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2023

GENERAL COMMENTS

Increased DL for propene due to interference from propane.

Sample DPX367 [SV16-01] : 2-Butanone biased high due to co-elution with hexane. This result represents the highest concentration possible of 2-butanone.

Sample DPX368 [SV16-02] : 2-Butanone biased high due to co-elution with hexane. This result represents the highest concentration possible of 2-butanone.

Sample DPX369 [DUP A] : 2-Butanone biased high due to co-elution with hexane. This result represents the highest concentration possible of 2-butanone.

Results relate only to the items tested.

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Maxxam Job #: B6R1882
Report Date: 2016/12/21

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2023

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
4795923	KM2	Method Blank	Bromochloromethane	2016/12/16		104	%	60 - 140
			D5-Chlorobenzene	2016/12/16		95	%	60 - 140
			Difluorobenzene	2016/12/16		103	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2016/12/16	<0.20		ppbv	
			1,2-Dichlorotetrafluoroethane	2016/12/16	<0.17		ppbv	
			Chloromethane	2016/12/16	<0.30		ppbv	
			Vinyl Chloride	2016/12/16	<0.10		ppbv	
			Chloroethane	2016/12/16	<0.30		ppbv	
			1,3-Butadiene	2016/12/16	<0.50		ppbv	
			Trichlorofluoromethane (FREON 11)	2016/12/16	<0.20		ppbv	
			Ethanol (ethyl alcohol)	2016/12/16	<1.0		ppbv	
			Trichlorotrifluoroethane	2016/12/16	<0.15		ppbv	
			2-propanol	2016/12/16	<1.0		ppbv	
			2-Propanone	2016/12/16	<0.80		ppbv	
			Methyl Ethyl Ketone (2-Butanone)	2016/12/16	<1.0		ppbv	
			Methyl Isobutyl Ketone	2016/12/16	<1.0		ppbv	
			Methyl Butyl Ketone (2-Hexanone)	2016/12/16	<1.0		ppbv	
			Methyl t-butyl ether (MTBE)	2016/12/16	<0.20		ppbv	
			Ethyl Acetate	2016/12/16	<1.0		ppbv	
			1,1-Dichloroethylene	2016/12/16	<0.10		ppbv	
			cis-1,2-Dichloroethylene	2016/12/16	<0.10		ppbv	
			trans-1,2-Dichloroethylene	2016/12/16	<0.10		ppbv	
			Methylene Chloride(Dichloromethane)	2016/12/16	<0.80		ppbv	
			Chloroform	2016/12/16	<0.10		ppbv	
			Carbon Tetrachloride	2016/12/16	<0.10		ppbv	
			1,1-Dichloroethane	2016/12/16	<0.10		ppbv	
			1,2-Dichloroethane	2016/12/16	<0.10		ppbv	
			Ethylene Dibromide	2016/12/16	<0.10		ppbv	
			1,1,1-Trichloroethane	2016/12/16	<0.10		ppbv	
			1,1,2-Trichloroethane	2016/12/16	<0.10		ppbv	
			1,1,2,2-Tetrachloroethane	2016/12/16	<0.10		ppbv	
			cis-1,3-Dichloropropene	2016/12/16	<0.10		ppbv	
			trans-1,3-Dichloropropene	2016/12/16	<0.10		ppbv	
			1,2-Dichloropropane	2016/12/16	<0.10		ppbv	
			Bromomethane	2016/12/16	<0.10		ppbv	
			Bromoform	2016/12/16	<0.20		ppbv	
			Bromodichloromethane	2016/12/16	<0.20		ppbv	
			Dibromochloromethane	2016/12/16	<0.20		ppbv	
			Trichloroethylene	2016/12/16	<0.10		ppbv	
			Tetrachloroethylene	2016/12/16	<0.10		ppbv	
			Benzene	2016/12/16	<0.10		ppbv	
			Toluene	2016/12/16	<0.10		ppbv	
			Ethylbenzene	2016/12/16	<0.10		ppbv	
			p+m-Xylene	2016/12/16	<0.20		ppbv	
			o-Xylene	2016/12/16	<0.10		ppbv	
			Styrene	2016/12/16	<0.10		ppbv	
			4-ethyltoluene	2016/12/16	<0.50		ppbv	
			1,3,5-Trimethylbenzene	2016/12/16	<0.50		ppbv	
			1,2,4-Trimethylbenzene	2016/12/16	<0.50		ppbv	
			Chlorobenzene	2016/12/16	<0.10		ppbv	
			Benzyl chloride	2016/12/16	<0.50		ppbv	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,3-Dichlorobenzene	2016/12/16	<0.40		ppbv	
			1,4-Dichlorobenzene	2016/12/16	<0.10		ppbv	
			1,2-Dichlorobenzene	2016/12/16	<0.10		ppbv	
			1,2,4-Trichlorobenzene	2016/12/16	<0.50		ppbv	
			Hexachlorobutadiene	2016/12/16	<0.50		ppbv	
			Hexane	2016/12/16	<0.30		ppbv	
			Heptane	2016/12/16	<0.30		ppbv	
			Cyclohexane	2016/12/16	<0.20		ppbv	
			Tetrahydrofuran	2016/12/16	<0.40		ppbv	
			1,4-Dioxane	2016/12/16	<1.0		ppbv	
			Naphthalene	2016/12/16	<0.50		ppbv	
			Total Xylenes	2016/12/16	<0.30		ppbv	
			1,1,1,2-Tetrachloroethane	2016/12/16	<0.10		ppbv	
			Vinyl Bromide	2016/12/16	<0.20		ppbv	
			Propene	2016/12/16	<0.50		ppbv	
			2,2,4-Trimethylpentane	2016/12/16	<0.20		ppbv	
			Carbon Disulfide	2016/12/16	<0.50		ppbv	
			Vinyl Acetate	2016/12/16	<0.20		ppbv	
4796490	KM2	Method Blank	F1-BTEX, C6-C10 (as Toluene)	2016/12/16	<5.0		ug/m3	
			F2, C10-C16 (as Decane)	2016/12/16	<5.0		ug/m3	
4792553	ASC	RPD [DPX367-01]	Dichlorodifluoromethane (FREON 12)	2016/12/21	NC		%	25
			1,2-Dichlorotetrafluoroethane	2016/12/21	NC		%	25
			Chloromethane	2016/12/21	NC		%	25
			Vinyl Chloride	2016/12/21	NC		%	25
			Chloroethane	2016/12/21	NC		%	25
			1,3-Butadiene	2016/12/21	NC		%	25
			Trichlorofluoromethane (FREON 11)	2016/12/21	NC		%	25
			Ethanol (ethyl alcohol)	2016/12/21	NC		%	25
			Trichlorotrifluoroethane	2016/12/21	NC		%	25
			2-propanol	2016/12/21	NC		%	25
			2-Propanone	2016/12/21	0.24		%	25
			Methyl Ethyl Ketone (2-Butanone)	2016/12/21	NC		%	25
			Methyl Isobutyl Ketone	2016/12/21	NC		%	25
			Methyl Butyl Ketone (2-Hexanone)	2016/12/21	NC		%	25
			Methyl t-butyl ether (MTBE)	2016/12/21	NC		%	25
			Ethyl Acetate	2016/12/21	NC		%	25
			1,1-Dichloroethylene	2016/12/21	NC		%	25
			cis-1,2-Dichloroethylene	2016/12/21	NC		%	25
			trans-1,2-Dichloroethylene	2016/12/21	4.7		%	25
			Methylene Chloride(Dichloromethane)	2016/12/21	NC		%	25
			Chloroform	2016/12/21	0.87		%	25
			Carbon Tetrachloride	2016/12/21	NC		%	25
			1,1-Dichloroethane	2016/12/21	NC		%	25
			1,2-Dichloroethane	2016/12/21	NC		%	25
			Ethylene Dibromide	2016/12/21	NC		%	25
			1,1,1-Trichloroethane	2016/12/21	NC		%	25
			1,1,2-Trichloroethane	2016/12/21	NC		%	25
			1,1,2,2-Tetrachloroethane	2016/12/21	NC		%	25
			cis-1,3-Dichloropropene	2016/12/21	NC		%	25
			trans-1,3-Dichloropropene	2016/12/21	NC		%	25
			1,2-Dichloropropane	2016/12/21	NC		%	25

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Bromomethane	2016/12/21	NC		%	25
			Bromoform	2016/12/21	NC		%	25
			Bromodichloromethane	2016/12/21	NC		%	25
			Dibromochloromethane	2016/12/21	NC		%	25
			Trichloroethylene	2016/12/21	NC		%	25
			Tetrachloroethylene	2016/12/21	0.36		%	25
			Benzene	2016/12/21	5.9		%	25
			Toluene	2016/12/21	4.4		%	25
			Ethylbenzene	2016/12/21	4.7		%	25
			p+m-Xylene	2016/12/21	7.2		%	25
			o-Xylene	2016/12/21	7.9		%	25
			Styrene	2016/12/21	NC		%	25
			4-ethyltoluene	2016/12/21	NC		%	25
			1,3,5-Trimethylbenzene	2016/12/21	NC		%	25
			1,2,4-Trimethylbenzene	2016/12/21	NC		%	25
			Chlorobenzene	2016/12/21	NC		%	25
			Benzyl chloride	2016/12/21	NC		%	25
			1,3-Dichlorobenzene	2016/12/21	NC		%	25
			1,4-Dichlorobenzene	2016/12/21	NC		%	25
			1,2-Dichlorobenzene	2016/12/21	NC		%	25
			1,2,4-Trichlorobenzene	2016/12/21	NC		%	25
			Hexachlorobutadiene	2016/12/21	NC		%	25
			Hexane	2016/12/21	2.2		%	25
			Heptane	2016/12/21	NC		%	25
			Cyclohexane	2016/12/21	NC		%	25
			Tetrahydrofuran	2016/12/21	NC		%	25
			1,4-Dioxane	2016/12/21	NC		%	25
			Naphthalene	2016/12/21	NC		%	25
			Total Xylenes	2016/12/21	7.4		%	25
			1,1,1,2-Tetrachloroethane	2016/12/21	NC		%	25
			Vinyl Bromide	2016/12/21	NC		%	25
			Propene	2016/12/21	NC		%	25
			2,2,4-Trimethylpentane	2016/12/21	NC		%	25
			Carbon Disulfide	2016/12/21	4.5		%	25
			Vinyl Acetate	2016/12/21	NC		%	25
4795923	KM2	RPD [DPX367-01]	Dichlorodifluoromethane (FREON 12)	2016/12/16	NC		%	25
			1,2-Dichlorotetrafluoroethane	2016/12/16	NC		%	25
			Chloromethane	2016/12/16	NC		%	25
			Vinyl Chloride	2016/12/16	NC		%	25
			Chloroethane	2016/12/16	NC		%	25
			1,3-Butadiene	2016/12/16	NC		%	25
			Trichlorofluoromethane (FREON 11)	2016/12/16	NC		%	25
			Ethanol (ethyl alcohol)	2016/12/16	NC		%	25
			Trichlorotrifluoroethane	2016/12/16	NC		%	25
			2-propanol	2016/12/16	NC		%	25
			2-Propanone	2016/12/16	0.24		%	25
			Methyl Ethyl Ketone (2-Butanone)	2016/12/16	NC		%	25
			Methyl Isobutyl Ketone	2016/12/16	NC		%	25
			Methyl Butyl Ketone (2-Hexanone)	2016/12/16	NC		%	25
			Methyl t-butyl ether (MTBE)	2016/12/16	NC		%	25
			Ethyl Acetate	2016/12/16	NC		%	25

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,1-Dichloroethylene	2016/12/16	NC		%	25
			cis-1,2-Dichloroethylene	2016/12/16	NC		%	25
			trans-1,2-Dichloroethylene	2016/12/16	4.7		%	25
			Methylene Chloride(Dichloromethane)	2016/12/16	NC		%	25
			Chloroform	2016/12/16	0.87		%	25
			Carbon Tetrachloride	2016/12/16	NC		%	25
			1,1-Dichloroethane	2016/12/16	NC		%	25
			1,2-Dichloroethane	2016/12/16	NC		%	25
			Ethylene Dibromide	2016/12/16	NC		%	25
			1,1,1-Trichloroethane	2016/12/16	NC		%	25
			1,1,2-Trichloroethane	2016/12/16	NC		%	25
			1,1,2,2-Tetrachloroethane	2016/12/16	NC		%	25
			cis-1,3-Dichloropropene	2016/12/16	NC		%	25
			trans-1,3-Dichloropropene	2016/12/16	NC		%	25
			1,2-Dichloropropane	2016/12/16	NC		%	25
			Bromomethane	2016/12/16	NC		%	25
			Bromoform	2016/12/16	NC		%	25
			Bromodichloromethane	2016/12/16	NC		%	25
			Dibromochloromethane	2016/12/16	NC		%	25
			Trichloroethylene	2016/12/16	NC		%	25
			Tetrachloroethylene	2016/12/16	0.36		%	25
			Benzene	2016/12/16	5.9		%	25
			Toluene	2016/12/16	4.4		%	25
			Ethylbenzene	2016/12/16	4.7		%	25
			p+m-Xylene	2016/12/16	7.2		%	25
			o-Xylene	2016/12/16	7.9		%	25
			Styrene	2016/12/16	NC		%	25
			4-ethyltoluene	2016/12/16	NC		%	25
			1,3,5-Trimethylbenzene	2016/12/16	NC		%	25
			1,2,4-Trimethylbenzene	2016/12/16	NC		%	25
			Chlorobenzene	2016/12/16	NC		%	25
			Benzyl chloride	2016/12/16	NC		%	25
			1,3-Dichlorobenzene	2016/12/16	NC		%	25
			1,4-Dichlorobenzene	2016/12/16	NC		%	25
			1,2-Dichlorobenzene	2016/12/16	NC		%	25
			1,2,4-Trichlorobenzene	2016/12/16	NC		%	25
			Hexachlorobutadiene	2016/12/16	NC		%	25
			Hexane	2016/12/16	2.2		%	25
			Heptane	2016/12/16	NC		%	25
			Cyclohexane	2016/12/16	NC		%	25
			Tetrahydrofuran	2016/12/16	NC		%	25
			1,4-Dioxane	2016/12/16	NC		%	25
			Naphthalene	2016/12/16	NC		%	25
			Total Xylenes	2016/12/16	7.4		%	25
			1,1,1,2-Tetrachloroethane	2016/12/16	NC		%	25
			Vinyl Bromide	2016/12/16	NC		%	25
			Propene	2016/12/16	NC		%	25
			2,2,4-Trimethylpentane	2016/12/16	NC		%	25
			Carbon Disulfide	2016/12/16	4.5		%	25
			Vinyl Acetate	2016/12/16	NC		%	25
4796490	KM2	RPD [DPX367-01]	F1-BTEX, C6-C10 (as Toluene)	2016/12/16	6.1		%	25

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			F2, C10-C16 (as Decane)	2016/12/16	3.6		%	25
4795923	KM2	LCS	Bromochloromethane	2016/12/16		102	%	60 - 140
			D5-Chlorobenzene	2016/12/16		101	%	60 - 140
			Difluorobenzene	2016/12/16		101	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2016/12/16		98	%	70 - 130
			1,2-Dichlorotetrafluoroethane	2016/12/16		85	%	70 - 130
			Chloromethane	2016/12/16		105	%	70 - 130
			Vinyl Chloride	2016/12/16		100	%	70 - 130
			Chloroethane	2016/12/16		97	%	70 - 130
			1,3-Butadiene	2016/12/16		115	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2016/12/16		87	%	70 - 130
			Ethanol (ethyl alcohol)	2016/12/16		112	%	70 - 130
			Trichlorotrifluoroethane	2016/12/16		93	%	70 - 130
			2-propanol	2016/12/16		118	%	70 - 130
			2-Propanone	2016/12/16		120	%	70 - 130
			Methyl Ethyl Ketone (2-Butanone)	2016/12/16		118	%	70 - 130
			Methyl Isobutyl Ketone	2016/12/16		111	%	70 - 130
			Methyl Butyl Ketone (2-Hexanone)	2016/12/16		104	%	70 - 130
			Methyl t-butyl ether (MTBE)	2016/12/16		112	%	70 - 130
			Ethyl Acetate	2016/12/16		123	%	70 - 130
			1,1-Dichloroethylene	2016/12/16		107	%	70 - 130
			cis-1,2-Dichloroethylene	2016/12/16		104	%	70 - 130
			trans-1,2-Dichloroethylene	2016/12/16		109	%	70 - 130
			Methylene Chloride(Dichloromethane)	2016/12/16		102	%	70 - 130
			Chloroform	2016/12/16		95	%	70 - 130
			Carbon Tetrachloride	2016/12/16		91	%	70 - 130
			1,1-Dichloroethane	2016/12/16		105	%	70 - 130
			1,2-Dichloroethane	2016/12/16		106	%	70 - 130
			Ethylene Dibromide	2016/12/16		96	%	70 - 130
			1,1,1-Trichloroethane	2016/12/16		92	%	70 - 130
			1,1,2-Trichloroethane	2016/12/16		97	%	70 - 130
			1,1,2,2-Tetrachloroethane	2016/12/16		99	%	70 - 130
			cis-1,3-Dichloropropene	2016/12/16		116	%	70 - 130
			trans-1,3-Dichloropropene	2016/12/16		114	%	70 - 130
			1,2-Dichloropropane	2016/12/16		105	%	70 - 130
			Bromomethane	2016/12/16		95	%	70 - 130
			Bromoform	2016/12/16		95	%	70 - 130
			Bromodichloromethane	2016/12/16		107	%	70 - 130
			Dibromochloromethane	2016/12/16		100	%	70 - 130
			Trichloroethylene	2016/12/16		95	%	70 - 130
			Tetrachloroethylene	2016/12/16		94	%	70 - 130
			Benzene	2016/12/16		102	%	70 - 130
			Toluene	2016/12/16		105	%	70 - 130
			Ethylbenzene	2016/12/16		98	%	70 - 130
			p+m-Xylene	2016/12/16		96	%	70 - 130
			o-Xylene	2016/12/16		98	%	70 - 130
			Styrene	2016/12/16		101	%	70 - 130
			4-ethyltoluene	2016/12/16		103	%	70 - 130
			1,3,5-Trimethylbenzene	2016/12/16		91	%	70 - 130
			1,2,4-Trimethylbenzene	2016/12/16		92	%	70 - 130
			Chlorobenzene	2016/12/16		93	%	70 - 130

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Benzyl chloride	2016/12/16		105	%	70 - 130
			1,3-Dichlorobenzene	2016/12/16		89	%	70 - 130
			1,4-Dichlorobenzene	2016/12/16		85	%	70 - 130
			1,2-Dichlorobenzene	2016/12/16		85	%	70 - 130
			1,2,4-Trichlorobenzene	2016/12/16		85	%	70 - 130
			Hexachlorobutadiene	2016/12/16		79	%	70 - 130
			Hexane	2016/12/16		107	%	70 - 130
			Heptane	2016/12/16		118	%	70 - 130
			Cyclohexane	2016/12/16		110	%	70 - 130
			Tetrahydrofuran	2016/12/16		122	%	70 - 130
			1,4-Dioxane	2016/12/16		69 (1)	%	70 - 130
			Naphthalene	2016/12/16		84	%	70 - 130
			Total Xylenes	2016/12/16		96	%	70 - 130
			Vinyl Bromide	2016/12/16		100	%	70 - 130
			Propene	2016/12/16		124	%	70 - 130
			2,2,4-Trimethylpentane	2016/12/16		115	%	70 - 130
			Carbon Disulfide	2016/12/16		116	%	70 - 130
			Vinyl Acetate	2016/12/16		126	%	70 - 130

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

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Maxxam Job #: B6R1882
Report Date: 2016/12/21

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2023

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Maureen Smith, Supervisor, Volatiles

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Toll Free: 1-800-563-6266

EXXONMOBIL/IMPERIAL OIL - MAXXAM AIR CHAIN OF CUSTODY RECORD

C of C # 81256

INVOICE INFORMATION

Company Name: ☒ Imperial Oil ☐ ExxonMobil
Contact Name: Stephen Scott
Address: 505 Quarry Park Blvd SE
Email: stephen.g.scott@esso.ca
Ph: 587-476-4466
Sampler Name (Print): Brandon McFarlan

REPORT INFORMATION

Company Name: Golder Associates Ltd.
Contact Name: Leon Burger
Address: 6925 Century Ave, Mississauga, ON, L5N 7K2
Email: leon-burger@golder.com
Ph: 226-220-6879
Consultant Project #: 1544125-1155-2023

ANALYSIS REQUESTED

	FIELD SAMPLE ID	Canister Serial #	Flow Regulator Serial #	Sample Collection DATE (YYYY/MM/DD)	Sample Collection TIME (24 HR)	Media Type (See Legend)	FLOW RATE (L/min)	LENGTH OF SAMPLING (minutes)	BTEX	Aromatic/Aliphatic Hydrocarbon Fractionations	F1 (C6-C10) - F2 (C10-C16)	VOCs
1	SV16-01	#2406	FX0578	2016/12/13	11:00	S	0.07	19	X		X	X
2	SV16-02	#2980	FX0447	2016/12/13	11:55	S	0.09	15	X		X	X
3	DUP A	#392	FX0232	2016/12/13	11:58	S	0.08	18	X		X	X
4	AIR	#1444	FX0178	2016/12/13	11:34	S	0.06	25	X		X	X
5												
6												
7												
8												
9												
10												
11												

IOL SITE LOCATION: 1660 Merivale Road, Ottawa, ON

IOL PROJECT # (if applicable): MZ.00277

MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM: 4410393424 +10

REGULATORY CRITERIA / DETECTION LIMITS: (PLEASE SPECIFY): NA

SPECIAL INSTRUCTIONS: Please upload to 88001627 ICE-NA

LEGEND
S - Summa Can
T - Tedlar
TB - Tedlar Bag
O - Other(Specify)
*TEMP N/A for SUMMA CAN

TURNAROUND TIME
Standard (10 days) ☒
Rush (9 days) ☐
(6 days) ☐
(3 days) ☐
Date Required

	YES	NO	COOLER ID # 1				YES	NO	COOLER ID #				YES	NO	COOLER ID #			
SEAL PRESENT	✓		TEMP °C	1	2	3			TEMP °C	1	2	3			TEMP °C	1	2	3
SEAL INTACT	✓																	
COOLING MEDIA PRESENT		✓																

LAB USE ONLY
MAXXAM JOB # B6R1882

RELINQUISHED BY:		DATE:	TIME (24 HR)	RECEIVED BY:		DATE:	TIME (24 HR)
1.	Brandon McFarlan	2016/12/13	13:30	1.	ASIFA BHATTU	2016/12/14	10:07
2.				2.			
3.				3.			

SAMPLES
LABELED BY: DM2
VERIFIED BY: MA

IOL COC-AIR-(04/2018) White: Maxxam Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: December 13, 2016

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Maxxam Analytics Mississauga

Consultant Project Number: 1544125-1155

Sample Submission Number: B6R1882

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within acceptance
Extraction Surrogate Recovery			X	criteria, please see QA/QC appendix.
Method Blank Concentration	X			
Matrix Duplicate RPD	X			
Matrix Spike Recovery			X	
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	All field QC samples are within
Trip Blank Concentration			X	alert limits.
Field Duplicate RPD	X			

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	n/a

Was a Data Quality Waiver (DQW) issued (Yes/No)?: No

Date Issued: n/a

Date of Response: n/a

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Anita Colbert

Data Reviewed by (Signature): Anita Colbert

Date: December 22, 2016

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Task Order#: 4410490399
Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2007
Your C.O.C. #: 616055-12-01

Attention:Ian Sosney

Golder Associates Ltd.
6925 Century Avenue
Suite #100
Mississauga, ON
Canada L5N 7K2

Report Date: 2017/06/29
Report #: R4566954
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7D2158
Received: 2017/06/23, 10:00

Sample Matrix: Water
Samples Received: 3

Analyses	Quantity	Laboratory Method	Primary Reference
Petroleum Hydro. CCME F1 & BTEX in Water	3	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1)	3	CAM SOP-00316	CCME PHC-CWS m
Dissolved Metals by ICPMS	3	CAM SOP-00447	EPA 6020B m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported: unless indicated otherwise, associated sample data are not blank corrected. All samples were analyzed within hold time unless otherwise flagged.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following "Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003". Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

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Task Order#: 4410490399
Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2007
Your C.O.C. #: 616055-12-01

Attention:Ian Sosney

Golder Associates Ltd.
6925 Century Avenue
Suite #100
Mississauga, ON
Canada L5N 7K2

Report Date: 2017/06/29
Report #: R4566954
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7D2158
Received: 2017/06/23, 10:00

Encryption Key

Khalida Aram
Project Manager
29 Jun 2017 17:05:30

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kyle Reinhart, Project Manager - Environmental Customer Service
Email: kreinhart@maxxam.ca
Phone# (905) 817-5700

==========

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Maxxam Job #: B7D2158
Report Date: 2017/06/29

Golder Associates Ltd.
Task Order#: 4410490399, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2007

LEAD (DISSOLVED) IN WATER

Maxxam ID		EPV352	EPV353	EPV354		
Sampling Date		2017/06/21 14:50	2017/06/21 15:30	2017/06/21 15:30		
COC Number		616055-12-01	616055-12-01	616055-12-01		
	UNITS	**TH4**	**TH5**	**DUP1**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	0.78	1.8	2.2	0.50	5044480

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B7D2158
Report Date: 2017/06/29

Golder Associates Ltd.
Task Order#: 4410490399, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2007

O.REG 153 PHCS IN WATER (WATER)

Maxxam ID		EPV352	EPV353	EPV354		
Sampling Date		2017/06/21 14:50	2017/06/21 15:30	2017/06/21 15:30		
COC Number		616055-12-01	616055-12-01	616055-12-01		
	UNITS	**TH4**	**TH5**	**DUP1**	**RDL**	**QC Batch**
Benzene	ug/L	210	210	190	1.0	5048986
Toluene	ug/L	28	25	23	1.0	5048986
Ethylbenzene	ug/L	470	690	640	1.0	5048986
o-Xylene	ug/L	36	77	70	1.0	5048986
p+m-Xylene	ug/L	1500	1700	1600	2.0	5048986
Total Xylenes	ug/L	1500	1800	1600	2.0	5048986
F1 (C6-C10)	ug/L	4200	7100	6900	130	5048986
F1 (C6-C10) - BTEX	ug/L	2000	4400	4400	130	5048986
F2 (C10-C16 Hydrocarbons)	ug/L	930	3600	3200	100	5050049
F3 (C16-C34 Hydrocarbons)	ug/L	<200	420	490	200	5050049
F4 (C34-C50 Hydrocarbons)	ug/L	<200	350	450	200	5050049
Reached Baseline at C50	ug/L	Yes	Yes	Yes		5050049
Extraction Surrogate Recovery (%)						
o-Terphenyl	%	99	99	99		5050049
Instrument Surrogate Recovery (%)						
1,4-Difluorobenzene	%	101	103	101		5048986
4-Bromofluorobenzene	%	107	109	107		5048986
D10-Ethylbenzene	%	100	102	99		5048986
D4-1,2-Dichloroethane	%	107	111	109		5048986

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B7D2158
Report Date: 2017/06/29

Golder Associates Ltd.
Task Order#: 4410490399, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2007

TEST SUMMARY

Maxxam ID: EPV352
Sample ID: TH4
Matrix: Water

Collected: 2017/06/21
Relinquished: 2017/06/22
Received: 2017/06/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5048986	N/A	2017/06/29	Jiaxuan (Simon) Xi
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5050049	2017/06/28	2017/06/29	Zhiyue (Frank) Zhu
Dissolved Metals by ICPMS	ICP/MS	5044480	N/A	2017/06/28	Arefa Dabhad

Maxxam ID: EPV353
Sample ID: TH5
Matrix: Water

Collected: 2017/06/21
Relinquished: 2017/06/22
Received: 2017/06/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5048986	N/A	2017/06/29	Jiaxuan (Simon) Xi
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5050049	2017/06/28	2017/06/29	Zhiyue (Frank) Zhu
Dissolved Metals by ICPMS	ICP/MS	5044480	N/A	2017/06/28	Arefa Dabhad

Maxxam ID: EPV354
Sample ID: DUP1
Matrix: Water

Collected: 2017/06/21
Relinquished: 2017/06/22
Received: 2017/06/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5048986	N/A	2017/06/29	Jiaxuan (Simon) Xi
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5050049	2017/06/28	2017/06/29	Zhiyue (Frank) Zhu
Dissolved Metals by ICPMS	ICP/MS	5044480	N/A	2017/06/28	Arefa Dabhad

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Maxxam Job #: B7D2158
Report Date: 2017/06/29

Golder Associates Ltd.
Task Order#: 4410490399, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2007

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	2.0°C

Results relate only to the items tested.

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Maxxam Job #: B7D2158
Report Date: 2017/06/29

Golder Associates Ltd.
Task Order#: 4410490399, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2007

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5044480	ADA	Method Blank	Dissolved Lead (Pb)	2017/06/28	<0.50		ug/L	
5048986	JXI	Method Blank	1,4-Difluorobenzene	2017/06/28		100	%	70 - 130
			4-Bromofluorobenzene	2017/06/28		106	%	70 - 130
			D10-Ethylbenzene	2017/06/28		105	%	70 - 130
			D4-1,2-Dichloroethane	2017/06/28		107	%	70 - 130
			Benzene	2017/06/28	<0.20		ug/L	
			Toluene	2017/06/28	<0.20		ug/L	
			Ethylbenzene	2017/06/28	<0.20		ug/L	
			o-Xylene	2017/06/28	<0.20		ug/L	
			p+m-Xylene	2017/06/28	<0.40		ug/L	
			Total Xylenes	2017/06/28	<0.40		ug/L	
			F1 (C6-C10)	2017/06/28	<25		ug/L	
			F1 (C6-C10) - BTEX	2017/06/28	<25		ug/L	
5050049	ZZ	Method Blank	o-Terphenyl	2017/06/28		100	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2017/06/28	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2017/06/28	<200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2017/06/28	<200		ug/L	
5044480	ADA	LCS	Dissolved Lead (Pb)	2017/06/28		96	%	80 - 120
5048986	JXI	LCS	1,4-Difluorobenzene	2017/06/28		100	%	70 - 130
			4-Bromofluorobenzene	2017/06/28		105	%	70 - 130
			D10-Ethylbenzene	2017/06/28		104	%	70 - 130
			D4-1,2-Dichloroethane	2017/06/28		109	%	70 - 130
			Benzene	2017/06/28		104	%	70 - 130
			Toluene	2017/06/28		97	%	70 - 130
			Ethylbenzene	2017/06/28		106	%	70 - 130
			o-Xylene	2017/06/28		108	%	70 - 130
			p+m-Xylene	2017/06/28		106	%	70 - 130
			F1 (C6-C10)	2017/06/28		99	%	70 - 130
5050049	ZZ	LCS	o-Terphenyl	2017/06/29		108	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2017/06/29		102	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2017/06/29		118	%	60 - 130
			F4 (C34-C50 Hydrocarbons)	2017/06/29		122	%	60 - 130

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B7D2158
Report Date: 2017/06/29

Golder Associates Ltd.
Task Order#: 4410490399, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2007

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Fax: (905) 817-5777
Toll Free: 800-563-6266

EXXONMOBIL/IMPERIAL OIL - MAXXAM
CHAIN-OF-CUSTODY RECORD
ANALYSIS REQUESTED

Page 1 of 1

C of C # 616055-12-01

616055

INVOICE INFORMATION	REPORT INFORMATION
Company Name: Imperial Oil, a partnership of Imperial Oil Limited and McColl Frontenac Petrole	Company Name: Golder Associates Ltd.
Contact Name: Stephen Scott	Contact Name: Ian Sosney
Address: 505 Quarry Park Blvd Calgary AB T2C 5N1	Address: 6925 Century Avenue Suite #100 Mississauga ON L5N 7K2
Email: stephen.a.scott@esso.ca	Email: Ian_Sosney@golder.com; IOL_1390@golder.co
Phone: (587) 476-4467 x	Phone: (647) 522-4698 x
Sampler Name (Print): Brandon McFarlan	Consultant Project #: 1669090-1155-2007

	FIELD SAMPLE ID	MATRIX: GROUND WATER	MATRIX: SURFACE WATER	MATRIX: SOIL	MATRIX: OTHER	# CONTAINERS	SAMPLING: DATE (YYYY/MM/DD)	SAMPLING: TIME (24 HR)	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	F1 & BTEX	F2-F4	Lead (Dissolved)
1	TH4	X				6	2017/06/21	14:50	X		X	X	X
2	TH5	X				6	2017/06/21	15:30	X		X	X	X
3	DUP1	X				6	2017/06/21	15:30	X		X	X	X
4							YYYY/MM/DD	HH:MM					
5							YYYY/MM/DD	HH:MM					
6							YYYY/MM/DD	HH:MM					
7							YYYY/MM/DD	HH:MM					
8							YYYY/MM/DD	HH:MM					
9							YYYY/MM/DD	HH:MM					
10							YYYY/MM/DD	HH:MM					

IOL SITE LOCATION:
1660 Merivale Rd OTTAWA,ON

IOL PROJECT # (if applicable):
MZ.00277

MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM:
4410490399-10

REGULATORY CRITERIA / DETECTION LIMITS:
☒ REG 153 Table 3 ☐ 2004 ☒ 2011 ☐ RSC
(Please indicate which Reg. version and if RSC required)
☐ ODWS ☐ PWQO
☐ Other

SPECIAL INSTRUCTIONS:
Sample bottles may contain headspace and/or sediment.
Upload to 8900627

JARS USED AND NOT SUBMITTED Enter N/A for Water: N/A

TURNAROUND TIME
Standard (5 days) ☒
Rush (3 days) ☐
(2 days) ☐
(1 day) ☐
(same day) ☐
Date Required

	YES	NO	COOLER ID: 1				YES	NO	COOLER ID:				YES	NO	COOLER ID:			
SEAL PRESENT	✓																	
SEAL INTACT	✓		TEMP °C	0 (1)	3 (2)	3 (3)			TEMP °C (1) (2) (3)						TEMP °C (1) (2) (3)			
COOLING MEDIA PRESENT	✓																	

* RELINQUISHED BY:		DATE:	TIME (24 HR)	RECEIVED BY:		DATE:	TIME (24 HR)
1. signature	Brandon McFarlan printed name	2017/06/22	13:00	1. signature	Ashitha Sukumar printed name	2017/06/23	10:00
2. signature	printed name	YYYY/MM/DD	HH:MM	2. signature	printed name	YYYY/MM/DD	HH:MM
3. signature	printed name	YYYY/MM/DD	HH:MM	3. signature	printed name	YYYY/MM/DD	HH:MM

LAB USE ONLY
MAXXAM JOB # B7D2158
SAMPLES
LABELED BY: MF
VERIFIED BY: TSP

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXXAM'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.MAXXAM.CA/TERMS.

COC – 1012 (2016) IOL – ON White: Maxxam Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: June 21, 2017

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Maxxam Analytics Mississauga

Consultant Project Number: 1669090-1155

Sample Submission Number: B7D2158

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within
Extraction Surrogate Recovery	X			acceptance criteria.
Method Blank Concentration	X			
Matrix Duplicate RPD	X			
Matrix Spike Recovery	X			
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	All field QC samples are within
Trip Blank Concentration			X	alert limits.
Field Duplicate RPD	X			

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Anita Colbert

Data Reviewed by (Signature): Anita Colbert

Date: June 30, 2017

Maxxam
A Bureau Veritas Group Company

Task Order#: 4410490399
Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2007
Your C.O.C. #: 616055-04-01

Attention:Ian Sosney

Golder Associates Ltd.
6925 Century Avenue
Suite #100
Mississauga, ON
Canada L5N 7K2

Report Date: 2017/06/29
Report #: R4566984
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7D2163
Received: 2017/06/23, 10:00

Sample Matrix: Water
Samples Received: 3

Analyses	Quantity	Laboratory Method	Primary Reference
Petroleum Hydro. CCME F1 & BTEX in Water	3	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1)	3	CAM SOP-00316	CCME PHC-CWS m
Dissolved Metals by ICPMS	3	CAM SOP-00447	EPA 6020B m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported: unless indicated otherwise, associated sample data are not blank corrected. All samples were analyzed within hold time unless otherwise flagged.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following "Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003". Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

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Task Order#: 4410490399
Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2007
Your C.O.C. #: 616055-04-01

Attention:Ian Sosney

Golder Associates Ltd.
6925 Century Avenue
Suite #100
Mississauga, ON
Canada L5N 7K2

Report Date: 2017/06/29
Report #: R4566984
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7D2163
Received: 2017/06/23, 10:00

Encryption Key

Khalida Aram
Project Manager
29 Jun 2017 16:53:57

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kyle Reinhart, Project Manager - Environmental Customer Service
Email: kreinhart@maxxam.ca
Phone# (905) 817-5700

==========

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Maxxam Job #: B7D2163
Report Date: 2017/06/29

Golder Associates Ltd.
Task Order#: 4410490399, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2007

LEAD (DISSOLVED) IN WATER

Maxxam ID		EPV367	EPV368	EPV369		
Sampling Date		2017/06/22 10:00	2017/06/22 10:45	2017/06/22 11:03		
COC Number		616055-04-01	616055-04-01	616055-04-01		
	UNITS	**TH6**	**MW15-01**	**MW15-2**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	<0.50	<0.50	1.1	0.50	5044480

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B7D2163
Report Date: 2017/06/29

Golder Associates Ltd.
Task Order#: 4410490399, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2007

O.REG 153 PHCS IN WATER (WATER)

Maxxam ID		EPV367	EPV368	EPV368	EPV369		
Sampling Date		2017/06/22 10:00	2017/06/22 10:45	2017/06/22 10:45	2017/06/22 11:03		
COC Number		616055-04-01	616055-04-01	616055-04-01	616055-04-01		
	UNITS	**TH6**	**MW15-01**	**MW15-01 Lab-Dup**	**MW15-2**	**RDL**	**QC Batch**
Benzene	ug/L	<0.20	<0.20		20	0.20	5048986
Toluene	ug/L	<0.20	<0.20		1.0	0.20	5048986
Ethylbenzene	ug/L	<0.20	<0.20		1.5	0.20	5048986
o-Xylene	ug/L	<0.20	<0.20		0.52	0.20	5048986
p+m-Xylene	ug/L	<0.40	<0.40		1.8	0.40	5048986
Total Xylenes	ug/L	<0.40	<0.40		2.3	0.40	5048986
F1 (C6-C10)	ug/L	<25	<25		210	25	5048986
F1 (C6-C10) - BTEX	ug/L	<25	<25		190	25	5048986
F2 (C10-C16 Hydrocarbons)	ug/L	<100	<100	<100	110	100	5049877
F3 (C16-C34 Hydrocarbons)	ug/L	<200	<200	<200	<200	200	5049877
F4 (C34-C50 Hydrocarbons)	ug/L	<200	<200	<200	<200	200	5049877
Reached Baseline at C50	ug/L	Yes	Yes	Yes	Yes		5049877
Extraction Surrogate Recovery (%)							
o-Terphenyl	%	98	98	98	97		5049877
Instrument Surrogate Recovery (%)							
1,4-Difluorobenzene	%	100	100		100		5048986
4-Bromofluorobenzene	%	105	105		106		5048986
D10-Ethylbenzene	%	104	105		106		5048986
D4-1,2-Dichloroethane	%	106	107		107		5048986

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B7D2163
Report Date: 2017/06/29

Golder Associates Ltd.
Task Order#: 4410490399, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2007

TEST SUMMARY

Maxxam ID: EPV367
Sample ID: TH6
Matrix: Water

Collected: 2017/06/22
Relinquished: 2017/06/22
Received: 2017/06/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5048986	N/A	2017/06/28	Jiaxuan (Simon) Xi
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5049877	2017/06/28	2017/06/28	Zhiyue (Frank) Zhu
Dissolved Metals by ICPMS	ICP/MS	5044480	N/A	2017/06/28	Arefa Dabhad

Maxxam ID: EPV368
Sample ID: MW15-01
Matrix: Water

Collected: 2017/06/22
Relinquished: 2017/06/22
Received: 2017/06/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5048986	N/A	2017/06/28	Jiaxuan (Simon) Xi
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5049877	2017/06/28	2017/06/28	Zhiyue (Frank) Zhu
Dissolved Metals by ICPMS	ICP/MS	5044480	N/A	2017/06/28	Arefa Dabhad

Maxxam ID: EPV368 Dup
Sample ID: MW15-01
Matrix: Water

Collected: 2017/06/22
Relinquished: 2017/06/22
Received: 2017/06/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5049877	2017/06/28	2017/06/28	Zhiyue (Frank) Zhu

Maxxam ID: EPV369
Sample ID: MW15-2
Matrix: Water

Collected: 2017/06/22
Relinquished: 2017/06/22
Received: 2017/06/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5048986	N/A	2017/06/28	Jiaxuan (Simon) Xi
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5049877	2017/06/28	2017/06/28	Zhiyue (Frank) Zhu
Dissolved Metals by ICPMS	ICP/MS	5044480	N/A	2017/06/28	Arefa Dabhad

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Maxxam Job #: B7D2163
Report Date: 2017/06/29

Golder Associates Ltd.
Task Order#: 4410490399, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2007

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	0.0°C

Results relate only to the items tested.

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Golder Associates Ltd.
Task Order#: 4410490399, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2007

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5044480	ADA	Method Blank	Dissolved Lead (Pb)	2017/06/28	<0.50		ug/L	
5048986	JXI	Method Blank	1,4-Difluorobenzene	2017/06/28		100	%	70 - 130
			4-Bromofluorobenzene	2017/06/28		106	%	70 - 130
			D10-Ethylbenzene	2017/06/28		105	%	70 - 130
			D4-1,2-Dichloroethane	2017/06/28		107	%	70 - 130
			Benzene	2017/06/28	<0.20		ug/L	
			Toluene	2017/06/28	<0.20		ug/L	
			Ethylbenzene	2017/06/28	<0.20		ug/L	
			o-Xylene	2017/06/28	<0.20		ug/L	
			p+m-Xylene	2017/06/28	<0.40		ug/L	
			Total Xylenes	2017/06/28	<0.40		ug/L	
			F1 (C6-C10)	2017/06/28	<25		ug/L	
			F1 (C6-C10) - BTEX	2017/06/28	<25		ug/L	
5049877	ZZ	Method Blank	o-Terphenyl	2017/06/28		97	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2017/06/28	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2017/06/28	<200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2017/06/28	<200		ug/L	
5049877	ZZ	RPD [EPV368-02]	F2 (C10-C16 Hydrocarbons)	2017/06/28	NC		%	30
			F3 (C16-C34 Hydrocarbons)	2017/06/28	NC		%	30
			F4 (C34-C50 Hydrocarbons)	2017/06/28	NC		%	30
5049877	ZZ	Matrix Spike [EPV367-02]	o-Terphenyl	2017/06/28		99	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2017/06/28		92	%	50 - 130
			F3 (C16-C34 Hydrocarbons)	2017/06/28		88	%	50 - 130
			F4 (C34-C50 Hydrocarbons)	2017/06/28		93	%	50 - 130
5044480	ADA	LCS	Dissolved Lead (Pb)	2017/06/28		96	%	80 - 120
5048986	JXI	LCS	1,4-Difluorobenzene	2017/06/28		100	%	70 - 130
			4-Bromofluorobenzene	2017/06/28		105	%	70 - 130
			D10-Ethylbenzene	2017/06/28		104	%	70 - 130
			D4-1,2-Dichloroethane	2017/06/28		109	%	70 - 130
			Benzene	2017/06/28		104	%	70 - 130
			Toluene	2017/06/28		97	%	70 - 130
			Ethylbenzene	2017/06/28		106	%	70 - 130
			o-Xylene	2017/06/28		108	%	70 - 130
			p+m-Xylene	2017/06/28		106	%	70 - 130
			F1 (C6-C10)	2017/06/28		99	%	70 - 130
5049877	ZZ	LCS	o-Terphenyl	2017/06/28		100	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2017/06/28		93	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2017/06/28		92	%	60 - 130
			F4 (C34-C50 Hydrocarbons)	2017/06/28		93	%	60 - 130

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

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Maxxam Job #: B7D2163
Report Date: 2017/06/29

Golder Associates Ltd.
Task Order#: 4410490399, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2007

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam

6740 Campobello Road
Mississauga, Ontario L5N 2L8
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Phone: (905) 817-5700
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Toll Free: 800-563-6266

EXXONMOBIL/IMPERIAL OIL - MAXXAM
CHAIN-OF-CUSTODY RECORD
ANALYSIS REQUESTED

C of C # 616055-04-01

616055

INVOICE INFORMATION	REPORT INFORMATION
Company Name: Imperial Oil, a partnership of Imperial Oil Limited and McColl Frontenac Petrole	Company Name: Golder Associates Ltd.
Contact Name: Stephen Scott	Contact Name: Ian Sosney
Address: 505 Quarry Park Blvd Calgary AB T2C 5N1	Address: 6925 Century Avenue Suite #100 Mississauga ON L5N 7K2
Email: stephen.a.scott@esso.ca	Email: Ian_Sosney@golder.com, IOL_1390@golder.co
Phone: (587) 476-4467 x	Phone: (647) 522-4698 x
Sampler Name (Print): Brandon McParlan, Leandra Mariani	Consultant Project #: 1669090-1155-2007

	FIELD SAMPLE ID	MATRIX: GROUND WATER	SURFACE WATER	SOIL	OTHER	# CONTAINERS	SAMPLING: DATE (YYYY/MM/DD)	TIME (24 HR)	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	F1 & BTEX	F2-F4	Lead (Dissolved)
1	TH6	X				6	2017/06/22	10:00	X		X	X	X
2	MW15-01	X				6	2017/06/22	10:45	X		X	X	X
3	MW15-2	X				6	2017/06/22	11:03	X		X	X	X
4							YYYY/MM/DD	HH:MM					
5							YYYY/MM/DD	HH:MM					
6							YYYY/MM/DD	HH:MM					
7							YYYY/MM/DD	HH:MM					
8							YYYY/MM/DD	HH:MM					
9							YYYY/MM/DD	HH:MM					
10							YYYY/MM/DD	HH:MM					

IOL SITE LOCATION:
1660 Merivale Rd OTTAWA,ON

IOL PROJECT # (if applicable):
MZ.00277

MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM:
4410490399-10

REGULATORY CRITERIA / DETECTION LIMITS:
☒ REG 153 Table 3 ☐ 2004 ☒ 2011 ☐ RSC
(Please indicate which Reg. version and if RSC required)
☐ ODWS ☐ PWQO
☐ Other

SPECIAL INSTRUCTIONS:
Bottles may contain headspace and/or sediment.

JARS USED AND NOT SUBMITTED Enter N/A for Water
N/A

TURNAROUND TIME
Standard (5 days) ☒
Rush (3 days) ☐
(2 days) ☐
(1 day) ☐
(same day) ☐
Date Required

	YES	NO	COOLER ID: 1			
SEAL PRESENT	✓		TEMP °C	1	2	3
SEAL INTACT	✓			0	0	0
COOLING MEDIA PRESENT	✓					

	YES	NO	COOLER ID:			
SEAL PRESENT			TEMP °C	1	2	3
SEAL INTACT						
COOLING MEDIA PRESENT						

	YES	NO	COOLER ID:			
SEAL PRESENT			TEMP °C	1	2	3
SEAL INTACT						
COOLING MEDIA PRESENT						

LAB USE ONLY
MAXXAM JOB # B7D2163

* RELINQUISHED BY:		DATE:	TIME (24 HR)	RECEIVED BY:		DATE:	TIME (24 HR)
1. B McP	Brandon McParlan	2017/06/22	13:00	1. Ashitha Sukumaran	ASHITHA SUKUMARAN	2017/06/23	10:00
2. signature	printed name	YYYY/MM/DD	HH:MM	2. signature	printed name	YYYY/MM/DD	HH:MM
3. signature	printed name	YYYY/MM/DD	HH:MM	3. signature	printed name	YYYY/MM/DD	HH:MM

SAMPLES
LABELED BY: MF
VERIFIED BY: TSP

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXXAM'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.MAXXAM.CA/TERMS.

COC – 1012 (2016) IOL – ON White: Maxxam Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: June 22, 2017

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Maxxam Analytics Mississauga

Consultant Project Number: 1669090-1155

Sample Submission Number: B7D2163

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within
Extraction Surrogate Recovery	X			acceptance criteria.
Method Blank Concentration	X			
Matrix Duplicate RPD	X			
Matrix Spike Recovery	X			
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	No field QC samples were collected.
Trip Blank Concentration			X	
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Anita Colbert

Data Reviewed by (Signature): Anita Colbert

Date: June 30, 2017

Maxxam
A Bureau Veritas Group Company

Task Order#: 4410490399
Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2007
Your C.O.C. #: 616055-07-01

Attention:Ian Sosney

Golder Associates Ltd.
6925 Century Avenue
Suite #100
Mississauga, ON
Canada L5N 7K2

Report Date: 2017/06/29
Report #: R4566988
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7D2167
Received: 2017/06/23, 10:00

Sample Matrix: Water
Samples Received: 3

Analyses	Quantity	Laboratory Method	Primary Reference
Petroleum Hydro. CCME F1 & BTEX in Water	3	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1)	3	CAM SOP-00316	CCME PHC-CWS m
Dissolved Metals by ICPMS	3	CAM SOP-00447	EPA 6020B m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported: unless indicated otherwise, associated sample data are not blank corrected. All samples were analyzed within hold time unless otherwise flagged.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following "Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003". Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

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Maxxam
A Bureau Veritas Group Company

Task Order#: 4410490399
Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2007
Your C.O.C. #: 616055-07-01

Attention:Ian Sosney

Golder Associates Ltd.
6925 Century Avenue
Suite #100
Mississauga, ON
Canada L5N 7K2

Report Date: 2017/06/29
Report #: R4566988
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7D2167
Received: 2017/06/23, 10:00

Encryption Key

Khalida Aram
Project Manager
29 Jun 2017 17:01:47

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kyle Reinhart, Project Manager - Environmental Customer Service
Email: kreinhart@maxxam.ca
Phone# (905) 817-5700

==========

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Maxxam Job #: B7D2167
Report Date: 2017/06/29

Golder Associates Ltd.
Task Order#: 4410490399, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2007

LEAD (DISSOLVED) IN WATER

Maxxam ID		EPV392	EPV393	EPV396		
Sampling Date		2017/06/20 23:59	2017/06/20 23:59	2017/06/20 21:03		
COC Number		616055-07-01	616055-07-01	616055-07-01		
	UNITS	**TH12**	**DUPA**	**TH9**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	3.8	4.5	2.3	0.50	5044480

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B7D2167
Report Date: 2017/06/29

Golder Associates Ltd.
Task Order#: 4410490399, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2007

O.REG 153 PHCS IN WATER (WATER)

Maxxam ID		EPV392	EPV393		EPV396		
Sampling Date		2017/06/20 23:59	2017/06/20 23:59		2017/06/20 21:03		
COC Number		616055-07-01	616055-07-01		616055-07-01		
	UNITS	**TH12**	**DUPA**	**RDL**	**TH9**	**RDL**	**QC Batch**
Benzene	ug/L	160	150	1.0	36	0.40	5048986
Toluene	ug/L	11	11	1.0	5.5	0.40	5048986
Ethylbenzene	ug/L	1200	1200	1.0	460	0.40	5048986
o-Xylene	ug/L	24	23	1.0	9.8	0.40	5048986
p+m-Xylene	ug/L	140	140	2.0	360	0.80	5048986
Total Xylenes	ug/L	170	160	2.0	370	0.80	5048986
F1 (C6-C10)	ug/L	9500	8800	130	5000	50	5048986
F1 (C6-C10) - BTEX	ug/L	7900	7300	130	4200	50	5048986
F2 (C10-C16 Hydrocarbons)	ug/L	2800	2600	100	1200	100	5049877
F3 (C16-C34 Hydrocarbons)	ug/L	750	700	200	<200	200	5049877
F4 (C34-C50 Hydrocarbons)	ug/L	460	430	200	<200	200	5049877
Reached Baseline at C50	ug/L	Yes	Yes		Yes		5049877
Extraction Surrogate Recovery (%)							
o-Terphenyl	%	97	96		97		5049877
Instrument Surrogate Recovery (%)							
1,4-Difluorobenzene	%	101	101		99		5048986
4-Bromofluorobenzene	%	105	109		106		5048986
D10-Ethylbenzene	%	102	101		100		5048986
D4-1,2-Dichloroethane	%	106	108		108		5048986

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B7D2167
Report Date: 2017/06/29

Golder Associates Ltd.
Task Order#: 4410490399, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2007

TEST SUMMARY

Maxxam ID: EPV392
Sample ID: TH12
Matrix: Water

Collected: 2017/06/20
Relinquished: 2017/06/22
Received: 2017/06/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5048986	N/A	2017/06/29	Jiaxuan (Simon) Xi
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5049877	2017/06/28	2017/06/28	Zhiyue (Frank) Zhu
Dissolved Metals by ICPMS	ICP/MS	5044480	N/A	2017/06/28	Arefa Dabhad

Maxxam ID: EPV393
Sample ID: DUPA
Matrix: Water

Collected: 2017/06/20
Relinquished: 2017/06/22
Received: 2017/06/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5048986	N/A	2017/06/29	Jiaxuan (Simon) Xi
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5049877	2017/06/28	2017/06/28	Zhiyue (Frank) Zhu
Dissolved Metals by ICPMS	ICP/MS	5044480	N/A	2017/06/28	Arefa Dabhad

Maxxam ID: EPV396
Sample ID: TH9
Matrix: Water

Collected: 2017/06/20
Relinquished: 2017/06/22
Received: 2017/06/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5048986	N/A	2017/06/29	Jiaxuan (Simon) Xi
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5049877	2017/06/28	2017/06/28	Zhiyue (Frank) Zhu
Dissolved Metals by ICPMS	ICP/MS	5044480	N/A	2017/06/28	Arefa Dabhad

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B7D2167
Report Date: 2017/06/29

Golder Associates Ltd.
Task Order#: 4410490399, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2007

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	1.7°C

Results relate only to the items tested.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B7D2167
Report Date: 2017/06/29

Golder Associates Ltd.
Task Order#: 4410490399, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2007

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5044480	ADA	Method Blank	Dissolved Lead (Pb)	2017/06/28	<0.50		ug/L	
5048986	JXI	Method Blank	1,4-Difluorobenzene	2017/06/28		100	%	70 - 130
			4-Bromofluorobenzene	2017/06/28		106	%	70 - 130
			D10-Ethylbenzene	2017/06/28		105	%	70 - 130
			D4-1,2-Dichloroethane	2017/06/28		107	%	70 - 130
			Benzene	2017/06/28	<0.20		ug/L	
			Toluene	2017/06/28	<0.20		ug/L	
			Ethylbenzene	2017/06/28	<0.20		ug/L	
			o-Xylene	2017/06/28	<0.20		ug/L	
			p+m-Xylene	2017/06/28	<0.40		ug/L	
			Total Xylenes	2017/06/28	<0.40		ug/L	
			F1 (C6-C10)	2017/06/28	<25		ug/L	
			F1 (C6-C10) - BTEX	2017/06/28	<25		ug/L	
5049877	ZZ	Method Blank	o-Terphenyl	2017/06/28		97	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2017/06/28	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2017/06/28	<200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2017/06/28	<200		ug/L	
5044480	ADA	LCS	Dissolved Lead (Pb)	2017/06/28		96	%	80 - 120
5048986	JXI	LCS	1,4-Difluorobenzene	2017/06/28		100	%	70 - 130
			4-Bromofluorobenzene	2017/06/28		105	%	70 - 130
			D10-Ethylbenzene	2017/06/28		104	%	70 - 130
			D4-1,2-Dichloroethane	2017/06/28		109	%	70 - 130
			Benzene	2017/06/28		104	%	70 - 130
			Toluene	2017/06/28		97	%	70 - 130
			Ethylbenzene	2017/06/28		106	%	70 - 130
			o-Xylene	2017/06/28		108	%	70 - 130
			p+m-Xylene	2017/06/28		106	%	70 - 130
			F1 (C6-C10)	2017/06/28		99	%	70 - 130
5049877	ZZ	LCS	o-Terphenyl	2017/06/28		100	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2017/06/28		93	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2017/06/28		92	%	60 - 130
			F4 (C34-C50 Hydrocarbons)	2017/06/28		93	%	60 - 130

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

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Maxxam Job #: B7D2167
Report Date: 2017/06/29

Golder Associates Ltd.
Task Order#: 4410490399, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2007

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam

6740 Campobello Road
Mississauga, Ontario L5N 2L8
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Phone: (905) 817-5700
Fax: (905) 817-5777
Toll Free: 800-563-6266

EXXONMOBIL/IMPERIAL OIL - MAXXAM
CHAIN-OF-CUSTODY RECORD
ANALYSIS REQUESTED

Page 1 of 1
C of C # 616055-07-01
616055

INVOICE INFORMATION	REPORT INFORMATION
Company Name: Imperial Oil, a partnership of Imperial Oil Limited and McColl Frontenac Petrole	Company Name: Golder Associates Ltd.
Contact Name: Stephen Scott	Contact Name: Ian Sosnev
Address: 505 Quarry Park Blvd Calgary AB T2C 5N1	Address: 6925 Century Avenue Suite #100 Mississauga ON L5N 7K2
Email: stephen.a.scott@esso.ca	Email: Ian_Sosney@golder.com, IOL_1390@golder.co
Phone: (587) 476-4467 x	Phone: (647) 522-4698 x
Sampler Name (Print): Brandon McParlan/Leandra	Consultant Project #: 1669090-1155-2007

	FIELD SAMPLE ID	MATRIX: GROUND WATER	MATRIX: SURFACE WATER	MATRIX: SOIL	MATRIX: OTHER	# CONTAINERS	SAMPLING: DATE (YYYY/MM/DD)	SAMPLING: TIME (24 HR)	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	F1 & BTEX	F2-F4	Lead (Dissolved)
1	TH12	X				6	2017/06/20	23:59	X		X	X	X
2	DUP A	X				6	2017/06/20	23:59	X		X	X	X
3	TH9	X				6	2017/06/20	21:03	X		X	X	X
4													
5													
6													
7													
8													
9													
10													

IOL SITE LOCATION:
1660 Merivale Rd OTTAWA,ON

IOL PROJECT # (if applicable):
MZ.00277

MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM:
4410490399-10

REGULATORY CRITERIA / DETECTION LIMITS:
☒ REG 153 Table 3 ☐ 2004 ☒ 2011 ☐ RSC
(Please indicate which Reg. version and if RSC required)
☐ ODWS ☐ PWQO
☐ Other

SPECIAL INSTRUCTIONS:
Sample bottles may contain headspace/Sediment.
Upload to 88001627

JARS USED AND NOT SUBMITTED
Enter N/A for Water
NA

TURNAROUND TIME
Standard (5 days) ☒
Rush (3 days) ☐
(2 days) ☐
(1 day) ☐
(same day) ☐
Date Required

	YES	NO	COOLER ID: 1				YES	NO	COOLER ID:				YES	NO	COOLER ID:			
SEAL PRESENT	✓		TEMP °C	3	1	1			TEMP °C	1	2	3			TEMP °C	1	2	3
SEAL INTACT	✓																	
COOLING MEDIA PRESENT	✓																	

* RELINQUISHED BY:		DATE:	TIME (24 HR)	RECEIVED BY:		DATE:	TIME (24 HR)
1. BMcPar	Brandon McParlan	2017/06/22	13:00	1. Ashitha Sukumar	ASHITHA SUKUMAR	2017/06/23	10:00
2.				2.			
3.				3.			

LAB USE ONLY
MAXXAM JOB # B7D 2167
SAMPLES
LABELED BY: MAK
VERIFIED BY: TSP

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXXAM'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.MAXXAM.CA/TERMS.

COC – 1012 (2016) IOL – ON White: Maxxam Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: June 20, 2017

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Maxxam Analytics Mississauga

Consultant Project Number: 1669090-1155

Sample Submission Number: B7D2167

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within
Extraction Surrogate Recovery	X			acceptance criteria.
Method Blank Concentration	X			
Matrix Duplicate RPD			X	
Matrix Spike Recovery			X	
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	All field QC samples are within
Trip Blank Concentration			X	alert limits.
Field Duplicate RPD	X			

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Anita Colbert

Data Reviewed by (Signature): Anita Colbert

Date: June 30, 2017

Maxxam
A Bureau Veritas Group Company

Task Order#: 4410490399
Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2007
Your C.O.C. #: 616055-06-01

Attention:Ian Sosney

Golder Associates Ltd.
6925 Century Avenue
Suite #100
Mississauga, ON
Canada L5N 7K2

Report Date: 2017/06/29
Report #: R4566990
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7D2173
Received: 2017/06/23, 10:00

Sample Matrix: Water
Samples Received: 4

Analyses	Quantity	Laboratory Method	Primary Reference
Petroleum Hydro. CCME F1 & BTEX in Water	4	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1)	4	CAM SOP-00316	CCME PHC-CWS m
Dissolved Metals by ICPMS	4	CAM SOP-00447	EPA 6020B m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported: unless indicated otherwise, associated sample data are not blank corrected. All samples were analyzed within hold time unless otherwise flagged.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following "Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003". Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Task Order#: 4410490399
Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2007
Your C.O.C. #: 616055-06-01

Attention:Ian Sosney

Golder Associates Ltd.
6925 Century Avenue
Suite #100
Mississauga, ON
Canada L5N 7K2

Report Date: 2017/06/29
Report #: R4566990
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7D2173
Received: 2017/06/23, 10:00

Encryption Key

Khalida Aram
Project Manager
29 Jun 2017 16:59:06

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kyle Reinhart, Project Manager - Environmental Customer Service
Email: kreinhart@maxxam.ca
Phone# (905) 817-5700

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam Job #: B7D2173
Report Date: 2017/06/29

Golder Associates Ltd.
Task Order#: 4410490399, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2007

LEAD (DISSOLVED) IN WATER

Maxxam ID		EPV411	EPV412	EPV413	EPV414		
Sampling Date		2017/06/20 22:00	2017/06/20 23:00	2017/06/20 22:58	2017/06/21 00:03		
COC Number		616055-06-01	616055-06-01	616055-06-01	616055-06-01		
	UNITS	**TH100**	**TH101**	**TH102**	**MW16-01**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	<0.50	0.84	<0.50	1.2	0.50	5044480

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B7D2173
Report Date: 2017/06/29

Golder Associates Ltd.
Task Order#: 4410490399, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2007

O.REG 153 PHCS IN WATER (WATER)

Maxxam ID		EPV411	EPV411		EPV412		EPV413	EPV414		
Sampling Date		2017/06/20 22:00	2017/06/20 22:00		2017/06/20 23:00		2017/06/20 22:58	2017/06/21 00:03		
COC Number		616055-06-01	616055-06-01		616055-06-01		616055-06-01	616055-06-01		
	UNITS	**TH100**	**TH100 Lab-Dup**	**RDL**	**TH101**	**RDL**	**TH102**	**MW16-01**	**RDL**	**QC Batch**
Benzene	ug/L	<0.20	<0.20	0.20	76	0.80	19	46	0.20	5049768
Toluene	ug/L	<0.20	<0.20	0.20	14	0.80	3.1	3.7	0.20	5049768
Ethylbenzene	ug/L	<0.20	<0.20	0.20	870	0.80	190	170	0.20	5049768
o-Xylene	ug/L	<0.20	<0.20	0.20	55	0.80	4.9	4.1	0.20	5049768
p+m-Xylene	ug/L	<0.40	<0.40	0.40	350	1.6	110	75	0.40	5049768
Total Xylenes	ug/L	<0.40	<0.40	0.40	410	1.6	120	79	0.40	5049768
F1 (C6-C10)	ug/L	<25	<25	25	6100	100	2100	1100	25	5049768
F1 (C6-C10) - BTEX	ug/L	<25	<25	25	4800	100	1800	820	25	5049768
F2 (C10-C16 Hydrocarbons)	ug/L	<100		100	1100	100	500	260	100	5049877
F3 (C16-C34 Hydrocarbons)	ug/L	<200		200	<200	200	<200	<200	200	5049877
F4 (C34-C50 Hydrocarbons)	ug/L	<200		200	<200	200	<200	<200	200	5049877
Reached Baseline at C50	ug/L	Yes			Yes		Yes	Yes		5049877
Extraction Surrogate Recovery (%)										
o-Terphenyl	%	97			96		97	96		5049877
Instrument Surrogate Recovery (%)										
1,4-Difluorobenzene	%	100	100		101		99	100		5049768
4-Bromofluorobenzene	%	102	102		101		100	102		5049768
D10-Ethylbenzene	%	99	98		98		100	100		5049768
D4-1,2-Dichloroethane	%	100	100		96		97	101		5049768

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B7D2173
Report Date: 2017/06/29

Golder Associates Ltd.
Task Order#: 4410490399, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2007

TEST SUMMARY

Maxxam ID: EPV411
Sample ID: TH100
Matrix: Water

Collected: 2017/06/20
Relinquished: 2017/06/22
Received: 2017/06/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5049768	N/A	2017/06/28	Haibin Wu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5049877	2017/06/28	2017/06/29	Zhiyue (Frank) Zhu
Dissolved Metals by ICPMS	ICP/MS	5044480	N/A	2017/06/28	Arefa Dabhad

Maxxam ID: EPV411 Dup
Sample ID: TH100
Matrix: Water

Collected: 2017/06/20
Relinquished: 2017/06/22
Received: 2017/06/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5049768	N/A	2017/06/28	Haibin Wu

Maxxam ID: EPV412
Sample ID: TH101
Matrix: Water

Collected: 2017/06/20
Relinquished: 2017/06/22
Received: 2017/06/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5049768	N/A	2017/06/29	Haibin Wu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5049877	2017/06/28	2017/06/29	Zhiyue (Frank) Zhu
Dissolved Metals by ICPMS	ICP/MS	5044480	N/A	2017/06/28	Arefa Dabhad

Maxxam ID: EPV413
Sample ID: TH102
Matrix: Water

Collected: 2017/06/20
Relinquished: 2017/06/22
Received: 2017/06/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5049768	N/A	2017/06/29	Haibin Wu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5049877	2017/06/28	2017/06/29	Zhiyue (Frank) Zhu
Dissolved Metals by ICPMS	ICP/MS	5044480	N/A	2017/06/28	Arefa Dabhad

Maxxam ID: EPV414
Sample ID: MW16-01
Matrix: Water

Collected: 2017/06/21
Relinquished: 2017/06/22
Received: 2017/06/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5049768	N/A	2017/06/29	Haibin Wu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5049877	2017/06/28	2017/06/29	Zhiyue (Frank) Zhu
Dissolved Metals by ICPMS	ICP/MS	5044480	N/A	2017/06/28	Arefa Dabhad

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Maxxam Job #: B7D2173
Report Date: 2017/06/29

Golder Associates Ltd.
Task Order#: 4410490399, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2007

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	1.7°C

Results relate only to the items tested.

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Report Date: 2017/06/29

Golder Associates Ltd.
Task Order#: 4410490399, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2007

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5044480	ADA	Method Blank	Dissolved Lead (Pb)	2017/06/28	<0.50		ug/L	
5049768	H_W	Method Blank	1,4-Difluorobenzene	2017/06/28		100	%	70 - 130
			4-Bromofluorobenzene	2017/06/28		102	%	70 - 130
			D10-Ethylbenzene	2017/06/28		98	%	70 - 130
			D4-1,2-Dichloroethane	2017/06/28		100	%	70 - 130
			Benzene	2017/06/28	<0.20		ug/L	
			Toluene	2017/06/28	<0.20		ug/L	
			Ethylbenzene	2017/06/28	<0.20		ug/L	
			o-Xylene	2017/06/28	<0.20		ug/L	
			p+m-Xylene	2017/06/28	<0.40		ug/L	
			Total Xylenes	2017/06/28	<0.40		ug/L	
			F1 (C6-C10)	2017/06/28	<25		ug/L	
			F1 (C6-C10) - BTEX	2017/06/28	<25		ug/L	
5049877	ZZ	Method Blank	o-Terphenyl	2017/06/28		97	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2017/06/28	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2017/06/28	<200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2017/06/28	<200		ug/L	
5049768	H_W	RPD [EPV411-04]	Benzene	2017/06/28	NC		%	30
			Toluene	2017/06/28	NC		%	30
			Ethylbenzene	2017/06/28	NC		%	30
			o-Xylene	2017/06/28	NC		%	30
			p+m-Xylene	2017/06/28	NC		%	30
			Total Xylenes	2017/06/28	NC		%	30
			F1 (C6-C10)	2017/06/28	NC		%	30
			F1 (C6-C10) - BTEX	2017/06/28	NC		%	30
5049768	H_W	Matrix Spike [EPV411-04]	1,4-Difluorobenzene	2017/06/28		100	%	70 - 130
			4-Bromofluorobenzene	2017/06/28		102	%	70 - 130
			D10-Ethylbenzene	2017/06/28		95	%	70 - 130
			D4-1,2-Dichloroethane	2017/06/28		103	%	70 - 130
			Benzene	2017/06/28		93	%	70 - 130
			Toluene	2017/06/28		87	%	70 - 130
			Ethylbenzene	2017/06/28		89	%	70 - 130
			o-Xylene	2017/06/28		92	%	70 - 130
			p+m-Xylene	2017/06/28		89	%	70 - 130
			F1 (C6-C10)	2017/06/28		92	%	70 - 130
5044480	ADA	LCS	Dissolved Lead (Pb)	2017/06/28		96	%	80 - 120
5049768	H_W	LCS	1,4-Difluorobenzene	2017/06/28		101	%	70 - 130
			4-Bromofluorobenzene	2017/06/28		101	%	70 - 130
			D10-Ethylbenzene	2017/06/28		97	%	70 - 130
			D4-1,2-Dichloroethane	2017/06/28		102	%	70 - 130
			Benzene	2017/06/28		99	%	70 - 130
			Toluene	2017/06/28		90	%	70 - 130
			Ethylbenzene	2017/06/28		92	%	70 - 130
			o-Xylene	2017/06/28		94	%	70 - 130
			p+m-Xylene	2017/06/28		91	%	70 - 130
			F1 (C6-C10)	2017/06/28		100	%	70 - 130
5049877	ZZ	LCS	o-Terphenyl	2017/06/28		100	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2017/06/28		93	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2017/06/28		92	%	60 - 130

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Maxxam Job #: B7D2173
Report Date: 2017/06/29

Golder Associates Ltd.
Task Order#: 4410490399, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2007

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			F4 (C34-C50 Hydrocarbons)	2017/06/28		93	%	60 - 130

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

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Maxxam Job #: B7D2173
Report Date: 2017/06/29

Golder Associates Ltd.
Task Order#: 4410490399, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2007

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Phone: (905) 817-5700
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Toll Free: 800-563-6266

EXXONMOBIL/IMPERIAL OIL - MAXXAM
CHAIN-OF-CUSTODY RECORD
ANALYSIS REQUESTED

C of C # 616055-06-01

616055

INVOICE INFORMATION	REPORT INFORMATION
Company Name: Imperial Oil, a partnership of Imperial Oil Limited and McColl Frontenac Petrole	Company Name: Golder Associates Ltd.
Contact Name: Stephen Scott	Contact Name: Ian Sosney
Address: 505 Quarry Park Blvd Calgary AB T2C 5N1	Address: 6925 Century Avenue Suite #100 Mississauga ON L5N 7K2
Email: stephen.a.scott@esso.ca	Email: Ian_Sosney@golder.com, IOL_1390@golder.co
Phone: (587) 476-4467 x	Phone: (647) 522-4698 x
Sampler Name (Print): Brandon McParlan, Leandra Mariani	Consultant Project #: 1669090-1155-2007

	FIELD SAMPLE ID	MATRIX: GROUND WATER	MATRIX: SURFACE WATER	MATRIX: SOIL	MATRIX: OTHER	# CONTAINERS	SAMPLING: DATE (YYYY/MM/DD)	SAMPLING: TIME (24 HR)	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	F1 & BTEX	F2-F4	Lead (Dissolved)
1	TH100	X				6	2017/06/20	22:00	X		X	X	X
2	TH101	X				6	2017/06/20	23:00	X		X	X	X
3	TH102	X				6	2017/06/20	22:58	X		X	X	X
4	~~DUP 1~~ MW16-01	X				6	2017/06/21	00:03	X		X	X	X
5							YYYY/MM/DD	HH:MM					
6							YYYY/MM/DD	HH:MM					
7							YYYY/MM/DD	HH:MM					
8							YYYY/MM/DD	HH:MM					
9							YYYY/MM/DD	HH:MM					
10							YYYY/MM/DD	HH:MM					

IOL SITE LOCATION:
1660 Merivale Rd OTTAWA,ON

IOL PROJECT # (if applicable):
MZ.00277

MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM:
4410490399-10

REGULATORY CRITERIA / DETECTION LIMITS:
(Please indicate which Reg. version and if RSC required)
☒ REG 153 Table 3 ☐ 2004 ☒ 2011 ☐ RSC
☐ ODWS ☐ PWQO
☐ Other

SPECIAL INSTRUCTIONS:
Samples may contain headspace and/or silt.
Upload to 8001627

JARS USED AND NOT SUBMITTED Enter N/A for Water: N/A

TURNAROUND TIME
Standard (5 days) ☒
Rush (3 days) ☐
(2 days) ☐
(1 day) ☐
(same day) ☐
Date Required

	YES	NO	COOLER ID: 1		2	3
SEAL PRESENT	✓					
SEAL INTACT	✓					
COOLING MEDIA PRESENT	✓					
TEMP °C			1	2	2	2

	YES	NO	COOLER ID:			
SEAL PRESENT						
SEAL INTACT						
COOLING MEDIA PRESENT						
TEMP °C			1	2	3	

	YES	NO	COOLER ID:			
SEAL PRESENT						
SEAL INTACT						
COOLING MEDIA PRESENT						
TEMP °C			1	2	3	

LAB USE ONLY
MAXXAM JOB # B7D2173

* RELINQUISHED BY:		DATE:	TIME (24 HR)	RECEIVED BY:		DATE:	TIME (24 HR)
1. BMcP	Brandon McParlan	2017/06/22	13:00	1. Ashlie Bellerman	Ashlie Bellerman	2017/06/23	10:00
2. signature	printed name	YYYY/MM/DD	HH:MM	2. signature	printed name	YYYY/MM/DD	HH:MM
3. signature	printed name	YYYY/MM/DD	HH:MM	3. signature	printed name	YYYY/MM/DD	HH:MM

SAMPLES
LABELED BY: MAF
VERIFIED BY: TSP

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXXAM'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.MAXXAM.CA/TERMS.

COC – 1012 (2016) IOL – ON White: Maxxam Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: June 20 and 21, 2017

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Maxxam Analytics Mississauga

Consultant Project Number: 1669090-1155

Sample Submission Number: B7D2173

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within
Extraction Surrogate Recovery	X			acceptance criteria.
Method Blank Concentration	X			
Matrix Duplicate RPD	X			
Matrix Spike Recovery	X			
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	No field QC samples were collected.
Trip Blank Concentration			X	
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Anita Colbert

Data Reviewed by (Signature): Anita Colbert

Date: June 30, 2017

Maxxam
A Bureau Veritas Group Company

Task Order#: 4410490399
Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2007
Your C.O.C. #: 616055-13-01

Attention:Ian Sosney

Golder Associates Ltd.
6925 Century Avenue
Suite #100
Mississauga, ON
Canada L5N 7K2

Report Date: 2017/06/29
Report #: R4566994
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7D2178
Received: 2017/06/23, 10:00

Sample Matrix: Water
Samples Received: 4

Analyses	Quantity	Laboratory Method	Primary Reference
Petroleum Hydro. CCME F1 & BTEX in Water	4	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1)	4	CAM SOP-00316	CCME PHC-CWS m
Dissolved Metals by ICPMS	4	CAM SOP-00447	EPA 6020B m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported: unless indicated otherwise, associated sample data are not blank corrected. All samples were analyzed within hold time unless otherwise flagged.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following "Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003". Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

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Task Order#: 4410490399
Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2007
Your C.O.C. #: 616055-13-01

Attention:Ian Sosney

Golder Associates Ltd.
6925 Century Avenue
Suite #100
Mississauga, ON
Canada L5N 7K2

Report Date: 2017/06/29
Report #: R4566994
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7D2178
Received: 2017/06/23, 10:00

Encryption Key

Khalida Aram
Project Manager
29 Jun 2017 16:55:35

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kyle Reinhart, Project Manager - Environmental Customer Service
Email: kreinhart@maxxam.ca
Phone# (905) 817-5700

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam Job #: B7D2178
Report Date: 2017/06/29

Golder Associates Ltd.
Task Order#: 4410490399, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2007

LEAD (DISSOLVED) IN WATER

Maxxam ID		EPV429	EPV430	EPV431	EPV431	EPV432		
Sampling Date		2017/06/21 12:50	2017/06/21 13:30	2017/06/21 14:05	2017/06/21 14:05	2017/06/22 10:14		
COC Number		616055-13-01	616055-13-01	616055-13-01	616055-13-01	616055-13-01		
	UNITS	**TH2**	**TH1**	**TH3**	**TH3 Lab-Dup**	**TH7**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	<0.50	<0.50	<0.50	<0.50	0.54	0.50	5044480

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B7D2178
Report Date: 2017/06/29

Golder Associates Ltd.
Task Order#: 4410490399, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2007

O.REG 153 PHCS IN WATER (WATER)

Maxxam ID		EPV429	EPV430	EPV430	EPV431	EPV432		
Sampling Date		2017/06/21 12:50	2017/06/21 13:30	2017/06/21 13:30	2017/06/21 14:05	2017/06/22 10:14		
COC Number		616055-13-01	616055-13-01	616055-13-01	616055-13-01	616055-13-01		
	UNITS	**TH2**	**TH1**	**TH1 Lab-Dup**	**TH3**	**TH7**	**RDL**	**QC Batch**
Benzene	ug/L	<0.20	<0.20		19	93	0.20	5049768
Toluene	ug/L	<0.20	<0.20		0.29	8.7	0.20	5049768
Ethylbenzene	ug/L	<0.20	<0.20		77	240	0.20	5049768
o-Xylene	ug/L	<0.20	<0.20		0.78	9.3	0.20	5049768
p+m-Xylene	ug/L	<0.40	<0.40		19	180	0.40	5049768
Total Xylenes	ug/L	<0.40	<0.40		20	190	0.40	5049768
F1 (C6-C10)	ug/L	<25	<25		740	1300	25	5049768
F1 (C6-C10) - BTEX	ug/L	<25	<25		630	800	25	5049768
F2 (C10-C16 Hydrocarbons)	ug/L	<100	<100	<100	140	190	100	5050049
F3 (C16-C34 Hydrocarbons)	ug/L	<200	<200	<200	<200	<200	200	5050049
F4 (C34-C50 Hydrocarbons)	ug/L	<200	<200	<200	<200	<200	200	5050049
Reached Baseline at C50	ug/L	Yes	Yes	Yes	Yes	Yes		5050049
Extraction Surrogate Recovery (%)								
o-Terphenyl	%	100	100	100	99	100		5050049
Instrument Surrogate Recovery (%)								
1,4-Difluorobenzene	%	102	98		102	102		5049768
4-Bromofluorobenzene	%	101	102		102	101		5049768
D10-Ethylbenzene	%	101	98		101	102		5049768
D4-1,2-Dichloroethane	%	98	101		101	95		5049768

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B7D2178
Report Date: 2017/06/29

Golder Associates Ltd.
Task Order#: 4410490399, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2007

TEST SUMMARY

Maxxam ID: EPV429
Sample ID: TH2
Matrix: Water

Collected: 2017/06/21
Relinquished: 2017/06/22
Received: 2017/06/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5049768	N/A	2017/06/29	Haibin Wu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5050049	2017/06/28	2017/06/29	Zhiyue (Frank) Zhu
Dissolved Metals by ICPMS	ICP/MS	5044480	N/A	2017/06/28	Arefa Dabhad

Maxxam ID: EPV430
Sample ID: TH1
Matrix: Water

Collected: 2017/06/21
Relinquished: 2017/06/22
Received: 2017/06/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5049768	N/A	2017/06/29	Haibin Wu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5050049	2017/06/28	2017/06/29	Zhiyue (Frank) Zhu
Dissolved Metals by ICPMS	ICP/MS	5044480	N/A	2017/06/28	Arefa Dabhad

Maxxam ID: EPV430 Dup
Sample ID: TH1
Matrix: Water

Collected: 2017/06/21
Relinquished: 2017/06/22
Received: 2017/06/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5050049	2017/06/28	2017/06/29	Zhiyue (Frank) Zhu

Maxxam ID: EPV431
Sample ID: TH3
Matrix: Water

Collected: 2017/06/21
Relinquished: 2017/06/22
Received: 2017/06/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5049768	N/A	2017/06/29	Haibin Wu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5050049	2017/06/28	2017/06/29	Zhiyue (Frank) Zhu
Dissolved Metals by ICPMS	ICP/MS	5044480	N/A	2017/06/28	Arefa Dabhad

Maxxam ID: EPV431 Dup
Sample ID: TH3
Matrix: Water

Collected: 2017/06/21
Relinquished: 2017/06/22
Received: 2017/06/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Metals by ICPMS	ICP/MS	5044480	N/A	2017/06/28	Arefa Dabhad

Maxxam ID: EPV432
Sample ID: TH7
Matrix: Water

Collected: 2017/06/22
Relinquished: 2017/06/22
Received: 2017/06/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5049768	N/A	2017/06/29	Haibin Wu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5050049	2017/06/28	2017/06/29	Zhiyue (Frank) Zhu
Dissolved Metals by ICPMS	ICP/MS	5044480	N/A	2017/06/28	Arefa Dabhad

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Maxxam Job #: B7D2178
Report Date: 2017/06/29

Golder Associates Ltd.
Task Order#: 4410490399, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2007

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	0.0°C

Results relate only to the items tested.

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Maxxam Job #: B7D2178
Report Date: 2017/06/29

Golder Associates Ltd.
Task Order#: 4410490399, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2007

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5044480	ADA	Method Blank	Dissolved Lead (Pb)	2017/06/28	<0.50		ug/L	
5049768	H_W	Method Blank	1,4-Difluorobenzene	2017/06/28		100	%	70 - 130
			4-Bromofluorobenzene	2017/06/28		102	%	70 - 130
			D10-Ethylbenzene	2017/06/28		98	%	70 - 130
			D4-1,2-Dichloroethane	2017/06/28		100	%	70 - 130
			Benzene	2017/06/28	<0.20		ug/L	
			Toluene	2017/06/28	<0.20		ug/L	
			Ethylbenzene	2017/06/28	<0.20		ug/L	
			o-Xylene	2017/06/28	<0.20		ug/L	
			p+m-Xylene	2017/06/28	<0.40		ug/L	
			Total Xylenes	2017/06/28	<0.40		ug/L	
			F1 (C6-C10)	2017/06/28	<25		ug/L	
			F1 (C6-C10) - BTEX	2017/06/28	<25		ug/L	
5050049	ZZ	Method Blank	o-Terphenyl	2017/06/28		100	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2017/06/28	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2017/06/28	<200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2017/06/28	<200		ug/L	
5050049	ZZ	RPD [EPV430-02]	F2 (C10-C16 Hydrocarbons)	2017/06/29	NC		%	30
			F3 (C16-C34 Hydrocarbons)	2017/06/29	NC		%	30
			F4 (C34-C50 Hydrocarbons)	2017/06/29	NC		%	30
5044480	ADA	RPD [EPV431-03]	Dissolved Lead (Pb)	2017/06/28	NC		%	20
5044480	ADA	Matrix Spike [EPV431-03]	Dissolved Lead (Pb)	2017/06/28		98	%	80 - 120
5050049	ZZ	Matrix Spike [EPV429-02]	o-Terphenyl	2017/06/29		102	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2017/06/29		87	%	50 - 130
			F3 (C16-C34 Hydrocarbons)	2017/06/29		99	%	50 - 130
			F4 (C34-C50 Hydrocarbons)	2017/06/29		102	%	50 - 130
5044480	ADA	LCS	Dissolved Lead (Pb)	2017/06/28		96	%	80 - 120
5049768	H_W	LCS	1,4-Difluorobenzene	2017/06/28		101	%	70 - 130
			4-Bromofluorobenzene	2017/06/28		101	%	70 - 130
			D10-Ethylbenzene	2017/06/28		97	%	70 - 130
			D4-1,2-Dichloroethane	2017/06/28		102	%	70 - 130
			Benzene	2017/06/28		99	%	70 - 130
			Toluene	2017/06/28		90	%	70 - 130
			Ethylbenzene	2017/06/28		92	%	70 - 130
			o-Xylene	2017/06/28		94	%	70 - 130
			p+m-Xylene	2017/06/28		91	%	70 - 130
			F1 (C6-C10)	2017/06/28		100	%	70 - 130
5050049	ZZ	LCS	o-Terphenyl	2017/06/29		108	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2017/06/29		102	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2017/06/29		118	%	60 - 130
			F4 (C34-C50 Hydrocarbons)	2017/06/29		122	%	60 - 130

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

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Maxxam Job #: B7D2178
Report Date: 2017/06/29

Golder Associates Ltd.
Task Order#: 4410490399, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2007

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Phone: (905) 817-5700
Fax: (905) 817-5777
Toll Free: 800-563-6266

EXXONMOBIL/IMPERIAL OIL - MAXXAM
CHAIN-OF-CUSTODY RECORD
ANALYSIS REQUESTED

C of C # 616055-13-01

616055

INVOICE INFORMATION	REPORT INFORMATION
Company Name:Imperial Oil, a partnership of Imperial Oil Limited and McColl Frontenac Petrole	Company Name:Golder Associates Ltd.
Contact Name: Stephen Scott	Contact Name: Ian Sosnev
Address: 505 Quarry Park Blvd Calgary AB T2C 5N1	Address: 6925 Century Avenue Suite #100 Mississauga ON L5N 7K2
Email: stephen.a.scott@esso.ca	Email: Ian_Sosney@golder.com, IOL_1390@golder.co
Phone: (587) 476-4467 x	Phone: (647) 522-4698 x
Sampler Name (Print): Brandon Mcfarlan, Leandra Mariani	Consultant Project #: 1669090-1155-2007

	FIELD SAMPLE ID	MATRIX: GROUND WATER	MATRIX: SURFACE WATER	MATRIX: SOIL	MATRIX: OTHER	# CONTAINERS	SAMPLING: DATE (YYYY/MM/DD)	SAMPLING: TIME (24 HR)	*FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	F1 & BTEX	F2-F4	Lead (Dissolved)
1	~~TH2~~ TH2	X				6	2017/06/21	12:50	X		X	X	X
2	~~TH1~~ TH1	X				6	2017/06/21	13:30	X		X	X	X
3	TH3	X				6	2017/06/21	14:05	X		X	X	X
4	TH7	X				6	2017/06/22	10:14	X		X	X	X
5													
6													
7													
8													
9													
10													

IOL SITE LOCATION:
1660 Merivale Rd OTTAWA,ON

IOL PROJECT # (if applicable):
MZ.00277

MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM:
4410490399-10

REGULATORY CRITERIA / DETECTION LIMITS:
X REG 153 Table 3 ☐ 2004 X 2011 ☐ RSC
(Please indicate which Reg. version and if RSC required)
☐ ODWS ☐ PWQO
☐ Other

SPECIAL INSTRUCTIONS:
Samples may contain headspace and/or silt
Upload to 88001627

JARS USED AND NOT SUBMITTED Enter N/A for Water: N/A

TURNAROUND TIME
Standard (5 days) X
Rush (3 days) ☐
(2 days) ☐
(1 day) ☐
(same day) ☐
Date Required

	YES	NO	COOLER ID: 1			
SEAL PRESENT	✓		TEMP °C	0	0	0
SEAL INTACT	✓			1	2	3
COOLING MEDIA PRESENT	✓					

	YES	NO	COOLER ID:			
SEAL PRESENT			TEMP °C			
SEAL INTACT				1	2	3
COOLING MEDIA PRESENT						

	YES	NO	COOLER ID:			
SEAL PRESENT			TEMP °C			
SEAL INTACT				1	2	3
COOLING MEDIA PRESENT						

LAB USE ONLY
MAXXAM JOB # B7D2178

* RELINQUISHED BY:		DATE:	TIME (24 HR)	RECEIVED BY:		DATE:	TIME (24 HR)
1. Shaine	Leandra Mariani	2017/06/22	13:00	1. Ashlitha Sukumaran	ASHLITHA SUKUMARAN	2017/06/23	10:00
2. signature	printed name	YYYY/MM/DD	HH:MM	2. signature	printed name	YYYY/MM/DD	HH:MM
3. signature	printed name	YYYY/MM/DD	HH:MM	3. signature	printed name	YYYY/MM/DD	HH:MM

SAMPLES
LABELED BY: MA
VERIFIED BY: TSP

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXXAM'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.MAXXAM.CA/TERMS.

COC – 1012 (2016) IOL – ON White: Maxxam Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: June 21 and 22, 2017

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Maxxam Analytics Mississauga

Consultant Project Number: 1669090-1155

Sample Submission Number: B7D2178

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within
Extraction Surrogate Recovery	X			acceptance criteria.
Method Blank Concentration	X			
Matrix Duplicate RPD	X			
Matrix Spike Recovery	X			
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	No field QC samples were collected.
Trip Blank Concentration			X	
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Anita Colbert

Data Reviewed by (Signature): Anita Colbert

Date: June 30, 2017

Maxxam
A Bureau Veritas Group Company

Task Order#: 4410490399
Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2007
Your C.O.C. #: 616055-05-01

Attention:Ian Sosney

Golder Associates Ltd.
6925 Century Avenue
Suite #100
Mississauga, ON
Canada L5N 7K2

Report Date: 2017/06/29
Report #: R4566996
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7D2188
Received: 2017/06/23, 10:00

Sample Matrix: Water
Samples Received: 2

Analyses	Quantity	Laboratory Method	Primary Reference
Petroleum Hydro. CCME F1 & BTEX in Water	2	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1)	2	CAM SOP-00316	CCME PHC-CWS m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported: unless indicated otherwise, associated sample data are not blank corrected. All samples were analyzed within hold time unless otherwise flagged.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following "Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003". Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Task Order#: 4410490399
Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2007
Your C.O.C. #: 616055-05-01

Attention:Ian Sosney

Golder Associates Ltd.
6925 Century Avenue
Suite #100
Mississauga, ON
Canada L5N 7K2

Report Date: 2017/06/29
Report #: R4566996
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7D2188
Received: 2017/06/23, 10:00

Encryption Key

Khalida Aram
Project Manager
29 Jun 2017 16:57:33

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kyle Reinhart, Project Manager - Environmental Customer Service
Email: kreinhart@maxxam.ca
Phone# (905) 817-5700

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam Job #: B7D2188
Report Date: 2017/06/29

Golder Associates Ltd.
Task Order#: 4410490399, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2007

O.REG 153 PHCS IN WATER (WATER)

Maxxam ID		EPV452	EPV453		
Sampling Date		2017/06/22 11:15	2017/06/22 11:30		
COC Number		616055-05-01	616055-05-01		
	UNITS	**FIELD BLANK**	**TRIP BLANK**	**RDL**	**QC Batch**
Benzene	ug/L	<0.20	<0.20	0.20	5049768
Toluene	ug/L	<0.20	<0.20	0.20	5049768
Ethylbenzene	ug/L	<0.20	<0.20	0.20	5049768
o-Xylene	ug/L	<0.20	<0.20	0.20	5049768
p+m-Xylene	ug/L	<0.40	<0.40	0.40	5049768
Total Xylenes	ug/L	<0.40	<0.40	0.40	5049768
F1 (C6-C10)	ug/L	<25	<25	25	5049768
F1 (C6-C10) - BTEX	ug/L	<25	<25	25	5049768
F2 (C10-C16 Hydrocarbons)	ug/L	<100	<100	100	5049221
F3 (C16-C34 Hydrocarbons)	ug/L	<200	<200	200	5049221
F4 (C34-C50 Hydrocarbons)	ug/L	<200	<200	200	5049221
Reached Baseline at C50	ug/L	Yes	Yes		5049221
Extraction Surrogate Recovery (%)					
o-Terphenyl	%	99	100		5049221
Instrument Surrogate Recovery (%)					
1,4-Difluorobenzene	%	100	102		5049768
4-Bromofluorobenzene	%	100	101		5049768
D10-Ethylbenzene	%	98	101		5049768
D4-1,2-Dichloroethane	%	99	99		5049768

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B7D2188
Report Date: 2017/06/29

Golder Associates Ltd.
Task Order#: 4410490399, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2007

TEST SUMMARY

Maxxam ID: EPV452
Sample ID: FIELD BLANK
Matrix: Water

Collected: 2017/06/22
Relinquished: 2017/06/22
Received: 2017/06/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5049768	N/A	2017/06/29	Haibin Wu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5049221	2017/06/28	2017/06/29	(Kent) Maolin Li

Maxxam ID: EPV453
Sample ID: TRIP BLANK
Matrix: Water

Collected: 2017/06/22
Relinquished: 2017/06/22
Received: 2017/06/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5049768	N/A	2017/06/29	Haibin Wu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5049221	2017/06/28	2017/06/29	(Kent) Maolin Li

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Maxxam Job #: B7D2188
Report Date: 2017/06/29

Golder Associates Ltd.
Task Order#: 4410490399, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2007

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	1.7°C

Results relate only to the items tested.

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Maxxam Job #: B7D2188
Report Date: 2017/06/29

Golder Associates Ltd.
Task Order#: 4410490399, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2007

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5049221	KLI	Method Blank	o-Terphenyl	2017/06/29		98	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2017/06/29	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2017/06/29	<200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2017/06/29	<200		ug/L	
5049768	H_W	Method Blank	1,4-Difluorobenzene	2017/06/28		100	%	70 - 130
			4-Bromofluorobenzene	2017/06/28		102	%	70 - 130
			D10-Ethylbenzene	2017/06/28		98	%	70 - 130
			D4-1,2-Dichloroethane	2017/06/28		100	%	70 - 130
			Benzene	2017/06/28	<0.20		ug/L	
			Toluene	2017/06/28	<0.20		ug/L	
			Ethylbenzene	2017/06/28	<0.20		ug/L	
			o-Xylene	2017/06/28	<0.20		ug/L	
			p+m-Xylene	2017/06/28	<0.40		ug/L	
			Total Xylenes	2017/06/28	<0.40		ug/L	
			F1 (C6-C10)	2017/06/28	<25		ug/L	
			F1 (C6-C10) - BTEX	2017/06/28	<25		ug/L	
5049221	KLI	LCS	o-Terphenyl	2017/06/29		102	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2017/06/29		96	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2017/06/29		102	%	60 - 130
			F4 (C34-C50 Hydrocarbons)	2017/06/29		101	%	60 - 130
5049768	H_W	LCS	1,4-Difluorobenzene	2017/06/28		101	%	70 - 130
			4-Bromofluorobenzene	2017/06/28		101	%	70 - 130
			D10-Ethylbenzene	2017/06/28		97	%	70 - 130
			D4-1,2-Dichloroethane	2017/06/28		102	%	70 - 130
			Benzene	2017/06/28		99	%	70 - 130
			Toluene	2017/06/28		90	%	70 - 130
			Ethylbenzene	2017/06/28		92	%	70 - 130
			o-Xylene	2017/06/28		94	%	70 - 130
			p+m-Xylene	2017/06/28		91	%	70 - 130
			F1 (C6-C10)	2017/06/28		100	%	70 - 130

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

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Maxxam Job #: B7D2188
Report Date: 2017/06/29

Golder Associates Ltd.
Task Order#: 4410490399, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2007

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam

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Mississauga, Ontario L5N 2L8
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Phone: (905) 817-5700
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Toll Free: 800-563-6266

EXXONMOBIL/IMPERIAL OIL - MAXXAM
CHAIN-OF-CUSTODY RECORD
ANALYSIS REQUESTED

C of C # 616055-05-01

616055

INVOICE INFORMATION	REPORT INFORMATION
Company Name: Imperial Oil, a partnership of Imperial Oil Limited and McColl Frontenac Petrole	Company Name: Golder Associates Ltd.
Contact Name: Stephen Scott	Contact Name: Ian Sosnev
Address: 505 Quarry Park Blvd Calgary AB T2C 5N1	Address: 6925 Century Avenue Suite #100 Mississauga ON L5N 7K2
Email: stephen.a.scott@esso.ca	Email: Ian_Sosney@golder.com, IOL_1390@golder.co
Phone: (587) 476-4467 x	Phone: (647) 522-4698 x
Sampler Name (Print): Brandon McParlan, Leandra Mariani	Consultant Project #: 1669090-1155-2007

	FIELD SAMPLE ID	MATRIX: GROUND WATER	MATRIX: SURFACE WATER	MATRIX: SOIL	MATRIX: OTHER	# CONTAINERS	SAMPLING: DATE (YYYY/MM/DD)	SAMPLING: TIME (24 HR)	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	F1 & BTEX	F2-F4	Lead (Dissolved)
1	Field Blank				X	5	2017/06/22	11:15			X	X	
2	Trip Blank				X	3	2017/06/22	11:30			X	X	
3							YYYY/MM/DD	HH:MM					
4							YYYY/MM/DD	HH:MM					
5							YYYY/MM/DD	HH:MM					
6							YYYY/MM/DD	HH:MM					
7							YYYY/MM/DD	HH:MM					
8							YYYY/MM/DD	HH:MM					
9							YYYY/MM/DD	HH:MM					
10							YYYY/MM/DD	HH:MM					

IOL SITE LOCATION:
1660 Merivale Rd OTTAWA,ON

IOL PROJECT # (if applicable):
MZ.00277

MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM:
4410490399-10

REGULATORY CRITERIA / DETECTION LIMITS:
☒ REG 153 Table 3 ☐ 2004 ☒ 2011 ☐ RSC
(Please indicate which Reg. version and if RSC required)
☐ ODWS ☐ PWQO
☐ Other

SPECIAL INSTRUCTIONS:
Sample bottles may contain headspace.
Please upload to 88001627

JARS USED AND NOT SUBMITTED
Enter N/A for Water
N/A

TURNAROUND TIME
Standard (5 days) ☒
Rush (3 days) ☐
(2 days) ☐
(1 day) ☐
(same day) ☐
Date Required

	YES	NO	COOLER ID: 1			
SEAL PRESENT	✓					
SEAL INTACT	✓		TEMP °C	3	1	1
COOLING MEDIA PRESENT	✓			1	2	3

	YES	NO	COOLER ID:			
SEAL PRESENT						
SEAL INTACT			TEMP °C			
COOLING MEDIA PRESENT				1	2	3

	YES	NO	COOLER ID:			
SEAL PRESENT						
SEAL INTACT			TEMP °C			
COOLING MEDIA PRESENT				1	2	3

LAB USE ONLY
MAXXAM JOB # B7D2188

* RELINQUISHED BY:		DATE:	TIME (24 HR)	RECEIVED BY:		DATE:	TIME (24 HR)
1. BMcP	Brandon McParlan	2017/06/22	13:00	1. Ashitha Sankunny	Ashitha Sankunny	2017/06/23	10:00
2. signature	printed name	YYYY/MM/DD	HH:MM	2. signature	printed name	YYYY/MM/DD	HH:MM
3. signature	printed name	YYYY/MM/DD	HH:MM	3. signature	printed name	YYYY/MM/DD	HH:MM

SAMPLES
LABELED BY: MK
VERIFIED BY: TSP

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXXAM'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.MAXXAM.CA/TERMS.

COC – 1012 (2016) IOL – ON

White: Maxxam

Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date:

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Maxxam Analytics Mississauga

Consultant Project Number: 1669090-1155

Sample Submission Number: B7D2188

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within
Extraction Surrogate Recovery	X			acceptance criteria.
Method Blank Concentration	X			
Matrix Duplicate RPD			X	
Matrix Spike Recovery			X	
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration	X			All field QC samples are within
Trip Blank Concentration	X			alert limits.
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Anita Colbert

Data Reviewed by (Signature): Anita Colbert

Date: June 30, 2017

Maxxam
A Bureau Veritas Group Company

Task Order#: 4410537964
Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1669090-1155-2023
Your C.O.C. #: 79521

Attention:Leon Burger

Golder Associates Ltd.
6925 Century Avenue
Suite #100
Mississauga, ON
Canada L5N 7K2

Report Date: 2017/08/04
Report #: R4633612
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7F6793
Received: 2017/07/24, 09:51

Sample Matrix: AIR
Samples Received: 4

Analyses	Quantity	Laboratory Method	Primary Reference
BTEX and CCME Compounds in Air(TO-15mod)	4	BRL SOP-00304	EPA TO-15 m
Canister Pressure (TO-15)	4	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (ug/m3)	4	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (TO-15) (1)	4	BRL SOP-00304	EPA TO-15 m

Remarks:

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All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported: unless indicated otherwise, associated sample data are not blank corrected. All samples were analyzed within hold time unless otherwise flagged.

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Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested.
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Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Air sampling canisters have been cleaned in accordance with U.S. EPA Method TO14A. At the end of the cleaning, evacuation, and pressurization cycles, one canister was selected and was pressurized with Zero Air. This canister was then analyzed via TO14A on a GC/MS. The canister must have been found to contain <0.2 ppbv concentration of all target analytes in order for the batch to have been considered clean. Each canister also underwent a leak check prior to shipment.

Please Note: SUMMA® canister samples will be retained by Maxxam for a period of 5 calendar days or as contractually agreed from the date of this report, after which time they will be cleaned for reuse. If you require a longer sample storage period, please contact your service representative.

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Task Order#: 4410537964
Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1669090-1155-2023
Your C.O.C. #: 79521

Attention:Leon Burger

Golder Associates Ltd.
6925 Century Avenue
Suite #100
Mississauga, ON
Canada L5N 7K2

Report Date: 2017/08/04
Report #: R4633612
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7F6793
Received: 2017/07/24, 09:51

Encryption Key



Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kyle Reinhart, Project Manager - Environmental Customer Service
Email: kreinhart@maxxam.ca
Phone# (905) 817-5700
==========
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Maxxam Job #: B7F6793
Report Date: 2017/08/04

Golder Associates Ltd.
Task Order#: 4410537964, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1669090-1155-2023

RESULTS OF ANALYSES OF AIR

Maxxam ID		EUN919	EUN920	EUN921	EUN922	
Sampling Date		2017/07/21 12:28	2017/07/21 11:31	2017/07/21 12:28	2017/07/21 11:34	
COC Number		79521	79521	79521	79521	
	UNITS	**SV16-01**	**SV16-02**	**DUP 1**	**AIR**	**QC Batch**
Pressure on Receipt	psig	(-4.2)	(-3.7)	(-3.9)	(-4.3)	5098073

QC Batch = Quality Control Batch

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Maxxam Job #: B7F6793
Report Date: 2017/08/04

Golder Associates Ltd.
Task Order#: 4410537964, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1669090-1155-2023

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		EUN919	EUN919		EUN920		EUN921		EUN922		
Sampling Date		2017/07/21 12:28	2017/07/21 12:28		2017/07/21 11:31		2017/07/21 12:28		2017/07/21 11:34		
COC Number		79521	79521		79521		79521		79521		
	UNITS	**SV16-01**	**SV16-01 Lab-Dup**	**RDL**	**SV16-02**	**RDL**	**DUP 1**	**RDL**	**AIR**	**RDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ppbv	2.61	2.47	0.20	7.29	0.20	2.74	0.20	0.47	0.20	5095321
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	<0.17	0.17	<0.17	0.17	<0.17	0.17	<0.17	0.17	5095321
Chloromethane	ppbv	<0.30	<0.30	0.30	<0.30	0.30	<0.30	0.30	0.52	0.30	5095321
Vinyl Chloride	ppbv	<0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	5095321
Chloroethane	ppbv	<0.30	<0.30	0.30	<0.30	0.30	<0.30	0.30	<0.30	0.30	5095321
1,3-Butadiene	ppbv	<0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	5095321
Trichlorofluoromethane (FREON 11)	ppbv	0.48	0.47	0.20	0.43	0.20	0.47	0.20	0.28	0.20	5095321
Ethanol (ethyl alcohol)	ppbv	1.2	1.1	1.0	<1.0	1.0	1.2	1.0	2.2	1.0	5095321
Trichlorotrifluoroethane	ppbv	<0.15	0.15	0.15	<0.15	0.15	0.15	0.15	<0.15	0.15	5095321
2-propanol	ppbv	<1.0	<1.0	1.0	<1.0	1.0	3.4	1.0	<1.0	1.0	5095321
2-Propanone	ppbv	32.2	31.6	0.80	7.43	0.80	33.0	0.80	3.88	0.80	5095321
Methyl Ethyl Ketone (2-Butanone)	ppbv	1.3 (1)	1.3 (1)	1.0	<1.0	1.0	1.3 (1)	1.0	<1.0	1.0	5095321
Methyl Isobutyl Ketone	ppbv	<1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	5095321
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	5095321
Methyl t-butyl ether (MTBE)	ppbv	<0.20	<0.20	0.20	<0.20	0.20	<0.20	0.20	<0.20	0.20	5095321
Ethyl Acetate	ppbv	<1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	5095321
1,1-Dichloroethylene	ppbv	<0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	5095321
cis-1,2-Dichloroethylene	ppbv	<0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	5095321
trans-1,2-Dichloroethylene	ppbv	0.33	0.34	0.10	<0.10	0.10	0.34	0.10	<0.10	0.10	5095321
Methylene Chloride(Dichloromethane)	ppbv	0.91	0.90	0.80	1.20	0.80	1.04	0.80	0.82	0.80	5095321
Chloroform	ppbv	0.60	0.60	0.10	0.52	0.10	0.57	0.10	0.11	0.10	5095321
Carbon Tetrachloride	ppbv	<0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	5095321
1,1-Dichloroethane	ppbv	<0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	5095321
1,2-Dichloroethane	ppbv	<0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	5095321
Ethylene Dibromide	ppbv	<0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	5095321
1,1,1-Trichloroethane	ppbv	<0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	5095321
1,1,2-Trichloroethane	ppbv	<0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	5095321
1,1,2,2-Tetrachloroethane	ppbv	<0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	5095321
cis-1,3-Dichloropropene	ppbv	<0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	5095321
trans-1,3-Dichloropropene	ppbv	<0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	5095321
1,2-Dichloropropane	ppbv	<0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	5095321

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
(1) 2-Butanone biased high due to co-elution with hexane. This result represents the highest concentration possible of 2-butanone.

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Maxxam Job #: B7F6793
Report Date: 2017/08/04

Golder Associates Ltd.
Task Order#: 4410537964, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1669090-1155-2023

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		EUN919	EUN919		EUN920		EUN921		EUN922		
Sampling Date		2017/07/21 12:28	2017/07/21 12:28		2017/07/21 11:31		2017/07/21 12:28		2017/07/21 11:34		
COC Number		79521	79521		79521		79521		79521		
	UNITS	**SV16-01**	**SV16-01 Lab-Dup**	**RDL**	**SV16-02**	**RDL**	**DUP 1**	**RDL**	**AIR**	**RDL**	**QC Batch**
Bromomethane	ppbv	<0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	5095321
Bromoform	ppbv	<0.20	<0.20	0.20	<0.20	0.20	<0.20	0.20	<0.20	0.20	5095321
Bromodichloromethane	ppbv	<0.20	<0.20	0.20	<0.20	0.20	<0.20	0.20	<0.20	0.20	5095321
Dibromochloromethane	ppbv	<0.20	<0.20	0.20	<0.20	0.20	<0.20	0.20	<0.20	0.20	5095321
Trichloroethylene	ppbv	0.20	0.21	0.10	0.94	0.10	<0.10	0.10	<0.10	0.10	5095321
Tetrachloroethylene	ppbv	1.04	1.07	0.10	0.20	0.10	1.06	0.10	<0.10	0.10	5095321
Benzene	ppbv	<0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	0.12	0.10	5095321
Toluene	ppbv	1.04	1.08	0.10	0.57	0.10	1.40	0.10	0.26	0.10	5095321
Ethylbenzene	ppbv	1.05	1.11	0.10	0.54	0.10	1.02	0.10	<0.10	0.10	5095321
p+m-Xylene	ppbv	3.80	3.90	0.20	1.76	0.20	3.79	0.20	<0.20	0.20	5095321
o-Xylene	ppbv	1.20	1.22	0.10	0.56	0.10	1.07	0.10	<0.10	0.10	5095321
Styrene	ppbv	<0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	5095321
4-ethyltoluene	ppbv	0.56	0.57	0.50	<0.50	0.50	0.57	0.50	<0.50	0.50	5095321
1,3,5-Trimethylbenzene	ppbv	0.71	0.71	0.50	<0.50	0.50	0.73	0.50	<0.50	0.50	5095321
1,2,4-Trimethylbenzene	ppbv	2.31	2.40	0.50	0.70	0.50	2.46	0.50	<0.50	0.50	5095321
Chlorobenzene	ppbv	<0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	5095321
Benzyl chloride	ppbv	<0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	5095321
1,3-Dichlorobenzene	ppbv	0.77	0.77	0.40	<0.40	0.40	0.47	0.40	<0.40	0.40	5095321
1,4-Dichlorobenzene	ppbv	0.22	0.22	0.10	<0.10	0.10	0.20	0.10	<0.10	0.10	5095321
1,2-Dichlorobenzene	ppbv	<0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	5095321
1,2,4-Trichlorobenzene	ppbv	<0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	5095321
Hexachlorobutadiene	ppbv	<0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	5095321
Hexane	ppbv	0.68	0.67	0.30	<0.30	0.30	0.57	0.30	<0.30	0.30	5095321
Heptane	ppbv	<0.30	<0.30	0.30	<0.30	0.30	<0.40 (1)	0.40	<0.30	0.30	5095321
Cyclohexane	ppbv	<0.20	<0.20	0.20	<0.20	0.20	<0.20	0.20	<0.20	0.20	5095321
Tetrahydrofuran	ppbv	<0.40	<0.40	0.40	<0.40	0.40	<0.40	0.40	<0.40	0.40	5095321
1,4-Dioxane	ppbv	<1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	5095321
Naphthalene	ppbv	<0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	5095321
Total Xylenes	ppbv	5.00	5.12	0.30	2.32	0.30	4.85	0.30	<0.30	0.30	5095321
1,1,1,2-Tetrachloroethane	ppbv	<0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	5095321
Vinyl Bromide	ppbv	<0.20	<0.20	0.20	<0.20	0.20	<0.20	0.20	<0.20	0.20	5095321

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
(1) Peak detected does not meet ratio criteria and has resulted in an elevated detection limit

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Maxxam Job #: B7F6793
Report Date: 2017/08/04

Golder Associates Ltd.
Task Order#: 4410537964, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1669090-1155-2023

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		EUN919	EUN919		EUN920		EUN921		EUN922		
Sampling Date		2017/07/21 12:28	2017/07/21 12:28		2017/07/21 11:31		2017/07/21 12:28		2017/07/21 11:34		
COC Number		79521	79521		79521		79521		79521		
	UNITS	**SV16-01**	**SV16-01 Lab-Dup**	**RDL**	**SV16-02**	**RDL**	**DUP 1**	**RDL**	**AIR**	**RDL**	**QC Batch**
Propene	ppbv	<1.5 (1)	<1.5 (1)	1.5	<0.50	0.50	<1.0 (1)	1.0	<0.50	0.50	5095321
2,2,4-Trimethylpentane	ppbv	<0.20	<0.20	0.20	<0.20	0.20	<0.20	0.20	<0.20	0.20	5095321
Carbon Disulfide	ppbv	8.60	8.50	0.50	5.08	0.50	8.45	0.50	<0.50	0.50	5095321
Vinyl Acetate	ppbv	<0.20	<0.20	0.20	<0.20	0.20	<0.20	0.20	<0.20	0.20	5095321
Instrument Surrogate Recovery (%)											
Bromochloromethane	%	82	92		99		98		82		5095321
D5-Chlorobenzene	%	73	82		90		87		73		5095321
Difluorobenzene	%	79	88		96		95		80		5095321

RDL = Reportable Detection Limit
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Lab-Dup = Laboratory Initiated Duplicate
(1) Increased DL due to interference from propane.

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Maxxam Job #: B7F6793
Report Date: 2017/08/04

Golder Associates Ltd.
Task Order#: 4410537964, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1669090-1155-2023

CALCULATED VOLATILE ORGANICS (AIR)

Maxxam ID		EUN919	EUN919		EUN920		EUN921		EUN922		
Sampling Date		2017/07/21 12:28	2017/07/21 12:28		2017/07/21 11:31		2017/07/21 12:28		2017/07/21 11:34		
COC Number		79521	79521		79521		79521		79521		
	UNITS	**SV16-01**	**SV16-01 Lab-Dup**	**RDL**	**SV16-02**	**RDL**	**DUP 1**	**RDL**	**AIR**	**RDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ug/m3	12.9	12.2	0.99	36.0	0.99	13.5	0.99	2.33	0.99	5087727
1,2-Dichlorotetrafluoroethane	ug/m3	<1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	5087727
Chloromethane	ug/m3	<0.62	<0.62	0.62	<0.62	0.62	<0.62	0.62	1.08	0.62	5087727
Vinyl Chloride	ug/m3	<0.26	<0.26	0.26	<0.26	0.26	<0.26	0.26	<0.26	0.26	5087727
Chloroethane	ug/m3	<0.79	<0.79	0.79	<0.79	0.79	<0.79	0.79	<0.79	0.79	5087727
1,3-Butadiene	ug/m3	<1.1	<1.1	1.1	<1.1	1.1	<1.1	1.1	<1.1	1.1	5087727
Trichlorofluoromethane (FREON 11)	ug/m3	2.7	2.6	1.1	2.4	1.1	2.7	1.1	1.6	1.1	5087727
Ethanol (ethyl alcohol)	ug/m3	2.2	2.1	1.9	<1.9	1.9	2.3	1.9	4.2	1.9	5087727
Trichlorotrifluoroethane	ug/m3	<1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	5087727
2-propanol	ug/m3	<2.5	<2.5	2.5	<2.5	2.5	8.3	2.5	<2.5	2.5	5087727
2-Propanone	ug/m3	76.5	75.1	1.9	17.6	1.9	78.5	1.9	9.2	1.9	5087727
Methyl Ethyl Ketone (2-Butanone)	ug/m3	4.0	3.7	2.9	<2.9	2.9	3.8	2.9	<2.9	2.9	5087727
Methyl Isobutyl Ketone	ug/m3	<4.1	<4.1	4.1	<4.1	4.1	<4.1	4.1	<4.1	4.1	5087727
Methyl Butyl Ketone (2-Hexanone)	ug/m3	<4.1	<4.1	4.1	<4.1	4.1	<4.1	4.1	<4.1	4.1	5087727
Methyl t-butyl ether (MTBE)	ug/m3	<0.72	<0.72	0.72	<0.72	0.72	<0.72	0.72	<0.72	0.72	5087727
Ethyl Acetate	ug/m3	<3.6	<3.6	3.6	<3.6	3.6	<3.6	3.6	<3.6	3.6	5087727
1,1-Dichloroethylene	ug/m3	<0.40	<0.40	0.40	<0.40	0.40	<0.40	0.40	<0.40	0.40	5087727
cis-1,2-Dichloroethylene	ug/m3	<0.40	<0.40	0.40	<0.40	0.40	<0.40	0.40	<0.40	0.40	5087727
trans-1,2-Dichloroethylene	ug/m3	1.33	1.36	0.40	<0.40	0.40	1.34	0.40	<0.40	0.40	5087727
Methylene Chloride(Dichloromethane)	ug/m3	3.2	3.1	2.8	4.2	2.8	3.6	2.8	2.9	2.8	5087727
Chloroform	ug/m3	2.95	2.91	0.49	2.56	0.49	2.78	0.49	0.55	0.49	5087727
Carbon Tetrachloride	ug/m3	<0.63	<0.63	0.63	<0.63	0.63	<0.63	0.63	<0.63	0.63	5087727
1,1-Dichloroethane	ug/m3	<0.40	<0.40	0.40	<0.40	0.40	<0.40	0.40	<0.40	0.40	5087727
1,2-Dichloroethane	ug/m3	<0.40	<0.40	0.40	<0.40	0.40	<0.40	0.40	<0.40	0.40	5087727
Ethylene Dibromide	ug/m3	<0.77	<0.77	0.77	<0.77	0.77	<0.77	0.77	<0.77	0.77	5087727
1,1,1-Trichloroethane	ug/m3	<0.55	<0.55	0.55	<0.55	0.55	<0.55	0.55	<0.55	0.55	5087727
1,1,2-Trichloroethane	ug/m3	<0.55	<0.55	0.55	<0.55	0.55	<0.55	0.55	<0.55	0.55	5087727
1,1,2,2-Tetrachloroethane	ug/m3	<0.69	<0.69	0.69	<0.69	0.69	<0.69	0.69	<0.69	0.69	5087727
cis-1,3-Dichloropropene	ug/m3	<0.45	<0.45	0.45	<0.45	0.45	<0.45	0.45	<0.45	0.45	5087727
trans-1,3-Dichloropropene	ug/m3	<0.45	<0.45	0.45	<0.45	0.45	<0.45	0.45	<0.45	0.45	5087727
1,2-Dichloropropane	ug/m3	<0.46	<0.46	0.46	<0.46	0.46	<0.46	0.46	<0.46	0.46	5087727
Bromomethane	ug/m3	<0.39	<0.39	0.39	<0.39	0.39	<0.39	0.39	<0.39	0.39	5087727
Bromoform	ug/m3	<2.1	<2.1	2.1	<2.1	2.1	<2.1	2.1	<2.1	2.1	5087727

RDL = Reportable Detection Limit
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Maxxam Job #: B7F6793
Report Date: 2017/08/04

Golder Associates Ltd.
Task Order#: 4410537964, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1669090-1155-2023

CALCULATED VOLATILE ORGANICS (AIR)

Maxxam ID		EUN919	EUN919		EUN920		EUN921		EUN922		
Sampling Date		2017/07/21 12:28	2017/07/21 12:28		2017/07/21 11:31		2017/07/21 12:28		2017/07/21 11:34		
COC Number		79521	79521		79521		79521		79521		
	UNITS	**SV16-01**	**SV16-01 Lab-Dup**	**RDL**	**SV16-02**	**RDL**	**DUP 1**	**RDL**	**AIR**	**RDL**	**QC Batch**
Bromodichloromethane	ug/m3	<1.3	<1.3	1.3	<1.3	1.3	<1.3	1.3	<1.3	1.3	5087727
Dibromochloromethane	ug/m3	<1.7	<1.7	1.7	<1.7	1.7	<1.7	1.7	<1.7	1.7	5087727
Trichloroethylene	ug/m3	1.09	1.13	0.54	5.04	0.54	<0.54	0.54	<0.54	0.54	5087727
Tetrachloroethylene	ug/m3	7.03	7.23	0.68	1.38	0.68	7.21	0.68	<0.68	0.68	5087727
Benzene	ug/m3	<0.32	<0.32	0.32	<0.32	0.32	<0.32	0.32	0.39	0.32	5087727
Toluene	ug/m3	3.93	4.07	0.38	2.14	0.38	5.28	0.38	0.98	0.38	5087727
Ethylbenzene	ug/m3	4.56	4.81	0.43	2.33	0.43	4.43	0.43	<0.43	0.43	5087727
p+m-Xylene	ug/m3	16.5	16.9	0.87	7.65	0.87	16.4	0.87	<0.87	0.87	5087727
o-Xylene	ug/m3	5.23	5.29	0.43	2.44	0.43	4.63	0.43	<0.43	0.43	5087727
Styrene	ug/m3	<0.43	<0.43	0.43	<0.43	0.43	<0.43	0.43	<0.43	0.43	5087727
4-ethyltoluene	ug/m3	2.8	2.8	2.5	<2.5	2.5	2.8	2.5	<2.5	2.5	5087727
1,3,5-Trimethylbenzene	ug/m3	3.5	3.5	2.5	<2.5	2.5	3.6	2.5	<2.5	2.5	5087727
1,2,4-Trimethylbenzene	ug/m3	11.4	11.8	2.5	3.4	2.5	12.1	2.5	<2.5	2.5	5087727
Chlorobenzene	ug/m3	<0.46	<0.46	0.46	<0.46	0.46	<0.46	0.46	<0.46	0.46	5087727
Benzyl chloride	ug/m3	<2.6	<2.6	2.6	<2.6	2.6	<2.6	2.6	<2.6	2.6	5087727
1,3-Dichlorobenzene	ug/m3	4.6	4.7	2.4	<2.4	2.4	2.8	2.4	<2.4	2.4	5087727
1,4-Dichlorobenzene	ug/m3	1.31	1.32	0.60	<0.60	0.60	1.20	0.60	<0.60	0.60	5087727
1,2-Dichlorobenzene	ug/m3	<0.60	<0.60	0.60	<0.60	0.60	<0.60	0.60	<0.60	0.60	5087727
1,2,4-Trichlorobenzene	ug/m3	<3.7	<3.7	3.7	<3.7	3.7	<3.7	3.7	<3.7	3.7	5087727
Hexachlorobutadiene	ug/m3	<5.3	<5.3	5.3	<5.3	5.3	<5.3	5.3	<5.3	5.3	5087727
Hexane	ug/m3	2.4	2.4	1.1	<1.1	1.1	2.0	1.1	<1.1	1.1	5087727
Heptane	ug/m3	<1.2	<1.2	1.2	<1.2	1.2	<1.6	1.6	<1.2	1.2	5087727
Cyclohexane	ug/m3	<0.69	<0.69	0.69	<0.69	0.69	<0.69	0.69	<0.69	0.69	5087727
Tetrahydrofuran	ug/m3	<1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	5087727
1,4-Dioxane	ug/m3	<3.6	<3.6	3.6	<3.6	3.6	<3.6	3.6	<3.6	3.6	5087727
Naphthalene	ug/m3	<2.6	<2.6	2.6	<2.6	2.6	<2.6	2.6	<2.6	2.6	5087727
Total Xylenes	ug/m3	21.7	22.2	1.3	10.1	1.3	21.1	1.3	<1.3	1.3	5087727
1,1,1,2-Tetrachloroethane	ug/m3	<0.69	<0.69	0.69	<0.69	0.69	<0.69	0.69	<0.69	0.69	5087727
Vinyl Bromide	ug/m3	<0.87	<0.87	0.87	<0.87	0.87	<0.87	0.87	<0.87	0.87	5087727
Propene	ug/m3	<2.6	<2.6	2.6	<0.86	0.86	<1.7	1.7	<0.86	0.86	5087727
2,2,4-Trimethylpentane	ug/m3	<0.93	<0.93	0.93	<0.93	0.93	<0.93	0.93	<0.93	0.93	5087727
Carbon Disulfide	ug/m3	26.8	26.5	1.6	15.8	1.6	26.3	1.6	<1.6	1.6	5087727
Vinyl Acetate	ug/m3	<0.70	<0.70	0.70	<0.70	0.70	<0.70	0.70	<0.70	0.70	5087727

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B7F6793
Report Date: 2017/08/04

Golder Associates Ltd.
Task Order#: 4410537964, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1669090-1155-2023

VOLATILE ORGANIC HYDROCARBONS BY GC/MS (AIR)

Maxxam ID		EUN919	EUN919	EUN920	EUN921	EUN922		
Sampling Date		2017/07/21 12:28	2017/07/21 12:28	2017/07/21 11:31	2017/07/21 12:28	2017/07/21 11:34		
COC Number		79521	79521	79521	79521	79521		
	UNITS	**SV16-01**	**SV16-01 Lab-Dup**	**SV16-02**	**DUP 1**	**AIR**	**RDL**	**QC Batch**
F1-BTEX, C6-C10 (as Toluene)	ug/m3	424	425	157	389	27.2	5.0	5098174
F2, C10-C16 (as Decane)	ug/m3	6090	5600	2310	5610	12.5	5.0	5098174

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B7F6793
Report Date: 2017/08/04

Golder Associates Ltd.
Task Order#: 4410537964, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1669090-1155-2023

TEST SUMMARY

Maxxam ID: EUN919
Sample ID: SV16-01
Matrix: AIR

Collected: 2017/07/21
Relinquished: 2017/07/21
Received: 2017/07/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	5098174	N/A	2017/07/28	Nicholas Smith
Canister Pressure (TO-15)	PRES	5098073	N/A	2017/07/28	Nicholas Smith
Volatile Organics in Air (ug/m3)	GC/MS	5087727	N/A	2017/07/31	Angel Guerrero
Volatile Organics in Air (TO-15)	GC/MS	5095321	N/A	2017/07/28	Nicholas Smith

Maxxam ID: EUN919 Dup
Sample ID: SV16-01
Matrix: AIR

Collected: 2017/07/21
Relinquished: 2017/07/21
Received: 2017/07/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	5098174	N/A	2017/07/28	Nicholas Smith
Volatile Organics in Air (ug/m3)	GC/MS	5087727	N/A	2017/08/03	Angel Guerrero
Volatile Organics in Air (TO-15)	GC/MS	5095321	N/A	2017/07/28	Nicholas Smith

Maxxam ID: EUN920
Sample ID: SV16-02
Matrix: AIR

Collected: 2017/07/21
Relinquished: 2017/07/21
Received: 2017/07/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	5098174	N/A	2017/07/28	Nicholas Smith
Canister Pressure (TO-15)	PRES	5098073	N/A	2017/07/28	Nicholas Smith
Volatile Organics in Air (ug/m3)	GC/MS	5087727	N/A	2017/07/31	Angel Guerrero
Volatile Organics in Air (TO-15)	GC/MS	5095321	N/A	2017/07/28	Nicholas Smith

Maxxam ID: EUN921
Sample ID: DUP 1
Matrix: AIR

Collected: 2017/07/21
Relinquished: 2017/07/21
Received: 2017/07/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	5098174	N/A	2017/07/28	Nicholas Smith
Canister Pressure (TO-15)	PRES	5098073	N/A	2017/07/28	Nicholas Smith
Volatile Organics in Air (ug/m3)	GC/MS	5087727	N/A	2017/07/31	Angel Guerrero
Volatile Organics in Air (TO-15)	GC/MS	5095321	N/A	2017/07/28	Nicholas Smith

Maxxam ID: EUN922
Sample ID: AIR
Matrix: AIR

Collected: 2017/07/21
Relinquished: 2017/07/21
Received: 2017/07/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	5098174	N/A	2017/07/28	Nicholas Smith
Canister Pressure (TO-15)	PRES	5098073	N/A	2017/07/28	Nicholas Smith
Volatile Organics in Air (ug/m3)	GC/MS	5087727	N/A	2017/07/31	Automated Statchk
Volatile Organics in Air (TO-15)	GC/MS	5095321	N/A	2017/07/28	Nicholas Smith

Maxxam Job #: B7F6793
Report Date: 2017/08/04

Golder Associates Ltd.
Task Order#: 4410537964, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1669090-1155-2023

GENERAL COMMENTS

Results relate only to the items tested.

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Maxxam Job #: B7F6793
Report Date: 2017/08/04

Golder Associates Ltd.
Task Order#: 4410537964, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1669090-1155-2023

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5095321	NS2	Method Blank	Bromochloromethane	2017/07/28		91	%	60 - 140
			D5-Chlorobenzene	2017/07/28		86	%	60 - 140
			Difluorobenzene	2017/07/28		91	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2017/07/28	<0.20		ppbv	
			1,2-Dichlorotetrafluoroethane	2017/07/28	<0.17		ppbv	
			Chloromethane	2017/07/28	<0.30		ppbv	
			Vinyl Chloride	2017/07/28	<0.10		ppbv	
			Chloroethane	2017/07/28	<0.30		ppbv	
			1,3-Butadiene	2017/07/28	<0.50		ppbv	
			Trichlorofluoromethane (FREON 11)	2017/07/28	<0.20		ppbv	
			Ethanol (ethyl alcohol)	2017/07/28	<1.0		ppbv	
			Trichlorotrifluoroethane	2017/07/28	<0.15		ppbv	
			2-propanol	2017/07/28	<1.0		ppbv	
			2-Propanone	2017/07/28	<0.80		ppbv	
			Methyl Ethyl Ketone (2-Butanone)	2017/07/28	<1.0		ppbv	
			Methyl Isobutyl Ketone	2017/07/28	<1.0		ppbv	
			Methyl Butyl Ketone (2-Hexanone)	2017/07/28	<1.0		ppbv	
			Methyl t-butyl ether (MTBE)	2017/07/28	<0.20		ppbv	
			Ethyl Acetate	2017/07/28	<1.0		ppbv	
			1,1-Dichloroethylene	2017/07/28	<0.10		ppbv	
			cis-1,2-Dichloroethylene	2017/07/28	<0.10		ppbv	
			trans-1,2-Dichloroethylene	2017/07/28	<0.10		ppbv	
			Methylene Chloride(Dichloromethane)	2017/07/28	<0.80		ppbv	
			Chloroform	2017/07/28	<0.10		ppbv	
			Carbon Tetrachloride	2017/07/28	<0.10		ppbv	
			1,1-Dichloroethane	2017/07/28	<0.10		ppbv	
			1,2-Dichloroethane	2017/07/28	<0.10		ppbv	
			Ethylene Dibromide	2017/07/28	<0.10		ppbv	
			1,1,1-Trichloroethane	2017/07/28	<0.10		ppbv	
			1,1,2-Trichloroethane	2017/07/28	<0.10		ppbv	
			1,1,2,2-Tetrachloroethane	2017/07/28	<0.10		ppbv	
			cis-1,3-Dichloropropene	2017/07/28	<0.10		ppbv	
			trans-1,3-Dichloropropene	2017/07/28	<0.10		ppbv	
			1,2-Dichloropropane	2017/07/28	<0.10		ppbv	
			Bromomethane	2017/07/28	<0.10		ppbv	
			Bromoform	2017/07/28	<0.20		ppbv	
			Bromodichloromethane	2017/07/28	<0.20		ppbv	
			Dibromochloromethane	2017/07/28	<0.20		ppbv	
			Trichloroethylene	2017/07/28	<0.10		ppbv	
			Tetrachloroethylene	2017/07/28	<0.10		ppbv	
			Benzene	2017/07/28	<0.10		ppbv	
			Toluene	2017/07/28	<0.10		ppbv	
			Ethylbenzene	2017/07/28	<0.10		ppbv	
			p+m-Xylene	2017/07/28	<0.20		ppbv	
			o-Xylene	2017/07/28	<0.10		ppbv	
			Styrene	2017/07/28	<0.10		ppbv	
			4-ethyltoluene	2017/07/28	<0.50		ppbv	
			1,3,5-Trimethylbenzene	2017/07/28	<0.50		ppbv	
			1,2,4-Trimethylbenzene	2017/07/28	<0.50		ppbv	
			Chlorobenzene	2017/07/28	<0.10		ppbv	
			Benzyl chloride	2017/07/28	<0.50		ppbv	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,3-Dichlorobenzene	2017/07/28	<0.40		ppbv	
			1,4-Dichlorobenzene	2017/07/28	<0.10		ppbv	
			1,2-Dichlorobenzene	2017/07/28	<0.10		ppbv	
			1,2,4-Trichlorobenzene	2017/07/28	<0.50		ppbv	
			Hexachlorobutadiene	2017/07/28	<0.50		ppbv	
			Hexane	2017/07/28	<0.30		ppbv	
			Heptane	2017/07/28	<0.30		ppbv	
			Cyclohexane	2017/07/28	<0.20		ppbv	
			Tetrahydrofuran	2017/07/28	<0.40		ppbv	
			1,4-Dioxane	2017/07/28	<1.0		ppbv	
			Naphthalene	2017/07/28	<0.50		ppbv	
			Total Xylenes	2017/07/28	<0.30		ppbv	
			1,1,1,2-Tetrachloroethane	2017/07/28	<0.10		ppbv	
			Vinyl Bromide	2017/07/28	<0.20		ppbv	
			Propene	2017/07/28	<0.50		ppbv	
			2,2,4-Trimethylpentane	2017/07/28	<0.20		ppbv	
			Carbon Disulfide	2017/07/28	<0.50		ppbv	
			Vinyl Acetate	2017/07/28	<0.20		ppbv	
5098174	NS2	Method Blank	F1-BTEX, C6-C10 (as Toluene)	2017/07/28	<5.0		ug/m3	
			F2, C10-C16 (as Decane)	2017/07/28	<5.0		ug/m3	
5087727	ASC	RPD [EUN919-01]	Dichlorodifluoromethane (FREON 12)	2017/08/03	5.5		%	25
			1,2-Dichlorotetrafluoroethane	2017/08/03	NC		%	25
			Chloromethane	2017/08/03	NC		%	25
			Vinyl Chloride	2017/08/03	NC		%	25
			Chloroethane	2017/08/03	NC		%	25
			1,3-Butadiene	2017/08/03	NC		%	25
			Trichlorofluoromethane (FREON 11)	2017/08/03	1.5		%	25
			Ethanol (ethyl alcohol)	2017/08/03	3.6		%	25
			Trichlorotrifluoroethane	2017/08/03	1.6		%	25
			2-propanol	2017/08/03	NC		%	25
			2-Propanone	2017/08/03	1.9		%	25
			Methyl Ethyl Ketone (2-Butanone)	2017/08/03	6.2		%	25
			Methyl Isobutyl Ketone	2017/08/03	NC		%	25
			Methyl Butyl Ketone (2-Hexanone)	2017/08/03	NC		%	25
			Methyl t-butyl ether (MTBE)	2017/08/03	NC		%	25
			Ethyl Acetate	2017/08/03	NC		%	25
			1,1-Dichloroethylene	2017/08/03	NC		%	25
			cis-1,2-Dichloroethylene	2017/08/03	NC		%	25
			trans-1,2-Dichloroethylene	2017/08/03	2.5		%	25
			Methylene Chloride(Dichloromethane)	2017/08/03	2.0		%	25
			Chloroform	2017/08/03	1.6		%	25
			Carbon Tetrachloride	2017/08/03	NC		%	25
			1,1-Dichloroethane	2017/08/03	NC		%	25
			1,2-Dichloroethane	2017/08/03	NC		%	25
			Ethylene Dibromide	2017/08/03	NC		%	25
			1,1,1-Trichloroethane	2017/08/03	NC		%	25
			1,1,2-Trichloroethane	2017/08/03	NC		%	25
			1,1,2,2-Tetrachloroethane	2017/08/03	NC		%	25
			cis-1,3-Dichloropropene	2017/08/03	NC		%	25
			trans-1,3-Dichloropropene	2017/08/03	NC		%	25
			1,2-Dichloropropane	2017/08/03	NC		%	25

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Bromomethane	2017/08/03	NC		%	25
			Bromoform	2017/08/03	NC		%	25
			Bromodichloromethane	2017/08/03	NC		%	25
			Dibromochloromethane	2017/08/03	NC		%	25
			Trichloroethylene	2017/08/03	3.1		%	25
			Tetrachloroethylene	2017/08/03	2.7		%	25
			Benzene	2017/08/03	NC		%	25
			Toluene	2017/08/03	3.6		%	25
			Ethylbenzene	2017/08/03	5.3		%	25
			p+m-Xylene	2017/08/03	2.7		%	25
			o-Xylene	2017/08/03	1.2		%	25
			Styrene	2017/08/03	NC		%	25
			4-ethyltoluene	2017/08/03	0.71		%	25
			1,3,5-Trimethylbenzene	2017/08/03	0.043		%	25
			1,2,4-Trimethylbenzene	2017/08/03	3.9		%	25
			Chlorobenzene	2017/08/03	NC		%	25
			Benzyl chloride	2017/08/03	NC		%	25
			1,3-Dichlorobenzene	2017/08/03	0.68		%	25
			1,4-Dichlorobenzene	2017/08/03	0.59		%	25
			1,2-Dichlorobenzene	2017/08/03	NC		%	25
			1,2,4-Trichlorobenzene	2017/08/03	NC		%	25
			Hexachlorobutadiene	2017/08/03	NC		%	25
			Hexane	2017/08/03	0.72		%	25
			Heptane	2017/08/03	NC		%	25
			Cyclohexane	2017/08/03	NC		%	25
			Tetrahydrofuran	2017/08/03	NC		%	25
			1,4-Dioxane	2017/08/03	NC		%	25
			Naphthalene	2017/08/03	NC		%	25
			Total Xylenes	2017/08/03	2.3		%	25
			1,1,1,2-Tetrachloroethane	2017/08/03	NC		%	25
			Vinyl Bromide	2017/08/03	NC		%	25
			Propene	2017/08/03	NC		%	25
			2,2,4-Trimethylpentane	2017/08/03	NC		%	25
			Carbon Disulfide	2017/08/03	1.1		%	25
			Vinyl Acetate	2017/08/03	NC		%	25
5095321	NS2	RPD [EUN919-01]	Dichlorodifluoromethane (FREON 12)	2017/07/28	5.5		%	25
			1,2-Dichlorotetrafluoroethane	2017/07/28	NC		%	25
			Chloromethane	2017/07/28	NC		%	25
			Vinyl Chloride	2017/07/28	NC		%	25
			Chloroethane	2017/07/28	NC		%	25
			1,3-Butadiene	2017/07/28	NC		%	25
			Trichlorofluoromethane (FREON 11)	2017/07/28	1.5		%	25
			Ethanol (ethyl alcohol)	2017/07/28	3.6		%	25
			Trichlorotrifluoroethane	2017/07/28	1.6		%	25
			2-propanol	2017/07/28	NC		%	25
			2-Propanone	2017/07/28	1.9		%	25
			Methyl Ethyl Ketone (2-Butanone)	2017/07/28	6.2 (1)		%	25
			Methyl Isobutyl Ketone	2017/07/28	NC		%	25
			Methyl Butyl Ketone (2-Hexanone)	2017/07/28	NC		%	25
			Methyl t-butyl ether (MTBE)	2017/07/28	NC		%	25
			Ethyl Acetate	2017/07/28	NC		%	25

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,1-Dichloroethylene	2017/07/28	NC		%	25
			cis-1,2-Dichloroethylene	2017/07/28	NC		%	25
			trans-1,2-Dichloroethylene	2017/07/28	2.5		%	25
			Methylene Chloride(Dichloromethane)	2017/07/28	2.0		%	25
			Chloroform	2017/07/28	1.6		%	25
			Carbon Tetrachloride	2017/07/28	NC		%	25
			1,1-Dichloroethane	2017/07/28	NC		%	25
			1,2-Dichloroethane	2017/07/28	NC		%	25
			Ethylene Dibromide	2017/07/28	NC		%	25
			1,1,1-Trichloroethane	2017/07/28	NC		%	25
			1,1,2-Trichloroethane	2017/07/28	NC		%	25
			1,1,2,2-Tetrachloroethane	2017/07/28	NC		%	25
			cis-1,3-Dichloropropene	2017/07/28	NC		%	25
			trans-1,3-Dichloropropene	2017/07/28	NC		%	25
			1,2-Dichloropropane	2017/07/28	NC		%	25
			Bromomethane	2017/07/28	NC		%	25
			Bromoform	2017/07/28	NC		%	25
			Bromodichloromethane	2017/07/28	NC		%	25
			Dibromochloromethane	2017/07/28	NC		%	25
			Trichloroethylene	2017/07/28	3.1		%	25
			Tetrachloroethylene	2017/07/28	2.7		%	25
			Benzene	2017/07/28	NC		%	25
			Toluene	2017/07/28	3.6		%	25
			Ethylbenzene	2017/07/28	5.3		%	25
			p+m-Xylene	2017/07/28	2.7		%	25
			o-Xylene	2017/07/28	1.2		%	25
			Styrene	2017/07/28	NC		%	25
			4-ethyltoluene	2017/07/28	0.71		%	25
			1,3,5-Trimethylbenzene	2017/07/28	0.043		%	25
			1,2,4-Trimethylbenzene	2017/07/28	3.9		%	25
			Chlorobenzene	2017/07/28	NC		%	25
			Benzyl chloride	2017/07/28	NC		%	25
			1,3-Dichlorobenzene	2017/07/28	0.68		%	25
			1,4-Dichlorobenzene	2017/07/28	0.59		%	25
			1,2-Dichlorobenzene	2017/07/28	NC		%	25
			1,2,4-Trichlorobenzene	2017/07/28	NC		%	25
			Hexachlorobutadiene	2017/07/28	NC		%	25
			Hexane	2017/07/28	0.72		%	25
			Heptane	2017/07/28	NC		%	25
			Cyclohexane	2017/07/28	NC		%	25
			Tetrahydrofuran	2017/07/28	NC		%	25
			1,4-Dioxane	2017/07/28	NC		%	25
			Naphthalene	2017/07/28	NC		%	25
			Total Xylenes	2017/07/28	2.3		%	25
			1,1,1,2-Tetrachloroethane	2017/07/28	NC		%	25
			Vinyl Bromide	2017/07/28	NC		%	25
			Propene	2017/07/28	NC (2)		%	25
			2,2,4-Trimethylpentane	2017/07/28	NC		%	25
			Carbon Disulfide	2017/07/28	1.1		%	25
			Vinyl Acetate	2017/07/28	NC		%	25
5098174	NS2	RPD [EUN919-01]	F1-BTEX, C6-C10 (as Toluene)	2017/07/28	0.10		%	25

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			F2, C10-C16 (as Decane)	2017/07/28	8.4		%	25
5095321	NS2	LCS	Bromochloromethane	2017/07/28		102	%	60 - 140
			D5-Chlorobenzene	2017/07/28		100	%	60 - 140
			Difluorobenzene	2017/07/28		101	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2017/07/28		98	%	70 - 130
			1,2-Dichlorotetrafluoroethane	2017/07/28		97	%	70 - 130
			Chloromethane	2017/07/28		100	%	70 - 130
			Vinyl Chloride	2017/07/28		103	%	70 - 130
			Chloroethane	2017/07/28		102	%	70 - 130
			1,3-Butadiene	2017/07/28		107	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2017/07/28		105	%	70 - 130
			Ethanol (ethyl alcohol)	2017/07/28		105	%	70 - 130
			Trichlorotrifluoroethane	2017/07/28		98	%	70 - 130
			2-propanol	2017/07/28		105	%	70 - 130
			2-Propanone	2017/07/28		107	%	70 - 130
			Methyl Ethyl Ketone (2-Butanone)	2017/07/28		118	%	70 - 130
			Methyl Isobutyl Ketone	2017/07/28		118	%	70 - 130
			Methyl Butyl Ketone (2-Hexanone)	2017/07/28		128	%	70 - 130
			Methyl t-butyl ether (MTBE)	2017/07/28		95	%	70 - 130
			Ethyl Acetate	2017/07/28		112	%	70 - 130
			1,1-Dichloroethylene	2017/07/28		101	%	70 - 130
			cis-1,2-Dichloroethylene	2017/07/28		100	%	70 - 130
			trans-1,2-Dichloroethylene	2017/07/28		106	%	70 - 130
			Methylene Chloride(Dichloromethane)	2017/07/28		96	%	70 - 130
			Chloroform	2017/07/28		99	%	70 - 130
			Carbon Tetrachloride	2017/07/28		103	%	70 - 130
			1,1-Dichloroethane	2017/07/28		101	%	70 - 130
			1,2-Dichloroethane	2017/07/28		97	%	70 - 130
			Ethylene Dibromide	2017/07/28		105	%	70 - 130
			1,1,1-Trichloroethane	2017/07/28		96	%	70 - 130
			1,1,2-Trichloroethane	2017/07/28		102	%	70 - 130
			1,1,2,2-Tetrachloroethane	2017/07/28		117	%	70 - 130
			cis-1,3-Dichloropropene	2017/07/28		105	%	70 - 130
			trans-1,3-Dichloropropene	2017/07/28		113	%	70 - 130
			1,2-Dichloropropane	2017/07/28		105	%	70 - 130
			Bromomethane	2017/07/28		99	%	70 - 130
			Bromoform	2017/07/28		120	%	70 - 130
			Bromodichloromethane	2017/07/28		108	%	70 - 130
			Dibromochloromethane	2017/07/28		107	%	70 - 130
			Trichloroethylene	2017/07/28		102	%	70 - 130
			Tetrachloroethylene	2017/07/28		97	%	70 - 130
			Benzene	2017/07/28		107	%	70 - 130
			Toluene	2017/07/28		103	%	70 - 130
			Ethylbenzene	2017/07/28		104	%	70 - 130
			p+m-Xylene	2017/07/28		110	%	70 - 130
			o-Xylene	2017/07/28		106	%	70 - 130
			Styrene	2017/07/28		106	%	70 - 130
			4-ethyltoluene	2017/07/28		113	%	70 - 130
			1,3,5-Trimethylbenzene	2017/07/28		109	%	70 - 130
			1,2,4-Trimethylbenzene	2017/07/28		110	%	70 - 130
			Chlorobenzene	2017/07/28		110	%	70 - 130

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Benzyl chloride	2017/07/28		122	%	70 - 130
			1,3-Dichlorobenzene	2017/07/28		113	%	70 - 130
			1,4-Dichlorobenzene	2017/07/28		120	%	70 - 130
			1,2-Dichlorobenzene	2017/07/28		117	%	70 - 130
			1,2,4-Trichlorobenzene	2017/07/28		126	%	70 - 130
			Hexachlorobutadiene	2017/07/28		110	%	70 - 130
			Hexane	2017/07/28		100	%	70 - 130
			Heptane	2017/07/28		103	%	70 - 130
			Cyclohexane	2017/07/28		101	%	70 - 130
			Tetrahydrofuran	2017/07/28		103	%	70 - 130
			1,4-Dioxane	2017/07/28		117	%	70 - 130
			Naphthalene	2017/07/28		123	%	70 - 130
			Total Xylenes	2017/07/28		109	%	70 - 130
			Vinyl Bromide	2017/07/28		93	%	70 - 130
			Propene	2017/07/28		100	%	70 - 130
			2,2,4-Trimethylpentane	2017/07/28		98	%	70 - 130
			Carbon Disulfide	2017/07/28		97	%	70 - 130
			Vinyl Acetate	2017/07/28		104	%	70 - 130

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) 2-Butanone biased high due to co-elution with hexane. This result represents the highest concentration possible of 2-butanone.

(2) Increased DL due to interference from propane.

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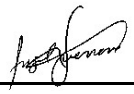
Maxxam Job #: B7F6793
Report Date: 2017/08/04

Golder Associates Ltd.
Task Order#: 4410537964, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1669090-1155-2023

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Angel Guerrero, Team Leader, VOC Air

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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EXXONMOBIL/IMPERIAL OIL - MAXXAM AIR CHAIN OF CUSTODY RECORD

Page 1 of 1

C of C # 79521

INVOICE INFORMATION	REPORT INFORMATION
Company Name: ☒ Imperial Oil ☐ ExxonMobil	Company Name: Golder Associates Ltd.
Contact Name: Stephen Scott	Contact Name: Leon Burger/Ian Sosney
Address: 505 Quarry Park Blvd SE Calgary, Alberta, T2C 5N1	Address: 6925 century Ave. Mississauga, ON, L5N 7K2
Email: stephen.a.scott@esso.ca	Email: lburger@golder.com; isosney@golder.com
Ph: 587-476-4466	Ph: 226-220-6879
Sampler Name (Print): Brandon McParlan	Consultant Project #: 1669090-1155-2023

ANALYSIS REQUESTED

	FIELD SAMPLE ID	Canister Serial #	Flow Regulator Serial #	Sample Collection DATE (YYYY/MM/DD)	Sample Collection TIME (24 HR)	Media Type (See Legend)	FLOW RATE (L/min)	LENGTH OF SAMPLING (minutes)	BTEX	Aromatic/Aliphatic Hydrocarbon Fractionations	F1 (C6-C10) - F2 (C10-C16)	VOCs
1	SV16-01	1255	FX0245	2017/07/21	12:28	S	0.18	8	X		X	X
2	SV16-02	2494	FX1454	2017/07/21	11:31	S	0.16	9	X		X	X
3	DUP 1	1329	FX0264	2017/07/21	12:28	S	0.18	8	X		X	X
4	AIR	1912	FX0486	2017/07/21	11:34	S	0.2	7	X		X	X
5												
6												
7												
8												
9												
10												
11												

IOL SITE LOCATION: 1660 Merivale Road, Ottawa, ON

IOL PROJECT # (if applicable): MZ.00277

MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM: PENDING

REGULATORY CRITERIA / DETECTION LIMITS: (PLEASE SPECIFY): NA

SPECIAL INSTRUCTIONS: Please upload to 88001627 Canister # 1229 unused. Box #2 contains used flow regulators.

LEGEND
S - Summa Can
T - Tube
TB - Tedlar Bag
O - Other(Specify)
*TEMP N/A for SUMMA CAN

TURNAROUND TIME
Standard (10 days) ☒
Rush (9 days) ☐
(6 days) ☐
(3 days) ☐
Date Required

	YES	NO	COOLER ID # 1				YES	NO	COOLER ID #				YES	NO	COOLER ID #			
SEAL PRESENT	✓		TEMP °C	1	2	3			TEMP °C	1	2	3			TEMP °C	1	2	3
SEAL INTACT	✓																	
COOLING MEDIA PRESENT		✓																

RELINQUISHED BY:		DATE:	TIME (24 HR)	RECEIVED BY:		DATE:	TIME (24 HR)
1. [signature]	Brandon McParlan	2017/07/21	14:00	1. [signature]	TANFIR KAPEMI	2017/07/21	09:51
2.				2.			
3.				3.			

LAB USE ONLY
MAXXAM JOB # B7F6793

SAMPLES
LABELED BY: TK1
VERIFIED BY: GKI

IOL COC-AIR-(04/2016) White: Maxxam Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: July 21, 2017

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Maxxam Analytics Mississauga

Consultant Project Number: 1669090-1155

Sample Submission Number: B7F6793

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within
Extraction Surrogate Recovery	X			acceptance criteria.
Method Blank Concentration	X			
Matrix Duplicate RPD	X			
Matrix Spike Recovery			X	
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	All field QC samples are within
Trip Blank Concentration			X	alert limits.
Field Duplicate RPD	X			

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	n/a

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Anita Colbert

Data Reviewed by (Signature): Anita Colbert

Date: August 8, 2017

Maxxam
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Task Order#: 4410537964
Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2003
Your C.O.C. #: 77729

Attention:Ian Sosney

Golder Associates Ltd.
6925 Century Avenue
Suite #100
Mississauga, ON
Canada L5N 7K2

Report Date: 2017/12/01
Report #: R4884602
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7Q3206
Received: 2017/11/22, 07:55

Sample Matrix: AIR
Samples Received: 4

Analyses	Quantity	Laboratory Method	Primary Reference
BTEX and CCME Compounds in Air(TO-15mod)	4	BRL SOP-00304	EPA TO-15 m
Canister Pressure (TO-15)	4	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (ug/m3)	4	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (TO-15) (1)	4	BRL SOP-00304	EPA TO-15 m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported: unless indicated otherwise, associated sample data are not blank corrected. All samples were analyzed within hold time unless otherwise flagged.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Air sampling canisters have been cleaned in accordance with U.S. EPA Method TO14A. At the end of the cleaning, evacuation, and pressurization cycles, one canister was selected and was pressurized with Zero Air. This canister was then analyzed via TO14A on a GC/MS. The canister must have been found to contain <0.2 ppbv concentration of all target analytes in order for the batch to have been considered clean. Each canister also underwent a leak check prior to shipment.

Please Note: SUMMA® canister samples will be retained by Maxxam for a period of 5 calendar days or as contractually agreed from the date of this report, after which time they will be cleaned for reuse. If you require a longer sample storage period, please contact your service representative.

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Maxxam
A Bureau Veritas Group Company

Task Order#: 4410537964
Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2003
Your C.O.C. #: 77729

Attention:Ian Sosney

Golder Associates Ltd.
6925 Century Avenue
Suite #100
Mississauga, ON
Canada L5N 7K2

Report Date: 2017/12/01
Report #: R4884602
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7Q3206
Received: 2017/11/22, 07:55

Encryption Key

Kyle Reinhart
Project Manager - Environmental Customer Service
01 Dec 2017 15:31:59

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kyle Reinhart, Project Manager - Environmental Customer Service
Email: kreinhart@maxxam.ca
Phone# (905) 817-5700

==========

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Maxxam Job #: B7Q3206
Report Date: 2017/12/01

Golder Associates Ltd.
Task Order#: 4410537964, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2003

RESULTS OF ANALYSES OF AIR

Maxxam ID		FPK129	FPK130	FPK131	FPK132	
Sampling Date		2017/11/21 09:24	2017/11/21 10:23	2017/11/21 10:23	2017/11/21 09:09	
COC Number		77729	77729	77729	77729	
	UNITS	**SV16-01**	**SV16-02**	**DUP1**	**AIR**	**QC Batch**
Pressure on Receipt	psig	(-2.7)	(-1.6)	(-1.3)	(-2.2)	5289649
QC Batch = Quality Control Batch						

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B7Q3206
Report Date: 2017/12/01

Golder Associates Ltd.
Task Order#: 4410537964, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2003

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		FPK129	FPK130	FPK131		FPK132		
Sampling Date		2017/11/21 09:24	2017/11/21 10:23	2017/11/21 10:23		2017/11/21 09:09		
COC Number		77729	77729	77729		77729		
	UNITS	**SV16-01**	**SV16-02**	**DUP1**	**RDL**	**AIR**	**RDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ppbv	1.22	2.65	2.63	0.20	0.54	0.20	5287823
1,2-Dichlorotetrafluoroethane	ppbv	<0.17	<0.17	<0.17	0.17	<0.17	0.17	5287823
Chloromethane	ppbv	<0.30	<0.30	<0.30	0.30	0.46	0.30	5287823
Vinyl Chloride	ppbv	<0.10	<0.10	<0.10	0.10	<0.10	0.10	5287823
Chloroethane	ppbv	<0.30	<0.30	<0.30	0.30	<0.30	0.30	5287823
1,3-Butadiene	ppbv	<0.50	<0.50	<0.50	0.50	<0.50	0.50	5287823
Trichlorofluoromethane (FREON 11)	ppbv	0.24	0.20	0.21	0.20	0.25	0.20	5287823
Ethanol (ethyl alcohol)	ppbv	<1.0	<1.0	<1.0	1.0	<1.0	1.0	5287823
Trichlorotrifluoroethane	ppbv	<0.15	<0.15	<0.15	0.15	<0.15	0.15	5287823
2-propanol	ppbv	<1.0	<1.0	<1.0	1.0	<1.0	1.0	5287823
2-Propanone	ppbv	1.22	<0.80	1.03	0.80	3.98	0.80	5287823
Methyl Ethyl Ketone (2-Butanone)	ppbv	<1.0	<1.0	<1.0	1.0	<1.0	1.0	5287823
Methyl Isobutyl Ketone	ppbv	<1.0	<1.0	<1.0	1.0	<1.0	1.0	5287823
Methyl Butyl Ketone (2-Hexanone)	ppbv	<1.0	<1.0	<1.0	1.0	<1.0	1.0	5287823
Methyl t-butyl ether (MTBE)	ppbv	<0.20	<0.20	<0.20	0.20	<0.20	0.20	5287823
Ethyl Acetate	ppbv	<1.0	<1.0	<1.0	1.0	<1.0	1.0	5287823
1,1-Dichloroethylene	ppbv	<0.10	<0.10	<0.10	0.10	<0.10	0.10	5287823
cis-1,2-Dichloroethylene	ppbv	<0.10	<0.10	<0.10	0.10	<0.10	0.10	5287823
trans-1,2-Dichloroethylene	ppbv	<0.10	<0.10	<0.10	0.10	<0.10	0.10	5287823
Methylene Chloride(Dichloromethane)	ppbv	<0.80	<0.80	<0.80	0.80	<0.80	0.80	5287823
Chloroform	ppbv	0.34	0.28	0.28	0.10	<0.10	0.10	5287823
Carbon Tetrachloride	ppbv	<0.10	<0.10	<0.10	0.10	<0.10	0.10	5287823
1,1-Dichloroethane	ppbv	<0.10	<0.10	<0.10	0.10	<0.10	0.10	5287823
1,2-Dichloroethane	ppbv	<0.10	<0.10	<0.10	0.10	<0.10	0.10	5287823
Ethylene Dibromide	ppbv	<0.10	<0.10	<0.10	0.10	<0.10	0.10	5287823
1,1,1-Trichloroethane	ppbv	<0.10	<0.10	<0.10	0.10	<0.10	0.10	5287823
1,1,2-Trichloroethane	ppbv	<0.10	<0.10	<0.10	0.10	<0.10	0.10	5287823
1,1,2,2-Tetrachloroethane	ppbv	<0.10	<0.10	<0.10	0.10	<0.10	0.10	5287823
cis-1,3-Dichloropropene	ppbv	<0.10	<0.10	<0.10	0.10	<0.10	0.10	5287823
trans-1,3-Dichloropropene	ppbv	<0.10	<0.10	<0.10	0.10	<0.10	0.10	5287823
1,2-Dichloropropane	ppbv	<0.10	<0.10	<0.10	0.10	<0.10	0.10	5287823
Bromomethane	ppbv	<0.10	<0.10	<0.10	0.10	<0.10	0.10	5287823
Bromoform	ppbv	<0.20	<0.20	<0.20	0.20	<0.20	0.20	5287823
Bromodichloromethane	ppbv	<0.20	<0.20	<0.20	0.20	<0.20	0.20	5287823

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B7Q3206
Report Date: 2017/12/01

Golder Associates Ltd.
Task Order#: 4410537964, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2003

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		FPK129	FPK130	FPK131		FPK132		
Sampling Date		2017/11/21 09:24	2017/11/21 10:23	2017/11/21 10:23		2017/11/21 09:09		
COC Number		77729	77729	77729		77729		
	UNITS	**SV16-01**	**SV16-02**	**DUP1**	**RDL**	**AIR**	**RDL**	**QC Batch**
Dibromochloromethane	ppbv	<0.20	<0.20	<0.20	0.20	<0.20	0.20	5287823
Trichloroethylene	ppbv	<0.10	0.79	0.82	0.10	0.18	0.10	5287823
Tetrachloroethylene	ppbv	9.75	12.1	6.11	0.10	1.41	0.10	5287823
Benzene	ppbv	<0.10	<0.10	<0.10	0.10	0.20	0.10	5287823
Toluene	ppbv	0.34	0.18	0.15	0.10	0.26	0.10	5287823
Ethylbenzene	ppbv	0.33	0.16	0.16	0.10	0.14	0.10	5287823
p+m-Xylene	ppbv	0.92	0.42	0.44	0.20	0.47	0.20	5287823
o-Xylene	ppbv	0.28	0.15	0.14	0.10	0.15	0.10	5287823
Styrene	ppbv	<0.10	<0.10	<0.10	0.10	<0.10	0.10	5287823
4-ethyltoluene	ppbv	<0.50	<0.50	<0.50	0.50	<0.50	0.50	5287823
1,3,5-Trimethylbenzene	ppbv	<0.50	<0.50	<0.50	0.50	<0.50	0.50	5287823
1,2,4-Trimethylbenzene	ppbv	<0.50	<0.50	<0.50	0.50	<0.50	0.50	5287823
Chlorobenzene	ppbv	<0.10	<0.10	<0.10	0.10	<0.10	0.10	5287823
Benzyl chloride	ppbv	<0.50	<0.50	<0.50	0.50	<0.50	0.50	5287823
1,3-Dichlorobenzene	ppbv	<0.40	<0.40	<0.40	0.40	<0.40	0.40	5287823
1,4-Dichlorobenzene	ppbv	<0.10	<0.10	<0.10	0.10	<0.10	0.10	5287823
1,2-Dichlorobenzene	ppbv	<0.10	<0.10	<0.10	0.10	<0.10	0.10	5287823
1,2,4-Trichlorobenzene	ppbv	<0.50	<0.50	<0.50	0.50	<0.50	0.50	5287823
Hexachlorobutadiene	ppbv	<0.50	<0.50	<0.50	0.50	<0.50	0.50	5287823
Hexane	ppbv	<0.30	<0.30	<0.30	0.30	<0.30	0.30	5287823
Heptane	ppbv	<0.30	<0.30	<0.30	0.30	<0.30	0.30	5287823
Cyclohexane	ppbv	<0.20	<0.20	<0.20	0.20	<0.20	0.20	5287823
Tetrahydrofuran	ppbv	<0.40	<0.40	<0.40	0.40	<0.40	0.40	5287823
1,4-Dioxane	ppbv	<1.0	<1.0	<1.0	1.0	<1.0	1.0	5287823
Naphthalene	ppbv	<0.50	<0.50	<0.50	0.50	<0.50	0.50	5287823
Total Xylenes	ppbv	1.20	0.57	0.57	0.30	0.62	0.30	5287823
1,1,1,2-Tetrachloroethane	ppbv	<0.10	<0.10	<0.10	0.10	<0.10	0.10	5287823
Vinyl Bromide	ppbv	<0.20	<0.20	<0.20	0.20	<0.20	0.20	5287823
Propene	ppbv	<0.50	<0.50	<0.50	0.50	<0.80	0.80	5287823
2,2,4-Trimethylpentane	ppbv	<0.20	<0.20	<0.20	0.20	<0.20	0.20	5287823
Carbon Disulfide	ppbv	1.20	1.07	1.07	0.50	<0.50	0.50	5287823
Vinyl Acetate	ppbv	<0.20	<0.20	<0.20	0.20	<0.20	0.20	5287823

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B7Q3206
Report Date: 2017/12/01

Golder Associates Ltd.
Task Order#: 4410537964, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2003

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		FPK129	FPK130	FPK131		FPK132		
Sampling Date		2017/11/21 09:24	2017/11/21 10:23	2017/11/21 10:23		2017/11/21 09:09		
COC Number		77729	77729	77729		77729		
	UNITS	**SV16-01**	**SV16-02**	**DUP1**	**RDL**	**AIR**	**RDL**	**QC Batch**
Instrument Surrogate Recovery (%)								
Bromochloromethane	%	85	86	86		85		5287823
D5-Chlorobenzene	%	83	85	85		82		5287823
Difluorobenzene	%	82	84	83		83		5287823

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B7Q3206
Report Date: 2017/12/01

Golder Associates Ltd.
Task Order#: 4410537964, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2003

CALCULATED VOLATILE ORGANICS (AIR)

Maxxam ID		FPK129	FPK130	FPK131		FPK132		
Sampling Date		2017/11/21 09:24	2017/11/21 10:23	2017/11/21 10:23		2017/11/21 09:09		
COC Number		77729	77729	77729		77729		
	UNITS	**SV16-01**	**SV16-02**	**DUP1**	**RDL**	**AIR**	**RDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ug/m3	6.05	13.1	13.0	0.99	2.68	0.99	5278399
1,2-Dichlorotetrafluoroethane	ug/m3	<1.2	<1.2	<1.2	1.2	<1.2	1.2	5278399
Chloromethane	ug/m3	<0.62	<0.62	<0.62	0.62	0.95	0.62	5278399
Vinyl Chloride	ug/m3	<0.26	<0.26	<0.26	0.26	<0.26	0.26	5278399
Chloroethane	ug/m3	<0.79	<0.79	<0.79	0.79	<0.79	0.79	5278399
1,3-Butadiene	ug/m3	<1.1	<1.1	<1.1	1.1	<1.1	1.1	5278399
Trichlorofluoromethane (FREON 11)	ug/m3	1.3	1.2	1.2	1.1	1.4	1.1	5278399
Ethanol (ethyl alcohol)	ug/m3	<1.9	<1.9	<1.9	1.9	<1.9	1.9	5278399
Trichlorotrifluoroethane	ug/m3	<1.2	<1.2	<1.2	1.2	<1.2	1.2	5278399
2-propanol	ug/m3	<2.5	<2.5	<2.5	2.5	<2.5	2.5	5278399
2-Propanone	ug/m3	2.9	<1.9	2.4	1.9	9.4	1.9	5278399
Methyl Ethyl Ketone (2-Butanone)	ug/m3	<2.9	<2.9	<2.9	2.9	<2.9	2.9	5278399
Methyl Isobutyl Ketone	ug/m3	<4.1	<4.1	<4.1	4.1	<4.1	4.1	5278399
Methyl Butyl Ketone (2-Hexanone)	ug/m3	<4.1	<4.1	<4.1	4.1	<4.1	4.1	5278399
Methyl t-butyl ether (MTBE)	ug/m3	<0.72	<0.72	<0.72	0.72	<0.72	0.72	5278399
Ethyl Acetate	ug/m3	<3.6	<3.6	<3.6	3.6	<3.6	3.6	5278399
1,1-Dichloroethylene	ug/m3	<0.40	<0.40	<0.40	0.40	<0.40	0.40	5278399
cis-1,2-Dichloroethylene	ug/m3	<0.40	<0.40	<0.40	0.40	<0.40	0.40	5278399
trans-1,2-Dichloroethylene	ug/m3	<0.40	<0.40	<0.40	0.40	<0.40	0.40	5278399
Methylene Chloride(Dichloromethane)	ug/m3	<2.8	<2.8	<2.8	2.8	<2.8	2.8	5278399
Chloroform	ug/m3	1.68	1.38	1.38	0.49	<0.49	0.49	5278399
Carbon Tetrachloride	ug/m3	<0.63	<0.63	<0.63	0.63	<0.63	0.63	5278399
1,1-Dichloroethane	ug/m3	<0.40	<0.40	<0.40	0.40	<0.40	0.40	5278399
1,2-Dichloroethane	ug/m3	<0.40	<0.40	<0.40	0.40	<0.40	0.40	5278399
Ethylene Dibromide	ug/m3	<0.77	<0.77	<0.77	0.77	<0.77	0.77	5278399
1,1,1-Trichloroethane	ug/m3	<0.55	<0.55	<0.55	0.55	<0.55	0.55	5278399
1,1,2-Trichloroethane	ug/m3	<0.55	<0.55	<0.55	0.55	<0.55	0.55	5278399
1,1,2,2-Tetrachloroethane	ug/m3	<0.69	<0.69	<0.69	0.69	<0.69	0.69	5278399
cis-1,3-Dichloropropene	ug/m3	<0.45	<0.45	<0.45	0.45	<0.45	0.45	5278399
trans-1,3-Dichloropropene	ug/m3	<0.45	<0.45	<0.45	0.45	<0.45	0.45	5278399
1,2-Dichloropropane	ug/m3	<0.46	<0.46	<0.46	0.46	<0.46	0.46	5278399
Bromomethane	ug/m3	<0.39	<0.39	<0.39	0.39	<0.39	0.39	5278399
Bromoform	ug/m3	<2.1	<2.1	<2.1	2.1	<2.1	2.1	5278399
Bromodichloromethane	ug/m3	<1.3	<1.3	<1.3	1.3	<1.3	1.3	5278399

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B7Q3206
Report Date: 2017/12/01

Golder Associates Ltd.
Task Order#: 4410537964, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2003

CALCULATED VOLATILE ORGANICS (AIR)

Maxxam ID		FPK129	FPK130	FPK131		FPK132		
Sampling Date		2017/11/21 09:24	2017/11/21 10:23	2017/11/21 10:23		2017/11/21 09:09		
COC Number		77729	77729	77729		77729		
	UNITS	**SV16-01**	**SV16-02**	**DUP1**	**RDL**	**AIR**	**RDL**	**QC Batch**
Dibromochloromethane	ug/m3	<1.7	<1.7	<1.7	1.7	<1.7	1.7	5278399
Trichloroethylene	ug/m3	<0.54	4.27	4.42	0.54	0.96	0.54	5278399
Tetrachloroethylene	ug/m3	66.1	81.9	41.4	0.68	9.55	0.68	5278399
Benzene	ug/m3	<0.32	<0.32	<0.32	0.32	0.63	0.32	5278399
Toluene	ug/m3	1.28	0.68	0.58	0.38	1.00	0.38	5278399
Ethylbenzene	ug/m3	1.41	0.67	0.69	0.43	0.60	0.43	5278399
p+m-Xylene	ug/m3	3.98	1.84	1.89	0.87	2.04	0.87	5278399
o-Xylene	ug/m3	1.23	0.65	0.60	0.43	0.63	0.43	5278399
Styrene	ug/m3	<0.43	<0.43	<0.43	0.43	<0.43	0.43	5278399
4-ethyltoluene	ug/m3	<2.5	<2.5	<2.5	2.5	<2.5	2.5	5278399
1,3,5-Trimethylbenzene	ug/m3	<2.5	<2.5	<2.5	2.5	<2.5	2.5	5278399
1,2,4-Trimethylbenzene	ug/m3	<2.5	<2.5	<2.5	2.5	<2.5	2.5	5278399
Chlorobenzene	ug/m3	<0.46	<0.46	<0.46	0.46	<0.46	0.46	5278399
Benzyl chloride	ug/m3	<2.6	<2.6	<2.6	2.6	<2.6	2.6	5278399
1,3-Dichlorobenzene	ug/m3	<2.4	<2.4	<2.4	2.4	<2.4	2.4	5278399
1,4-Dichlorobenzene	ug/m3	<0.60	<0.60	<0.60	0.60	<0.60	0.60	5278399
1,2-Dichlorobenzene	ug/m3	<0.60	<0.60	<0.60	0.60	<0.60	0.60	5278399
1,2,4-Trichlorobenzene	ug/m3	<3.7	<3.7	<3.7	3.7	<3.7	3.7	5278399
Hexachlorobutadiene	ug/m3	<5.3	<5.3	<5.3	5.3	<5.3	5.3	5278399
Hexane	ug/m3	<1.1	<1.1	<1.1	1.1	<1.1	1.1	5278399
Heptane	ug/m3	<1.2	<1.2	<1.2	1.2	<1.2	1.2	5278399
Cyclohexane	ug/m3	<0.69	<0.69	<0.69	0.69	<0.69	0.69	5278399
Tetrahydrofuran	ug/m3	<1.2	<1.2	<1.2	1.2	<1.2	1.2	5278399
1,4-Dioxane	ug/m3	<3.6	<3.6	<3.6	3.6	<3.6	3.6	5278399
Naphthalene	ug/m3	<2.6	<2.6	<2.6	2.6	<2.6	2.6	5278399
Total Xylenes	ug/m3	5.2	2.5	2.5	1.3	2.7	1.3	5278399
1,1,1,2-Tetrachloroethane	ug/m3	<0.69	<0.69	<0.69	0.69	<0.69	0.69	5278399
Vinyl Bromide	ug/m3	<0.87	<0.87	<0.87	0.87	<0.87	0.87	5278399
Propene	ug/m3	<0.86	<0.86	<0.86	0.86	<1.4	1.4	5278399
2,2,4-Trimethylpentane	ug/m3	<0.93	<0.93	<0.93	0.93	<0.93	0.93	5278399
Carbon Disulfide	ug/m3	3.8	3.3	3.3	1.6	<1.6	1.6	5278399
Vinyl Acetate	ug/m3	<0.70	<0.70	<0.70	0.70	<0.70	0.70	5278399

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B7Q3206
Report Date: 2017/12/01

Golder Associates Ltd.
Task Order#: 4410537964, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2003

VOLATILE ORGANIC HYDROCARBONS BY GC/MS (AIR)

Maxxam ID		FPK129	FPK130	FPK131	FPK132		
Sampling Date		2017/11/21 09:24	2017/11/21 10:23	2017/11/21 10:23	2017/11/21 09:09		
COC Number		77729	77729	77729	77729		
	UNITS	**SV16-01**	**SV16-02**	**DUP1**	**AIR**	**RDL**	**QC Batch**
F1-BTEX, C6-C10 (as Toluene)	ug/m3	145	98.3	64.6	9.8	5.0	5290000
F2, C10-C16 (as Decane)	ug/m3	501	281	292	12.3	5.0	5290000

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B7Q3206
Report Date: 2017/12/01

Golder Associates Ltd.
Task Order#: 4410537964, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2003

TEST SUMMARY

Maxxam ID: FPK129
Sample ID: SV16-01
Matrix: AIR

Collected: 2017/11/21
Relinquished: 2017/11/21
Received: 2017/11/22

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	5290000	N/A	2017/11/28	Yao Liang Sun
Canister Pressure (TO-15)	PRES	5289649	N/A	2017/11/28	Yao Liang Sun
Volatile Organics in Air (ug/m3)	GC/MS	5278399	N/A	2017/11/29	Maureen Smith
Volatile Organics in Air (TO-15)	GC/MS	5287823	N/A	2017/11/28	Yao Liang Sun

Maxxam ID: FPK130
Sample ID: SV16-02
Matrix: AIR

Collected: 2017/11/21
Relinquished: 2017/11/21
Received: 2017/11/22

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	5290000	N/A	2017/11/28	Yao Liang Sun
Canister Pressure (TO-15)	PRES	5289649	N/A	2017/11/28	Yao Liang Sun
Volatile Organics in Air (ug/m3)	GC/MS	5278399	N/A	2017/11/29	Maureen Smith
Volatile Organics in Air (TO-15)	GC/MS	5287823	N/A	2017/11/28	Yao Liang Sun

Maxxam ID: FPK131
Sample ID: DUP1
Matrix: AIR

Collected: 2017/11/21
Relinquished: 2017/11/21
Received: 2017/11/22

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	5290000	N/A	2017/11/28	Yao Liang Sun
Canister Pressure (TO-15)	PRES	5289649	N/A	2017/11/28	Yao Liang Sun
Volatile Organics in Air (ug/m3)	GC/MS	5278399	N/A	2017/11/29	Maureen Smith
Volatile Organics in Air (TO-15)	GC/MS	5287823	N/A	2017/11/28	Yao Liang Sun

Maxxam ID: FPK132
Sample ID: AIR
Matrix: AIR

Collected: 2017/11/21
Relinquished: 2017/11/21
Received: 2017/11/22

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
BTEX and CCME Compounds in Air(TO-15mod)	GC/MS	5290000	N/A	2017/11/28	Yao Liang Sun
Canister Pressure (TO-15)	PRES	5289649	N/A	2017/11/28	Yao Liang Sun
Volatile Organics in Air (ug/m3)	GC/MS	5278399	N/A	2017/11/29	Automated Statchk
Volatile Organics in Air (TO-15)	GC/MS	5287823	N/A	2017/11/28	Yao Liang Sun

Maxxam Job #: B7Q3206
Report Date: 2017/12/01

Golder Associates Ltd.
Task Order#: 4410537964, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2003

GENERAL COMMENTS

Sample FPK132 [AIR] : Increased DL for propene due to interference from propane.

Results relate only to the items tested.

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Maxxam Job #: B7Q3206
Report Date: 2017/12/01

Golder Associates Ltd.
Task Order#: 4410537964, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2003

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5287823	LSY	Method Blank	Bromochloromethane	2017/11/28		91	%	60 - 140
			D5-Chlorobenzene	2017/11/28		93	%	60 - 140
			Difluorobenzene	2017/11/28		91	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2017/11/28	<0.20		ppbv	
			1,2-Dichlorotetrafluoroethane	2017/11/28	<0.17		ppbv	
			Chloromethane	2017/11/28	<0.30		ppbv	
			Vinyl Chloride	2017/11/28	<0.10		ppbv	
			Chloroethane	2017/11/28	<0.30		ppbv	
			1,3-Butadiene	2017/11/28	<0.50		ppbv	
			Trichlorofluoromethane (FREON 11)	2017/11/28	<0.20		ppbv	
			Ethanol (ethyl alcohol)	2017/11/28	<1.0		ppbv	
			Trichlorotrifluoroethane	2017/11/28	<0.15		ppbv	
			2-propanol	2017/11/28	<1.0		ppbv	
			2-Propanone	2017/11/28	<0.80		ppbv	
			Methyl Ethyl Ketone (2-Butanone)	2017/11/28	<1.0		ppbv	
			Methyl Isobutyl Ketone	2017/11/28	<1.0		ppbv	
			Methyl Butyl Ketone (2-Hexanone)	2017/11/28	<1.0		ppbv	
			Methyl t-butyl ether (MTBE)	2017/11/28	<0.20		ppbv	
			Ethyl Acetate	2017/11/28	<1.0		ppbv	
			1,1-Dichloroethylene	2017/11/28	<0.10		ppbv	
			cis-1,2-Dichloroethylene	2017/11/28	<0.10		ppbv	
			trans-1,2-Dichloroethylene	2017/11/28	<0.10		ppbv	
			Methylene Chloride(Dichloromethane)	2017/11/28	<0.80		ppbv	
			Chloroform	2017/11/28	<0.10		ppbv	
			Carbon Tetrachloride	2017/11/28	<0.10		ppbv	
			1,1-Dichloroethane	2017/11/28	<0.10		ppbv	
			1,2-Dichloroethane	2017/11/28	<0.10		ppbv	
			Ethylene Dibromide	2017/11/28	<0.10		ppbv	
			1,1,1-Trichloroethane	2017/11/28	<0.10		ppbv	
			1,1,2-Trichloroethane	2017/11/28	<0.10		ppbv	
			1,1,2,2-Tetrachloroethane	2017/11/28	<0.10		ppbv	
			cis-1,3-Dichloropropene	2017/11/28	<0.10		ppbv	
			trans-1,3-Dichloropropene	2017/11/28	<0.10		ppbv	
			1,2-Dichloropropane	2017/11/28	<0.10		ppbv	
			Bromomethane	2017/11/28	<0.10		ppbv	
			Bromoform	2017/11/28	<0.20		ppbv	
			Bromodichloromethane	2017/11/28	<0.20		ppbv	
			Dibromochloromethane	2017/11/28	<0.20		ppbv	
			Trichloroethylene	2017/11/28	<0.10		ppbv	
			Tetrachloroethylene	2017/11/28	<0.10		ppbv	
			Benzene	2017/11/28	<0.10		ppbv	
			Toluene	2017/11/28	<0.10		ppbv	
			Ethylbenzene	2017/11/28	<0.10		ppbv	
			p+m-Xylene	2017/11/28	<0.20		ppbv	
			o-Xylene	2017/11/28	<0.10		ppbv	
			Styrene	2017/11/28	<0.10		ppbv	
			4-ethyltoluene	2017/11/28	<0.50		ppbv	
			1,3,5-Trimethylbenzene	2017/11/28	<0.50		ppbv	
			1,2,4-Trimethylbenzene	2017/11/28	<0.50		ppbv	
			Chlorobenzene	2017/11/28	<0.10		ppbv	
			Benzyl chloride	2017/11/28	<0.50		ppbv	

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Maxxam Job #: B7Q3206
Report Date: 2017/12/01

Golder Associates Ltd.
Task Order#: 4410537964, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2003

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,3-Dichlorobenzene	2017/11/28	<0.40		ppbv	
			1,4-Dichlorobenzene	2017/11/28	<0.10		ppbv	
			1,2-Dichlorobenzene	2017/11/28	<0.10		ppbv	
			1,2,4-Trichlorobenzene	2017/11/28	<0.50		ppbv	
			Hexachlorobutadiene	2017/11/28	<0.50		ppbv	
			Hexane	2017/11/28	<0.30		ppbv	
			Heptane	2017/11/28	<0.30		ppbv	
			Cyclohexane	2017/11/28	<0.20		ppbv	
			Tetrahydrofuran	2017/11/28	<0.40		ppbv	
			1,4-Dioxane	2017/11/28	<1.0		ppbv	
			Naphthalene	2017/11/28	<0.50		ppbv	
			Total Xylenes	2017/11/28	<0.30		ppbv	
			1,1,1,2-Tetrachloroethane	2017/11/28	<0.10		ppbv	
			Vinyl Bromide	2017/11/28	<0.20		ppbv	
			Propene	2017/11/28	<0.50		ppbv	
			2,2,4-Trimethylpentane	2017/11/28	<0.20		ppbv	
			Carbon Disulfide	2017/11/28	<0.50		ppbv	
			Vinyl Acetate	2017/11/28	<0.20		ppbv	
5290000	LSY	Method Blank	F1-BTEX, C6-C10 (as Toluene)	2017/11/28	<5.0		ug/m3	
			F2, C10-C16 (as Decane)	2017/11/28	<5.0		ug/m3	
5287823	LSY	LCS	Bromochloromethane	2017/11/28		102	%	60 - 140
			D5-Chlorobenzene	2017/11/28		101	%	60 - 140
			Difluorobenzene	2017/11/28		102	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2017/11/28		98	%	70 - 130
			1,2-Dichlorotetrafluoroethane	2017/11/28		92	%	70 - 130
			Chloromethane	2017/11/28		86	%	70 - 130
			Vinyl Chloride	2017/11/28		92	%	70 - 130
			Chloroethane	2017/11/28		91	%	70 - 130
			1,3-Butadiene	2017/11/28		91	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2017/11/28		98	%	70 - 130
			Ethanol (ethyl alcohol)	2017/11/28		76	%	70 - 130
			Trichlorotrifluoroethane	2017/11/28		101	%	70 - 130
			2-propanol	2017/11/28		86	%	70 - 130
			2-Propanone	2017/11/28		84	%	70 - 130
			Methyl Ethyl Ketone (2-Butanone)	2017/11/28		96	%	70 - 130
			Methyl Isobutyl Ketone	2017/11/28		103	%	70 - 130
			Methyl Butyl Ketone (2-Hexanone)	2017/11/28		99	%	70 - 130
			Methyl t-butyl ether (MTBE)	2017/11/28		84	%	70 - 130
			Ethyl Acetate	2017/11/28		99	%	70 - 130
			1,1-Dichloroethylene	2017/11/28		94	%	70 - 130
			cis-1,2-Dichloroethylene	2017/11/28		100	%	70 - 130
			trans-1,2-Dichloroethylene	2017/11/28		92	%	70 - 130
			Methylene Chloride(Dichloromethane)	2017/11/28		87	%	70 - 130
			Chloroform	2017/11/28		107	%	70 - 130
			Carbon Tetrachloride	2017/11/28		104	%	70 - 130
			1,1-Dichloroethane	2017/11/28		96	%	70 - 130
			1,2-Dichloroethane	2017/11/28		101	%	70 - 130
			Ethylene Dibromide	2017/11/28		110	%	70 - 130
			1,1,1-Trichloroethane	2017/11/28		103	%	70 - 130
			1,1,2-Trichloroethane	2017/11/28		108	%	70 - 130
			1,1,2,2-Tetrachloroethane	2017/11/28		121	%	70 - 130

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			cis-1,3-Dichloropropene	2017/11/28		101	%	70 - 130
			trans-1,3-Dichloropropene	2017/11/28		103	%	70 - 130
			1,2-Dichloropropane	2017/11/28		105	%	70 - 130
			Bromomethane	2017/11/28		99	%	70 - 130
			Bromoform	2017/11/28		114	%	70 - 130
			Bromodichloromethane	2017/11/28		109	%	70 - 130
			Dibromochloromethane	2017/11/28		105	%	70 - 130
			Trichloroethylene	2017/11/28		111	%	70 - 130
			Tetrachloroethylene	2017/11/28		103	%	70 - 130
			Benzene	2017/11/28		112	%	70 - 130
			Toluene	2017/11/28		105	%	70 - 130
			Ethylbenzene	2017/11/28		107	%	70 - 130
			p+m-Xylene	2017/11/28		110	%	70 - 130
			o-Xylene	2017/11/28		107	%	70 - 130
			Styrene	2017/11/28		107	%	70 - 130
			4-ethyltoluene	2017/11/28		106	%	70 - 130
			1,3,5-Trimethylbenzene	2017/11/28		107	%	70 - 130
			1,2,4-Trimethylbenzene	2017/11/28		110	%	70 - 130
			Chlorobenzene	2017/11/28		115	%	70 - 130
			Benzyl chloride	2017/11/28		100	%	70 - 130
			1,3-Dichlorobenzene	2017/11/28		115	%	70 - 130
			1,4-Dichlorobenzene	2017/11/28		117	%	70 - 130
			1,2-Dichlorobenzene	2017/11/28		122	%	70 - 130
			1,2,4-Trichlorobenzene	2017/11/28		122	%	70 - 130
			Hexachlorobutadiene	2017/11/28		114	%	70 - 130
			Hexane	2017/11/28		95	%	70 - 130
			Heptane	2017/11/28		96	%	70 - 130
			Cyclohexane	2017/11/28		97	%	70 - 130
			Tetrahydrofuran	2017/11/28		91	%	70 - 130
			1,4-Dioxane	2017/11/28		101	%	70 - 130
			Naphthalene	2017/11/28		122	%	70 - 130
			Total Xylenes	2017/11/28		109	%	70 - 130
			Vinyl Bromide	2017/11/28		88	%	70 - 130
			Propene	2017/11/28		85	%	70 - 130
			2,2,4-Trimethylpentane	2017/11/28		95	%	70 - 130
			Carbon Disulfide	2017/11/28		94	%	70 - 130
			Vinyl Acetate	2017/11/28		81	%	70 - 130

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

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Maxxam Job #: B7Q3206
Report Date: 2017/12/01

Golder Associates Ltd.
Task Order#: 4410537964, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE RD, OTTAWA, ON
Project #: 1669090-1155-2003

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Maureen Smith

Maureen Smith, Supervisor, Volatiles

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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EXXONMOBIL/IMPERIAL OIL - MAXXAM AIR CHAIN OF CUSTODY RECORD

Page 1 of 1

C of C # 77729

INVOICE INFORMATION	REPORT INFORMATION
Company Name: ☒ Imperial Oil ☐ ExxonMobil	Company Name: Golder Associates Ltd.
Contact Name: John Koo	Contact Name: Ian Sosney
Address: 505 Quarry Park Blvd SE Calgary, AB, T2C 5N1	Address: 110 Hanover St, Unit 203 St. Catherines, Ontario
Email: john.koo@esso.ca	Email: Ian-Sosney@golder.com
Ph: 587-476-5881	Ph: 905-688-8217
Sampler Name (Print): Brandon McParlan	Consultant Project #: 1669090-1155-2023

ANALYSIS REQUESTED

	FIELD SAMPLE ID	Canister Serial #	Flow Regulator Serial #	Sample Collection DATE (YYYY/MM/DD)	Sample Collection TIME (24 HR)	Media Type (See Legend)	FLOW RATE (L/min)	LENGTH OF SAMPLING (minutes)	BTEX	Aromatic/Aliphatic Hydrocarbon Fractionations	F1 (C6-C10) - F2 (C10-C16)	VOCs
1	SV16-01	416	FX1121	2017/11/21	09:24	S	0.16	9	X		X	X
2	SV16-02	343	FX1443	2017/11/21	10:23	S	0.16	18	X		X	X
3	DUP 1	2387	FX1443	2017/11/21	10:23	S	0.16	18	X		X	X
4	AIR	1281	FX0299	2017/11/21	09:09	S	0.18	8	X		X	X
5	Unused	2980	NA	NA	NA	NA	NA	NA				
6	Unused	1482	NA	NA	NA	NA	NA	NA				
7	Unused	1368	NA	NA	NA	NA	NA	NA				
8	Unused	1387	NA	NA	NA	NA	NA	NA				
9												
10												
11												

IOL SITE LOCATION: 1660 Merivale Road, Ottawa, Ontario

IOL PROJECT # (if applicable): MZ.00277

MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM: 4410537964-10

REGULATORY CRITERIA / DETECTION LIMITS: (PLEASE SPECIFY): NA

SPECIAL INSTRUCTIONS: ICE NA
IES: AZ601436
Please upload to 88001627
Returning unused canisters and regulators.

LEGEND
S - Summa Can
T - Tube
TB - Tedlar Bag
O - Other(Specify)
*TEMP N/A for SUMMA CAN

TURNAROUND TIME
Standard (10 days) ☒
Rush (9 days) ☐
(6 days) ☐
(3 days) ☐
Date Required

	YES	NO	COOLER ID # 1		YES	NO	COOLER ID # 2		YES	NO	COOLER ID # 3
SEAL PRESENT	✓		TEMP °C 1 2 3	SEAL PRESENT	✓		TEMP °C 1 2 3	SEAL PRESENT	✓		TEMP °C 1 2 3
SEAL INTACT	✓			SEAL INTACT	✓			SEAL INTACT	✓		2017/11/22 AJR
COOLING MEDIA PRESENT		✓		COOLING MEDIA PRESENT		✓		COOLING MEDIA PRESENT		✓	

LAB USE ONLY
MAXXAM JOB # KES 2017/11/22 ~~BO~~ B703206

RELINQUISHED BY:		DATE:	TIME (24 HR)	RECEIVED BY:		DATE:	TIME (24 HR)
1. [signature]	Brandon McParlan	2017/11/21	14:00	1. [signature]	ASHIPALA SUKUMAR	2017/11/22	07:55
2.				2.			
3.				3.			

SAMPLES
LABELED BY: KES
VERIFIED BY: PSY

IOL COC-AIR-(04/2018) White: Maxxam Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: November 21, 2017

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Maxxam Analytics Mississauga

Consultant Project Number: 1669090-1155

Sample Submission Number: B7Q3206

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within
Extraction Surrogate Recovery			X	acceptance criteria.
Method Blank Concentration	X			
Matrix Duplicate RPD			X	
Matrix Spike Recovery			X	
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	Samples SV16-02 and DUP 1 exceed the alert limit
Trip Blank Concentration			X	for tetrachloroethylene (66%). All remaining field
Field Duplicate RPD		X		QC samples are within alert limits.

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	n/a

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): 

Date: December 4, 2017

APPENDIX D QUALITY ASSURANCE/QUALITY CONTROL

QUALITY ASSURANCE/QUALITY CONTROL

In conjunction with the field investigations completed to date, a Quality Assurance/Quality Control (QA/QC) program was implemented to ensure the integrity of the groundwater and soil vapour sampling and analytical testing results.

1.0 FIELD PROGRAM

All sampling activities were completed in accordance with Golder's Technical Field Procedures by trained Golder personnel. All field activities were documented in field notes and results were recorded on standard field forms. All field equipment involved in sampling and monitoring was decontaminated in accordance with Golder's Technical Procedures. Groundwater and soil vapour samples were collected using appropriate handling protocols and were placed in sample containers provided by Maxxam Analytics Inc. (Maxxam).

All re-useable field equipment involved in collecting samples was decontaminated between each sampling location. To help prevent cross-contamination, a new pair of clean nitrile gloves was used for the collection of each sample.

Samples were given unique identification numbers and the sampling containers were preserved in ice-filled coolers. Samples were logged onto formal chain-of-custody documents and transported to Maxxam's Mississauga Laboratory for chemical analysis. Maxxam's Mississauga laboratory is accredited by the Standards Council of Canada (SCC).

Blind field duplicate samples were submitted for analysis. Trip and field blanks were submitted for analysis, as necessary, to evaluate the potential for cross-contamination during the sampling and transportation of the samples. Submission of blind field duplicate QC samples was at a minimum rate of 10% of total samples.

2.0 LABORATORY PROGRAM

The laboratory QA/QC program included adherence to laboratory sampling and analysis protocols (e.g., hold times, sample containers, preservatives, detection limits and approved methodology) and the analysis of laboratory method blanks, laboratory sample duplicates, surrogate recovery and chemical spikes.

The laboratory method blank analysis results were used to detect interferences or impurities introduced by the laboratory equipment, reagents, or solvents. Surrogate recovery is analyzed for organics by spiking samples with known quantities of surrogate chemicals which have similar chemical properties to the parameters being analyzed. The reported recovery provides an indication of the analytical method accuracy for that sample. Matrix spikes were conducted by adding known concentrations of the analyte of interest to a sample to evaluate the effects of the sample matrix on the analytical method. The analysis of selected samples in duplicate is used to evaluate the reproducibility of the analytical method.

4.0 DATA RECEPTION

Once laboratory analytical results were received, Golder completed a review of field and laboratory quality. This included review of laboratory QC performance to confirm results are within acceptance criteria, as well as evaluation of field duplicate and blank results to confirm they were within alert limits. Upon receipt of the analytical results, Relative Percent Difference (RPD) values between the original samples and their blind field duplicates were calculated as follows:

$$RPD = \frac{|x_2 - x_1|}{\left(\frac{x_1 + x_2}{2}\right)} \times 100$$

Where: RPD = relative percent difference
X_2 = sample value
X_1 = blind field duplicate or replicate value.

Since analytical error increases near the Reportable Detection Limit (RDL), an RPD was only calculated where the concentrations of both the original and blind field duplicate samples were greater than five times the RDL. The calculated RPDs were then compared to parameter specific alert limits.

Exceedances of the QC acceptance or alert criteria were investigated with the laboratory and, if warranted, a corrective action report was requested from the laboratory.

5.0 DATA QUALITY REVIEW RESULTS

Results of the data quality review are summarized in Table D1. The RPD calculations and QC results are presented in Table D2 and D5.

Two field duplicate groundwater samples were collected and submitted to the laboratory as part of the groundwater investigation. One field blank and one trip blank were also submitted to the laboratory as part of the groundwater QC program. One soil vapour field duplicate samples and two ambient air field blank samples were collected and submitted to the laboratory as part of the soil vapour probe investigation.

Based on the data quality review, two data quality issues were identified. The issues did not have a material effect on the reliability of the data presented in this report. The issues are discussed in detail in Table D1.

6.0 SUMMARY OF RESULTS

Based on the review of the QA/QC results, the data presented in this report are considered to be reliable.

Table D1
Summary of Quality Control Samples
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Maxxam Job Number	Data Quality Waiver Issued (Yes/No)	Data Quality Waiver Number	Matrix	Maxxam Sample ID Affected	Test Affected	Data Quality Issue	Comments
B7D2158	No	n/a	Groundwater	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
B7D2163	No	n/a	Groundwater	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
B7D2167	No	n/a	Groundwater	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
B7D2173	No	n/a	Groundwater	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
B7D2178	No	n/a	Groundwater	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
B7D2188	No	n/a	Water	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
B6R1882	No	n/a	Air	LCS	1,4-Dioxane	Lab control sample recovery outside acceptance range of 70-130% for 1,4-Dioxane for batch 4795923.	For multi-parameter tests, 10% of parameters can fall outside of the acceptance range. Under these circumstances, the 1,4-Dioxane data reported can be considered reliable.
B7F6793	No	n/a	Air	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
B7Q3206	No	n/a	Soil Vapour	FPK130 and FPK131	Tetrachloroethylene	Field duplicate samples SV16-02 and DUP 1 exceed the alert limit for tetrachloroethylene (66%).	A quality check of the data yielded similar results. Sample non-homogeneity is believed to be the root cause. Tetrachloroethylene concentrations in both the sample and the field duplicate were above the regulatory guideline, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the tetrachloroethylene data reported can be considered reliable.

Notes:
n/a - not applicable

Table D2
Summary of Field Duplicate Sample Results - Petroleum Hydorcarbons and Dissolved Lead
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location	Units	Alert Limit	RDL	TH12	DUPA	RPD %	TH5	DUP1	RPD %
Sample Collection Date				20-Jun-17	20-Jun-17		21-Jun-17	21-Jun-17	
Maxxam Sample ID				EPV392	EPV393		EPV353	EPV354	
Benzene	µg/L	>80%	1	160	150	6	210	190	10
Toluene	µg/L	>80%	1	11	11	0	25	23	8
Ethylbenzene	µg/L	>80%	1	1,200	1,200	0	690	640	8
o-Xylene	µg/L	>80%	1	24	23	4	77	70	10
p+m-Xylene	µg/L	>80%	2	140	140	0	1,700	1,600	6
Total Xylenes	µg/L	>80%	2	170	160	6	1,800	1,600	12
Hexane	µg/L	>80%	NA	NA	NA	NA	NA	NA	NA
F1 (C6-C10)	µg/L	>80%	130	9,500	8,800	8	7,100	6,900	3
F1 (C6-C10) - BTEX	µg/L	>80%	130	7,900	7,300	8	4,400	4,400	0
F2 (C10-C16 Hydrocarbons)	µg/L	>80%	100	2,800	2,600	7	3,600	3,200	12
F3 (C16-C34 Hydrocarbons)	µg/L	>80%	200	750	700	n/c	420	490	n/c
F4 (C34-C50 Hydrocarbons)	µg/L	>80%	200	460	430	n/c	350	450	n/c
Dissolved Lead (Pb)	µg/L	>50%	0.5	3.8	4.5	n/c	1.8	2.2	n/c

Notes:

Bold/Underlined - value exceeds alert limit

BTEX - benzene, toluene, ethylbenzene, xylenes

F1, F2 - petroleum hydrocarbon fractions 1 and 2

NA - not applicable

n/c - not calculated

RDL - reportable detection limit

RPD - relative percent difference

µg/L - micrograms per litre

> - greater than

< - less than

RPD is not calculated if either the original or field duplicate sample has a result of less than 5X the RDL

Table D3
Summary of Field Blank and Trip Blank Results - Petroleum Hydrocarbons and Lead Parameters
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Parameter	Units	Alert Limit	RDL	Field Blank	Do the results exceed the Alert Limit?	Trip Blank	Do the results exceed the Alert Limit?
Sample Collection Date				22-Jun-17		22-Jun-17	
Maxxam Sample ID				EPV452		EPV453	
Benzene	µg/L	>5X RDL	0.2	<0.20	no	<0.20	no
Toluene	µg/L	>5X RDL	0.2	<0.20	no	<0.20	no
Ethylbenzene	µg/L	>5X RDL	0.2	<0.20	no	<0.20	no
o-Xylene	µg/L	>5X RDL	0.2	<0.20	no	<0.20	no
p+m-Xylene	µg/L	>5X RDL	0.4	<0.40	no	<0.40	no
Total Xylenes	µg/L	>5X RDL	0.4	<0.40	no	<0.40	no
F1 (C6-C10)	µg/L	>2X RDL	25	<25	no	<25	no
F1 (C6-C10) - BTEX	µg/L	>2X RDL	25	<25	no	<25	no
F2 (C10-C16 Hydrocarbons)	µg/L	>2X RDL	100	<100	no	<100	no
F3 (C16-C34 Hydrocarbons)	µg/L	>2X RDL	200	<200	no	<200	no
F4 (C34-C50 Hydrocarbons)	µg/L	>2X RDL	200	<200	no	<200	no

Notes:

Bold/Underlined - value exceeds alert limit

BTEX - benzene, toluene, ethylbenzene, xylenes

F1, F2 - petroleum hydrocarbon fractions 1 and 2

RDL - reportable detection limit

µg/L - micrograms per litre

> - greater than

< - less than

Alert limit is 5X the RDL for BTEX and 2X the RDL for F1 and F2

Table D4
Summary of Field Duplicate Sample Results - Soil Vapour Volatile Organic Hydrocarbon
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location	Units	Alert Limit	RDL	SV16-02	DUP 1	RPD %
Sample Collection Date				21-Nov-17	21-Nov-17	
Maxxam Sample ID				FPK130	FPK131	
Dichlorodifluoromethane (FREON 12)	µg/m^3	>50%	0.2	13.1	13	1
1,2-Dichlorotetrafluoroethane	µg/m^3	>50%	0.17	<1.2	<1.2	n/c
Chloromethane	µg/m^3	>50%	0.3	<0.62	<0.62	n/c
Vinyl Chloride	µg/m^3	>50%	0.1	<0.26	<0.26	n/c
Chloroethane	µg/m^3	>50%	0.3	<0.79	<0.79	n/c
1,3-Butadiene	µg/m^3	>50%	0.5	<1.1	<1.1	n/c
Trichlorofluoromethane (FREON 11)	µg/m^3	>50%	0.2	1.2	1.2	n/c
Ethanol (ethyl alcohol)	µg/m^3	>50%	1	<1.9	<1.9	n/c
Trichlorotrifluoroethane	µg/m^3	>50%	0.15	<1.2	<1.2	n/c
2-propanol	µg/m^3	>50%	1	<2.5	<2.5	n/c
2-Propanone	µg/m^3	>50%	0.8	<1.9	2.4	n/c
Methyl Ethyl Ketone (2-Butanone)	µg/m^3	>50%	1	<2.9	<2.9	n/c
Methyl Isobutyl Ketone	µg/m^3	>50%	1	<4.1	<4.1	n/c
Methyl Butyl Ketone (2-Hexanone)	µg/m^3	>50%	1	<4.1	<4.1	n/c
Methyl t-butyl ether (MTBE)	µg/m^3	>50%	0.2	<0.72	<0.72	n/c
Ethyl Acetate	µg/m^3	>50%	1	<3.6	<3.6	n/c
1,1-Dichloroethylene	µg/m^3	>50%	0.1	<0.40	<0.40	n/c
cis-1,2-Dichloroethylene	µg/m^3	>50%	0.1	<0.40	<0.40	n/c
trans-1,2-Dichloroethylene	µg/m^3	>50%	0.1	<0.40	<0.40	n/c
Methylene Chloride(Dichloromethane)	µg/m^3	>50%	0.8	<2.8	<2.8	n/c
Chloroform	µg/m^3	>50%	0.1	1.38	1.38	n/c
Carbon Tetrachloride	µg/m^3	>50%	0.1	<0.63	<0.63	n/c
1,1-Dichloroethane	µg/m^3	>50%	0.1	<0.40	<0.40	n/c
1,2-Dichloroethane	µg/m^3	>50%	0.1	<0.40	<0.40	n/c
Ethylene Dibromide	µg/m^3	>50%	0.1	<0.77	<0.77	n/c
1,1,1-Trichloroethane	µg/m^3	>50%	0.1	<0.55	<0.55	n/c
1,1,2-Trichloroethane	µg/m^3	>50%	0.1	<0.55	<0.55	n/c
1,1,2,2-Tetrachloroethane	µg/m^3	>50%	0.1	<0.69	<0.69	n/c
cis-1,3-Dichloropropene	µg/m^3	>50%	0.1	<0.45	<0.45	n/c
trans-1,3-Dichloropropene	µg/m^3	>50%	0.1	<0.45	<0.45	n/c
1,2-Dichloropropane	µg/m^3	>50%	0.1	<0.46	<0.46	n/c
Bromomethane	µg/m^3	>50%	0.1	<0.39	<0.39	n/c
Bromoform	µg/m^3	>50%	0.2	<2.1	<2.1	n/c
Bromodichloromethane	µg/m^3	>50%	0.2	<1.3	<1.3	n/c
Dibromochloromethane	µg/m^3	>50%	0.2	<1.7	<1.7	n/c
Trichloroethylene	µg/m^3	>50%	0.1	4.27	4.42	3
Tetrachloroethylene	µg/m^3	>50%	0.1	81.9	41.4	**66**
Benzene	µg/m^3	>50%	0.1	<0.32	<0.32	n/c
Toluene	µg/m^3	>50%	0.1	0.68	0.58	n/c
Ethylbenzene	µg/m^3	>50%	0.1	0.67	0.69	n/c
p+m-Xylene	µg/m^3	>50%	0.2	1.84	1.89	n/c
o-Xylene	µg/m^3	>50%	0.1	0.65	0.6	n/c
Styrene	µg/m^3	>50%	0.1	<0.43	<0.43	n/c
4-ethyltoluene	µg/m^3	>50%	0.5	<2.5	<2.5	n/c
1,3,5-Trimethylbenzene	µg/m^3	>50%	0.5	<2.5	<2.5	n/c
1,2,4-Trimethylbenzene	µg/m^3	>50%	0.5	<2.5	<2.5	n/c
Chlorobenzene	µg/m^3	>50%	0.1	<0.46	<0.46	n/c
Benzyl chloride	µg/m^3	>50%	0.5	<2.6	<2.6	n/c
1,3-Dichlorobenzene	µg/m^3	>50%	0.4	<2.4	<2.4	n/c
1,4-Dichlorobenzene	µg/m^3	>50%	0.1	<0.60	<0.60	n/c
1,2-Dichlorobenzene	µg/m^3	>50%	0.1	<0.60	<0.60	n/c
1,2,4-Trichlorobenzene	µg/m^3	>50%	0.5	<3.7	<3.7	n/c
Hexachlorobutadiene	µg/m^3	>50%	0.5	<5.3	<5.3	n/c
Hexane	µg/m^3	>50%	0.3	<1.1	<1.1	n/c
Heptane	µg/m^3	>50%	0.3	<1.2	<1.2	n/c
Cyclohexane	µg/m^3	>50%	0.2	<0.69	<0.69	n/c
Tetrahydrofuran	µg/m^3	>50%	0.4	<1.2	<1.2	n/c
1,4-Dioxane	µg/m^3	>50%	1	<3.6	<3.6	n/c
Naphthalene	µg/m^3	>50%	0.5	<2.6	<2.6	n/c
Total Xylenes	µg/m^3	>50%	0.3	2.5	2.5	n/c
1,1,1,2-Tetrachloroethane	µg/m^3	>50%	0.1	<0.69	<0.69	n/c
Vinyl Bromide	µg/m^3	>50%	0.2	<0.87	<0.87	n/c
Propene	µg/m^3	>50%	0.9	<0.86	<0.86	n/c
2,2,4-Trimethylpentane	µg/m^3	>50%	0.2	<0.93	<0.93	n/c
Carbon Disulfide	µg/m^3	>50%	0.5	3.3	3.3	n/c
Vinyl Acetate	µg/m^3	>50%	0.2	<0.70	<0.70	n/c
F1-BTEX, C6-C10 (as Toluene)	µg/m^3	>50%	5	98.3	64.6	41
F2, C10-C16 (as Decane)	µg/m^3	>50%	5	281	292	4

Notes:

Bold/Underlined - value exceeds alert limit

BTEX - benzene, toluene, ethylbenzene, xylenes

F1, F2 - petroleum hydrocarbon fractions 1 and 2

n/c - not calculated

RDL - reportable detection limit

RPD - relative percent difference

µg/m^3 - micrograms per cubic metre

> - greater than

< - less than

RPD is not calculated if either the original or field duplicate sample has a result of less than 5X the RDL

Table D5
Summary of Soil Vapour Field Blank Sample Results
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Parameter	Units	Alert Limit	RDL	Field Blank (Ambient Air)	Do the results exceed the Alert Limit?	RDL	Field Blank (Ambient Air)	Do the results exceed the Alert Limit?
Sample Collection Date				**13-Dec-16**			**21-Jul-17**	
Maxxam Sample ID				**DPX368**			**EUN919**	
Dichlorodifluoromethane (FREON 12	µg/m³	>5X RDL	0.99	6.46	**yes**	0.99	12.90	**yes**
1,2-Dichlorotetrafluoroethane	µg/m³	>5X RDL	1.2	<1.2	no	1.2	<1.2	no
Chloromethane	µg/m³	>5X RDL	0.62	<0.62	no	0.62	<0.62	no
Vinyl Chloride	µg/m³	>5X RDL	0.26	<0.26	no	0.26	<0.26	no
Chloroethane	µg/m³	>5X RDL	0.79	<0.79	no	0.79	<0.79	no
1,3-Butadiene	µg/m³	>5X RDL	1.1	<1.1	no	1.1	<1.1	no
Trichlorofluoromethane (FREON 11)	µg/m³	>5X RDL	1.1	1.5	no	1.1	2.70	no
Ethanol (ethyl alcohol)	µg/m³	>5X RDL	1.9	<1.9	no	1.9	2.20	no
Trichlorotrifluoroethane	µg/m³	>5X RDL	1.2	<1.2	no	1.2	<1.2	no
2-propanol	µg/m³	>5X RDL	2.5	<2.5	no	2.5	<2.5	no
2-Propanone	µg/m³	>5X RDL	1.9	13	**yes**	1.9	76.50	**yes**
Methyl Ethyl Ketone (2-Butanone)	µg/m³	>5X RDL	2.9	5.9	no	2.9	4.00	no
Methyl Isobutyl Ketone	µg/m³	>5X RDL	4.1	<4.1	no	4.1	<4.1	no
Methyl Butyl Ketone (2-Hexanone)	µg/m³	>5X RDL	4.1	<4.1	no	4.1	<4.1	no
Methyl t-butyl ether (MTBE)	µg/m³	>5X RDL	0.72	<0.72	no	0.72	<0.72	no
Ethyl Acetate	µg/m³	>5X RDL	3.6	<3.6	no	3.6	<3.6	no
1,1-Dichloroethylene	µg/m³	>5X RDL	0.4	<0.40	no	0.4	<0.40	no
cis-1,2-Dichloroethylene	µg/m³	>5X RDL	0.4	<0.40	no	0.4	<0.40	no
trans-1,2-Dichloroethylene	µg/m³	>5X RDL	0.4	12.6	**yes**	0.4	1.33	no
Methylene Chloride(Dichloromethane	µg/m³	>5X RDL	2.8	<2.8	no	2.8	3.20	no
Chloroform	µg/m³	>5X RDL	0.49	10.8	**yes**	0.49	2.95	**yes**
Carbon Tetrachloride	µg/m³	>5X RDL	0.63	<0.63	no	0.63	<0.63	no
1,1-Dichloroethane	µg/m³	>5X RDL	0.4	<0.40	no	0.4	<0.40	no
1,2-Dichloroethane	µg/m³	>5X RDL	0.4	<0.40	no	0.4	<0.40	no
Ethylene Dibromide	µg/m³	>5X RDL	0.77	<0.77	no	0.77	<0.77	no
1,1,1-Trichloroethane	µg/m³	>5X RDL	0.55	<0.55	no	0.55	<0.55	no
1,1,2-Trichloroethane	µg/m³	>5X RDL	0.55	<0.55	no	0.55	<0.55	no
1,1,2,2-Tetrachloroethane	µg/m³	>5X RDL	0.69	<0.69	no	0.69	<0.69	no
cis-1,3-Dichloropropene	µg/m³	>5X RDL	0.45	<0.45	no	0.45	<0.45	no
trans-1,3-Dichloropropene	µg/m³	>5X RDL	0.45	<0.45	no	0.45	<0.45	no
1,2-Dichloropropane	µg/m³	>5X RDL	0.46	<0.46	no	0.46	<0.46	no
Bromomethane	µg/m³	>5X RDL	0.39	<0.39	no	0.39	<0.39	no
Bromoform	µg/m³	>5X RDL	2.1	<2.1	no	2.1	<2.1	no
Bromodichloromethane	µg/m³	>5X RDL	1.3	<1.3	no	1.3	<1.3	no
Dibromochloromethane	µg/m³	>5X RDL	1.7	<1.7	no	1.7	<1.7	no
Trichloroethylene	µg/m³	>5X RDL	0.54	4.55	**yes**	0.54	1.09	no
Tetrachloroethylene	µg/m³	>5X RDL	0.68	<0.68	no	0.68	7.03	**yes**
Benzene	µg/m³	>5X RDL	0.32	1.38	no	0.32	<0.32	no
Toluene	µg/m³	>5X RDL	0.38	8.57	**yes**	0.38	3.93	**yes**
Ethylbenzene	µg/m³	>5X RDL	0.43	2.75	**yes**	0.43	4.56	**yes**
p+m-Xylene	µg/m³	>5X RDL	0.87	6.99	**yes**	0.87	16.50	**yes**
o-Xylene	µg/m³	>5X RDL	0.43	2.64	**yes**	0.43	5.23	**yes**
Styrene	µg/m³	>5X RDL	0.43	<0.43	no	0.43	<0.43	no
4-ethyltoluene	µg/m³	>5X RDL	2.5	<2.5	no	2.5	2.80	no
1,3,5-Trimethylbenzene	µg/m³	>5X RDL	2.5	<2.5	no	2.5	3.50	no
1,2,4-Trimethylbenzene	µg/m³	>5X RDL	2.5	2.6	no	2.5	11.40	no
Chlorobenzene	µg/m³	>5X RDL	0.46	<0.46	no	0.46	<0.46	no
Benzyl chloride	µg/m³	>5X RDL	2.6	<2.6	no	2.6	<2.6	no
1,3-Dichlorobenzene	µg/m³	>5X RDL	2.4	<2.4	no	2.4	4.60	no
1,4-Dichlorobenzene	µg/m³	>5X RDL	0.6	<0.60	no	0.6	1.31	no
1,2-Dichlorobenzene	µg/m³	>5X RDL	0.6	<0.60	no	0.6	<0.60	no
1,2,4-Trichlorobenzene	µg/m³	>5X RDL	3.7	<3.7	no	3.7	<3.7	no
Hexachlorobutadiene	µg/m³	>5X RDL	5.3	<5.3	no	5.3	<5.3	no
Hexane	µg/m³	>5X RDL	1.1	3.4	no	1.1	2.40	no
Heptane	µg/m³	>5X RDL	1.2	1.4	no	1.2	<1.2	no
Cyclohexane	µg/m³	>5X RDL	0.69	<0.69	no	0.69	<0.69	no
Tetrahydrofuran	µg/m³	>5X RDL	1.2	<1.2	no	1.2	<1.2	no
1,4-Dioxane	µg/m³	>5X RDL	3.6	<3.6	no	3.6	<3.6	no
Naphthalene	µg/m³	>5X RDL	2.6	<2.6	no	2.6	<2.6	no
Total Xylenes	µg/m³	>5X RDL	1.3	9.6	**yes**	1.3	21.70	**yes**
1,1,1,2-Tetrachloroethane	µg/m³	>5X RDL	0.69	<0.69	no	0.69	<0.69	no
Vinyl Bromide	µg/m³	>5X RDL	0.87	<0.87	no	0.87	<0.87	no
Propene	µg/m³	>5X RDL	1.5	<1.5	no	1.5	<2.6	no
2,2,4-Trimethylpentane	µg/m³	>5X RDL	0.93	<0.93	no	0.93	<0.93	no
Carbon Disulfide	µg/m³	>5X RDL	1.6	13.5	**yes**	1.6	26.80	**yes**
Vinyl Acetate	µg/m³	>5X RDL	0.7	<0.70	no	0.7	<0.70	no
F1-BTEX, C6-C10 (as Toluene)	µg/m³	>5X RDL	5	439.0	**yes**	5	424.0	**yes**
F2, C10-C16 (as Decane)	µg/m³	>5X RDL	5	563.0	**yes**	5	6,090.0	**yes**

Notes:
Bold/Underlined - value exceeds alert limit
BTEX - benzene, toluene, ethylbenzene, xylenes
F1, F2 - petroleum hydrocarbon fractions 1 and 2
NA - not analyzed
n/c - not calculated
RDL - reportable detection limit
RPD - relative percent difference
µg/m³ - micrograms per cubic metre
> - greater than
< - less than
RPD is not calculated if either the original or field duplicate sample has a result of less than 5X the RDL

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October 2, 2017

Mr. John Koo
Imperial Oil Limited
505 Quarry Park Blvd S.E.
Calgary, Alberta
T2C 5N1

Groundwater Monitoring Program – 1660 Merivale Road, Ottawa, Ontario
TSSA Service Request # 791084

Dear Mr. Koo,

Thank you for submitting the following reports:

- *"Supplemental Phase II Environmental Assessment – 1660 Merivale Road, Ottawa, Ontario"*, prepared by EXP, dated November 20, 2014;
- *"2014 Groundwater Monitoring and Sampling Program Report, Site Address: 1660 Merivale Road, Ottawa, Ontario"*, prepared by exp Energy Services Ltd. (EXP), dated October 8, 2014;
- "*Interim Contaminant Management Plan, 1660 Merivale Road, Ottawa, Ontario"*, prepared by EXP, dated April 2, 2015; and

The November 2014 Supplemental Phase II ESA report provides the following information:

- Three (3) boreholes (TH100 to TH102) were advanced to a maximum depth of approximately 5.0 mbgs from September 16 to 19, 2014. The boreholes were advanced along the road allowance of Merivale Road (TH102 and TH101) and along the road allowance of Viewmount Drive (TH100). The boreholes were advanced in the bedrock.
- EXP selected the MOE Table 3 SCS for industrial/commercial/community property use in a non-potable groundwater condition with medium to fine textured soils as being applicable for use at this site.
- Three (3) soil samples (one collected from each borehole) were submitted to Maxxam for laboratory analysis of BTEX, PHC F1-F4, methyl-t-butyl-ether (MTBE), hexane and lead. The analytical results of the submitted soil samples were reported by EXP to be below the selected MOE Table 3 SCS for all analyzed parameters
- The three (3) newly installed monitoring wells (TH100 to TH102) and five previously installed monitoring wells ((TH8, TH9, TH10, TH11 and TH12) were monitored on October 6, 2013 for depth to groundwater, petroleum vapour concentrations and presence or absence of LPH.
- The depth to groundwater ranged from 2.75 mbgs (TH12) to 3.60 mbgs (TH100). The groundwater flow direction was interpreted to be towards southwest.
- Headspace vapour concentrations ranged from 200 ppm (in TH100) to 100% LEL (in TH9). LPH was not detected in any monitoring wells.
- Groundwater samples were collected from the four (4) offsite monitoring wells (TH9, TH100, TH101 and TH102) on October 6, 2014. The groundwater samples were submitted to Maxxam for laboratory analysis of BTEX, PHC F1-F4, MTBE, Hexane and lead. The analytical results of the submitted groundwater samples were reported by EXP to be above the selected MOE Table 3 SCS for concentrations of one or more of PHC F1-F3 with the exception of the sample collected from TH100, which satisfied the selected MOE Table 3 SCS.

The October 2014 groundwater monitoring report provides the following information:

- Seven (7) onsite monitoring wells (TH1 through TH7) were monitored on August 26, 2014 for depth to groundwater, petroleum vapour concentrations and presence or absence of liquid petroleum hydrocarbon (LPH).
- EXP selected the Ontario Ministry of the Environment (MOE) Table 3 full depth generic Site Condition Standards (SCS) for industrial/commercial/community property use in a non-potable groundwater condition with medium to fine textured soils as being applicable for use at this site.
- The depth to groundwater ranged from 3.03 mbgs (in TH4) to 4.05 mbgs (in TH7). The groundwater flow direction was interpreted to be southeasterly.
- Headspace vapour concentrations ranged from non-detect (at various locations) to 30% lower explosive limit of hexane (LEL) (in TH4).
- LPH was not detected in any monitoring wells.
- Groundwater samples were collected from the seven (7) onsite monitoring wells (TH1 through TH7) on August 26-27, 2014. The groundwater samples were submitted to Maxxam Analytics Inc. (Maxxam), an accredited laboratory by the Canadian Association for Laboratory Accreditation Inc. (CALA). Groundwater samples were submitted for laboratory analysis of benzene, toluene, ethylbenzene, xylenes (BTEX), petroleum hydrocarbon fractions F1 to F4 (PHC F1-F4), Hexane and lead.
- The analytical results of the submitted groundwater samples were reported by EXP to be below the selected MOE Table 3 SCS for all analyzed parameters with the exception of the samples collected from TH3, TH4, TH5 and TH7, which exceeded for concentrations of one or more of benzene, and/or PHC F1-F2.

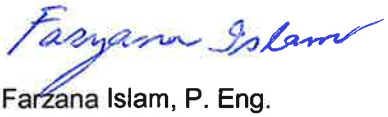
The April 2015 Contaminant Management Plan (CMP) proposes the following:

- On an annual basis, the onsite monitoring wells (TH1 to TH7) and the offsite monitoring wells (TH8 to TH12 and TH100 to TH102) will be monitored for depth to groundwater, subsurface vapour concentrations and presence or absence of LPH.
- On an annual basis, the onsite monitoring wells (TH1 to TH7) and the offsite monitoring wells (TH8 to TH12 and TH100 to TH102) will be sampled for BTEX and PHC F1-F4.
- On an annual basis, a report summarizing the findings from the onsite monitoring wells will be submitted to the TSSA.
- On an annual basis, a report summarizing the findings from the offsite monitoring wells will be submitted to the TSSA and the City of Ottawa (the City). TSSA will be copied on all correspondence with the municipality.
- Up to three additional test holes are to be installed to further delineate the offsite ground water impacts to the north and east of the subject property. The completion of this work will depend on the access permission from the third party.
- Up to two additional test holes are to be installed to further delineate the ground water impacts to the south of TH7. The completion of this work has been planned for 2015.

Our review of the information provided in the 2014 reports indicates that the petroleum hydrocarbon (PHC) impacts identified in groundwater at the locations of onsite monitoring well TH7 and at the locations of offsite monitoring wells TH9, TH101 and TH102 have not been completely delineated. We understand that further groundwater impact delineation work was planned to be completed in 2015. The delineation work on the City of Ottawa's right-of-way is pending the access permission and the City's concurrence to the offsite CMP proposal. We understand that additional investigation and further groundwater monitoring program was carried out at the site in 2015, 2016 and in 2017. Our comments will be provided under a separate letter that will follow.

Should you have any further questions, please do not hesitate to contact me directly.

Yours truly,



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October 2, 2017

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Tank Replacement Program – 1660 Merivale Road, Ottawa, Ontario
TSSA Service Request # 791084

Dear Mr. Scott,

Thank you for submitting the following reports:

- "*Phase II Environmental Assessment – 1660 Merivale Road, Ottawa, Ontario*", prepared by exp Energy Services Ltd. (EXP), dated December 5, 2013;
- "*2013 Ground Water Monitoring and Sampling Program Report, 1660 Merivale Road, Ottawa, Ontario*", prepared by EXP, dated July 22, 2013.

The December 2013 Phase II ESA report provides the following information:

- Five (5) boreholes (TH8 to TH12) were advanced to a maximum depth of approximately 5.0 metres below ground surface (mbgs) between August 28 and 33, 2012. Two boreholes (TH8 and TH9) were advanced along the road allowance of Merivale Road and three boreholes were advanced along the road allowance of Viewmount Drive. All boreholes were completed as monitoring wells.
- The boreholes were advanced in the bedrock. The boreholes were daylighted to a maximum depth of approximately 2.1 mbgs using a hydrovacuum truck.
- Six (6) soil samples (one collected from each borehole) were submitted to Maxxam Analytics Inc. (Maxxam), an accredited laboratory by the Canadian Association for Laboratory Accreditation Inc. (CALA). Soil samples were submitted for laboratory analysis of benzene, toluene, ethylbenzene, xylenes (BTEX), petroleum hydrocarbon fractions F1 to F4 (PHC F1-F4), polycyclic aromatic hydrocarbons (PAHs) and lead.
- EXP selected the Ontario Ministry of the Environment (MOE) Table 3 full depth generic Site Condition Standards (SCS) for industrial/commercial/community property use in a non-potable groundwater condition with medium to fine textured soils as being applicable for use at this site.
- The analytical results of the submitted soil samples were reported by EXP to be below the selected MOE Table 3 SCS for all analyzed parameters.
- One coring water sample (W1) was also submitted to Maxxam for laboratory analysis of BTEX, hexane and PHC F1-F4. The analytical results of the submitted water sample were reported by EXP to be below the selected MOE Table 3 SCS for all analyzed parameters.
- The newly installed monitoring wells were monitored on June 10, 2013 for depth to groundwater, petroleum vapour concentrations and presence or absence of liquid petroleum hydrocarbon (LPH).
- The depth to groundwater ranged from 2.75 mbgs (TH12) to 3.03 mbgs (TH10). The groundwater flow direction was interpreted to be southerly.
- Headspace vapour concentrations ranged from 50 parts per million (ppm) to 18% lower explosive limit of hexane (LEL). LPH was not detected in any monitoring wells.
- Groundwater samples were collected from the four (4) offsite monitoring wells (TH8, TH10, TH11 and TH12) on June 10-11, 2013. The groundwater samples were submitted to Maxxam for

laboratory analysis of BTEX and PHC F1-F4. The analytical results of the submitted groundwater samples were reported by EXP to be above the selected MOE Table 3 SCS for concentrations of PHC F1-F2 with the exception of the sample collected from TH8, which satisfied the selected MOE Table 3 SCS.

The July 2013 Onsite groundwater monitoring report provides the following information:

- Seven (7) onsite monitoring wells (TH1 through TH7) were monitored on June 12, 2013 for depth to groundwater, petroleum vapour concentrations and presence or absence of LPH.
- The depth to groundwater measured in the monitoring wells ranged from 3.49 mbgs (in TH1) to 3.06 mbgs (in TH3). The groundwater flow direction was not interpreted to be south.
- Headspace vapour concentrations ranged from non-detect to 290 ppm in TH5.
- LPH was not detected in any monitoring wells.
- EXP selected the Ontario Ministry of the Environment (MOE) Table 3 full depth generic Site Condition Standards (SCS) for all types of property use in a non-potable groundwater condition, and medium to fine textured soils as being applicable for use at this site.
- Groundwater samples were collected from the seven onsite monitoring wells (TH1 through TH7) on June 13, 2013. The groundwater samples were submitted to Maxxam for laboratory analysis of BTEX, PHC F1-F4, Hexane and lead.
- The analytical results of the submitted groundwater samples were reported by Golder to be below the selected MOE Table 3 SCS for all analyzed parameters with the exception of the samples collected from TH3, TH4, TH5 and TH7, which exceeded for concentrations of one or more of benzene, xylenes, PHC F1-F4.

Our review of the above information indicates that the petroleum hydrocarbon (PHC) impacts identified in groundwater at the locations of onsite monitoring well TH7 and at the locations of offsite monitoring wells TH10, TH11 and TH12 have not been delineated. We understand that additional investigation and further groundwater monitoring program was carried out at the site in 2014, 2015, 2016 and 2017. Our comments will be provided under a separate letter that will follow.

Should you have any further questions, please do not hesitate to contact me directly.

Yours truly,

Farzana Islam

Farzana Islam, P. Eng.
Fuels Safety Program
Tel.: 416-734-3598
Fax: 416-231-7525
Email: fislam@tssa.org

May 19, 2017

Project No. 1669090-1155

THIS REPORT CONTAINS PROVISIONS LIMITING LIABILITY, THE SCOPE OF THE REPORT AND THIRD PARTY RELIANCE

These documents and the information contained therein are confidential property of Imperial Oil Limited and any disclosure of same is governed by the provisions of each of the applicable provincial and territorial freedom of information legislation, the Privacy Act (Canada) 1980-81-83, c.111, Sch. II"1", and the Access to Information Act (Canada) 1980-81-82-83, c.111, Sch.I"1", as such, legislation may be amended from time to time.

City of Ottawa
110 Laurier Avenue West, 5th Floor West
Ottawa, ON
K1P 1J1

ADJACENT TO 1660 MERIVALE ROAD, OTTAWA, ON

CONTAMINANT MANAGEMENT PLAN

Mr. Richard Barker

Introduction

Golder Associates Ltd. (Golder) was retained by Imperial Oil Limited (Imperial) to prepare a Contaminant Management Plan (CMP) for the property located at 1660 Merivale Road, Ottawa, Ontario. For the purpose of this letter, the Site is considered the lands adjacent to the property located at 1660 Merivale Road, owned by the City of Ottawa and forms part of the municipal rights of way (ROW) along Merivale Road (the Site). This letter documents the scope of the CMP as it pertains to the municipal ROW. A Site location and layout plan is provided as Figures 1 – 3.

The CMP is proposed in accordance with the Technical Standards and Safety Authority (TSSA) document: *Environmental Management Protocol for Fuel Handling Sites in Ontario* (EMP), August 2012.

Limitation of Liability, Scope of Report, and Third Party Reliance is included in this report.

Background

Golder and others have carried out a series of Environmental Site Assessment (ESA) and monitoring investigations at 1660 Merivale Road and the adjacent ROW. The following reports that have been prepared by Golder or others are pertinent, documenting site assessment activities at the Site:

- Phase II Environmental Site Assessment Adjacent to 1660 Merivale Road, Ottawa, ON. Report prepared by exp Energy Services Ltd., dated December 5, 2013.
- Supplemental Phase II Environmental Site Assessment Adjacent to 1660 Merivale Road, Ottawa, ON. Report prepared by exp Energy Services Ltd., November 20, 2014.
- Screening Level Risk Assessment, Right-of-way Adjacent to 1660 Merivale Road, Ottawa, ON (SAP No. 88001627). Report prepared by Golder, dated May 3, 2016
- 2015 Groundwater Monitoring and Sampling Report, Adjacent to 1660 Merivale Road, Ottawa, ON (SAP No. 88001627), Report prepared by Golder, dated May 6, 2016.

Golder Associates Ltd.
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Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

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- 2016 Groundwater Monitoring and Sampling Report, Adjacent to 1660 Merivale Road, Ottawa, ON (SAP No. 88001627). Report prepared by Golder, dated November 21, 2016.

Based on the results of the environmental assessments (ESAs) completed at the Site by exp Energy Services Ltd. (exp) and Golder, exceedances of petroleum hydrocarbon (PHC) fractions F1 to F4 in groundwater were identified within the RoW. These soil and groundwater analytical results were compared against the MOECC Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Commercial/ Industrial/Community Property Use, coarse-textured soil, April 15, 2011 for soil and all types of property use for groundwater (Table 3 Standards).

Phase II ESA Adjacent to 1660 Merivale, exp, 2013

A Phase II ESA was carried out by exp and included installation of five monitoring wells (TH8 to TH12) including soil and groundwater sampling. No soil concentrations for petroleum hydrocarbons (PHC) fractions F1 to F4, select polycyclic aromatic hydrocarbons (PAHs), hexane and lead exceeded the Table 3 Standards. Groundwater samples from three monitoring wells (TH10, TH11 and TH12) were analysed for PHC F1 to F4, hexane and lead. Groundwater concentrations exceeded the Table 3 Standards for PHC fractions F1 and F2. A groundwater sample was not collected from TH9. The remaining groundwater samples reported concentrations below the Table 3 Standards.

Supplemental Phase II ESA Adjacent to 1660 Merivale, exp, 2014

A supplemental Phase II ESA was carried out by exp and included installation of three monitoring wells (TH100 to TH102) including soil and groundwater sampling. No soil concentrations for PHC fractions F1 to F4, hexane, methyl tert-butyl ether (MTBE) and lead exceeded the Table 3 Standards. Groundwater samples from four monitoring wells (TH9, TH100, TH101 and TH102) were analysed for PHC F1 to F4, hexane, MTBE and lead. Groundwater concentrations exceeded the Table 3 Standards for one or more of PHC fractions F1 to F3 at TH9, TH101 and TH102. The remaining groundwater samples reported concentrations below the Table 3 Standards.

Screening Level Risk Assessment, Right-of-way Adjacent to 1660 Merivale Road, Golder, 2016

A screening level risk assessment (SLRA) was conducted to identify whether there are potential risks to human and ecological receptors within the RoW associated with the presence of PHC impacts in groundwater. For the purposes of the SLRA, only receptors present within the RoW were considered. After screening these contaminants of concern (COCs) against their respective applicable human health MOECC Table 3 component values, no COCs were retained for further consideration and no risks were identified for human receptors. Pathways for ecological receptors were considered to be incomplete; therefore, no risks were identified.

2015 Groundwater Monitoring and Sampling, Golder, 2016

A groundwater monitoring and sampling investigation was carried out by Golder including monitoring and sampling groundwater at seven monitoring wells (TH8, TH9, TH11, TH12 and TH100 to TH102), no groundwater sample was collected from TH10. Groundwater samples were analysed for PHC F1 to F4, hexane and lead. Groundwater concentrations exceeded the Table 3 Standards for one or more of PHC fractions F1 to F4 at TH9, TH11, TH12, TH101 and TH102. The remaining groundwater samples reported concentrations below the Table 3 Standards.

2016 Groundwater Monitoring and Sampling, Golder, 2016

A groundwater monitoring and sampling investigation including decommissioning of TH10 and replacing it as MW16-01 was carried out by Golder. Groundwater was sampled at eight monitoring wells (TH8, TH9, TH11, TH12, TH100 to TH102 and MW16-01). Groundwater samples were analysed for PHC F1 to F4, hexane and lead.

Groundwater concentrations exceeded the Table 3 Standards for one or more of PHC fractions F1 to F4 at TH9, TH11, TH12, TH101 and TH102. The remaining groundwater samples reported concentrations below the Table 3 Standards.

Proposed Contaminant Management Plan

In accordance with the TSSA EMP, Imperial will continue to manage the petroleum-related impacts per the following proposed CMP:

- Off-Site monitoring wells (MW16-01, TH8, TH9, TH11, TH12, TH100 to TH102) will be monitored for subsurface vapour concentrations, depth to groundwater level and the presence of LNAPL on an annual basis.
- Sampling of off-Site monitoring wells (MW16-01, TH8, TH9, TH11, TH12, TH100 to TH102) for petroleum related parameters (BTEX, PHC F1-F4 and lead) on an annual basis.
- Preparation of one annual report including the analytical results to be provided to the City of Ottawa.

Rationale for Proposed Contaminant Management Plan

The following rationale is provided for the above noted CMP:

Extent and severity of Petroleum-related Contamination

- Based on the findings of previous assessments, the full extent of off-Site soil petroleum related impacts in the overburden soil have been delineated. Parameters analyzed at the extent of the contaminant plume were below the Table 3 Standards or not detected.
- The full extent of off-Site petroleum related impacts in groundwater has not been delineated to the north and east. Off-Site groundwater impacts at TH8, MW16-01 and TH100 have been delineated to the north and northeast. Off-site impacts at TH9, TH11, TH12, TH101 and TH102 have been evaluated as part of a SLRA and the petroleum related parameters exceeding the applicable Table 3 Standards are considered to not pose risk to human receptors and pathways for ecological receptors were considered to be incomplete; therefore, no risks were identified. LNAPL has not been detected in the monitoring wells investigated.
- Due to the direction of groundwater flow, towards the property at 1660 Merivale road, the exceedances noted in the ROW are considered up- or cross gradient from the property at 1660 Merivale road. No further investigation of this exceedance is currently proposed.

Acknowledgement from off-Site Property Owners

The City of Ottawa is hereby being notified of the environmental conditions in the public right of way adjacent to the property at 1660 Merivale Road, including our proposal to implement the CMP as it pertains to the public right of way.

We request that you provide written acknowledgement of the CMP proposed to be implemented.

Limitation of Liability, Scope of Report and Third Party Reliance

This report has been prepared and the work referred to in this report has been undertaken by Golder Associates Ltd. for Imperial Oil Limited. It is intended for the sole and exclusive use of Imperial Oil Limited, its affiliated companies and partners and their respective insurers, agents, employees and advisors (collectively, Imperial Oil). Any use, reliance on or decision made by any person other than Imperial Oil based on this report is the sole responsibility of such other person. Imperial Oil and Golder Associates Ltd. make no representation or warranty to any other person with regard to this report and the work referred to in this report and they accept no duty of care to any other person or any liability or responsibility whatsoever for any losses, expenses, damages, fines, penalties or other harm that may be suffered or incurred by any other person as a result of the use of, reliance on, any decision made or any action taken based on this report or the work referred to in this report.

The investigation undertaken by Golder Associates Ltd. with respect to this report and any conclusions or recommendations made in this report reflect Golder Associates Ltd.'s judgement based on the site conditions observed at the time of the site inspection on the date(s) set out in this report and on information available at the time of preparation of this report. This report has been prepared for specific application to this site and it is based, in part, upon visual observation of the site, subsurface investigation at discrete locations and depths, and specific analysis of specific chemical parameters and materials during a specific time interval, all as described in this report. Unless otherwise stated, the findings cannot be extended to previous or future site conditions, portions of the site which were unavailable for direct investigation, subsurface locations which were not investigated directly, or chemical parameters, materials or analysis which were not addressed. Substances other than those addressed by the investigation described in this report may exist within the site, substances addressed by the investigation may exist in areas of the site not investigated and concentrations of substances addressed which are different than those reported may exist in areas other than the locations from which samples were taken.

If site conditions or applicable standards change or if any additional information becomes available at a future date, modifications to the findings, conclusions and recommendations in this report may be necessary.

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Closure

We trust this letter provides you with sufficient information at this time, if you have further questions regarding this letter, please contact the undersigned.

GOLDER ASSOCIATES LTD.

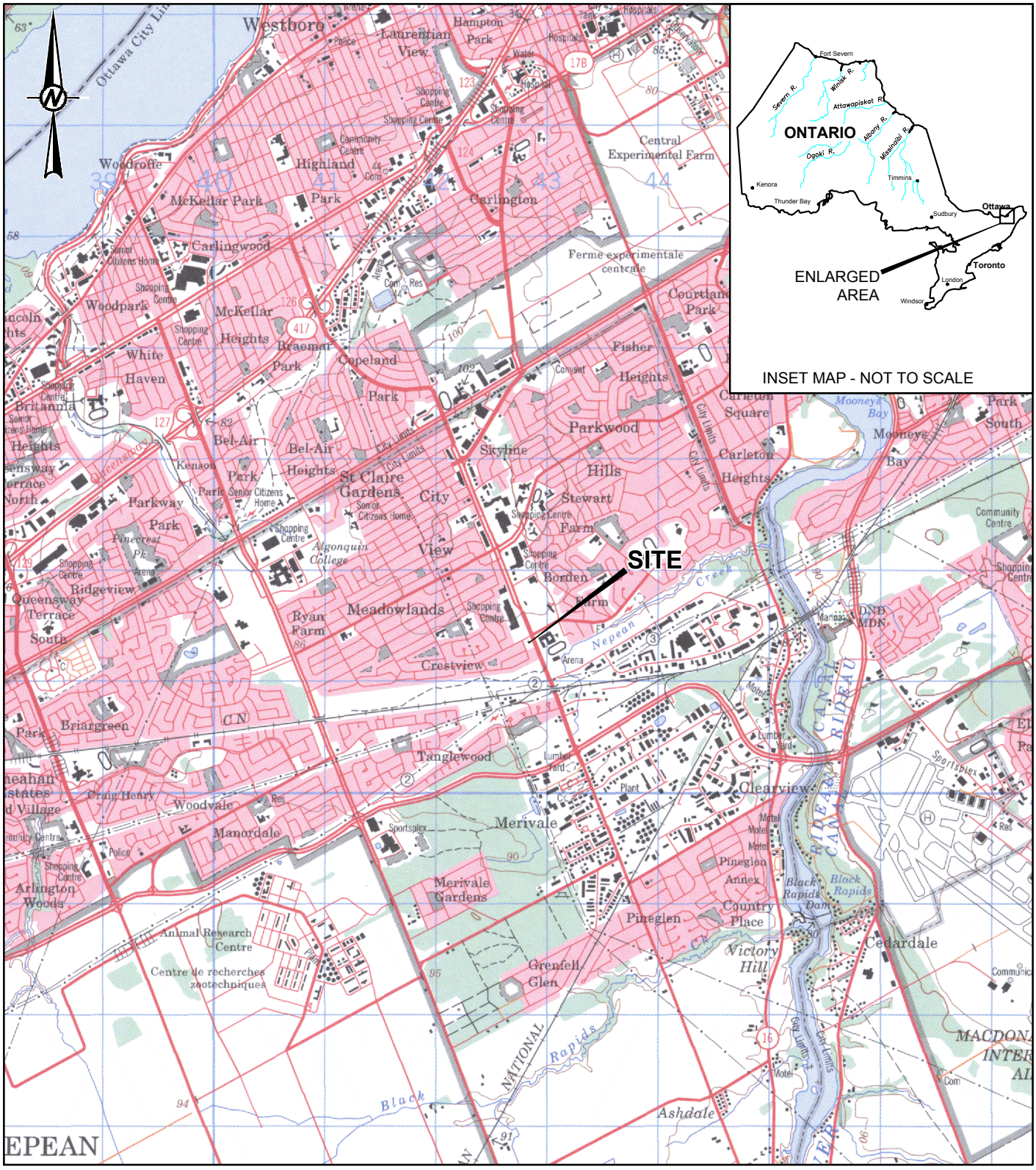
Leon Burger, B.Sc. Hons, P.Geo.
Environmental Scientist, Project Manager

Sandra Carrelas, M.Sc., P.Eng.
Associate, Senior Environmental Engineer

LB/lb/nb

Attachments: Figures

https://capws.golder.com/sites/ont1100to1195iolontario/phases and tasks/1155/2016 - reporting/off site cmp to city/1155 off site 1660 merivale rd ottawa cmp may 2017.docx



INSET MAP - NOT TO SCALE

REFERENCE

TOPOGRAPHIC MAP 31G/05 OBTAINED FROM Canmatrix. © 1998 HER MAJESTY THE QUEEN IN RIGHT OF CANADA. DEPARTMENT OF NATURAL RESOURCES. PROJECTION: TRANSVERSE MERCATOR; DATUM: NAD83; COORDINATE SYSTEM: UTM ZONE 18.

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CLIENT
IMPERIAL OIL LIMITED

CONSULTANT
Golder Associates

YYYY-MM-DD	2016-11-21
DESIGNED	BMcParlan
PREPARED	AMehdilou
REVIEWED	BMcParlan
APPROVED	SCarrelas

PROJECT
ADJACENT TO
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
TOPOGRAPHIC MAP

PROJECT NO.	PHASE-TASK	REV.	FIGURE
1544125	1155-2016	0	1

Path: ---- | File Name: 1544125-1155-1001.dwg

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A

0 25 mm



REFERENCE

IMAGE OBTAINED FROM GOOGLE EARTH © 2015 GOOGLE INC. USED WITH PERMISSION.
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IMAGERY DATE: SEPTEMBER 24, 2013. GOOGLE EARTH IMAGE IS NOT TO SCALE.
NAD83, PROJECTION: UTM ZONE 18.

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No.: 11010-SITE PLAN OFFSITE-OCT14; SCALE: UNKNOWN; DATE: AUGUST 2014.

0 50 100
(APPROX.) METRES

CLIENT
IMPERIAL OIL LIMITED

CONSULTANT
Golder Associates

YYYY-MM-DD	2016-11-21
DESIGNED	BMcParlan
PREPARED	AMehdilou
REVIEWED	BMcParlan
APPROVED	SCarrelas

PROJECT
ADJACENT TO
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
SITE LOCALITY MAP

PROJECT NO.	PHASE-TASK	REV.	FIGURE
1544125	1155-2016	0	2

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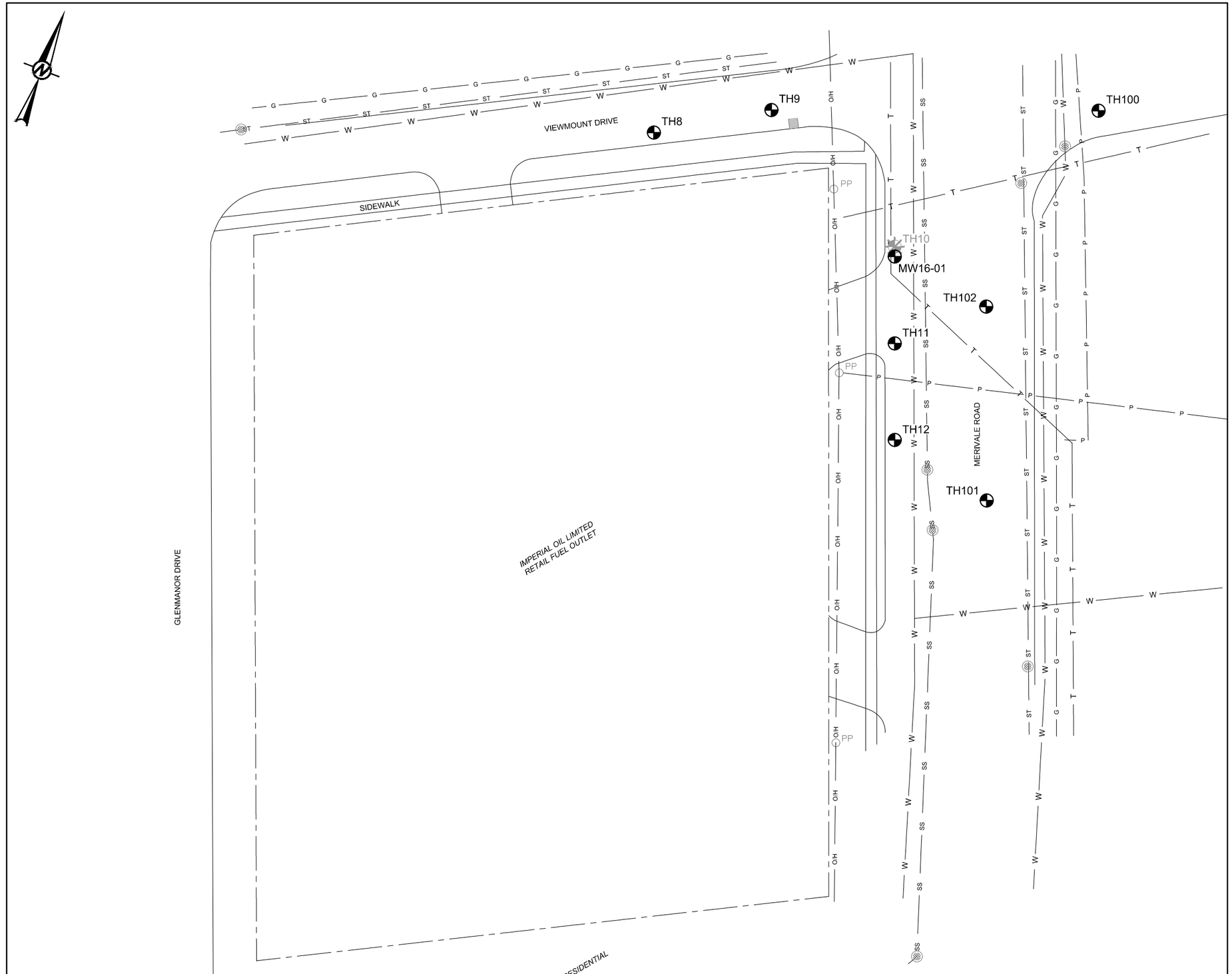

LEGEND

- PROPERTY BOUNDARY
- O/H — OVERHEAD POWER LINE
- G — UNDERGROUND GAS LINE
- P — UNDERGROUND POWER LINE
- SS — UNDERGROUND SANITARY LINE
- ST — UNDERGROUND STORM SEWER LINE
- T — UNDERGROUND TELEPHONE LINE
- W — UNDERGROUND WATERLINE
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL (DECOMMISSIONED)
- CATCH BASIN
- MANHOLE
- PP — POWER POLE

REFERENCE

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No.: 11010-SITE PLAN OFFSITE-OCT14; SCALE: UNKNOWN; DATE: OCTOBER 2014.

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CLIENT
IMPERIAL OIL LIMITED

PROJECT
ADJACENT TO
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
SITE PLAN WITH MONITORING WELL LOCATIONS

CONSULTANT
Golder Associates

YYYY-MM-DD	2016-11-21
DESIGNED	BMcParlan
PREPARED	AMehdilou
REVIEWED	BMcParlan
APPROVED	SCarrelas

PROJECT NO.	PHASE-TASK	REV.	FIGURE
1544125	1155-2016	0	3

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January 31, 2017 Project No. 1544125-1155

Imperial Oil Limited
505 Quarry Park Boulevard SE
Calgary, Alberta, T2C 5N1

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2016 GROUNDWATER MONITORING AND SAMPLING REPORT
FORMER IMPERIAL OIL RETAIL FUEL OUTLET
1660 MERIVALE ROAD, OTTAWA, ONTARIO
SAP NO. 88001627

The Site location is presented in Figures 1 through 4.

GROUNDWATER MONITORING AND SAMPLING EVENT(S):

- August 9 and 10 and December 5, 2016.

SCOPE OF WORK

- Monitoring all 9 accessible on-Site groundwater monitoring wells for vapour concentrations, depth to groundwater and the thickness, if present, of Light Non-Aqueous Phase Liquid (LNAPL);
- Collecting groundwater samples from 9 on-Site monitoring wells using the low-flow sampling method for laboratory analysis of Benzene, Toluene, Ethylbenzene, Xylenes (BTEX), Petroleum Hydrocarbon (PHC) Fractions F1 to F4, hexane and lead;
- Comparing analytical chemistry data from the groundwater samples to the Ontario Ministry of the Environment and Climate Change (MOECC) standards considered to be applicable at the Site, Table 3 full depth generic site condition standards in a non-potable groundwater condition for medium and fine textured soils, for all types of property use from the MOECC document titled “Soil, Ground Water, and Sediment Standards for Use Under Part XV.1 of the *Environmental Protection Act,”* dated April 15, 2011 (hereafter referred to as the Table 3 Standards).

METHODOLOGY

Combustible Gas Detector Calibrations and Headspace Concentrations

- Headspace vapour concentrations were measured using an RKI Eagle® Combustible Organic Vapour Monitor (OVM) with methane elimination. The OVM was bump tested daily to 15% lower explosive limit using a hexane standard. If the bump test differed more than 10% from the known concentration, the OVM was adjusted to match the exact concentration of the calibration gas. Calibrations were logged at the start of each day.

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- Vapour concentrations were taken from inside each well casing by placing the OVM nozzle about 15 to 30 cm below the Top Of Casing (TOC). The OVM reading was taken immediately after the cap had been removed from the top of the monitoring well casing, in order to minimize the loss of volatiles from within the casing. The peak OVM reading was recorded.

Depth to Groundwater and LNAPL Thickness

- Depth to groundwater was measured and, if present, the thickness of LNAPL using an oil/water interface probe. If LNAPL is detected, then its presence is confirmed visually using a bailer. Prior to use in each well, the interface probe was cleaned using a phosphate-free detergent and water solution and rinsed with distilled water to minimize the potential for cross-contamination. Depth to groundwater measurements were taken from the TOC.

Low Flow Sampling

Groundwater samples were collected from 9 monitoring wells (TH1 to TH7, MW15-01 and MW15-02) using the low flow sampling technique. Groundwater was pumped from each well, at a rate of 0.1 to 1 L/min, using Waterra® High Density Polyethylene (HDPE) tubing connected to a peristaltic pump with a portion of silicone tubing. Routine water quality indicator parameters were measured during the pumping using a multi-parameter monitoring device and flow-through cell. The parameters measured included dissolved oxygen, electrical conductivity, pH, temperature and redox potential. Calibration of the multi-parameter monitoring device was completed as per the manufacturer's instructions. Purged water was collected in drums and removed from Site.

Twelve samples, including one duplicate sample, one field blank, one trip blank and nine groundwater samples were collected. TH1 was resampled on December 5, 2016.

Laboratory Analysis of Groundwater Samples

- The samples were submitted under chain-of-custody to Maxxam Analytics Inc. in Mississauga, Ontario, for analysis of BTEX, PHC Fractions F1 to F4, hexane and lead.
- Groundwater samples for BTEX, PHC Fraction F1 and hexane analysis were placed in 44-mL clear glass vials provided by the laboratory and preserved with sodium bisulphate as a microbial inhibitor. The groundwater samples for PHC Fraction F2 to F4 analysis were placed in 500-mL amber glass bottles and preserved with sodium bisulphate. Groundwater samples for dissolved lead parameters were placed in 250-mL plastic bottles that were field filtered and preserved with nitric acid.
- Sampling containers were preserved in ice-filled coolers and transported to Maxxam for chemical analysis.

RESULTS

Monitoring Well Headspace Vapour (Date; Range)

- August 9, 2016; Not detected to 85 parts per million by volume (Table 1).
- December 5, 2016; Not detected (Table 1).

LNAPL Occurrence (Date; Observations)

- August 9, 2016; Not detected in any of the monitoring wells (Table 1).
- December 5, 2016; Not detected in TH1 (Table 1).

Groundwater Monitoring (Date; Depth to Groundwater Range; Groundwater Direction)

- August 9, 2016; Depth to groundwater levels ranged from 2.50 to 4.17 metres below ground surface (mbgs) (Table1); South (Figure 4).
- December 5, 2016; Depth to groundwater at TH1 was 3.69 mbgs (Table 1). Groundwater flow direction not inferred due to water level being measured at only one well.

Groundwater Analytical Results (Date; Parameters; No. of wells)

- August 9, 2016; BTEX, PHC F1 to F4, hexane and lead; Exceedances of PHC F1, F2, F3 and/or F4 at four monitoring wells (Figure 5 and Table 2).
- December 5, 2016; BTEX, PHC F1 to F4 and lead; Non-detect at TH1 (Figure 5 and Table 2).

QUALITY ASSURANCE/QUALITY CONTROL

- Copies of the associated laboratory certificates of analysis are provided in Appendix A.
- Based on the data quality review, no data quality issue were identified that would have a material effect on the reliability of the data (Appendix B).

CLOSURE

We trust the information presented in this report meets your current requirements. Please contact the undersigned at (403) 299-5600 if you require additional information.

Yours truly,

GOLDER ASSOCIATES LTD.

Authored by:

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Project Coordinator

Reviewed by:

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PRACTISING MEMBER
2713
PROFESSIONAL GEOSCIENTIST
ONTARIO

Leon Burger, B.Sc. (Hons), P.Geo.
Project Manager

LICENSED PROFESSIONAL ENGINEER
S. CARRELAS
100012804
PROVINCE OF ONTARIO

Sandra Carrelas, M.E.Sc., P.Eng.
Associate, Project Director

Attachments: Statement of Limitations
Figures
Tables
Appendix A: Laboratory Certificates of Analysis and Data Quality Review Checklists
Appendix B: Quality Assurance/Quality Control

STATEMENT OF LIMITATIONS

This report has been prepared and the work referred to in this report has been undertaken by Golder Associates Ltd. for Imperial Oil Limited. It is intended for the sole and exclusive use of Imperial Oil Limited, its affiliated companies and partners and their respective insurers, agents, employees and advisors (collectively, Imperial Oil). Any use, reliance on or decision made by any person other than Imperial Oil based on this report is the sole responsibility of such other person. Imperial Oil and Golder Associates Ltd. make no representation or warranty to any other person with regard to this report and the work referred to in this report and they accept no duty of care to any other person or any liability or responsibility whatsoever for any losses, expenses, damages, fines, penalties or other harm that may be suffered or incurred by any other person as a result of the use of, reliance on, any decision made or any action taken based on this report or the work referred to in this report.

The investigation undertaken by Golder Associates Ltd. with respect to this report and any conclusions or recommendations made in this report reflect Golder Associates Ltd.'s judgement based on the site conditions observed at the time of the site inspection on the date(s) set out in this report and on information available at the time of preparation of this report. This report has been prepared for specific application to this site and it is based, in part, upon visual observation of the site, subsurface investigation at discrete locations and depths, and specific analysis of specific chemical parameters and materials during a specific time interval, all as described in this report. Unless otherwise stated, the findings cannot be extended to previous or future site conditions, portions of the site which were unavailable for direct investigation, subsurface locations which were not investigated directly, or chemical parameters, materials or analysis which were not addressed. Substances other than those addressed by the investigation described in this report may exist within the site, substances addressed by the investigation may exist in areas of the site not investigated and concentrations of substances addressed which are different than those reported may exist in areas other than the locations from which samples were taken.

If site conditions or applicable standards change or if any additional information becomes available at a future date, modifications to the findings, conclusions and recommendations in this report may be necessary.

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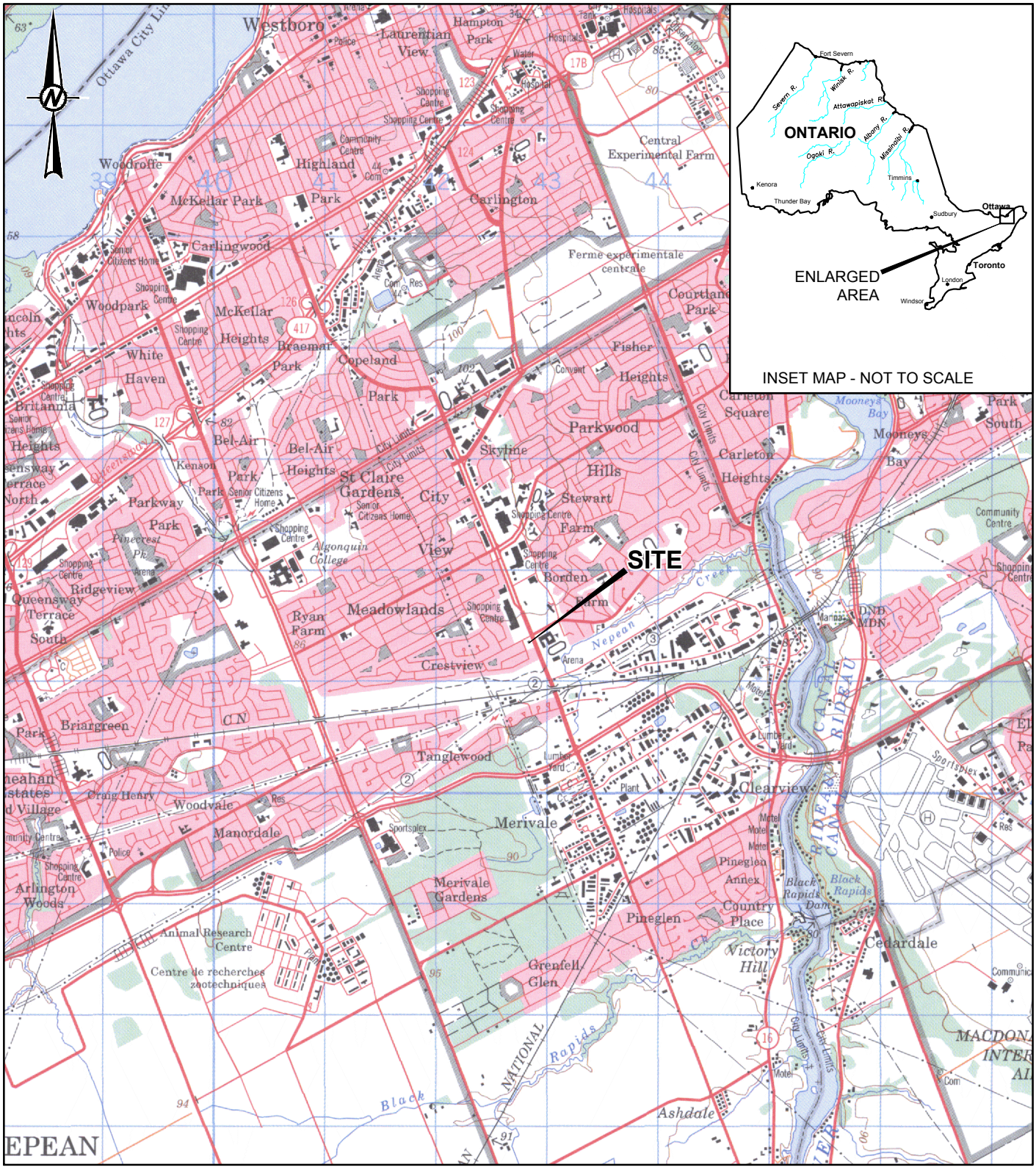
FIGURES



REFERENCE

TOPOGRAPHIC MAP 31G/05 OBTAINED FROM Canmatrix. © 1998 HER MAJESTY THE QUEEN IN RIGHT OF CANADA. DEPARTMENT OF NATURAL RESOURCES. PROJECTION: TRANSVERSE MERCATOR; DATUM: NAD83; COORDINATE SYSTEM: UTM ZONE 18.

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CLIENT
IMPERIAL OIL LIMITED

CONSULTANT
Golder Associates

YYYY-MM-DD	2017-01-31
DESIGNED	BMcParlan
PREPARED	AMehdilou
REVIEWED	LBurger
APPROVED	SCarrelas

PROJECT
ACTIVE RETAIL OUTLET
1660 MERIVALE ROAD
OTTAWA, ONTARIO

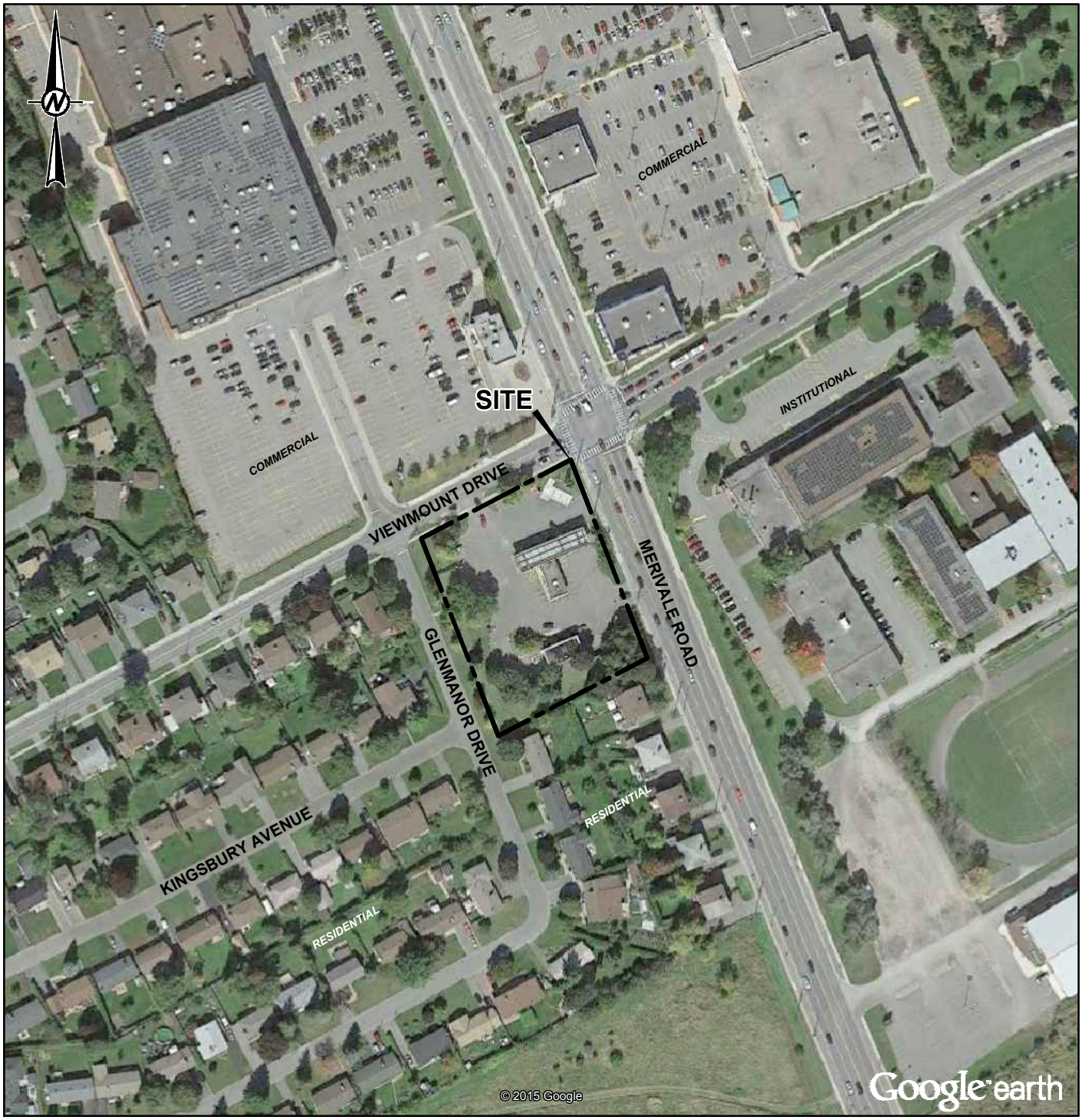
TITLE
TOPOGRAPHIC MAP

PROJECT NO.	PHASE-TASK	REV.	FIGURE
1544125	1155-2016	1	1

Path: \\golder.gds\gal\Windsor\Active\CAD\IMPERIAL_OIL\DOWNSTREAM\OTTAWA_ON_1660_MERIVALE_ROAD\99_PROJECTS\1544125\02_PRODUCTION\1155-2016\DWG\ONSITE\ | File Name: 1544125-1155-0001.dwg

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A

0 25 mm



LEGEND

PROPERTY BOUNDARY

REFERENCE

IMAGE OBTAINED FROM GOOGLE EARTH © 2015 GOOGLE INC. USED WITH PERMISSION.
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ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No.: 11010-SITE PLAN ONSITE-JUN14;
SCALE: UNKNOWN; DATE: JUNE 2014.

0 50 100
(APPROX.) METRES

CLIENT
IMPERIAL OIL LIMITED

PROJECT
ACTIVE RETAIL OUTLET
1660 MERIVALE ROAD
OTTAWA, ONTARIO

CONSULTANT
Golder Associates

YYYY-MM-DD	2017-01-31
DESIGNED	BMcParlan
PREPARED	AMehdilou
REVIEWED	LBurger
APPROVED	SCarrelas

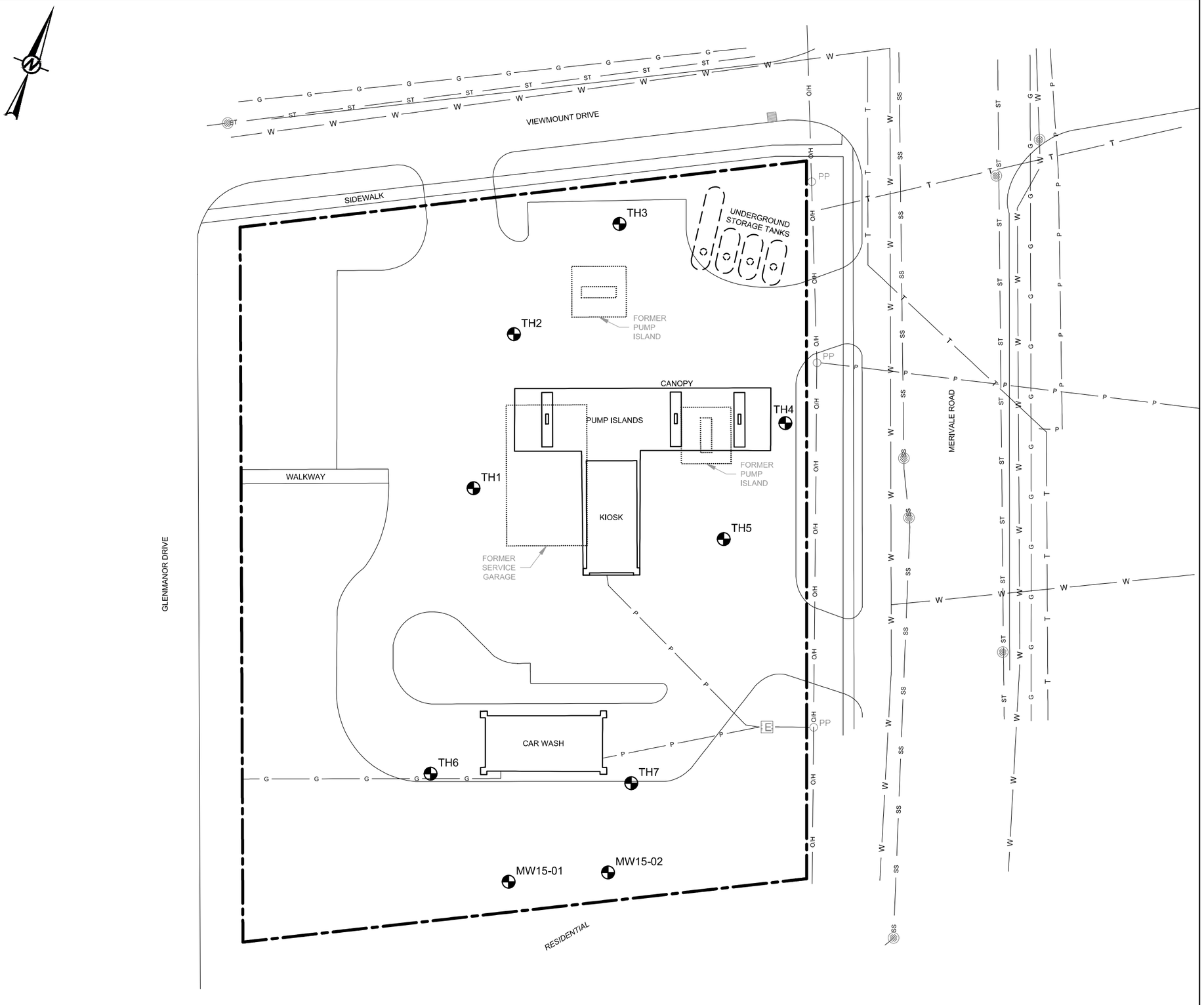
TITLE
SITE LOCALITY MAP

PROJECT NO.	PHASE-TASK	REV.	FIGURE
1544125	1155-2016	1	2

Path: ---- | File Name: 1544125-1155-0002.dwg

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A

0 25 mm



LEGEND

- PROPERTY BOUNDARY
- FORMER FACILITY
- O/H — OVERHEAD POWER LINE
- G — UNDERGROUND GAS LINE
- P — UNDERGROUND POWER LINE
- SS — UNDERGROUND SANITARY LINE
- ST — UNDERGROUND STORM SEWER LINE
- T — UNDERGROUND TELEPHONE LINE
- W — UNDERGROUND WATERLINE
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL
- CATCH BASIN
- ELECTRICAL PEDESTAL
- MANHOLE
- POWER POLE

REFERENCE

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No.: 11010-SITE PLAN ONSITE-JUN14; SCALE: UNKNOWN; DATE: JUNE 2014.

0 10 20
1:500 METRES

CLIENT
IMPERIAL OIL LIMITED

PROJECT
ACTIVE RETAIL OUTLET
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
SITE LOCATION WITH MONITORING WELL LOCATIONS

CONSULTANT
Golder Associates

YYYY-MM-DD	2017-01-31
DESIGNED	BMcParlan
PREPARED	AMehdilou
REVIEWED	LBurger
APPROVED	SCarrelas

PROJECT NO.	PHASE-TASK	REV.	FIGURE
1544125	1155-2016	1	3

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B
25 mm
0
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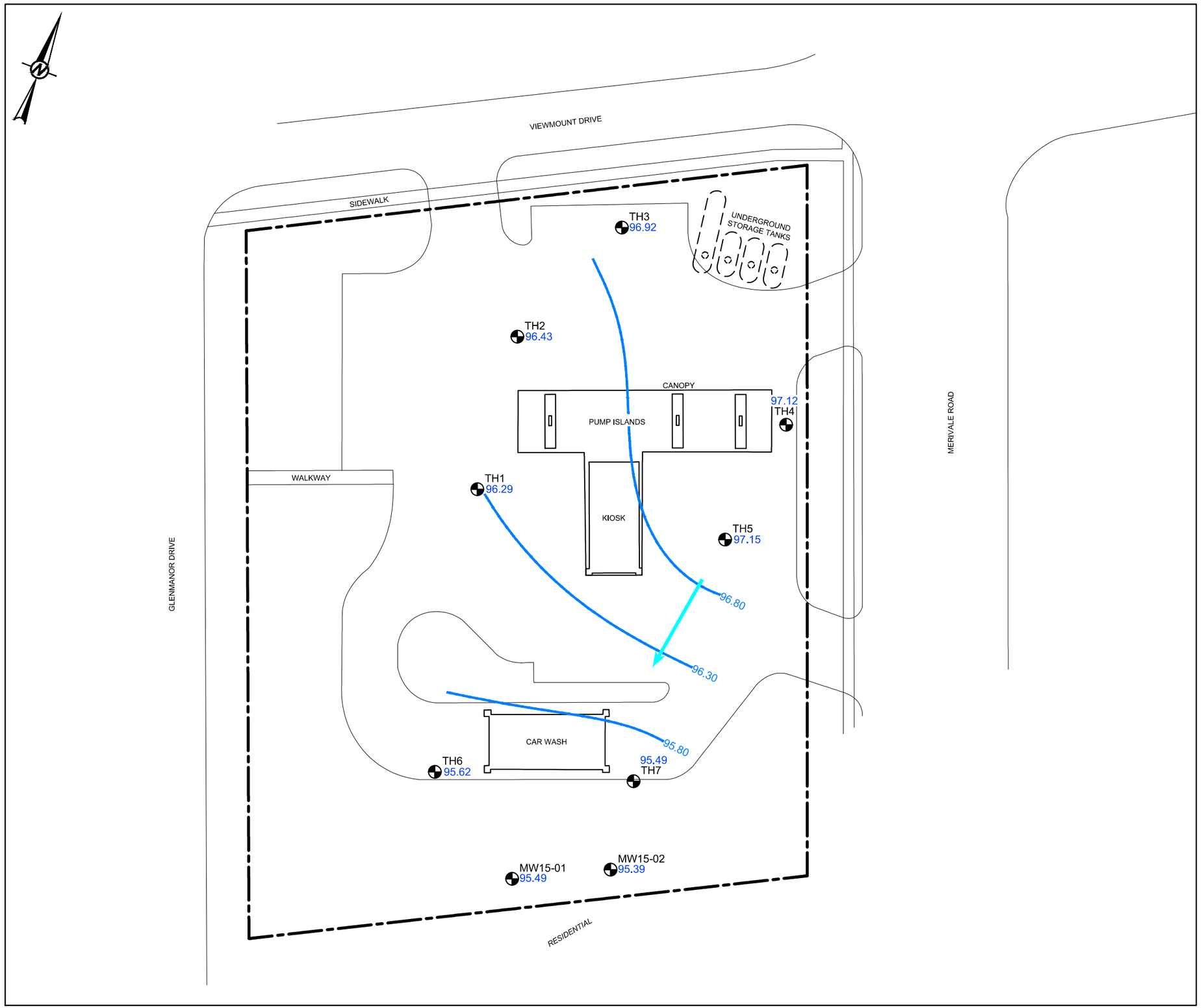


LEGEND

- PROPERTY BOUNDARY
- 96.80 GROUNDWATER CONTOUR (masl)
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL
- 96.92 GROUNDWATER ELEVATION (masl)
- DIRECTION OF GROUNDWATER FLOW

LIST OF APPLICABLE ABBREVIATIONS

m	METRE
masl	METRES ABOVE SEA LEVEL

NOTE

TH1 TO TH5 AND TH7 ELEVATIONS ARE RELATIVE TO LOCAL BENCHMARK (CENTRE OF STORM SEWER CATCH BASIN LOCATED APPROXIMATELY 5 METRES WEST OF KIOSK) ASSIGNED ELEVATION: 100.00 m (EXP 2013).

MW15-01, MW15-02 AND TH6 ELEVATIONS ARE RELATIVE TO LOCAL BENCHMARK (GROUND SURFACE AT TH7) ASSIGNED ELEVATION: 99.66 m (EXP 2013).

REFERENCE

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No.: 11010-SITE PLAN ONSITE-JUN14; SCALE: UNKNOWN; DATE: JUNE 2014.

0 10 20
1:500 METRES

CLIENT
IMPERIAL OIL LIMITED

PROJECT
ACTIVE RETAIL OUTLET
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
GROUNDWATER FLOW DIRECTION
August 9, 2016

CONSULTANT
Golder Associates

YYYY-MM-DD	2017-01-31
DESIGNED	BMcParlan
PREPARED	AMehdilou
REVIEWED	LBurger
APPROVED	SCarrelas

PROJECT NO.	PHASE-TASK	REV.	FIGURE
1544125	1155-2016	1	4

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25 mm

Path: ---- | File Name: 1544125-1155-0004.dwg

TH1 — Screen Interval: 2.6 to 5.6 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-11	<0.20	<0.20	<0.20	<0.40	<25	<100	<100	<100	<5.0	<0.50
13-Jun-13	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	0.53
26-Aug-14	<0.20	0.75	<0.20	1.2	<25	<100	<200	<200	<5.0	<0.50
17-Nov-15	<0.20	0.27	0.28	<0.40	<25	<100	<200	<200	<5.0	<0.50
10-Aug-16	<0.20	<0.20	<0.20	<0.40	<25	<100	300	1,200[IN]	<5.0	<0.50
5-Dec-16	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50

TH2 — Screen Interval: 3.2 to 4.7 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-11	0.77	<0.20	1.3	0.48	<25	<100	<100	<100	<5.0	<0.50
13-Jun-13	0.62	<0.20	2.2	<0.40	<25	<100	<200	<200	<5.0	<0.50
27-Aug-14	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
17-Nov-15	<0.20	0.29	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
9-Aug-16	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50

TH3 — Screen Interval: 3.2 to 4.7 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-11	27	2.4	79	150	1100	430	<100	130	20	3.8
31-Aug-11 (DUP)	23	2.1	69	130	1100	380	<100	110	17	3.9
13-Jun-13	11	0.61	66	85	900	350	<200	<200	<5.0	3.1
26-Aug-14	14	0.28	19	5.2	520	180	<200	<200	<5.0	2.2
28-Oct-15	25	<0.20	15	0.89	450	<100	<100	<200	<5.0	2.0
10-Aug-16	42	<0.20	26	1.5	560	110	<200	<200	<5.0	0.98

TH4 — Screen Interval: 3.4 to 4.9 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-11	610	610	3,400	19,000	26,000	17,000	360	170	540	2.6
13-Jun-13	200	35	1200	4,300	6,200	19,000	580	430	<100	5.8
26-Aug-14	500	37	1400	2600	4,700	1400	<200	<200	58	3.0
26-Aug-14 (DUP)	540	40	1600	2700	400	1400	<200	<200	62	1.9
17-Nov-15	180	18	560	930	1,900	940	240	230	<100	3.1
10-Aug-16 (DUP A)	190	9.7	490	1,400	1,600	400	210	<200	31	1.7
10-Aug-16	210	11	550	1,500	1,800	370	<200	<200	27	1.1

TH5 — Screen Interval: 3.5 to 5.0 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-11	750	140	3,000	13,000	85,000	20,000	690	620	1,400	5.5
13-Jun-13	530	44	1600	3800	9,900	160,000	12,000	6,800	<100	8.3
13-Jun-13 (DUP)	550	44	1600	3800	9,200	110,000	7,000	4,300	<100	8
27-Aug-14	450	46	1600	3100	11,000	2,800	<200	<200	210	4.1
17-Nov-15	360	26	930	1,300	3,300	2,900	320	240	<100	3.7
10-Aug-16	420	43	1,500	3,700	13,000	11,000	1,100	810	240	0.81

TH6 — Screen Interval: 3.6 to 5.1 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
20-Oct-11	<0.20	<0.20	<0.20	<0.40	<25	<100	<100	<100	<5.0	<0.50
20-Oct-11 (DUP)	<0.20	<0.20	<0.20	<0.40	<25	<100	<100	<100	<5.0	<0.50
13-Jun-13	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	0.6
27-Aug-14	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
28-Oct-15	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
9-Aug-16	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50

TH7 — Screen Interval: 4.4 to 5.8 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
14-Nov-11	31	5.4	160	340	430	<100	<100	<100	<30	<0.5
13-Jun-13	37	2.8	140	130	550	460	<200	<200	<5.0	3.2
27-Aug-14	150	18	610	730	1,900	540	<200	<200	22	2.1
28-Oct-15	93	8.4	270	300	1,000	280	<200	<200	<5.0	1.2
9-Aug-16	62	5.8	120	140	500	150	<200	<200	<5.0	<0.50

MW15-01 — Screen Interval: 3.0 to 6.0 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
17-Nov-15	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
9-Aug-16	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50

MW15-02 — Screen Interval: 2.7 to 4.9 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
17-Nov-15	44	5.9	180	170	2,300	750	<200	<200	35	2.2
9-Aug-16	78	4.7	73	25	800	450	<200	<200	5.5	<0.50

ONTARIO STANDARDS

PARAMETERS	B	T	E	X	F1	F2	F3	F4	HA	Pb
STANDARDS[a]	430	18,000	2,300	4,200	750[IC]	150	500	500	520	25
RDL	0.20	0.20	0.20	0.40	25	100	200	200	10	0.50

(a) O.REG 153 (2011) TABLE 3 FULL DEPTH GENERIC SITE CONDITION STANDARDS FOR ALL TYPES OF PROPERTY USE FOR GROUNDWATER IN MEDIUM AND FINE TEXTURED SOIL IN IN A NON-POTABLE GROUND WATER CONDITION.

LEGEND

PROPERTY BOUNDARY

BOREHOLE LOCATION COMPLETED AS A MONITORING WELL

LIST OF APPLICABLE ABBREVIATIONS

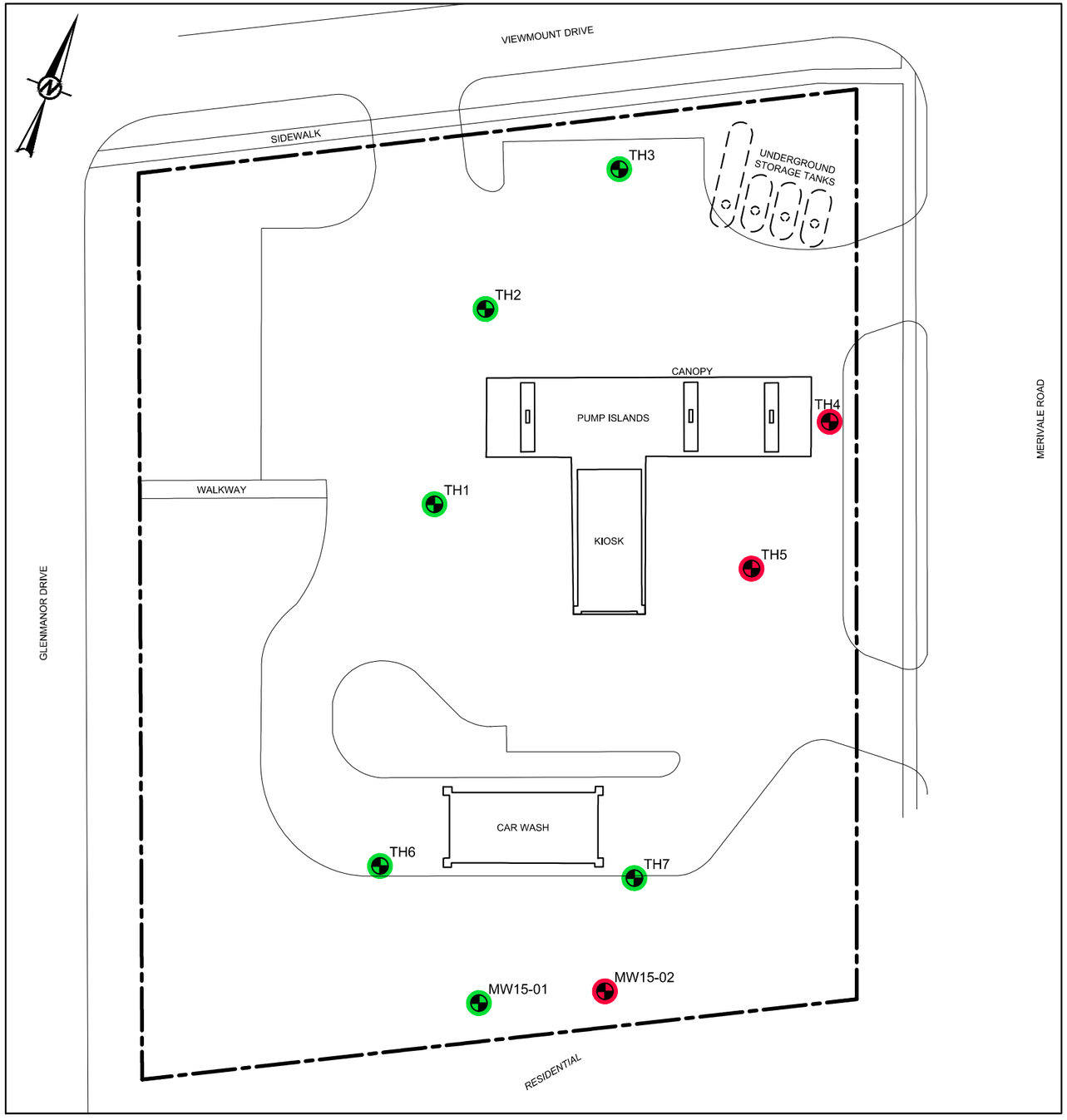
<	LESS THAN
µg/L	MICROGRAMS PER LITRE
B	BENZENE
T	TOLUENE
E	ETHYLBENZENE
X	XYLENES
DUP	DUPLICATE FIELD SAMPLE
F1	PETROLEUM HYDROCARBON FRACTION 1 (C_6-C_{10}) MINUS BTEX
F2	PETROLEUM HYDROCARBON FRACTION 2 (C_{10}-C_{16})
F3	PETROLEUM HYDROCARBON FRACTION 3 (C_{16}-C_{34})
F4	PETROLEUM HYDROCARBON FRACTION 4 (C_{34}-C_{50})
HA	n-HEXANE
mbgs	METRES BELOW GROUND SURFACE
Pb	LEAD
O.REG	ONTARIO REGULATION
RDL	REPORTABLE DETECTION LIMIT

NOTES

1. LOCATIONS WHERE MOST RECENT GROUNDWATER SAMPLE MEETS APPLICABLE STANDARDS FOR ALL PARAMETERS ANALYZED SHOWN IN **GREEN.**
2. LOCATIONS WHERE MOST RECENT GROUNDWATER SAMPLE EXCEEDS APPLICABLE STANDARDS FOR AT LEAST ONE OF THE PARAMETERS ANALYZED SHOWN IN **RED.**
3. EXCEEDANCES OF APPLICABLE STANDARDS IN TEXT ARE SHOWN IN **RED.**
4. LOCATION WHERE NO SAMPLES WERE TAKEN IN THE MOST RECENT SAMPLING EVENT SHOWN IN **BLACK**.
5. ALL RESULTS IN µg/L.

REFERENCE

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No.: 11010-SITE PLAN ONSITE-JUN14; SCALE: UNKNOWN; DATE: JUNE 2014.



0 10 20
1:500 METRES

CLIENT
IMPERIAL OIL LIMITED

CONSULTANT
Golder Associates

YYYY-MM-DD	2017-01-31
DESIGNED	BMcParlan
PREPARED	AMehdilou
REVIEWED	LBurger
APPROVED	SCarrelas

PROJECT
ACTIVE RETAIL OUTLET
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
GROUNDWATER ANALYTICAL RESULTS - BTEX, PHC FRACTIONS F1 - F4, n-HEXANE AND LEAD

PROJECT NO.	PHASE-TASK	REV.	FIGURE
1544125	1155-2016	1	5

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25 mm

Path: \\golder.gds\gal\Windsor\Active\CAD\IMPERIAL_OIL\DOWNSTREAM\OTTAWA_ON_1660_MERIVALE_ROAD\99_PROJECTS\1544125\02_PRODUCTION\1155-2016\DWG\ONSITE\ | File Name: 1544125-1155-0005.dwg

TABLES

Table 1
Summary of Groundwater Field Monitoring Results
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Well Name	Top of Casing Elevation[(a)(b)] (masl)	Ground Elevation[(a)(b)] (masl)	Monitoring Date	Depth to Groundwater (mbtoc)	Depth to Groundwater (mbgs)	Groundwater Elevation[(a)(b)] (masl)	Product Thickness (mm)	Headspace Vapours (ppmv)
TH1	99.99	100.08	30-Aug-11	4.080	4.18	95.83	nd	nd
			20-Oct-11	--	nm	na	nm	nm
			15-Nov-11	--	nm	na	nm	nm
			12-Jun-13	3.391	3.48	96.60	nd	10
			26-Aug-14	3.455	3.55	96.54	nd	75
			17-Nov-15	3.61	3.70	96.38	nd	15
			9-Aug-16	3.70	3.79	96.29	nd	45
			5-Dec-16	3.69	3.78	96.31	nd	nm
TH2	100.04	100.14	30-Aug-11	4.10	4.19	95.88	nd	130
			20-Oct-11	--	nm	na	nm	nm
			15-Nov-11	--	nm	na	nm	nm
			12-Jun-13	3.36	3.46	96.68	nd	75
			26-Aug-14	3.47	3.57	96.57	nd	nd
			17-Nov-15	3.47	3.57	96.57	nd	5
			9-Aug-16	3.62	3.71	96.43	nd	nd
TH3	100.28	100.41	30-Aug-11	3.14	3.27	97.03	nd	8%
			20-Oct-11	--	nm	na	nm	nm
			15-Nov-11	--	nm	na	nm	nm
			12-Jun-13	2.93	3.06	97.35	nd	35
			26-Aug-14	3.31	3.44	96.97	nd	nd
			28-Oct-15	3.40	3.53	96.88	nd	195
			9-Aug-16	3.36	3.49	96.92	nd	85
TH4	100.27	100.35	30-Aug-11	3.15	3.23	97.04	nd	45
			20-Oct-11	--	nm	na	nm	nm
			15-Nov-11	--	nm	na	nm	nm
			12-Jun-13	2.99	3.07	97.28	nd	150
			26-Aug-14	2.95	3.03	97.32	nd	30%
			17-Nov-15	3.01	3.09	97.26	nd	160
			9-Aug-16	3.15	3.23	97.12	nd	75
TH5	100.12	100.23	30-Aug-11	3.22	3.34	96.79	nd	450
			20-Oct-11	--	nm	na	nm	nm
			15-Nov-11	--	nm	na	nm	nm
			12-Jun-13	3.36	3.47	96.76	nd	290
			26-Aug-14	2.94	3.05	97.18	nd	50
			17-Nov-15	3.09	3.20	97.03	nd	230
			9-Aug-16	2.97	3.08	97.15	nd	5
TH6	99.44	99.54	20-Oct-11	5.06	5.06	na	nd	nd
			15-Nov-11	--	nm	na	nm	nm
			12-Jun-13	3.31	3.22	96.78	nd	25
			26-Aug-14	3.56	3.48	96.52	nd	25
			28-Oct-15	3.84	3.94	95.60	nd	1250
			9-Aug-16	3.82	3.92	95.62	nd	45
TH7	100.50	99.66	20-Oct-11	--	dry	dry	nd	nd
			15-Nov-11	3.77	2.93	na	nd	nd
			12-Jun-13	4.32	3.48	96.18	nd	nd
			26-Aug-14	4.88	4.05	95.62	nd	nd
			28-Oct-15	5.00	4.16	95.50	nd	nd
			9-Aug-16	5.01	4.17	95.49	nd	15
MW15-01	97.84	97.99	17-Nov-15	2.26	2.41	95.58	nd	nd
			9-Aug-16	2.35	2.50	95.49	nd	nd
MW15-02	98.01	98.08	17-Nov-15	2.49	2.56	95.52	nd	nd
			9-Aug-16	2.63	2.69	95.39	nd	20

Notes:

[(a)] TH1 to TH5 and TH7 elevations are relative to local benchmark (centre of storm sewer catch basin located approximately 5 metres west of kiosk).
assigned elevation = 100.00 m (exp, 2013)

[(a)] MW15-01 , MW15-02 and TH6 elevations are relative to local benchmark (ground surface at TH7).
assigned elevation = 99.66 m (exp, 2013)

masl - metres above sea level

mbtoc - metres below top of casing

mm - millimetres

nd - not detected

ppmv - parts per million by volume

nm - not measured

na - not accessible

Table 2
Summary of Groundwater Analytical Results - Petroleum Hydrocarbons
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

			Sample Location	**MW15-01**	**MW15-02**	**TH1**	**TH1**	**TH2**	**TH3**	**TH4**		**TH5**	**TH6**	**TH7**
			Sample ID	MW15-01	MW15-02	TH1	TH1	TH2	TH3	DUP A	TH4	TH5	TH6	TH7
			Maxxam Sample ID	CWH960	CWH961	CWH959	DPB272	CWH964	CWH955	CWH957	CWH956	CWH958	CWH962	CWH963
			Maxxam Job Number	B6G9952	B6G9952	B6G9951	B6Q7339	B6G9952	B6G9951	B6G9951	B6G9951	B6G9951	B6G9952	B6G9952
			Sample Date	09-Aug-16	09-Aug-16	10-Aug-16	05-Dec-16	09-Aug-16	10-Aug-16	10-Aug-16	10-Aug-16	10-Aug-16	09-Aug-16	09-Aug-16
Parameters	**Units**	**RDL**	**Standards[a]**											
Benzene	µg/L	0.20	430	<0.20	78	<0.20	<0.20	<0.20	42	190	210	420	<0.20	62
Toluene	µg/L	0.20	18,000	<0.20	4.7	<0.20	<0.20	<0.20	<0.20	9.7	11	43	<0.20	5.8
Ethylbenzene	µg/L	0.20	2,300	<0.20	73	<0.20	<0.20	<0.20	26	490	550	1,500	<0.20	120
Xylenes	µg/L	0.40	4,200	<0.40	25	<0.40	<0.40	<0.40	1.5	1,400	1,500	3,700	<0.40	140
F1 (C_6-C_{10}) - BTEX	µg/L	25	750[c]	<25	**800**	<25	<25	<25	560	**1,600**	**1,800**	**13,000**	<25	500
F2 (C_{10}-C_{16})	µg/L	100	150	<100	**450**	<100	<100	<100	110	**400**	**370**	**11,000**	<100	150
F3 (C_{16}-C_{34})	µg/L	200	500	<200	<200	300	<200	<200	<200	210	<200	**1,100**	<200	<200
F4 (C_{34}-C_{50})	µg/L	200	500	<200	<200	**1,200[b]**	<200	<200	<200	<200	<200	**810**	<200	<200
n-Hexane	µg/L	10	520	<5.0	5.5	<5.0	na	<5.0	<5.0	31	27	240	<5.0	<5.0
Lead	µg/L	0.50	25	<0.50	<0.50	<0.50	<0.50	<0.50	0.98	1.7	1.1	0.81	<0.50	<0.50

Notes:

[a] O.Reg 153 (2011) Table 3 Full Depth Generic Site Condition Standards for all types of property use for groundwater in medium and fine textured soil in in a non-potable ground

[b] Baseline was not reached at Carbon 50. Value presented corresponds to F4G

[c] F1 fraction does not include BTEX; however, the proponent has the choice as to whether or not to subtract BTEX from the analytical result.

Bold/Underlined - value exceeds criteria/standard

BTEX - benzene, toluene, ethylbenzene, xylenes

F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3 and 4

RDL - reportable detection limit

µg/L - micrograms per litre

< - less than

na - not analyzed

APPENDIX A LABORATORY CERTIFICATES OF ANALYSIS AND DATA QUALITY REVIEW CHECKLISTS

Maxxam
A Bureau Veritas Group Company

Task Order#: 4410393424
Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007
Your C.O.C. #: 572973-03-01

Attention:Leon Burger

Golder Associates Ltd.
6925 Century Avenue
Suite #100
Mississauga, ON
Canada L5N 7K2

Report Date: 2016/08/19
Report #: R4121568
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B6G9951
Received: 2016/08/11, 16:31

Sample Matrix: Water
Samples Received: 5

Analyses	Quantity	Laboratory Method	Primary Reference
Petroleum Hydro. CCME F1 & BTEX in Water	5	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1)	5	CAM SOP-00316	CCME PHC-CWS m
F4G (CCME Hydrocarbons Gravimetric)	1	CAM SOP-00326	CCME PHC-CWS m
Dissolved Metals by ICPMS	5	CAM SOP-00447	EPA 6020A m

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act.

Maxxam Analytics is accredited by SCC (Lab ID 97) for all specific parameters as required by GUCSO and O.Reg 153/04. Maxxam Analytics is limited in liability to the actual cost of analysis unless otherwise agreed in writing. There is no other warranty expressed or implied. Samples will be retained at Maxxam Analytics for three weeks from receipt of data or as per contract.

All data is in statistical control and has met all QC and method performance criteria unless otherwise flagged. All samples were analysed within hold time unless otherwise flagged. All soil samples for BTEX analysis were methanol extracted within 24 hours unless otherwise flagged.

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following “Alberta Environment’s Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003”. Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

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MAXXAM JOB #: B6G9951
Received: 2016/08/11, 16:31

Encryption Key

Melissa White
Senior Project Manager
19 Aug 2016 11:31:10 -04:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kudrat Bajwa, B.Sc., Project Manager
Email: KBajwa@maxxam.ca
Phone# (905)817-5822

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam Job #: B6G9951
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Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007

LEAD (DISSOLVED) IN WATER

Maxxam ID		CWH955	CWH955	CWH956	CWH957	CWH958	CWH959		
Sampling Date		2016/08/10 00:30	2016/08/10 00:30	2016/08/10 01:30	2016/08/10 01:30	2016/08/10 02:00	2016/08/10 02:30		
COC Number		572973-03-01	572973-03-01	572973-03-01	572973-03-01	572973-03-01	572973-03-01		
	UNITS	**TH3**	**TH3 Lab-Dup**	**TH4**	**DUP A**	**TH5**	**TH1**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	0.98	0.95	1.1	1.7	0.81	<0.50	0.50	4618791

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B6G9951
Report Date: 2016/08/19

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007

HBTEX/F1-F4 PET. HYDROCARBONS IN WATER (WATER)

Maxxam ID		CWH955		CWH956	CWH957		CWH958		CWH959		
Sampling Date		2016/08/10 00:30		2016/08/10 01:30	2016/08/10 01:30		2016/08/10 02:00		2016/08/10 02:30		
COC Number		572973-03-01		572973-03-01	572973-03-01		572973-03-01		572973-03-01		
	UNITS	**TH3**	**RDL**	**TH4**	**DUP A**	**RDL**	**TH5**	**RDL**	**TH1**	**RDL**	**QC Batch**
Benzene	ug/L	42	0.20	210	190	0.40	420	2.0	<0.20	0.20	4621969
Toluene	ug/L	<0.20	0.20	11	9.7	0.40	43	2.0	<0.20	0.20	4621969
Ethylbenzene	ug/L	26	0.20	550	490	0.40	1500	2.0	<0.20	0.20	4621969
o-Xylene	ug/L	<0.20	0.20	10	8.3	0.40	140	2.0	<0.20	0.20	4621969
p+m-Xylene	ug/L	1.5	0.40	1500	1400	0.80	3600	4.0	<0.40	0.40	4621969
Total Xylenes	ug/L	1.5	0.40	1500	1400	0.80	3700	4.0	<0.40	0.40	4621969
Hexane	ug/L	<5.0	5.0	27	31	10	240	50	<5.0	5.0	4621969
F1 (C6-C10)	ug/L	630	25	4100	3700	50	19000	250	<25	25	4621969
F1 (C6-C10) - BTEX	ug/L	560	25	1800	1600	50	13000	250	<25	25	4621969
F2 (C10-C16 Hydrocarbons)	ug/L	110	100	370	400	100	11000	100	<100	100	4623186
F3 (C16-C34 Hydrocarbons)	ug/L	<200	200	<200	210	200	1100	200	300	200	4623186
F4 (C34-C50 Hydrocarbons)	ug/L	<200	200	<200	<200	200	810	200	340	200	4623186
Reached Baseline at C50	ug/L	Yes		Yes	Yes		Yes		No		4623186
Extraction Surrogate Recovery (%)											
o-Terphenyl	%	104		104	106		105		104		4623186
Instrument Surrogate Recovery (%)											
1,4-Difluorobenzene	%	106		89	92		91		100		4621969
4-Bromofluorobenzene	%	103		104	106		101		92		4621969
D10-Ethylbenzene	%	103		94	98		102		100		4621969
D4-1,2-Dichloroethane	%	101		90	91		89		96		4621969

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B6G9951
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Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		CWH959		
Sampling Date		2016/08/10 02:30		
COC Number		572973-03-01		
	UNITS	**TH1**	**RDL**	**QC Batch**
F4G-sg (Grav. Heavy Hydrocarbons)	ug/L	1200	500	4625382

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B6G9951
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Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007

TEST SUMMARY

Maxxam ID: CWH955
Sample ID: TH3
Matrix: Water

Collected: 2016/08/10
Relinquished: 2016/08/10
Received: 2016/08/11

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	4621969	N/A	2016/08/17	Jiaxuan (Simon) Xi
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	4623186	2016/08/17	2016/08/17	Zhiyue (Frank) Zhu
Dissolved Metals by ICPMS	ICP/MS	4618791	N/A	2016/08/16	Cristina Petran

Maxxam ID: CWH955 Dup
Sample ID: TH3
Matrix: Water

Collected: 2016/08/10
Relinquished: 2016/08/10
Received: 2016/08/11

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Metals by ICPMS	ICP/MS	4618791	N/A	2016/08/16	Cristina Petran

Maxxam ID: CWH956
Sample ID: TH4
Matrix: Water

Collected: 2016/08/10
Relinquished: 2016/08/10
Received: 2016/08/11

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	4621969	N/A	2016/08/17	Jiaxuan (Simon) Xi
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	4623186	2016/08/17	2016/08/17	Zhiyue (Frank) Zhu
Dissolved Metals by ICPMS	ICP/MS	4618791	N/A	2016/08/16	Cristina Petran

Maxxam ID: CWH957
Sample ID: DUP A
Matrix: Water

Collected: 2016/08/10
Relinquished: 2016/08/10
Received: 2016/08/11

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	4621969	N/A	2016/08/17	Jiaxuan (Simon) Xi
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	4623186	2016/08/17	2016/08/18	Zhiyue (Frank) Zhu
Dissolved Metals by ICPMS	ICP/MS	4618791	N/A	2016/08/16	Cristina Petran

Maxxam ID: CWH958
Sample ID: TH5
Matrix: Water

Collected: 2016/08/10
Relinquished: 2016/08/10
Received: 2016/08/11

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	4621969	N/A	2016/08/17	Jiaxuan (Simon) Xi
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	4623186	2016/08/17	2016/08/18	Zhiyue (Frank) Zhu
Dissolved Metals by ICPMS	ICP/MS	4618791	N/A	2016/08/16	Cristina Petran

Maxxam ID: CWH959
Sample ID: TH1
Matrix: Water

Collected: 2016/08/10
Relinquished: 2016/08/10
Received: 2016/08/11

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	4621969	N/A	2016/08/16	Jiaxuan (Simon) Xi

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Maxxam Job #: B6G9951
Report Date: 2016/08/19

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007

TEST SUMMARY

Maxxam ID: CWH959
Sample ID: TH1
Matrix: Water

Collected: 2016/08/10
Relinquished: 2016/08/10
Received: 2016/08/11

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	4623186	2016/08/17	2016/08/18	Zhiyue (Frank) Zhu
F4G (CCME Hydrocarbons Gravimetric)	BAL	4625382	2016/08/18	2016/08/18	Francis Afonso
Dissolved Metals by ICPMS	ICP/MS	4618791	N/A	2016/08/16	Cristina Petran

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Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	1.0°C

The following bottles contained visual sediment, which was included in the analysis as per the Protocol for Analytical Methods Use in the Assessment of Properties under part XV.1 of the Environmental Protection Act.

For Sample TH5:
1 x 250 mL amber glass bottle for F4G contains 1.4 cm of sediment.
1 of 2 and 2 of 2 x 250 mL amber glass bottles for F2-F4 contains 1.5 and 1.8 cm of sediment, respectively.

For Sample TH1:
1 x 250 mL amber glass bottle for F4G contains 2.0 cm of sediment.
1 of 2 and 2 of 2 x 250 mL amber glass bottles for F2-F4 contain 2.5 and 2.6 cm of sediment, respectively.
2nd of 2 x 40mL clear glass vials for F1BTEX contains 1.2 cm of sediment.

Results relate only to the items tested.

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Maxxam Job #: B6G9951
Report Date: 2016/08/19

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
4618791	CPE	Method Blank	Dissolved Lead (Pb)	2016/08/16	<0.50		ug/L	
4621969	JXI	Method Blank	1,4-Difluorobenzene	2016/08/16		103	%	70 - 130
			4-Bromofluorobenzene	2016/08/16		97	%	70 - 130
			D10-Ethylbenzene	2016/08/16		102	%	70 - 130
			D4-1,2-Dichloroethane	2016/08/16		103	%	70 - 130
			Benzene	2016/08/16	<0.20		ug/L	
			Toluene	2016/08/16	<0.20		ug/L	
			Ethylbenzene	2016/08/16	<0.20		ug/L	
			o-Xylene	2016/08/16	<0.20		ug/L	
			p+m-Xylene	2016/08/16	<0.40		ug/L	
			Total Xylenes	2016/08/16	<0.40		ug/L	
			Hexane	2016/08/16	<5.0		ug/L	
			F1 (C6-C10)	2016/08/16	<25		ug/L	
			F1 (C6-C10) - BTEX	2016/08/16	<25		ug/L	
4623186	ZZ	Method Blank	o-Terphenyl	2016/08/17		104	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2016/08/17	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2016/08/17	<200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2016/08/17	<200		ug/L	
4625382	FA	Method Blank	F4G-sg (Grav. Heavy Hydrocarbons)	2016/08/18	<500		ug/L	
4625382	FA	RPD	F4G-sg (Grav. Heavy Hydrocarbons)	2016/08/18	NC		%	20
4618791	CPE	RPD [CWH955-03]	Dissolved Lead (Pb)	2016/08/16	NC		%	20
4618791	CPE	Matrix Spike [CWH955-03]	Dissolved Lead (Pb)	2016/08/16		94	%	80 - 120
4618791	CPE	LCS	Dissolved Lead (Pb)	2016/08/16		98	%	80 - 120
4621969	JXI	LCS	1,4-Difluorobenzene	2016/08/17		91	%	70 - 130
			4-Bromofluorobenzene	2016/08/17		104	%	70 - 130
			D10-Ethylbenzene	2016/08/17		103	%	70 - 130
			D4-1,2-Dichloroethane	2016/08/17		95	%	70 - 130
			Benzene	2016/08/17		104	%	70 - 130
			Toluene	2016/08/17		102	%	70 - 130
			Ethylbenzene	2016/08/17		109	%	70 - 130
			o-Xylene	2016/08/17		103	%	70 - 130
			p+m-Xylene	2016/08/17		101	%	70 - 130
			Hexane	2016/08/17		100	%	70 - 130
			F1 (C6-C10)	2016/08/17		97	%	70 - 130
4623186	ZZ	LCS	o-Terphenyl	2016/08/17		103	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2016/08/17		101	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2016/08/17		100	%	60 - 130
			F4 (C34-C50 Hydrocarbons)	2016/08/17		94	%	60 - 130
4625382	FA	LCS	F4G-sg (Grav. Heavy Hydrocarbons)	2016/08/18		94	%	65 - 135

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

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Maxxam Job #: B6G9951
Report Date: 2016/08/19

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Toll Free: 800-563-6266

EXXONMOBIL/IMPERIAL OIL - MAXXAM
CHAIN-OF-CUSTODY RECORD
ANALYSIS REQUESTED

Page 1 of 1
C of C # 572973-03-01
572973

INVOICE INFORMATION	REPORT INFORMATION
Company Name: Imperial Oil, a partnership of Imperial Oil Limited and McColl Frontenac Petrole	Company Name: Golder Associates Ltd.
Contact Name: Jordan Hardy	Contact Name: Leon Burger
Address: 1 Duncan Mill Road North York ON M3B 1Z2	Address: 6925 Century Avenue Suite #100 Mississauga ON L5N 7K2
Email: Jordan.P.Hardy@esso.ca	Email: Leon_Burger@golder.com
Phone: (587) 476-3858	Phone: (226) 220-6879
Sampler Name (Print): Ian Atchison & Brandon McFarlane	Consultant Project #: 1544125-1155-2007

	FIELD SAMPLE ID	MATRIX: GROUND WATER	MATRIX: SURFACE WATER	MATRIX: SOIL	MATRIX: OTHER	# CONTAINERS	SAMPLING: DATE (YYYY/MM/DD)	SAMPLING: TIME (24 HR)	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	F1 & BTEX (Including n-Hexane)	F2-F4	Lead
1	TH3	X				6	2016/08/10	00:30	X		X	X	X
2	TH4	X				6		01:30	X		X	X	X
3	DUP A	X				6		01:30	X		X	X	X
4	TH5	X				6		02:00	X		X	X	X
5	TH1	X				6	2016/08/10	02:30	X		X	X	X
6													
7													
8													
9													
10													

IOL SITE LOCATION:
1660 Merivale Road, Ottawa, ON

IOL PROJECT # (if applicable):
MZ.00277

MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM:
4410393424-10

REGULATORY CRITERIA / DETECTION LIMITS:
☒ REG 153 Table 3 ☐ 2004 ☒ 2011 ☐ RSC
(Please indicate which Reg. version and if RSC required)
☐ ODWS ☐ PWQO
☐ Other

SPECIAL INSTRUCTIONS:
Samples may contain headspace due to off gasing and sediment.
Upload to SAP: 88001627

JARS USED AND NOT SUBMITTED
Enter N/A for Water
N/A

TURNAROUND TIME
Standard (5 days) ☒
Rush (3 days) ☐
(2 days) ☐
(1 day) ☐
(same day) ☐
Date Required

	YES	NO	COOLER ID: 1			
SEAL PRESENT	/		TEMP °C	1	2	3
SEAL INTACT	/					
COOLING MEDIA PRESENT	/					

	YES	NO	COOLER ID:			
SEAL PRESENT			TEMP °C	1	2	3
SEAL INTACT						
COOLING MEDIA PRESENT						

	YES	NO	COOLER ID:			
SEAL PRESENT			TEMP °C	1	2	3
SEAL INTACT						
COOLING MEDIA PRESENT						

LAB USE ONLY
MAXXAM JOB #
B6G 9951
SAMPLES
LABELED BY: ABH
VERIFIED BY: DKN

RELINQUISHED BY:		DATE:	TIME (24 HR)	RECEIVED BY:		DATE:	TIME (24 HR)
1.	Ian Atchison	2016/08/10	14:00		JOLENA UMALI	2016/08/11	16:31
2.				2.			
3.				3.			

COC – 1012 (2013) IOL – ON White: Maxxam Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: August 10, 2016

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Maxxam Analytics Mississauga

Consultant Project Number: 1544125-1155

Sample Submission Number: B6G9951

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within
Extraction Surrogate Recovery	X			acceptance criteria.
Method Blank Concentration	X			
Matrix Duplicate RPD	X			
Matrix Spike Recovery	X			
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	All field QC samples are within
Trip Blank Concentration			X	alert limits.
Field Duplicate RPD	X			

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Was a Data Quality Waiver (DQW) issued (Yes/No)?: No

Date Issued: n/a

Date of Response: n/a

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): Amanda Newberry

Date: August 19, 2016

Maxxam
A Bureau Veritas Group Company

Task Order#: 4410393424
Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007
Your C.O.C. #: 572973-02-01

Attention:Leon Burger

Golder Associates Ltd.
6925 Century Avenue
Suite #100
Mississauga, ON
Canada L5N 7K2

Report Date: 2016/08/18
Report #: R4121020
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B6G9952
Received: 2016/08/11, 16:31

Sample Matrix: Water
Samples Received: 5

Analyses	Quantity	Laboratory Method	Primary Reference
Petroleum Hydro. CCME F1 & BTEX in Water	5	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1)	5	CAM SOP-00316	CCME PHC-CWS m
Dissolved Metals by ICPMS	5	CAM SOP-00447	EPA 6020A m

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act.

Maxxam Analytics is accredited by SCC (Lab ID 97) for all specific parameters as required by GUCSO and O.Reg 153/04. Maxxam Analytics is limited in liability to the actual cost of analysis unless otherwise agreed in writing. There is no other warranty expressed or implied. Samples will be retained at Maxxam Analytics for three weeks from receipt of data or as per contract.

All data is in statistical control and has met all QC and method performance criteria unless otherwise flagged. All samples were analysed within hold time unless otherwise flagged. All soil samples for BTEX analysis were methanol extracted within 24 hours unless otherwise flagged.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following "Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003". Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Encryption Key

Melissa White
Senior Project Manager
19 Aug 2016 11:52:15 -04:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kudrat Bajwa, B.Sc., Project Manager
Email: KBajwa@maxxam.ca
Phone# (905)817-5822

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6G9952
Report Date: 2016/08/18

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007

LEAD (DISSOLVED) IN WATER

Maxxam ID		CWH960	CWH961	CWH962	CWH963	CWH964		
Sampling Date		2016/08/09 22:00	2016/08/09 22:30	2016/08/09 23:00	2016/08/09 23:15	2016/08/09 23:30		
COC Number		572973-02-01	572973-02-01	572973-02-01	572973-02-01	572973-02-01		
	UNITS	**MW15-01**	**MW15-02**	**TH6**	**TH7**	**TH2**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	4618791

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B6G9952
Report Date: 2016/08/18

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007

HBTEX/F1-F4 PET. HYDROCARBONS IN WATER (WATER)

Maxxam ID		CWH960	CWH961	CWH962	CWH963	CWH964		
Sampling Date		2016/08/09 22:00	2016/08/09 22:30	2016/08/09 23:00	2016/08/09 23:15	2016/08/09 23:30		
COC Number		572973-02-01	572973-02-01	572973-02-01	572973-02-01	572973-02-01		
	UNITS	**MW15-01**	**MW15-02**	**TH6**	**TH7**	**TH2**	**RDL**	**QC Batch**
Benzene	ug/L	<0.20	78	<0.20	62	<0.20	0.20	4623498
Toluene	ug/L	<0.20	4.7	<0.20	5.8	<0.20	0.20	4623498
Ethylbenzene	ug/L	<0.20	73	<0.20	120	<0.20	0.20	4623498
o-Xylene	ug/L	<0.20	2.1	<0.20	9.0	<0.20	0.20	4623498
p+m-Xylene	ug/L	<0.40	23	<0.40	130	<0.40	0.40	4623498
Total Xylenes	ug/L	<0.40	25	<0.40	140	<0.40	0.40	4623498
Hexane	ug/L	<5.0	5.5	<5.0	<5.0	<5.0	5.0	4623498
F1 (C6-C10)	ug/L	<25	980	<25	820	<25	25	4623498
F1 (C6-C10) - BTEX	ug/L	<25	800	<25	500	<25	25	4623498
F2 (C10-C16 Hydrocarbons)	ug/L	<100	450	<100	150	<100	100	4623595
F3 (C16-C34 Hydrocarbons)	ug/L	<200	<200	<200	<200	<200	200	4623595
F4 (C34-C50 Hydrocarbons)	ug/L	<200	<200	<200	<200	<200	200	4623595
Reached Baseline at C50	ug/L	Yes	Yes	Yes	Yes	Yes		4623595
Extraction Surrogate Recovery (%)								
o-Terphenyl	%	104	104	104	108	103		4623595
Instrument Surrogate Recovery (%)								
1,4-Difluorobenzene	%	92	94	94	91	93		4623498
4-Bromofluorobenzene	%	97	101	98	105	100		4623498
D10-Ethylbenzene	%	115	110	113	106	105		4623498
D4-1,2-Dichloroethane	%	100	96	99	92	98		4623498

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B6G9952
Report Date: 2016/08/18

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007

TEST SUMMARY

Maxxam ID: CWH960
Sample ID: MW15-01
Matrix: Water

Collected: 2016/08/09
Relinquished: 2016/08/10
Received: 2016/08/11

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	4623498	N/A	2016/08/17	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	4623595	2016/08/17	2016/08/18	Zhiyue (Frank) Zhu
Dissolved Metals by ICPMS	ICP/MS	4618791	N/A	2016/08/16	Cristina Petran

Maxxam ID: CWH961
Sample ID: MW15-02
Matrix: Water

Collected: 2016/08/09
Relinquished: 2016/08/10
Received: 2016/08/11

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	4623498	N/A	2016/08/18	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	4623595	2016/08/17	2016/08/18	Zhiyue (Frank) Zhu
Dissolved Metals by ICPMS	ICP/MS	4618791	N/A	2016/08/16	Cristina Petran

Maxxam ID: CWH962
Sample ID: TH6
Matrix: Water

Collected: 2016/08/09
Relinquished: 2016/08/10
Received: 2016/08/11

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	4623498	N/A	2016/08/18	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	4623595	2016/08/17	2016/08/18	Zhiyue (Frank) Zhu
Dissolved Metals by ICPMS	ICP/MS	4618791	N/A	2016/08/16	Cristina Petran

Maxxam ID: CWH963
Sample ID: TH7
Matrix: Water

Collected: 2016/08/09
Relinquished: 2016/08/10
Received: 2016/08/11

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	4623498	N/A	2016/08/18	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	4623595	2016/08/17	2016/08/18	Zhiyue (Frank) Zhu
Dissolved Metals by ICPMS	ICP/MS	4618791	N/A	2016/08/16	Cristina Petran

Maxxam ID: CWH964
Sample ID: TH2
Matrix: Water

Collected: 2016/08/09
Relinquished: 2016/08/10
Received: 2016/08/11

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	4623498	N/A	2016/08/18	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	4623595	2016/08/17	2016/08/18	Zhiyue (Frank) Zhu
Dissolved Metals by ICPMS	ICP/MS	4618791	N/A	2016/08/16	Cristina Petran

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Maxxam Job #: B6G9952
Report Date: 2016/08/18

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	2.3°C

Results relate only to the items tested.

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Maxxam Job #: B6G9952
Report Date: 2016/08/18

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
4618791	CPE	Method Blank	Dissolved Lead (Pb)	2016/08/16	<0.50		ug/L	
4623498	LRA	Method Blank	1,4-Difluorobenzene	2016/08/17		97	%	70 - 130
			4-Bromofluorobenzene	2016/08/17		96	%	70 - 130
			D10-Ethylbenzene	2016/08/17		86	%	70 - 130
			D4-1,2-Dichloroethane	2016/08/17		97	%	70 - 130
			Benzene	2016/08/17	<0.20		ug/L	
			Toluene	2016/08/17	<0.20		ug/L	
			Ethylbenzene	2016/08/17	<0.20		ug/L	
			o-Xylene	2016/08/17	<0.20		ug/L	
			p+m-Xylene	2016/08/17	<0.40		ug/L	
			Total Xylenes	2016/08/17	<0.40		ug/L	
			Hexane	2016/08/17	<5.0		ug/L	
			F1 (C6-C10)	2016/08/17	<25		ug/L	
			F1 (C6-C10) - BTEX	2016/08/17	<25		ug/L	
4623595	ZZ	Method Blank	o-Terphenyl	2016/08/18		104	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2016/08/18	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2016/08/18	<200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2016/08/18	<200		ug/L	
4618791	CPE	LCS	Dissolved Lead (Pb)	2016/08/16		98	%	80 - 120
4623498	LRA	LCS	1,4-Difluorobenzene	2016/08/17		99	%	70 - 130
			4-Bromofluorobenzene	2016/08/17		103	%	70 - 130
			D10-Ethylbenzene	2016/08/17		108	%	70 - 130
			D4-1,2-Dichloroethane	2016/08/17		101	%	70 - 130
			Benzene	2016/08/17		105	%	70 - 130
			Toluene	2016/08/17		97	%	70 - 130
			Ethylbenzene	2016/08/17		103	%	70 - 130
			o-Xylene	2016/08/17		94	%	70 - 130
			p+m-Xylene	2016/08/17		96	%	70 - 130
			Hexane	2016/08/17		82	%	70 - 130
			F1 (C6-C10)	2016/08/17		95	%	70 - 130
4623595	ZZ	LCS	o-Terphenyl	2016/08/18		111	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2016/08/18		109	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2016/08/18		108	%	60 - 130
			F4 (C34-C50 Hydrocarbons)	2016/08/18		100	%	60 - 130

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

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Maxxam Job #: B6G9952
Report Date: 2016/08/18

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam

6740 Campobello Road
Mississauga, Ontario L5N 2L8
www.maxxam.ca

Phone: (905) 817-5700
Fax: (905) 817-5777
Toll Free: 800-563-6266

EXXONMOBIL/IMPERIAL OIL - MAXXAM
CHAIN-OF-CUSTODY RECORD
ANALYSIS REQUESTED

Page 1 of 1
C of C # 572973-02-01
572973

INVOICE INFORMATION	REPORT INFORMATION
Company Name: Imperial Oil, a partnership of Imperial Oil Limited and McColl Frontenac Petrole	Company Name: Golder Associates Ltd.
Contact Name: Jordan Hardy	Contact Name: Leon Burger
Address: 1 Duncan Mill Road North York ON M3B 1Z2	Address: 6925 Century Avenue Suite #100 Mississauga ON L5N 7K2
Email: Jordan.P.Hardy@esso.ca	Email: Leon_Burger@golder.com
Phone: (587) 476-3858	Phone: (226) 220-6879
Sampler Name (Print): Ian Atkesen & Brandon McParlan	Consultant Project #: 1544125-1155-2007

	FIELD SAMPLE ID	MATRIX: GROUND WATER	MATRIX: SURFACE WATER	MATRIX: SOIL	MATRIX: OTHER	# CONTAINERS	SAMPLING: DATE (YYYY/MM/DD)	SAMPLING: TIME (24 HR)	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	F1 & BTEX (including n-hexane)	F2-F4	Lead
1	MW15-01	X				6	2016/08/09	22:00	X		X	X	X
2	MW15-02	X				6		22:30	X		X	X	X
3	TH6	X				6		23:00	X		X	X	X
4	TH7	X				6		23:15	X		X	X	X
5	TH2	X				6	2016/08/09	23:30	X		X	X	X
6													
7													
8													
9													
10													

IOL SITE LOCATION:
1660 Merivale Road, Ottawa, ON

IOL PROJECT # (if applicable):
MZ.00277

MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM:
4410393424-10

REGULATORY CRITERIA / DETECTION LIMITS:
☒ REG 153 Table 3 ☐ 2004 ☒ 2011 ☐ RSC
(Please indicate which Reg. version and if RSC required)
☐ ODWS ☐ PWQO
☐ Other

SPECIAL INSTRUCTIONS:
Samples may contain headspace due to off gassing and sediment.
Upload to SAP: 88001627

JARS USED AND NOT SUBMITTED
Enter N/A for Water
N/A

TURNAROUND TIME
Standard (5 days) ☒
Rush (3 days) ☐
(2 days) ☐
(1 day) ☐
(same day) ☐
Date Required

	YES	NO	COOLER ID: 1			
SEAL PRESENT	✓					
SEAL INTACT	✓		TEMP °C	2	1	4
COOLING MEDIA PRESENT	✓			1	2	3

	YES	NO	COOLER ID:			
SEAL PRESENT						
SEAL INTACT			TEMP °C	1	2	3
COOLING MEDIA PRESENT						

	YES	NO	COOLER ID:			
SEAL PRESENT						
SEAL INTACT			TEMP °C	1	2	3
COOLING MEDIA PRESENT						

LAB USE ONLY
MAXXAM JOB #
B6G9952
SAMPLES
LABELED BY: AB19
VERIFIED BY: DKN

RELINQUISHED BY:		DATE:	TIME (24 HR)	RECEIVED BY:		DATE:	TIME (24 HR)
1.	Ian Atkesen	2016/08/10	~~14:00~~ 14:00	1.	JOSEPH UMALI	2016/08/11	16:31
2.				2.			
3.				3.			

COC – 1012 (2013) IOL – ON White: Maxxam Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: August 9, 2016

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Maxxam Analytics Mississauga

Consultant Project Number: 1544125-1155

Sample Submission Number: B6G9952

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within
Extraction Surrogate Recovery	X			acceptance criteria.
Method Blank Concentration	X			
Matrix Duplicate RPD			X	
Matrix Spike Recovery			X	
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	No field QC samples were collected.
Trip Blank Concentration			X	
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Was a Data Quality Waiver (DQW) issued (Yes/No)?: No

Date Issued: n/a

Date of Response: n/a

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): Amanda Newberry

Date: August 19, 2016

Maxxam
A Bureau Veritas Group Company

Task Order#: 4410393424
Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007
Your C.O.C. #: 572973-04-01

Attention:Leon Burger

Golder Associates Ltd.
6925 Century Avenue
Suite #100
Mississauga, ON
Canada L5N 7K2

Report Date: 2016/08/19
Report #: R4121847
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B6H0949
Received: 2016/08/12, 11:39

Sample Matrix: Water
Samples Received: 3

Analyses	Quantity	Laboratory Method	Primary Reference
Petroleum Hydro. CCME F1 & BTEX in Water	3	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1)	3	CAM SOP-00316	CCME PHC-CWS m
Dissolved Metals by ICPMS	3	CAM SOP-00447	EPA 6020A m

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act.

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All data is in statistical control and has met all QC and method performance criteria unless otherwise flagged. All samples were analysed within hold time unless otherwise flagged. All soil samples for BTEX analysis were methanol extracted within 24 hours unless otherwise flagged.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following "Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003". Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Encryption Key

Melissa White
Senior Project Manager
19 Aug 2016 13:47:39 -04:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kudrat Bajwa, B.Sc., Project Manager
Email: KBajwa@maxxam.ca
Phone# (905)817-5822

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6H0949
Report Date: 2016/08/19

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007

LEAD (DISSOLVED) IN WATER

Maxxam ID		CWM500	CWM500	CWM501	CWM502		
Sampling Date		2016/08/10 21:30	2016/08/10 21:30	2016/08/10 21:45	2016/08/10 23:15		
COC Number		572973-04-01	572973-04-01	572973-04-01	572973-04-01		
	UNITS	**TH8**	**TH8 Lab-Dup**	**TH9**	**TH100**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	0.77	0.73	1.1	<0.50	0.50	4618938

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B6H0949
Report Date: 2016/08/19

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007

HBTEX/F1-F4 PET. HYDROCARBONS IN WATER (WATER)

Maxxam ID		CWM500	CWM501	CWM502		
Sampling Date		2016/08/10 21:30	2016/08/10 21:45	2016/08/10 23:15		
COC Number		572973-04-01	572973-04-01	572973-04-01		
	UNITS	**TH8**	**TH9**	**TH100**	**RDL**	**QC Batch**
Benzene	ug/L	3.0	23	<0.20	0.20	4621969
Toluene	ug/L	<0.20	1.8	<0.20	0.20	4621969
Ethylbenzene	ug/L	0.66	250	<0.20	0.20	4621969
o-Xylene	ug/L	<0.20	1.9	<0.20	0.20	4621969
p+m-Xylene	ug/L	<0.40	68	<0.40	0.40	4621969
Total Xylenes	ug/L	<0.40	70	<0.40	0.40	4621969
Hexane	ug/L	<5.0	11	<5.0	5.0	4621969
F1 (C6-C10)	ug/L	74	1900	<25	25	4621969
F1 (C6-C10) - BTEX	ug/L	70	1600	<25	25	4621969
F2 (C10-C16 Hydrocarbons)	ug/L	<100	350	<100	100	4623186
F3 (C16-C34 Hydrocarbons)	ug/L	<200	<200	<200	200	4623186
F4 (C34-C50 Hydrocarbons)	ug/L	<200	<200	<200	200	4623186
Reached Baseline at C50	ug/L	Yes	Yes	Yes		4623186
Extraction Surrogate Recovery (%)						
o-Terphenyl	%	104	105	108		4623186
Instrument Surrogate Recovery (%)						
1,4-Difluorobenzene	%	91	92	100		4621969
4-Bromofluorobenzene	%	88	90	94		4621969
D10-Ethylbenzene	%	100	101	98		4621969
D4-1,2-Dichloroethane	%	90	86	100		4621969

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B6H0949
Report Date: 2016/08/19

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007

TEST SUMMARY

Maxxam ID: CWM500
Sample ID: TH8
Matrix: Water

Collected: 2016/08/10
Relinquished: 2016/08/11
Received: 2016/08/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	4621969	N/A	2016/08/16	Jiaxuan (Simon) Xi
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	4623186	2016/08/17	2016/08/18	Zhiyue (Frank) Zhu
Dissolved Metals by ICPMS	ICP/MS	4618938	N/A	2016/08/18	Kevin Comerford

Maxxam ID: CWM500 Dup
Sample ID: TH8
Matrix: Water

Collected: 2016/08/10
Relinquished: 2016/08/11
Received: 2016/08/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Metals by ICPMS	ICP/MS	4618938	N/A	2016/08/18	Kevin Comerford

Maxxam ID: CWM501
Sample ID: TH9
Matrix: Water

Collected: 2016/08/10
Relinquished: 2016/08/11
Received: 2016/08/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	4621969	N/A	2016/08/17	Jiaxuan (Simon) Xi
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	4623186	2016/08/17	2016/08/18	Zhiyue (Frank) Zhu
Dissolved Metals by ICPMS	ICP/MS	4618938	N/A	2016/08/18	Kevin Comerford

Maxxam ID: CWM502
Sample ID: TH100
Matrix: Water

Collected: 2016/08/10
Relinquished: 2016/08/11
Received: 2016/08/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	4621969	N/A	2016/08/16	Jiaxuan (Simon) Xi
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	4623186	2016/08/17	2016/08/18	Zhiyue (Frank) Zhu
Dissolved Metals by ICPMS	ICP/MS	4618938	N/A	2016/08/18	Kevin Comerford

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Maxxam Job #: B6H0949
Report Date: 2016/08/19

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	2.3°C

Results relate only to the items tested.

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Maxxam Job #: B6H0949
Report Date: 2016/08/19

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
4618938	KCO	Method Blank	Dissolved Lead (Pb)	2016/08/18	<0.50		ug/L	
4621969	JXI	Method Blank	1,4-Difluorobenzene	2016/08/16		103	%	70 - 130
			4-Bromofluorobenzene	2016/08/16		97	%	70 - 130
			D10-Ethylbenzene	2016/08/16		102	%	70 - 130
			D4-1,2-Dichloroethane	2016/08/16		103	%	70 - 130
			Benzene	2016/08/16	<0.20		ug/L	
			Toluene	2016/08/16	<0.20		ug/L	
			Ethylbenzene	2016/08/16	<0.20		ug/L	
			o-Xylene	2016/08/16	<0.20		ug/L	
			p+m-Xylene	2016/08/16	<0.40		ug/L	
			Total Xylenes	2016/08/16	<0.40		ug/L	
			Hexane	2016/08/16	<5.0		ug/L	
			F1 (C6-C10)	2016/08/16	<25		ug/L	
			F1 (C6-C10) - BTEX	2016/08/16	<25		ug/L	
4623186	ZZ	Method Blank	o-Terphenyl	2016/08/17		104	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2016/08/17	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2016/08/17	<200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2016/08/17	<200		ug/L	
4618938	KCO	RPD [CWM500-03]	Dissolved Lead (Pb)	2016/08/18	NC		%	20
4618938	KCO	Matrix Spike [CWM500-03]	Dissolved Lead (Pb)	2016/08/18		97	%	80 - 120
4618938	KCO	LCS	Dissolved Lead (Pb)	2016/08/18		100	%	80 - 120
4621969	JXI	LCS	1,4-Difluorobenzene	2016/08/17		91	%	70 - 130
			4-Bromofluorobenzene	2016/08/17		104	%	70 - 130
			D10-Ethylbenzene	2016/08/17		103	%	70 - 130
			D4-1,2-Dichloroethane	2016/08/17		95	%	70 - 130
			Benzene	2016/08/17		104	%	70 - 130
			Toluene	2016/08/17		102	%	70 - 130
			Ethylbenzene	2016/08/17		109	%	70 - 130
			o-Xylene	2016/08/17		103	%	70 - 130
			p+m-Xylene	2016/08/17		101	%	70 - 130
			Hexane	2016/08/17		100	%	70 - 130
			F1 (C6-C10)	2016/08/17		97	%	70 - 130
4623186	ZZ	LCS	o-Terphenyl	2016/08/17		103	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2016/08/17		101	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2016/08/17		100	%	60 - 130
			F4 (C34-C50 Hydrocarbons)	2016/08/17		94	%	60 - 130

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

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Maxxam Job #: B6H0949
Report Date: 2016/08/19

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: August 10, 2016

Location: 1660 Merivlae Road, Ottawa, ON

Laboratory: Maxxam Analytics Mississauga

Consultant Project Number: 1544125-1155

Sample Submission Number: B6H0949

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within
Extraction Surrogate Recovery	X			acceptance criteria.
Method Blank Concentration	X			
Matrix Duplicate RPD	X			
Matrix Spike Recovery	X			
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	No field QC samples were collected.
Trip Blank Concentration			X	
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Was a Data Quality Waiver (DQW) issued (Yes/No)?: No

Date Issued: n/a

Date of Response: n/a

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Anita Colbert

Data Reviewed by (Signature): Anita Colbert

Date: August 23, 2016

Maxxam
A Bureau Veritas Group Company

Task Order#: 4410393424
Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007
Your C.O.C. #: 572973-05-01

Attention:Leon Burger

Golder Associates Ltd.
6925 Century Avenue
Suite #100
Mississauga, ON
Canada L5N 7K2

Report Date: 2016/08/18
Report #: R4120857
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B6H0953
Received: 2016/08/12, 11:39

Sample Matrix: Water
Samples Received: 2

Analyses	Quantity	Laboratory Method	Primary Reference
Petroleum Hydro. CCME F1 & BTEX in Water	2	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1)	2	CAM SOP-00316	CCME PHC-CWS m

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act.

Maxxam Analytics is accredited by SCC (Lab ID 97) for all specific parameters as required by GUCSO and O.Reg 153/04. Maxxam Analytics is limited in liability to the actual cost of analysis unless otherwise agreed in writing. There is no other warranty expressed or implied. Samples will be retained at Maxxam Analytics for three weeks from receipt of data or as per contract.

All data is in statistical control and has met all QC and method performance criteria unless otherwise flagged. All samples were analysed within hold time unless otherwise flagged. All soil samples for BTEX analysis were methanol extracted within 24 hours unless otherwise flagged.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following "Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003". Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Encryption Key



Patricia Legette
Project Manager
18 Aug 2016 16:48:57 -04:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kudrat Bajwa, B.Sc., Project Manager
Email: KBajwa@maxxam.ca
Phone# (905)817-5822

==========

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Maxxam Job #: B6H0953
Report Date: 2016/08/18

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007

HBTEX/F1-F4 PET. HYDROCARBONS IN WATER (WATER)

Maxxam ID		CWM514	CWM515		
Sampling Date		2016/08/11 03:00	2016/08/11 03:30		
COC Number		572973-05-01	572973-05-01		
	UNITS	**FIELD BLANK**	**TRIP BLANK**	**RDL**	**QC Batch**
Benzene	ug/L	<0.20	<0.20	0.20	4623498
Toluene	ug/L	<0.20	<0.20	0.20	4623498
Ethylbenzene	ug/L	<0.20	<0.20	0.20	4623498
o-Xylene	ug/L	<0.20	<0.20	0.20	4623498
p+m-Xylene	ug/L	<0.40	<0.40	0.40	4623498
Total Xylenes	ug/L	<0.40	<0.40	0.40	4623498
Hexane	ug/L	<5.0	<5.0	5.0	4623498
F1 (C6-C10)	ug/L	<25	<25	25	4623498
F1 (C6-C10) - BTEX	ug/L	<25	<25	25	4623498
F2 (C10-C16 Hydrocarbons)	ug/L	<100	<100	100	4623595
F3 (C16-C34 Hydrocarbons)	ug/L	<200	<200	200	4623595
F4 (C34-C50 Hydrocarbons)	ug/L	<200	<200	200	4623595
Reached Baseline at C50	ug/L	Yes	Yes		4623595
Extraction Surrogate Recovery (%)					
o-Terphenyl	%	102	108		4623595
Instrument Surrogate Recovery (%)					
1,4-Difluorobenzene	%	93	93		4623498
4-Bromofluorobenzene	%	100	100		4623498
D10-Ethylbenzene	%	94	106		4623498
D4-1,2-Dichloroethane	%	99	97		4623498

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B6H0953
Report Date: 2016/08/18

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007

TEST SUMMARY

Maxxam ID: CWM514
Sample ID: FIELD BLANK
Matrix: Water

Collected: 2016/08/11
Relinquished: 2016/08/11
Received: 2016/08/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	4623498	N/A	2016/08/17	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	4623595	2016/08/17	2016/08/18	Zhiyue (Frank) Zhu

Maxxam ID: CWM515
Sample ID: TRIP BLANK
Matrix: Water

Collected: 2016/08/11
Relinquished: 2016/08/11
Received: 2016/08/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	4623498	N/A	2016/08/17	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	4623595	2016/08/17	2016/08/18	Zhiyue (Frank) Zhu

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Maxxam Job #: B6H0953
Report Date: 2016/08/18

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	2.3°C

Results relate only to the items tested.

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Maxxam Job #: B6H0953
Report Date: 2016/08/18

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
4623498	LRA	Method Blank	1,4-Difluorobenzene	2016/08/17		97	%	70 - 130
			4-Bromofluorobenzene	2016/08/17		96	%	70 - 130
			D10-Ethylbenzene	2016/08/17		86	%	70 - 130
			D4-1,2-Dichloroethane	2016/08/17		97	%	70 - 130
			Benzene	2016/08/17	<0.20		ug/L	
			Toluene	2016/08/17	<0.20		ug/L	
			Ethylbenzene	2016/08/17	<0.20		ug/L	
			o-Xylene	2016/08/17	<0.20		ug/L	
			p+m-Xylene	2016/08/17	<0.40		ug/L	
			Total Xylenes	2016/08/17	<0.40		ug/L	
			Hexane	2016/08/17	<5.0		ug/L	
			F1 (C6-C10)	2016/08/17	<25		ug/L	
			F1 (C6-C10) - BTEX	2016/08/17	<25		ug/L	
4623595	ZZ	Method Blank	o-Terphenyl	2016/08/18		104	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2016/08/18	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2016/08/18	<200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2016/08/18	<200		ug/L	
4623498	LRA	LCS	1,4-Difluorobenzene	2016/08/17		99	%	70 - 130
			4-Bromofluorobenzene	2016/08/17		103	%	70 - 130
			D10-Ethylbenzene	2016/08/17		108	%	70 - 130
			D4-1,2-Dichloroethane	2016/08/17		101	%	70 - 130
			Benzene	2016/08/17		105	%	70 - 130
			Toluene	2016/08/17		97	%	70 - 130
			Ethylbenzene	2016/08/17		103	%	70 - 130
			o-Xylene	2016/08/17		94	%	70 - 130
			p+m-Xylene	2016/08/17		96	%	70 - 130
			Hexane	2016/08/17		82	%	70 - 130
			F1 (C6-C10)	2016/08/17		95	%	70 - 130
4623595	ZZ	LCS	o-Terphenyl	2016/08/18		111	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2016/08/18		109	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2016/08/18		108	%	60 - 130
			F4 (C34-C50 Hydrocarbons)	2016/08/18		100	%	60 - 130

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6H0953
Report Date: 2016/08/18

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Cristina Carriere

Cristina Carriere, Scientific Services

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Fax: (905) 817-5777
Toll Free: 800-563-6266

EXXONMOBIL/IMPERIAL OIL - MAXXAM
CHAIN-OF-CUSTODY RECORD
ANALYSIS REQUESTED

C of C #:572973-05-01

572973

INVOICE INFORMATION	REPORT INFORMATION
Company Name: Imperial Oil, a partnership of Imperial Oil Limited and McColl Frontenac Petrole	Company Name: Golder Associates Ltd.
Contact Name: Jordan Hardy	Contact Name: Leon Burger
Address: 1 Duncan Mill Road North York ON M3B 1Z2	Address: 6925 Century Avenue Suite #100 Mississauga ON L5N 7K2
Email: Jordan.P.Hardy@esso.ca	Email: Leon_Burger@golder.com;
Phone: (587) 476-3858	Phone: (226) 220-6879
Sampler Name (Print): Ian Atkinson & Brandon McFarlan	Consultant Project #: 1544125-1155-2007

	FIELD SAMPLE ID	MATRIX: GROUND WATER	MATRIX: SURFACE WATER	MATRIX: SOIL	MATRIX: OTHER	# CONTAINERS	SAMPLING: DATE (YYYY/MM/DD)	SAMPLING: TIME (24 HR)	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	F1 & BTEX (including n-hexane)	F2-F4	Lead
1	Field Blank				X	5	2016/08/11	03:00			X	X	
2	Trip Blank				X	3	2016/08/11	03:30			X		
3													
4													
5													
6													
7													
8													
9													
10													

IOL SITE LOCATION:
1660 Merivale Road, Ottawa, ON

IOL PROJECT # (if applicable):
MZ.00277

MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM:
4410393424-10

REGULATORY CRITERIA / DETECTION LIMITS:
☒ REG 153 Table 3 ☐ 2004 ☒ 2011 ☐ RSC
(Please indicate which Reg. version and if RSC required)
☐ ODWS ☐ PWQO
☐ Other

SPECIAL INSTRUCTIONS:
Upload to SAP: 88001627

JARS USED AND NOT SUBMITTED
Enter N/A for Water
N/A

TURNAROUND TIME
Standard (5 days) ☒
Rush (3 days) ☐
(2 days) ☐
(1 day) ☐
(same day) ☐
Date Required

	YES	NO	COOLER ID: 1			
SEAL PRESENT	✓					
SEAL INTACT	✓		TEMP °C	0 (1)	3 (2)	4 (3)
COOLING MEDIA PRESENT	✓					

	YES	NO	COOLER ID:			
SEAL PRESENT						
SEAL INTACT			TEMP °C	(1)	(2)	(3)
COOLING MEDIA PRESENT						

	YES	NO	COOLER ID:			
SEAL PRESENT						
SEAL INTACT			TEMP °C	(1)	(2)	(3)
COOLING MEDIA PRESENT						

LAB USE ONLY
MAXXAM JOB #
B6H0953

RELINQUISHED BY:		DATE:	TIME (24 HR):	RECEIVED BY:		DATE:	TIME (24 HR):
1.	Ian Atkinson	2016/08/11	14:00	1.	Jimmy Lee	2016/08/12	11:39
2.				2.			
3.				3.			

SAMPLES
LABELED BY: HQR
VERIFIED BY: JTZ

COC – 1012 (2013) IOL – ON White: Maxxam Yellow: Client

Maxxam
A Bureau Veritas Group Company

EXXONMOBIL / IMPERIAL OIL - MAXXAM ADDITIONAL ANALYSIS REQUEST RECORD

Company Name: Golder Associates Ltd.
Contact Name: Leon Burger
Consultant Project #: 1544125-1155-2007
Maxxam Job #: B6H0953
(Please complete this form on a per job basis - i.e. one form per original Maxxam Job#)

IOL Project Manager: Jordan Hardy
IOL Site Location: 1660 Merivale Road, Ottawa. ON
IOL Site #: NA
IOL Project #: MZ.00277
IOL Task Order or Service Order #: 4410393424
Line Item (if applicable): 10
Maxxam Location: Mississauga, Ontario

TURNAROUND TIME		
Standard	(5 days)	☑
Rush	(3 days)	☐
	(2 days)	☐
	(1 day)	☐
	(same day)	☐
Date Required :		

Applicable Guidelines (please specify):
O.Reg. 153/04, 2011, Table 3

ADDITIONAL ANALYSIS REQUEST

CLIENT SAMPLE ID	Original COC #	LAB ID	Matrix	SAMPLING DATE (YYYY/MM/DD)	SAMPLING Time HH:MM	F2-F4	Sample previously submitted on hold (Y/N)
Trip Blank	572973-05-01	CWM515	Other	2016/08/11	3:30	x	n

LAB USE ONLY
Original COC analysis completed and invoiced at time of add-on (circle one)
YES (NO)
(if yes original coc in invoice package is for reference only)
New Maxxam Job # (if applicable)
N/A

SPECIAL INSTRUCTIONS

REQUESTED BY: (Please Sign & Print) Leon Burger	DATE: (YYYY/MM/DD) 2016/08/17	TIME: (HH:MM) 09:55	
RECEIVED BY: (Please Sign & Print) PATRICIA LEGETTE	DATE: (YYYY/MM/DD) 2016/08/17	TIME: (HH:MM) 10:21	

COR FCD-00106 / 5

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: August 11, 2016

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Maxxam Analytics Mississauga

Consultant Project Number: 1544125-1155

Sample Submission Number: B6H0953

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within
Extraction Surrogate Recovery	X			acceptance criteria.
Method Blank Concentration	X			
Matrix Duplicate RPD			X	
Matrix Spike Recovery			X	
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration	X			All field QC samples are within
Trip Blank Concentration	X			alert limits.
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Was a Data Quality Waiver (DQW) issued (Yes/No)?: No

Date Issued: n/a

Date of Response: n/a

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): Amanda Newberry

Date: August 19, 2016

Maxxam
A Bureau Veritas Group Company

Task Order#: 4410393424
Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007
Your C.O.C. #: 590062-01-01

Attention:Leon Burger

Golder Associates Ltd.
6925 Century Avenue
Suite #100
Mississauga, ON
Canada L5N 7K2

Report Date: 2016/12/15
Report #: R4288559
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B6Q7339
Received: 2016/12/08, 08:09

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Laboratory Method	Primary Reference
Petroleum Hydro. CCME F1 & BTEX in Water	1	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1)	1	CAM SOP-00316	CCME PHC-CWS m
Dissolved Metals by ICPMS	1	CAM SOP-00447	EPA 6020B m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported: unless indicated otherwise, associated sample data are not blank corrected. All samples were analyzed within hold time unless otherwise flagged.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods. Results relate to samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following "Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003". Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

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Task Order#: 4410393424
Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007
Your C.O.C. #: 590062-01-01

Attention:Leon Burger

Golder Associates Ltd.
6925 Century Avenue
Suite #100
Mississauga, ON
Canada L5N 7K2

Report Date: 2016/12/15
Report #: R4288559
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B6Q7339
Received: 2016/12/08, 08:09

Encryption Key [redacted]
Kyle Reinhart
Project Manager - Environmental Customer Service
15 Dec 2016 15:56:03

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kyle Reinhart, Project Manager - Environmental Customer Service
Email: kreinhart@maxxam.ca
Phone# (905) 817-5700

==========

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Maxxam Job #: B6Q7339
Report Date: 2016/12/15

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007

LEAD (DISSOLVED) IN WATER

Maxxam ID		DPB272	DPB272		
Sampling Date		2016/12/05 15:30	2016/12/05 15:30		
COC Number		590062-01-01	590062-01-01		
	UNITS	**TH1**	**TH1 Lab-Dup**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	<0.50	<0.50	0.50	4786638

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B6Q7339
Report Date: 2016/12/15

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007

O.REG 153 PHCS IN WATER (WATER)

Maxxam ID		DPB272		
Sampling Date		2016/12/05 15:30		
COC Number		590062-01-01		
	UNITS	**TH1**	**RDL**	**QC Batch**
Benzene	ug/L	<0.20	0.20	4789245
Toluene	ug/L	<0.20	0.20	4789245
Ethylbenzene	ug/L	<0.20	0.20	4789245
o-Xylene	ug/L	<0.20	0.20	4789245
p+m-Xylene	ug/L	<0.40	0.40	4789245
Total Xylenes	ug/L	<0.40	0.40	4789245
F1 (C6-C10)	ug/L	<25	25	4789245
F1 (C6-C10) - BTEX	ug/L	<25	25	4789245
F2 (C10-C16 Hydrocarbons)	ug/L	<100	100	4790932
F3 (C16-C34 Hydrocarbons)	ug/L	<200	200	4790932
F4 (C34-C50 Hydrocarbons)	ug/L	<200	200	4790932
Reached Baseline at C50	ug/L	Yes		4790932
Extraction Surrogate Recovery (%)				
o-Terphenyl	%	96		4790932
Instrument Surrogate Recovery (%)				
1,4-Difluorobenzene	%	101		4789245
4-Bromofluorobenzene	%	91		4789245
D10-Ethylbenzene	%	98		4789245
D4-1,2-Dichloroethane	%	86		4789245

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B6Q7339
Report Date: 2016/12/15

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007

TEST SUMMARY

Maxxam ID: DPB272
Sample ID: TH1
Matrix: Water

Collected: 2016/12/05
Relinquished: 2016/12/06
Received: 2016/12/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	4789245	N/A	2016/12/13	Georgeta Rusu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	4790932	2016/12/13	2016/12/14	Zhiyue (Frank) Zhu
Dissolved Metals by ICPMS	ICP/MS	4786638	N/A	2016/12/14	Cristina Petran

Maxxam ID: DPB272 Dup
Sample ID: TH1
Matrix: Water

Collected: 2016/12/05
Relinquished: 2016/12/06
Received: 2016/12/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Metals by ICPMS	ICP/MS	4786638	N/A	2016/12/14	Cristina Petran

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Maxxam Job #: B6Q7339
Report Date: 2016/12/15

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	2.7°C

Results relate only to the items tested.

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Maxxam Job #: B6Q7339
Report Date: 2016/12/15

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
4786638	CPE	Method Blank	Dissolved Lead (Pb)	2016/12/14	<0.50		ug/L	
4789245	GRU	Method Blank	1,4-Difluorobenzene	2016/12/12		99	%	70 - 130
			4-Bromofluorobenzene	2016/12/12		93	%	70 - 130
			D10-Ethylbenzene	2016/12/12		92	%	70 - 130
			D4-1,2-Dichloroethane	2016/12/12		89	%	70 - 130
			Benzene	2016/12/12	<0.20		ug/L	
			Toluene	2016/12/12	<0.20		ug/L	
			Ethylbenzene	2016/12/12	<0.20		ug/L	
			o-Xylene	2016/12/12	<0.20		ug/L	
			p+m-Xylene	2016/12/12	<0.40		ug/L	
			Total Xylenes	2016/12/12	<0.40		ug/L	
			F1 (C6-C10)	2016/12/12	<25		ug/L	
			F1 (C6-C10) - BTEX	2016/12/12	<25		ug/L	
4790932	ZZ	Method Blank	o-Terphenyl	2016/12/13		96	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2016/12/13	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2016/12/13	<200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2016/12/13	<200		ug/L	
4786638	CPE	RPD [DPB272-03]	Dissolved Lead (Pb)	2016/12/14	NC		%	20
4786638	CPE	Matrix Spike [DPB272-03]	Dissolved Lead (Pb)	2016/12/14		89	%	80 - 120
4786638	CPE	LCS	Dissolved Lead (Pb)	2016/12/14		97	%	80 - 120
4789245	GRU	LCS	1,4-Difluorobenzene	2016/12/12		100	%	70 - 130
			4-Bromofluorobenzene	2016/12/12		98	%	70 - 130
			D10-Ethylbenzene	2016/12/12		88	%	70 - 130
			D4-1,2-Dichloroethane	2016/12/12		89	%	70 - 130
			Benzene	2016/12/12		98	%	70 - 130
			Toluene	2016/12/12		99	%	70 - 130
			Ethylbenzene	2016/12/12		99	%	70 - 130
			o-Xylene	2016/12/12		98	%	70 - 130
			p+m-Xylene	2016/12/12		88	%	70 - 130
			F1 (C6-C10)	2016/12/12		97	%	70 - 130
4790932	ZZ	LCS	o-Terphenyl	2016/12/14		101	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2016/12/14		89	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2016/12/14		91	%	60 - 130
			F4 (C34-C50 Hydrocarbons)	2016/12/14		94	%	60 - 130

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

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Maxxam Job #: B6Q7339
Report Date: 2016/12/15

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Mississauga, Ontario L5N 2L8
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Phone: (905) 817-5700
Fax: (905) 817-5777
Toll Free: 800-563-6266

EXXONMOBIL/IMPERIAL OIL - MAXXAM CHAIN-OF-CUSTODY RECORD

ANALYSIS REQUESTED

Page 1 of 1

C of C # 590062-01-01

590062

INVOICE INFORMATION	REPORT INFORMATION
Company Name: Imperial Oil, a partnership of Imperial Oil Limited and McColl Frontenac Petrole	Company Name: Golder Associates Ltd.
Contact Name: Jordan Hardy	Contact Name: Leon Burger
Address: 505 Quarry Park Blvd SE Calgary AB T2C 5N1	Address: 6925 Century Avenue Suite #100 Mississauga ON L5N 7K2
Email: Jordan.P.Hardy@esso.ca	Email: Leon_Burger@golder.com
Phone: (587) 476-3858	Phone: (226) 220-6879
Sampler Name (Print): Brandon McFarlan	Consultant Project #: 1544125-1155-2007

	FIELD SAMPLE ID	MATRIX: GROUNDWATER	MATRIX: SURFACE WATER	MATRIX: SOIL	MATRIX: OTHER	# CONTAINERS	SAMPLING: DATE (YYYY/MM/DD)	SAMPLING: TIME (24 HR)	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	F1 & BTEX	F2 - F4	Lead
1	TH1	X				6	2016/12/05	15:30	X		X	X	X
2													
3													
4													
5													
6													
7													
8													
9													
10													

IOL SITE LOCATION:
1660 Merivale Road, Ottawa, ON

IOL PROJECT # (if applicable):
MZ.00277

MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM:
4410393424-10

REGULATORY CRITERIA / DETECTION LIMITS:
☒ REG 153 Table 3 ☐ 2004 ☒ 2011 ☐ RSC
(Please indicate which Reg. version and if RSC required)
☐ ODWS ☐ PWQO
☐ Other

SPECIAL INSTRUCTIONS:
Please upload to 88001627
Headspace and Sediment may be present in sample containers.

JARS USED AND NOT SUBMITTED
Enter N/A for Water
NA

TURNAROUND TIME
Standard (5 days) ☒
Rush (3 days) ☐
(2 days) ☐
(1 day) ☐
(same day) ☐
Date Required

	YES	NO	COOLER ID: 1				YES	NO	COOLER ID:				YES	NO	COOLER ID:			
SEAL PRESENT	✓																	
SEAL INTACT	✓		TEMP °C	1	2	5			TEMP °C	1	2	3			TEMP °C	1	2	3
COOLING MEDIA PRESENT	✓			1	2	3												

RELINQUISHED BY:		DATE:	TIME (24 HR)	RECEIVED BY:		DATE:	TIME (24 HR)
1.	Brandon McFarlan	2016/12/06	12:00	1.	ASAD BHATTI	2016/12/08	08:09
2.				2.			
3.				3.			

LAB USE ONLY
MAXXAM JOB #
B6Q7339
SAMPLES
LABELED BY: MA
VERIFIED BY: AKP

COC – 1012 (2013) IOL – ON White: Maxxam Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: December 5, 2016

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Maxxam Analytics Mississauga

Consultant Project Number: 1544125-1155

Sample Submission Number: B6Q7339

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within
Extraction Surrogate Recovery	X			acceptance criteria.
Method Blank Concentration	X			
Matrix Duplicate RPD	X			
Matrix Spike Recovery	X			
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	No field QC samples were collected.
Trip Blank Concentration			X	
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Was a Data Quality Waiver (DQW) issued (Yes/No)?: No

Date Issued: n/a

Date of Response: n/a

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): Amanda Newberry

Date: December 15, 2016

APPENDIX B QUALITY ASSURANCE/QUALITY CONTROL

QUALITY ASSURANCE/QUALITY CONTROL

In conjunction with the field investigations completed to date, a Quality Assurance/Quality Control (QA/QC) program was implemented to ensure the integrity of the soil and groundwater sampling and analytical testing results.

1.0 FIELD PROGRAM

All sampling activities were completed in accordance with Golder's Technical Field Procedures by trained Golder personnel. All field activities were documented in field notes and results were recorded on standard field forms. All field equipment involved in sampling and monitoring was decontaminated in accordance with Golder's Technical Procedures. Soil and groundwater samples were collected using appropriate handling protocols and were placed in sample containers provided by Maxxam Analytics Inc. (Maxxam).

All re-useable field equipment involved in collecting samples was decontaminated between each sampling location. To help prevent cross-contamination, a new pair of clean nitrile gloves was used for the collection of each sample.

Samples were given unique identification numbers and the sampling containers were preserved in ice-filled coolers. Samples were logged onto formal chain-of-custody documents and transported to Maxxam's Mississauga Laboratory for chemical analysis. Maxxam's Mississauga laboratory is accredited by the Standards Council of Canada (SCC).

Blind field duplicate samples were submitted for analysis. Trip and field blanks were submitted for analysis, as necessary, to evaluate the potential for cross-contamination during the sampling and transportation of the samples. Submission of blind field duplicate QC samples was at a minimum rate of 10% of total samples.

2.0 LABORATORY PROGRAM

The laboratory QA/QC program included adherence to laboratory sampling and analysis protocols (e.g., hold times, sample containers, preservatives, detection limits and approved methodology) and the analysis of laboratory method blanks, laboratory sample duplicates, surrogate recovery and chemical spikes.

The laboratory method blank analysis results were used to detect interferences or impurities introduced by the laboratory equipment, reagents, or solvents. Surrogate recovery is analyzed for organics by spiking samples with known quantities of surrogate chemicals which have similar chemical properties to the parameters being analyzed. The reported recovery provides an indication of the analytical method accuracy for that sample. Matrix spikes were conducted by adding known concentrations of the analyte of interest to a sample to evaluate the effects of the sample matrix on the analytical method. The analysis of selected samples in duplicate is used to evaluate the reproducibility of the analytical method.

4.0 DATA RECEPTION

Once laboratory analytical results were received, Golder completed a review of field and laboratory quality. This included review of laboratory QC performance to confirm results are within acceptance criteria, as well as evaluation of field duplicate and blank results to confirm they were within alert limits. Upon receipt of the analytical results, Relative Percent Difference (RPD) values between the original samples and their blind field duplicates were calculated as follows:

$$RPD = \frac{|x_2 - x_1|}{\left(\frac{x_1 + x_2}{2}\right)} \times 100$$

Where: RPD = relative percent difference
X_2 = sample value
X_1 = blind field duplicate or replicate value.

Since analytical error increases near the Reportable Detection Limit (RDL), an RPD was only calculated where the concentrations of both the original and blind field duplicate samples were greater than five times the RDL. The calculated RPDs were then compared to parameter specific alert limits.

Exceedances of the QC acceptance or alert criteria were investigated with the laboratory and, if warranted, a corrective action report was requested from the laboratory.

5.0 DATA QUALITY REVIEW RESULTS

Results of the data quality review are summarized in Table D1. The RPD calculations and QC results are presented in Table D2 and D3.

One groundwater field duplicate sample was submitted to the laboratory for analysis of BTEX, PHC F1 to F4, Lead, and hexane as part of the groundwater QC program.

Based on the data quality review, no data quality issue were identified that would have a material effect on the reliability of the data.

Additional information is provided in Table D1.

6.0 SUMMARY OF RESULTS

Based on the review of the QA/QC results, the data presented in this report are considered to be reliable.

Table B1
Summary of Quality Control Samples - Groundwater Monitoring
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Maxxam Job Number	Data Quality Waiver Issued (Yes/No)	Data Quality Waiver Number	Matrix	Maxxam Sample ID Affected	Test Affected	Data Quality Issue	Comments
B6H0949	No	n/a	Groundwater	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
B6G9951	No	n/a	Groundwater	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
B6G9952	No	n/a	Groundwater	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
B6H0953	No	n/a	Groundwater	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
B6Q7343	No	n/a	Groundwater	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
B6Q7339	No	n/a	Groundwater	n/a	n/a	No data quality issues were identified.	The data are considered reliable.

Notes:
n/a - not applicable

Table B2
Summary of Field Duplicate Sample Results - Groundwater Monitoring
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location Sample Collection Date Maxxam Sample ID	Units	Alert Limit	RDL	5X RDL	Are the results >5X RDL	TH4 August 10, 2016 CWH956	DUP A August 10, 2016 CWH957	RPD %
Hydrocarbons								
Benzene	µg/L	>80%	0.4	2	yes	210	190	10
Toluene	µg/L	>80%	0.4	2	yes	11	9.7	13
Ethylbenzene	µg/L	>80%	0.4	2	yes	550	490	12
o-Xylene	µg/L	>80%	0.4	2	yes	10	8.3	19
p+m-Xylene	µg/L	>80%	0.8	4	yes	1500	1400	7
Total Xylenes	µg/L	>80%	0.8	4	yes	1500	1400	7
Hexane	µg/L	>80%	10	50	no	27	31	n/c
F1 (C6-C10)	µg/L	>80%	50	250	yes	4100	3700	10
F1 (C6-C10) - BTEX	µg/L	>80%	50	250	yes	1800	1600	12
F2 (C10-C16 Hydrocarbons)	µg/L	>80%	100	500	no	370	400	n/c
F3 (C16-C34 Hydrocarbons)	µg/L	>80%	200	1000	no	<200	210	n/c
F4 (C34-C50 Hydrocarbons)	µg/L	>80%	200	1000	no	<200	<200	n/c
Dissolved Lead (Pb)	µg/L	>50%	0.5	2.5	no	1.1	1.7	n/c

Notes:
Bold/Underlined - value exceeds alert limit
BTEX - benzene, toluene, ethylbenzene, xylenes
F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3 and 4
mbgs - metres below ground surface
µg/L - micrograms per litre
n/a - not analyzed
n/c - not calculable
RDL - reportable detection limit
RPD - relative percent difference
> - greater than
< - less than
RPD is not calculated if either the original or field duplicate sample has a result less than 5X the RDL

Table B3
Summary of Field Blank and Trip Blank Results - PHC Parameters
1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Sample Collection Date / Maxxam Sample ID	Units	RDL	Field Blank August 11, 2016 CWM514	Alert Limit	Do the results exceed the Alert Limit?	Trip Blank August 11, 2016 CWM515	Alert Limit	Do the results exceed the Alert Limit?	Trip Blank December 5, 2016 DPB277	Alert Limit	Do the results exceed the Alert Limit?
Hydrocarbons											
Benzene	ug/L	0.2	<0.20	>5X RDL	no	<0.20	>5X RDL	no	<0.20	>5X RDL	no
Toluene	ug/L	0.2	<0.20	>5X RDL	no	<0.20	>5X RDL	no	<0.20	>5X RDL	no
Ethylbenzene	ug/L	0.2	<0.20	>5X RDL	no	<0.20	>5X RDL	no	<0.20	>5X RDL	no
Total Xylenes	ug/L	0.4	<0.40	>5X RDL	no	<0.40	>5X RDL	no	<0.40	>5X RDL	no
Hexane	ug/L	5	<5.0	>5X RDL	no	<5.0	>5X RDL	no	na	>5X RDL	na
F1 (C6-C10)	ug/L	25	<25	>2X RDL	no	<25	>2X RDL	no	<25	>2X RDL	no
F1 (C6-C10) - BTEX	ug/L	25	<25	>2X RDL	no	<25	>2X RDL	no	<25	>2X RDL	no
F2 (C10-C16 Hydrocarbons)	ug/L	100	<100	>2X RDL	no	<100	>2X RDL	no	na	>2X RDL	na
F3 (C16-C34 Hydrocarbons)	ug/L	200	<200	>2X RDL	no	<200	>2X RDL	no	na	>2X RDL	na
F4 (C34-C50 Hydrocarbons)	ug/L	200	<200	>2X RDL	no	<200	>2X RDL	no	na	>2X RDL	na

Notes:

Bold/Underlined - value exceeds alert limit

BTEX - benzene, toluene, ethylbenzene, xylenes

F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3 and 4

RDL - reportable detection limit

> - greater than

< - less than

Alert limit is 5X the RDL for BTEX and 2X the RDL for F1 to F4.

All values reported in µg/L (micrograms per litre)

na - not analyzed

November 21, 2016 1544125-1155

THIS REPORT CONTAINS PROVISIONS LIMITING LIABILITY, THE SCOPE OF THE REPORT AND THIRD PARTY RELIANCE

These documents and the information contained therein are confidential property of Imperial Oil Limited and any disclosure of same is governed by the provisions of each of the applicable provincial and territorial freedom of information legislation, the Privacy Act (Canada) 1980-81-83, c.111, Sch. II"1", and the Access to Information Act (Canada) 1980-81-82-83, c.111, Sch.I"1", as such, legislation may be amended from time to time.

Imperial Oil Limited
505 Quarry Park Blvd SE
Calgary, Alberta
T2C 5N1

2016 GROUNDWATER MONITORING AND SAMPLING REPORT ADJACENT TO 1660 MERIVALE ROAD, OTTAWA, ON (SAP NO. 88001627)

INTRODUCTION

Golder Associates Ltd. (Golder) was retained by Imperial Oil Limited (Imperial) to conduct a groundwater monitoring and sampling program along the roadways of Viewmount Drive and Merivale Road adjacent to the north and east of the Imperial Oil site located at 1660 Merivale Road in Ottawa, Ontario (Figures 1 and 2). This area of Viewmount Drive and Merivale Road will henceforth be referred to as the subject property. The fieldwork was conducted between August 10 and 31, 2016.

Limitation of liability, scope of report and third party reliance is provided in Appendix A.

SCOPE OF WORK

The scope of work consisted of the following activities:

- Decommissioning TH10 and drilling a new monitoring well (MW16-01) 1.25 metres (m) south of TH10;
- Monitoring seven existing monitoring wells (TH8, TH9, TH11, TH12, TH100, TH101 and TH102) and one new monitoring well (MW16-01) (Figure 3) for vapour concentrations, depth to groundwater and the thickness, if present, of light non-aqueous phase liquids (LNAPLs);
- Collecting groundwater samples from seven existing and one new monitoring wells using low-flow sampling methods;
- Submitting groundwater samples for analysis of benzene, toluene, ethylbenzene, xylene (BTEX), petroleum hydrocarbons (PHCs) fractions F1 to F4, hexane and lead;
- Implementing a quality assurance and quality control (QA/QC) program; and,
- Comparing analytical chemistry data from the groundwater samples to the Ontario Ministry of the Environment and Climate Change (MOECC) standards considered to be applicable at the subject property, Table 3 full depth generic site condition standards in a non-potable groundwater condition for medium and fine textured soil, all types of property use of the MOECC document titled “Soil, Ground Water, and Sediment Standards for Use Under Part XV.1 of the *Environmental Protection Act,”* dated April 15, 2011 (hereafter referred to as the Table 3 Standards).

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Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

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METHODOLOGY

Monitoring Well Decommissioning

TH10 was found to be blocked and unusable during the 2015 monitoring and sampling event. TH10 was decommissioned on August 24, 2016 by vacuuming out the well casing to remove debris from the casing, filling the casing with hydrated bentonite chips, to approximately 1.3 mbgs, hydrated bentonite seal was placed from 1.3 to 0.3 mbgs and sand was used to fill the top 0.3 m with asphalt cold patch covering to match the existing road grade.

Monitoring Well Drilling and Installation

One borehole was drilled at the Site and completed as a monitoring well (MW16-01). Prior to drilling, the borehole was hydro-vacuumed to 2.4 mbgs for utility clearance. The hydrovac truck was operated by Badger Daylighting Inc. of Ottawa. Borehole drilling was completed using a GeoProbe drill rig using a diamond core bit. The drill rig was operated by Strata Drilling of Ottawa.

Soil samples were not collected during drilling since the borehole was completed in bedrock below the hydrovac hole. The borehole was completed as a monitoring well. The monitoring well was constructed of 50-mm diameter, Schedule 40 polyvinyl chloride screen and solid riser. The well completion zone consisted of 0.010-inch slot screen, and 10-20 silica sand was placed around the screen to a level of 0.3 m above the top of the screen. Well annuli above the sand pack were sealed with hydrated bentonite chips. The monitoring well was completed with a flush mount casing set in concrete.

The monitoring well locations are presented on Figure 3. The borehole log and well completion details are presented in Appendix B.

Monitoring Well Development

Following drilling and prior to groundwater sampling, the newly-installed well was developed by removing the equivalent of three well volumes of water from the well. High density polyethylene (HDPE) tubing and a surge block were used to develop the monitoring well. Surge blocking was used for developing the monitoring well in order to set the sand pack and to reduce the amount of sediment in the groundwater. Purged water was retained on-site in a 205-L barrel. Once the field program was completed, the barrel was transported off-site and properly disposed at an approved facility.

Combustible Gas Detector Calibrations and Headspace Concentrations

Headspace vapour concentrations were measured using a combustible organic vapour meter (OVM). The OVM was rented from and calibrated by Pine Environmental.

Vapour concentrations were taken from inside each well casing by placing the OVM nozzle about 15 to 30 centimetres (cm) below the top of casing (TOC). The OVM reading was taken immediately after the cap had been removed from the top of the monitoring well casing in order to minimize the loss of volatiles from within the casing. The peak OVM reading was recorded.

Depth to Groundwater and LNAPL Thickness

Depth to groundwater was measured and, if present, the thickness of LNAPLs was measured using an oil/water interface probe. If LNAPLs were detected, then its presence was confirmed visually using a bailer. Prior to use in each well, the interface probe was cleaned using a phosphate-free detergent and deionized water solution, then rinsed with distilled water to minimize the potential for cross contamination. Depth to groundwater measurements were taken from the TOC.

Low Flow Groundwater Sampling

Groundwater samples were collected from TH8, TH9, TH11, TH12, TH100, TH101, TH102 and MW16-01 using the low flow sampling technique. Water was pumped from each well, at a rate of 0.1 to 1 L/min, using low density polyethylene (LDPE) tubing connected to a peristaltic pump with a portion of silicone tubing. Routine water quality indicator parameters were measured during the pumping using a multi-parameter water quality meter with a flow-through cell. The parameters measured included EC, pH and temperature. Calibration of the instrument was completed as per the manufacturer's instructions. Eleven samples, including one duplicate, one field blank, one trip blank and eight groundwater samples, were collected in total. Purged water was collected in a drum for removal from subject property. The liquid was picked up by Badger Daylighting Inc. (Badger), a MOECC licensed waste hauler, and disposed of at the Tomlinson Environmental Services Ltd. Industrial Waste Division waste receiving facility on Power Road in Ottawa, Ontario, a MOECC approved waste receiver.

Laboratory Analysis of Groundwater Samples

- The samples were submitted under chain-of-custody to Maxxam Analytics Inc. (Maxxam) in Mississauga, Ontario, for analysis of BTEX and PHC Fractions F1 to F4, hexane and lead. The sample from MW16-01 was not analysed for hexane.
- Groundwater samples for BTEX, PHC Fraction F1 and hexane analysis were placed in 44-mL clear glass vials provided by the laboratory and preserved with sodium bisulphate as a microbial inhibitor. The groundwater samples for PHC Fraction F2 to F4 analysis were placed in 250-mL amber glass bottles and preserved with sodium bisulphate. The groundwater samples for lead were placed in laboratory-supplied 120 mL plastic bottles and preserved with nitric acid.
- Sampling containers were preserved in ice-filled coolers and transported to Maxxam for chemical analysis.

Quality Assurance and Quality Control

A QA/QC program was followed to minimize and quantify impacts introduced during sample collection, handling, shipping and analysis. As part of the QA/QC program, sampling protocols included minimizing sample handling, submitting field QA/QC samples, using dedicated non-contaminating sampling equipment, using sample-specific identification and labelling procedures, and using chain-of-custody records.

RESULTS

Monitoring Well Headspace Vapour (Date; Range)

- August 10 - 31, 2016; not detected to 100% LEL (Table 1).

LNAPL Occurrence (Date; Observations)

- August 10 - 31, 2016; Not detected (Table 1).

Groundwater Monitoring (Date; Depth to Groundwater Range; Groundwater Direction)

- August 10 - 31, 2016; Depth to shallow groundwater level was 2.88 to 3.68 metres below ground surface (mbgs) (Table1); groundwater flow direction could not be determined (Figure 4).

Groundwater Analytical Results (Date; Parameters; No. of wells)

- August 10 - 31, 2016; BTEX, PHC Fractions F1 to F4, hexane and lead; exceedances of PHC Fractions F1 to F4 at five monitoring wells (Table 2 and Figure 5).

QUALITY ASSURANCE/QUALITY CONTROL

- Copies of the associated laboratory certificates of analysis are provided in Appendix C.
- No data quality issues were identified. The data presented in this report are considered to be reliable (Appendix D).

CLOSURE

We trust the information provided herein meets your requirements. If you have any questions about the contents of the letter, please contact the undersigned.

Yours truly,

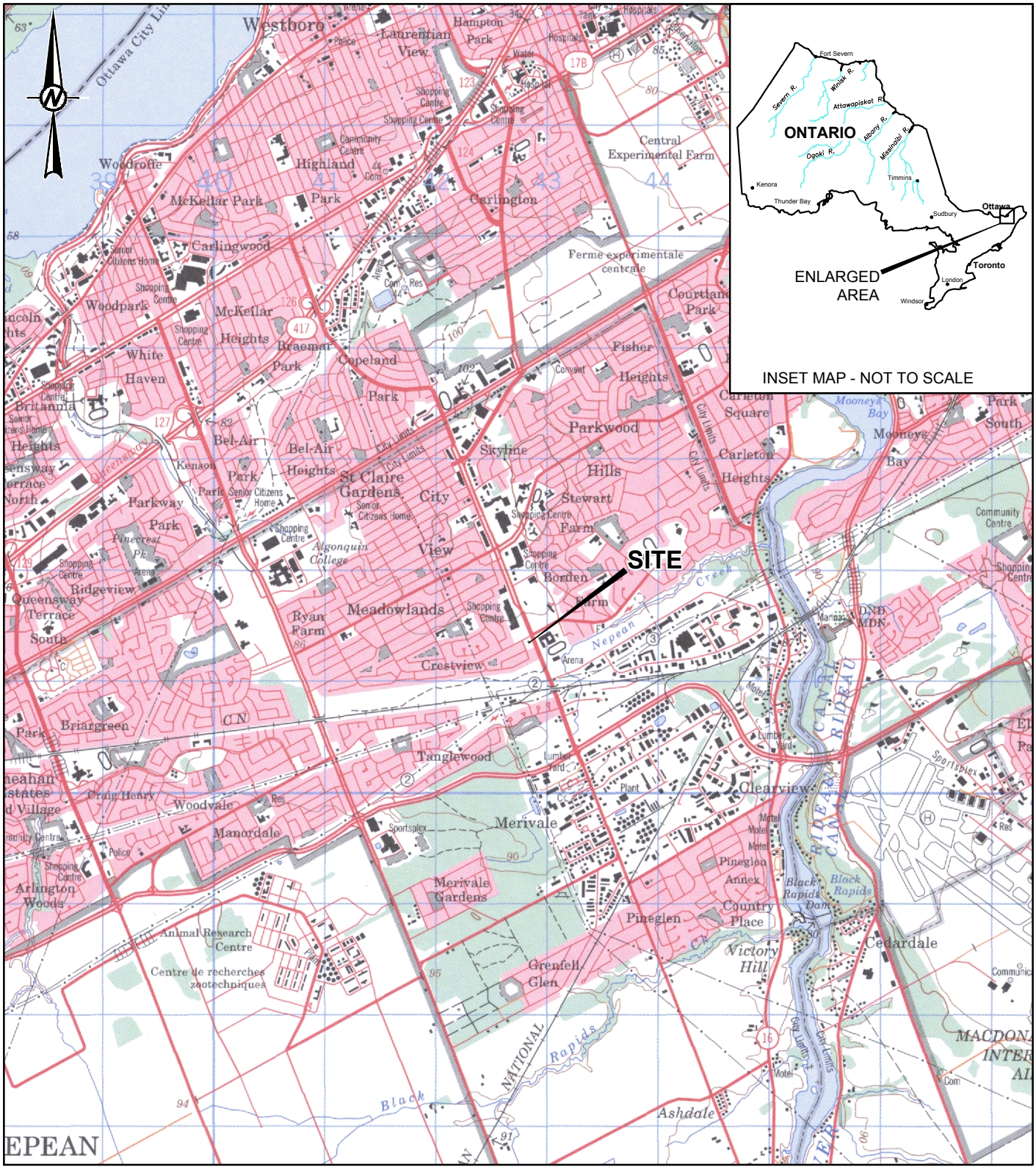
GOLDER ASSOCIATES LTD.

Brandon McParlan, B.Sc.
Project Coordinator

Sandra Carrelas, M.E.Sc., P.Eng.
Associate, Senior Geo-Environmental Engineer

Attachments: Figures
Tables
Appendix A: Limitations of Liability, Scope of Report and Third Party Review
Appendix B: Monitoring Well Log
Appendix C: Laboratory Certificates of Analysis and Data Quality Review Checklists
Appendix D: Quality Assurance/Quality Control

FIGURES



INSET MAP - NOT TO SCALE

REFERENCE

TOPOGRAPHIC MAP 31G/05 OBTAINED FROM Canmatrix. © 1998 HER MAJESTY THE QUEEN IN RIGHT OF CANADA. DEPARTMENT OF NATURAL RESOURCES. PROJECTION: TRANSVERSE MERCATOR; DATUM: NAD83; COORDINATE SYSTEM: UTM ZONE 18.

0 1,000 2,000
1:50,000 METRES

CLIENT
IMPERIAL OIL LIMITED

CONSULTANT
Golder Associates

YYYY-MM-DD	2016-11-21
DESIGNED	BMcParlan
PREPARED	AMehdilou
REVIEWED	BMcParlan
APPROVED	SCarrelas

PROJECT
ADJACENT TO
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
TOPOGRAPHIC MAP

PROJECT NO.	PHASE-TASK	REV.	FIGURE
1544125	1155-2016	0	1

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IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A

0 25 mm



REFERENCE

IMAGE OBTAINED FROM GOOGLE EARTH © 2015 GOOGLE INC. USED WITH PERMISSION.
GOOGLE AND GOOGLE LOGO ARE REGISTERED TRADEMARKS OF GOOGLE INC.
IMAGERY DATE: SEPTEMBER 24, 2013. GOOGLE EARTH IMAGE IS NOT TO SCALE.
NAD83, PROJECTION: UTM ZONE 18.

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No.: 11010-SITE PLAN OFFSITE-OCT14; SCALE: UNKNOWN; DATE: AUGUST 2014.

0 50 100
(APPROX.) METRES

CLIENT
IMPERIAL OIL LIMITED

CONSULTANT
Golder Associates

YYYY-MM-DD	2016-11-21
DESIGNED	BMcParlan
PREPARED	AMehdilou
REVIEWED	BMcParlan
APPROVED	SCarrelas

PROJECT
ADJACENT TO
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
SITE LOCALITY MAP

PROJECT NO.	PHASE-TASK	REV.	FIGURE
1544125	1155-2016	0	2

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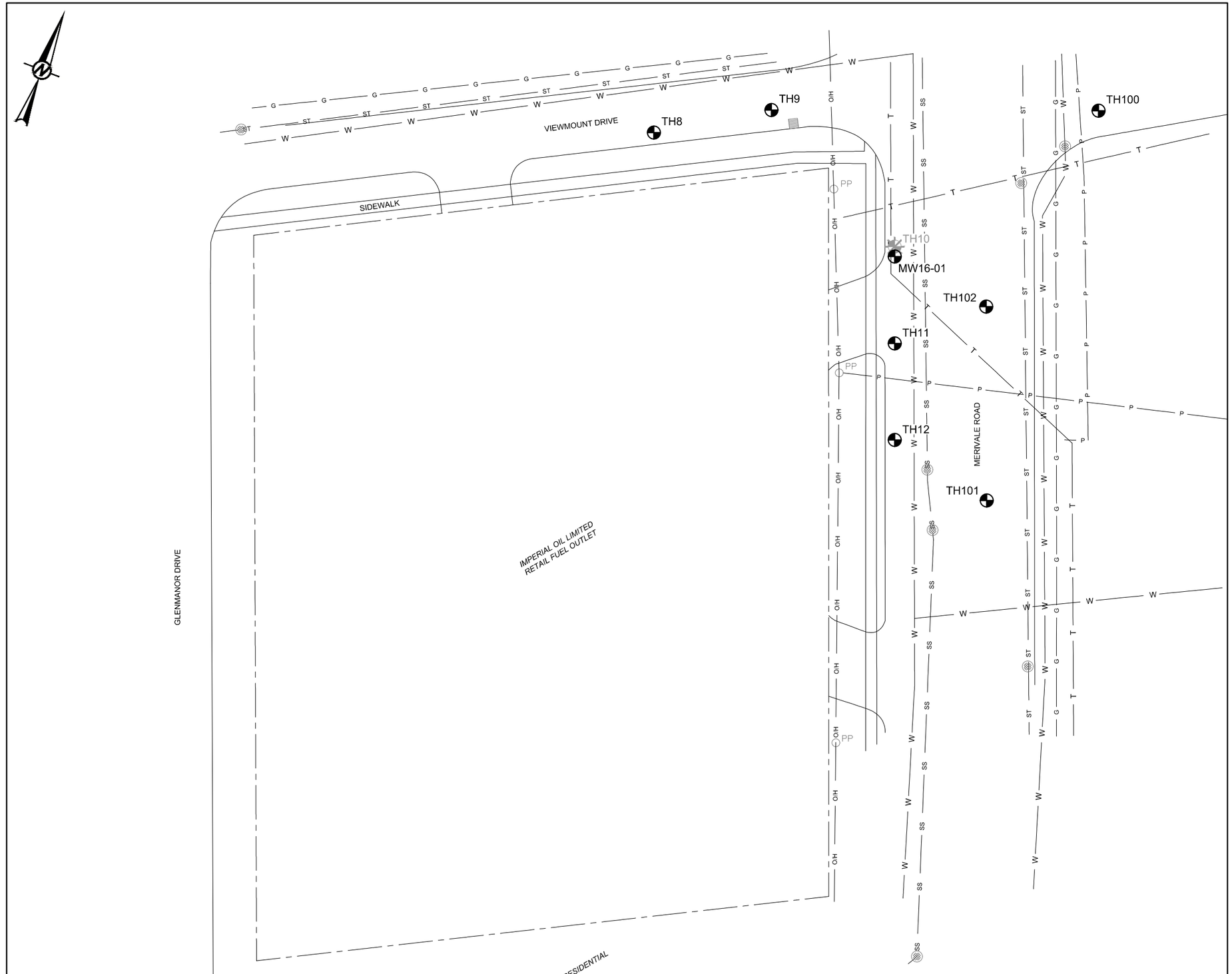

LEGEND

- PROPERTY BOUNDARY
- O/H — OVERHEAD POWER LINE
- G — UNDERGROUND GAS LINE
- P — UNDERGROUND POWER LINE
- SS — UNDERGROUND SANITARY LINE
- ST — UNDERGROUND STORM SEWER LINE
- T — UNDERGROUND TELEPHONE LINE
- W — UNDERGROUND WATERLINE
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL (DECOMMISSIONED)
- CATCH BASIN
- MANHOLE
- PP — POWER POLE

REFERENCE

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No.: 11010-SITE PLAN OFFSITE-OCT14; SCALE: UNKNOWN; DATE: OCTOBER 2014.

0 10 20
1:500 METRES

CLIENT
IMPERIAL OIL LIMITED

PROJECT
ADJACENT TO
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
SITE PLAN WITH MONITORING WELL LOCATIONS

CONSULTANT
Golder Associates

YYYY-MM-DD	2016-11-21
DESIGNED	BMcParlan
PREPARED	AMehdilou
REVIEWED	BMcParlan
APPROVED	SCarrelas

PROJECT NO.	PHASE-TASK	REV.	FIGURE
1544125	1155-2016	0	3

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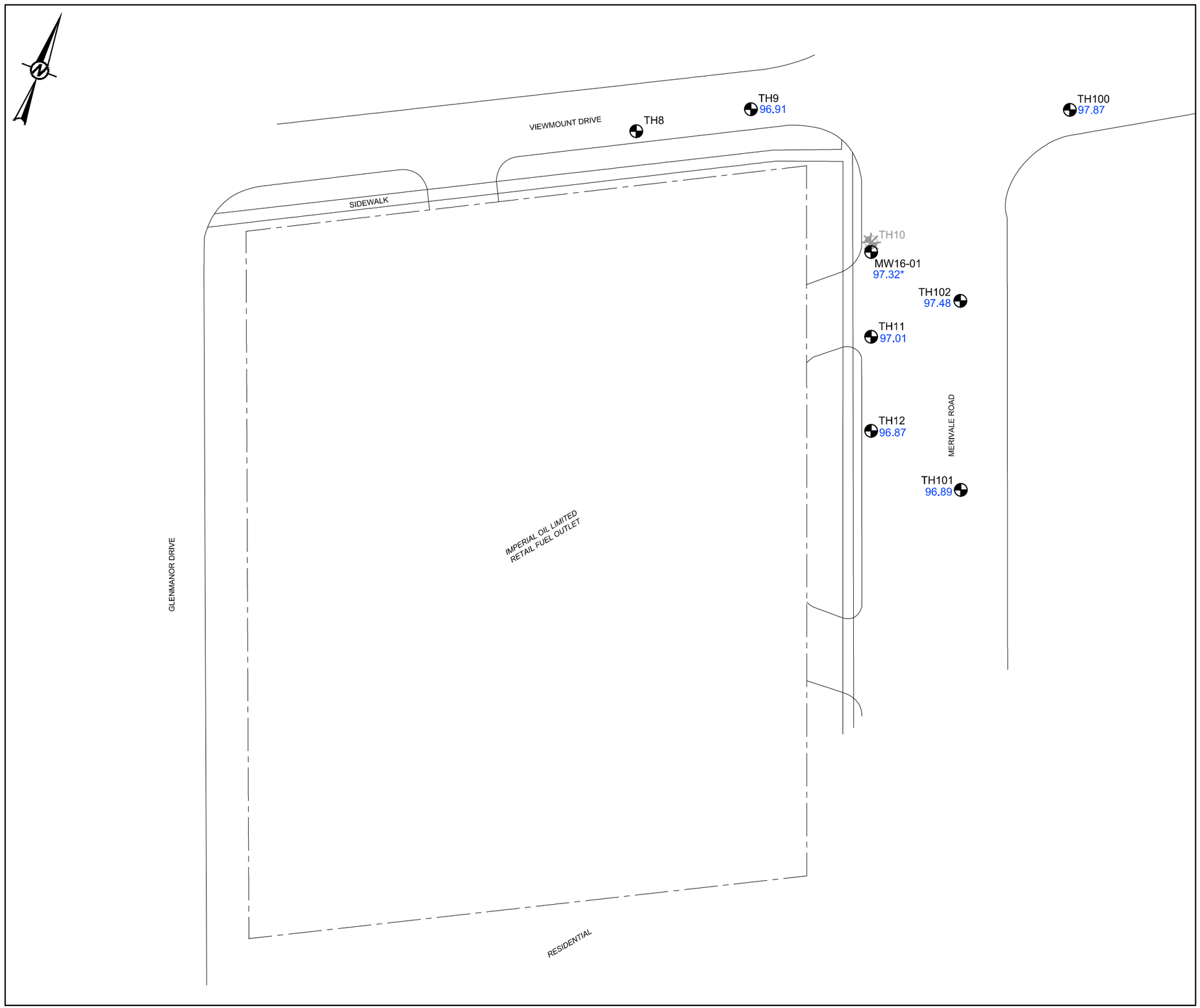


LEGEND

——— – ———	PROPERTY BOUNDARY
⊕	BOREHOLE LOCATION COMPLETED AS A MONITORING WELL
96.99	GROUNDWATER ELEVATION (masl)
97.32*	NOT USED IN GROUNDWATER FLOW CALCULATION (m)

LIST OF APPLICABLE ABBREVIATIONS

m	METRE
masl	METRES ABOVE SEA LEVEL

NOTE

ELEVATIONS ARE RELATIVE TO LOCAL BENCHMARK (NORTH SIDE OF MANHOLE COVER LOCATED 5 m WEST OF KIOSK ON IMPERIAL OIL PROPERTY) ASSIGNED ELEVATION: 100.00 m (EXP 2014).

REFERENCE

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No.: 11010-SITE PLAN OFFSITE-OCT14; SCALE: UNKNOWN; DATE: OCTOBER 2014.

0 10 20
1:500 METRES

CLIENT
IMPERIAL OIL LIMITED

PROJECT
ADJACENT TO
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
GROUNDWATER ELEVATIONS
August 10, 2016

CONSULTANT

Golder Associates

YYYY-MM-DD	2016-11-21
DESIGNED	BMcParlan
PREPARED	AMehdilou
REVIEWED	BMcParlan
APPROVED	SCarrelas

PROJECT NO.	PHASE-TASK	REV.	FIGURE
1544125	1155-2016	0	4

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25 mm

0

Path: ---- | File Name: 1544125-1155-1004.dwg

TH8										Screen Interval: 3.3 to 4.9 mbgs
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
13-Jun-13	3.9	<0.20	4.1	0.61	48	<100	<200	<200	<0.5	1.1
27-Oct-15	4.4	<0.20	0.51	0.41	<25	<100	<200	<200	<5.0	0.82
10-Aug-16	3.0	<0.20	0.66	<0.40	70	<100	<200	<200	<5.0	0.77

TH9										Screen Interval: 3.4 to 4.9 mbgs
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
06-Oct-14	31	3	230	290	1,000	570	610	420	15	1.1
27-Oct-15	51	7.2	390	350	2,500	1,100	220	360	35	2.6
10-Aug-16	23	1.8	250	70	1,600	350	<200	<200	11	1.1

TH10										Screen Interval: 3.3 to 4.9 mbgs
Date	B	T	E	X	F1	F2	F3	F4	H	Pb
11-Jun-13	73	58	52	200	1400	560	<200	<200	35	1.2
TH10 decomissioned August 24, 2016										

TH11										Screen Interval: 3.3 to 4.9 mbgs
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
11-Jun-13	370	34	2,200	3,400	11,000	1,400	<200	<200	130	2.6
28-Oct-15	96	8.1	710	120	4,400	2,500	1,300	820	72	4.6
11-Aug-16	100	6.3	590	160	5,000	6,700	2,200	1,300	37	6.0
11-Aug-16 (DUP B)	110	7.1	610	170	4,900	7,100	2,400	1,400	43	3.3

TH12										Screen Interval: 3.3 to 4.9 mbgs
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
11-Jun-13	380	35	2,300	3,500	11,000	3,100	<200	<200	<100	6.8
11-Jun-13 (DUP)	360	34	2,300	3,500	11,000	2,800	<200	<200	<100	6.9
28-Oct-15	95	14	620	400	4,500	1,600	540	320	140	4.5
11-Aug-16	130	17	1,100	630	6,800	1,800	900	510	120	2.1

TH100										Screen Interval: 3.0 to 4.9 mbgs
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
06-Oct-14	<0.20	<0.20	0.31	0.91	<25	<100	<200	<200	<5.0	<0.50
27-Oct-15	<0.20	<0.20	0.94	1.1	<25	<100	<200	<200	<5.0	<0.50
27-Oct-15 (DUP A)	<0.20	<0.20	0.24	<0.40	<25	<100	<200	<200	<5.0	<0.50
10-Aug-16	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50

TH101										Screen Interval: 3.0 to 4.9 mbgs
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
06-Oct-14	85	12	580	500	4,100	830	<200	<200	44	2.9
06-Oct-14 (DUP)	84	12	580	510	4,100	910	<200	<200	54	4.2
28-Oct-15	110	16	740	590	3,400	830	<200	<200	64	4.6
11-Aug-16	49	8.6	580	390	2,200	590	<200	<200	23	0.63

TH102										Screen Interval: 3.0 to 4.9 mbgs
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
06-Oct-14	0.72	0.52	16	42	360	360	<200	<200	7.2	3.9
28-Oct-15	42	1.6	100	140	970	350	<200	<200	23	1.5
11-Aug-16	8.3	<0.20	33	21	510	180	<200	<200	18	1.4

MW16-01										Screen Interval: 3.3 - 4.8 mbgs
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-16	18	3.8	41	59	250	<100	<200	<200	NA	0.53

ONTARIO STANDARDS

PARAMETERS	B	T	E	X	F1	F2	F3	F4	HA	Pb
STANDARDS[a]	430	18,000	2,300	4,200	750[b]	150	500	500	520	25
RDL	0.20	0.20	0.20	0.40	130	100	200	200	10	0.50

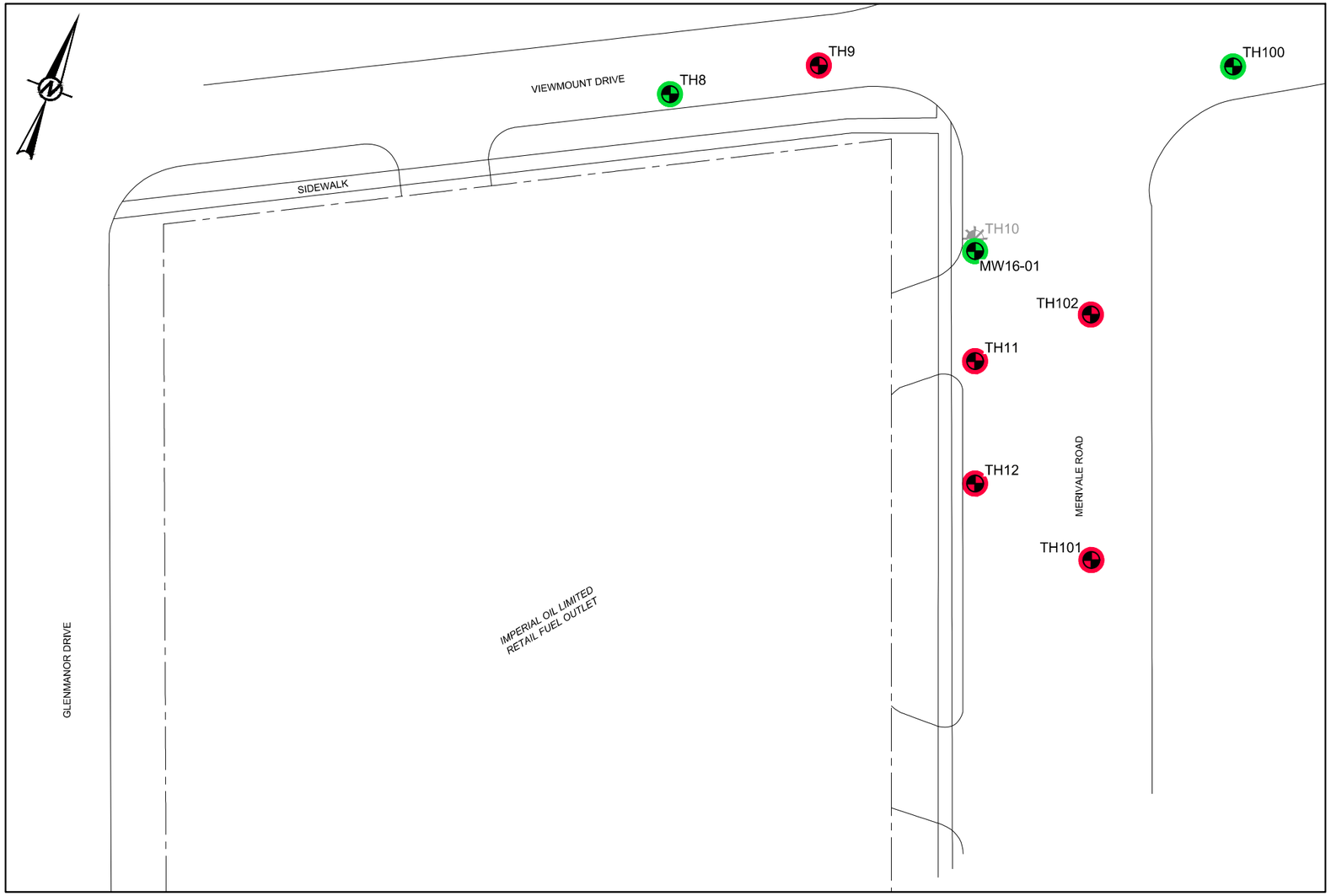
(a) O.REG 153 (2011) TABLE 3 FULL DEPTH GENERIC SITE CONDITION STANDARDS FOR ALL TYPES OF PROPERTY USE FOR GROUNDWATER IN MEDIUM AND FINE TEXTURED SOIL IN A NON-POTABLE GROUND WATER CONDITION.

LIST OF APPLICABLE ABBREVIATIONS

<	LESS THAN	F3	PETROLEUM HYDROCARBON FRACTION 3 (C_{16}-C_{34})
µg/L	MICROGRAMS PER LITRE	F4	PETROLEUM HYDROCARBON FRACTION 4 (C_{34}-C_{50})
B	BENZENE	HA	n-HEXANE
T	TOLUENE	mbgs	METRES BELOW GROUND SURFACE
E	ETHYLBENZENE	NA	NOT AVAILABLE
X	XYLENES	Pb	LEAD
DUP	DUPLICATE FIELD SAMPLE	O.REG	ONTARIO REGULATION
F1	PETROLEUM HYDROCARBON FRACTION 1 (C_6-C_{10}) MINUS BTEX	RDL	REPORTABLE DETECTION LIMIT
F2	PETROLEUM HYDROCARBON FRACTION 2 (C_{10}-C_{16})		

NOTES

1. LOCATIONS WHERE MOST RECENT GROUNDWATER SAMPLE MEETS APPLICABLE STANDARDS FOR ALL PARAMETERS ANALYZED SHOWN IN **GREEN.**
2. LOCATIONS WHERE MOST RECENT GROUNDWATER SAMPLE EXCEEDS APPLICABLE STANDARDS FOR AT LEAST ONE OF THE PARAMETERS ANALYZED SHOWN IN **RED.**
3. EXCEEDANCES OF APPLICABLE STANDARDS IN TEXT ARE SHOWN IN **RED.**
4. ALL RESULTS IN µg/L.
5. SAMPLING EVENTS COMPLETED IN OCTOBER AND NOVEMBER 2015 WERE CONDUCTED BY GOLDER FIELD STAFF. PREVIOUS DATA TAKEN FROM EXP 2014.



REFERENCE

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No.: 11010-SITE PLAN OFFSITE-OCT14; SCALE: UNKNOWN; DATE: OCTOBER 2014.

LEGEND

PROPERTY BOUNDARY

BOREHOLE LOCATION COMPLETED AS A MONITORING WELL

BOREHOLE LOCATION COMPLETED AS A MONITORING WELL (DECOMMISSIONED)

0 10 20
1:500 METRES

CLIENT
IMPERIAL OIL LIMITED

CONSULTANT
Golder Associates

YYYY-MM-DD	2016-11-21
DESIGNED	BMcParlan
PREPARED	AMehdilou
REVIEWED	BMcParlan
APPROVED	SCarrelas

PROJECT
ADJACENT TO
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
GROUNDWATER ANALYTICAL RESULTS - BTEX, PHC FRACTIONS F1 - F4, n-HEXAN AND LEAD

PROJECT NO.	PHASE-TASK	REV.	FIGURE
1544125	1155-2016	0	5

Path: ---- | File Name: 1544125-1155-1005.dwg

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25mm
0

TABLES

Table 1
Summary of Groundwater Field Monitoring Results
Adjacent to 1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Well Name	Top of Casing Elevation[a] (masl)	Ground Elevation[a] (masl)	Monitoring Date	Depth to Groundwater (mbtoc)	Depth to Groundwater (mbgs)	Groundwater Elevation[a] (masl)	Product Thickness (mm)	Headspace Vapours (ppmv)
TH8	100.03	100.16	10-Jun-13	--	3.01	97.15	nd	100
			6-Oct-14	3.45	nm	na	nm	nm
			27-Oct-15	3.55	3.68	96.48	n/d	710
			10-Aug-16	nm[b]	nm[b]	nm[b]	nm[b]	10
TH9	100.46	100.59	10-Jun-13	--	nm	na	nm	nm
			6-Oct-14	3.45	3.58	97.01	nd	100% LEL
			27-Oct-15	3.52	3.65	96.94	nd	2,900
			10-Aug-16	3.55	3.68	96.91	nd	100% LEL
TH10	100.17	100.26	10-Jun-13	--	3.03	97.24	nd	170
			6-Oct-14	--	nm	na	nm	nm
			27-Oct-15	D	D	D	D	D
			TH10 decommissioned on August 24, 2016					
TH11	99.90	100.04	10-Jun-13	--	2.92	97.12	nd	50
			6-Oct-14	--	nm	na	nm	nm
			27-Oct-15	2.91	3.05	96.99	nd	25
			10-Aug-16	2.89	3.03	97.01	nd	320
TH12	99.60	99.74	10-Jun-13	--	2.75	96.98	nd	18% LEL
			6-Oct-14	--	nm	na	nm	nm
			27-Oct-15	2.75	2.89	96.85	nd	nd
			10-Aug-16	2.74	2.88	96.87	nd	nd
TH100	101.40	101.52	6-Oct-14	3.48	3.60	97.92	nd	200
			27-Oct-15	3.52	3.64	97.88	nd	nd
			10-Aug-16	3.54	3.65	97.87	nd	nd
TH101	99.94	100.06	6-Oct-14	2.90	3.02	97.04	nd	50% LEL
			27-Oct-15	2.98	3.10	96.96	nd	11,100 (Over)
			10-Aug-16	3.05	3.17	96.89	nd	9,450
TH102	100.59	100.69	6-Oct-14	3.05	3.15	97.54	nd	10% LEL
			27-Oct-15	3.04	3.14	97.55	nd	2,700
			10-Aug-16	3.11	3.21	97.48	nd	430
MW16-01	100.19	100.30	31-Aug-16	2.87	2.97	97.32	nd	185

Notes:

[a] Elevations are relative to local benchmark (north side of manhole cover located 5 m west of kiosk on Imperial Oil property) assigned elevation = 100.00 m (exp, 2014)

[b] Well was not monitored due to bentonite in the casing prohibiting interface probe to descend

LEL - Lower explosive limit

mbgs - metres below ground surface

mbtoc - metres below top of casing

mm - millimetres

nd - not detected

na - not accessible

nm - not measured

ppmv - parts per million by volume

(Over) - reading is above OVM limits

D - well was destroyed

Table 2
Summary of Groundwater Analytical Results - Petroleum Hydrocarbons
Adjacent to 1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

			Sample Location	**TH8**	**TH9**	**TH11**		**TH12**	**TH100**	**TH101**	**TH102**	**MW16-01**
			Sample ID	TH8	TH9	TH11	DUP B	TH12	TH100	TH101	TH102	MW16-01
			Maxxam Sample ID	CWM500	CWM501	CWM521	CWM523	CWM522	CWM502	CWM524	CWM525	CZS332
			Maxxam Job Number	B6H0949	B6H0949	B6H0955	B6H0955	B6H0955	B6H0949	B6H0955	B6H0955	B6I8170
			Sample Date	10-Aug-16	10-Aug-16	11-Aug-16	11-Aug-16	11-Aug-16	10-Aug-16	11-Aug-16	11-Aug-16	31-Aug-16
Parameters	**Units**	**RDL**	**Standards[a]**									
Benzene	µg/L	0.20	430	3.0	23	100	110	130	<0.20	49	8.3	18
Toluene	µg/L	0.20	18,000	<0.20	1.8	6.3	7.1	17	<0.20	8.6	<0.20	3.8
Ethylbenzene	µg/L	0.20	2,300	0.66	250	590	610	1,100	<0.20	580	33	41
Xylenes	µg/L	0.40	4,200	<0.40	70	160	170	630	<0.40	390	21	59
F1 (C_6-C_{10}) - BTEX	µg/L	130	750[b]	70	**1,600**	**5,000**	**4,900**	**6,800**	<25	**2,200**	510	250
F2 (C_{10}-C_{16})	µg/L	100	150	<100	**350**	**6,700**	**7,100**	**1,800**	<100	**590**	**180**	<100
F3 (C_{16}-C_{34})	µg/L	200	500	<200	<200	**2,200**	**2,400**	**900**	<200	<200	<200	<200
F4 (C_{34}-C_{50})	µg/L	200	500	<200	<200	**1,300**	**1,400**	**510**	<200	<200	<200	<200
n-Hexane	µg/L	10	520	<5.0	11	37	43	120	<5.0	23	18	NA
Lead	µg/L	0.50	25	0.77	1.1	6.0	3.3	2.1	<0.50	0.63	1.4	0.53

Notes:

[a] O.Reg 153 (2011) Table 3 Full Depth Generic Site Condition Standards for all types o property use for groundwater in medium and fine textured soil in in a non-potable ground water condition

[b] F1 fraction does not include BTEX; however, the proponent has the choice as to whether or not to subtract BTEX from the analytical result

Bold/Underlined - value exceeds criteria/standard

BTEX - benzene, toluene, ethylbenzene, xylenes

F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3 and 4

RDL - reportable detection limit

µg/L - micrograms per litre

< - less than

NA - not analyzed

APPENDIX A LIMITATIONS OF LIABILITY, SCOPE OF REPORT AND THIRD PARTY REVIEW

LIMITATION OF LIABILITY, SCOPE OF REPORT AND THIRD PARTY RELIANCE

This report has been prepared and the work referred to in this report has been undertaken by Golder Associates Ltd. for Imperial Oil Limited. It is intended for the sole and exclusive use of Imperial Oil Limited, its affiliated companies and partners and their respective insurers, agents, employees and advisors (collectively, Imperial Oil). Any use, reliance on or decision made by any person other than Imperial Oil based on this report is the sole responsibility of such other person. Imperial Oil and Golder Associates Ltd. make no representation or warranty to any other person with regard to this report and the work referred to in this report and they accept no duty of care to any other person or any liability or responsibility whatsoever for any losses, expenses, damages, fines, penalties or other harm that may be suffered or incurred by any other person as a result of the use of, reliance on, any decision made or any action taken based on this report or the work referred to in this report.

The investigation undertaken by Golder Associates Ltd. with respect to this report and any conclusions or recommendations made in this report reflect Golder Associates Ltd.'s judgement based on the site conditions observed at the time of the site inspection on the date(s) set out in this report and on information available at the time of preparation of this report. This report has been prepared for specific application to this site and it is based, in part, upon visual observation of the site, subsurface investigation at discrete locations and depths, and specific analysis of specific chemical parameters and materials during a specific time interval, all as described in this report. Unless otherwise stated, the findings cannot be extended to previous or future site conditions, portions of the site which were unavailable for direct investigation, subsurface locations which were not investigated directly, or chemical parameters, materials or analysis which were not addressed. Substances other than those addressed by the investigation described in this report may exist within the site, substances addressed by the investigation may exist in areas of the site not investigated and concentrations of substances addressed which are different than those reported may exist in areas other than the locations from which samples were taken.

If site conditions or applicable standards change or if any additional information becomes available at a future date, modifications to the findings, conclusions and recommendations in this report may be necessary.

Other than by Imperial Oil, copying or distribution of this report or use of or reliance on the information contained herein, in whole or in part, is not permitted without the express written permission of Golder Associates Ltd. Nothing in this report is intended to constitute or provide a legal opinion.

APPENDIX B MONITORING WELL LOG

Ontario

Ministry of the Environment and Climate Change

Measurements recorded in: [X] Metric [ ] Imperial

Well Tag No. *(Place Sticker and/or Print Below)* A191039

Well Record

Regulation 903 Ontario Water Resources Act

S-19025 Page _____ of _____

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	[ ] Well Constructed by Well Owner
c/o: Jordan Hardy	Imperial Oil Ltd.		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. *(inc. area code)*
505 Quarry Park Blvd., SE	Calgary	AB	T2C 5N1	

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
1660 Merivale			

County/District/Municipality	City/Town/Village	Province	Postal Code
	Ottawa	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	18	442864	5021388		

Overburden and Bedrock Materials/Abandonment Sealing Record *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
BRN	Fill			0	1.0
BRN/GRY	Silt	Gravel		1.0	2.44
WHT	Limestone			2.44	4.88

Annular Space

Depth Set at (m/ft) From	Depth Set at (m/ft) To	Type of Sealant Used (Material and Type)	Volume Placed (m^3/ft^3)
0	.31	Concrete (Flushmount	
.31	3.1	Bentonite	
3.1	4.88		

Method of Construction

[ ] Cable Tool [X] Diamond
[ ] Rotary (Conventional) [ ] Jetting
[ ] Rotary (Reverse) [ ] Driving
[ ] Boring [ ] Digging
[ ] Air percussion
[ ] Other, *specify* _____

Well Use

[ ] Public [ ] Commercial [ ] Not used
[ ] Domestic [ ] Municipal [ ] Dewatering
[ ] Livestock [X] Test Hole [X] Monitoring
[ ] Irrigation [ ] Cooling & Air Conditioning
[ ] Industrial
[ ] Other, *specify* _____

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
2"0	PVC	.390	0	3.5

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
6.03	PVC	10	3.5	4.88

Status of Well

[ ] Water Supply
[ ] Replacement Well
[X] Test Hole
[ ] Recharge Well
[ ] Dewatering Well
[X] Observation and/or Monitoring Hole
[ ] Alteration (Construction)
[ ] Abandoned, Insufficient Supply
[ ] Abandoned, Poor Water Quality
[ ] Abandoned, other, *specify* _____
[ ] Other, *specify* _____

Results of Well Yield Testing

After test of well yield, water was:
[ ] Clear and sand free
[ ] Other, *specify* _____

If pumping discontinued, give reason:

Pump intake set at *(m/ft)*

Pumping rate *(l/min / GPM)*

Duration of pumping _____ hrs + _____ min

Final water level end of pumping *(m/ft)*

If flowing give rate *(l/min / GPM)*

Recommended pump depth *(m/ft)*

Recommended pump rate *(l/min / GPM)*

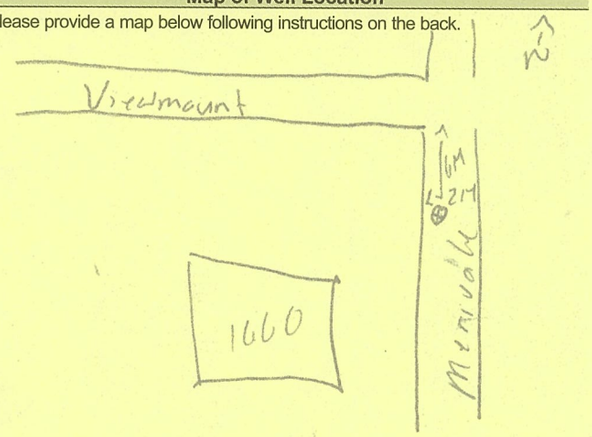
Well production *(l/min / GPM)*

Disinfected? [ ] Yes [ ] No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level				
1			1	
2			2	
3			3	
4			4	
5			5	
10			10	
15			15	
20			20	
25			25	
30			30	
40			40	
50			50	
60			60	

Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Water Details

Water found at Depth (m/ft)	Kind of Water	Hole Diameter Depth From (m/ft)	Hole Diameter Depth To (m/ft)	Hole Diameter (cm/in)
[ ] Gas	[ ] Fresh [ ] Untested [ ] Other, *specify*	0	2.44	
[ ] Gas	[ ] Fresh [ ] Untested [ ] Other, *specify*	2.44	4.88	
[ ] Gas	[ ] Fresh [ ] Untested [ ] Other, *specify*			

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Strata Drilling Group	7241

Business Address (Street Number/Name)	Municipality	Province	Postal Code	Business E-mail Address
165 Shields Court	Markham	ON	L3R 8V2	Wrecords@Stratasoil.com

Bus. Telephone No. *(inc. area code)*	Name of Well Technician (Last Name, First Name)	Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
905 940 7791	Halladay, Phil	3823		2016/09/13

Well owner's information package delivered: [ ] Yes [ ] No

Date Package Delivered: YYYY MM DD

Date Work Completed: 2016/08/31

Ministry Use Only

Audit No. Z233023

Received

Contractor's Copy

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Ontario

Ministry of the Environment and Climate Change

Measurements recorded in: ☒ Metric ☐ Imperial

Well Tag No. *(Place Sticker and/or Print Below)* None Found

Well Record

Regulation 903 Ontario Water Resources Act

S-19025 Page _____ of _____

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	☐ Well Constructed by Well Owner
c/o: Jordan Hardy	Imperial Oil Ltd.		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. *(inc. area code)*
505 Quarry Park Blvd., SE	Calgary	AB	T2C 5N1	

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
1660 Merivale			

County/District/Municipality	City/Town/Village	Province	Postal Code
	ottawa	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	18	441886	5025138		

Overburden and Bedrock Materials/Abandonment Sealing Record *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used *(Material and Type)*	Volume Placed *(m³/ft³)*
0	.31	Asphalt	
.31	1.22	hole plug	
1.22	4.57	Grout slurry	

Method of Construction

☐ Cable Tool ☐ Diamond
☐ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☐ Driving
☐ Boring ☐ Digging
☐ Air percussion
☐ Other, *specify* _____

Well Use

☐ Public ☐ Commercial ☐ Not used
☐ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☒ Test Hole ☒ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ Other, *specify* _____

Construction Record - Casing

Inside Diameter *(cm/in)*	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness *(cm/in)*	Depth (m/ft) From	Depth (m/ft) To
5.20	PVC	.390	0	

Construction Record - Screen

Outside Diameter *(cm/in)*	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To

Status of Well

☐ Water Supply
☐ Replacement Well
☐ Test Hole
☐ Recharge Well
☐ Dewatering Well
☐ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☒ Abandoned, other, *specify* not needed
☐ Other, *specify*

Water Details

Water found at Depth (m/ft)	Gas	Kind of Water: Fresh	Untested	Other, *specify*
	☐	☐	☐	
	☐	☐	☐	
	☐	☐	☐	

Hole Diameter

Depth (m/ft) From	To	Diameter *(cm/in)*
0	1.83	15.24

Results of Well Yield Testing

After test of well yield, water was:
☐ Clear and sand free
☐ Other, *specify* _____

If pumping discontinued, give reason:

Pump intake set at *(m/ft)*

Pumping rate *(l/min / GPM)*

Duration of pumping _____ hrs + _____ min

Final water level end of pumping *(m/ft)*

If flowing give rate *(l/min / GPM)*

Recommended pump depth *(m/ft)*

Recommended pump rate *(l/min / GPM)*

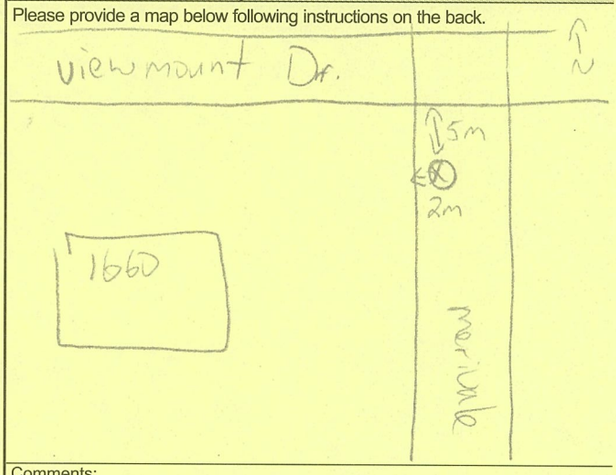
Well production *(l/min / GPM)*

Disinfected? ☐ Yes ☐ No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level				
1			1	
2			2	
3			3	
4			4	
5			5	
10			10	
15			15	
20			20	
25			25	
30			30	
40			40	
50			50	
60			60	

Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Strata drilling Group	7124

Business Address (Street Number/Name)	Municipality
165 Shields Court	Markham

Province	Postal Code	Business E-mail Address
ON	L3R8N2	wrecords@stratasoil.ca

Bus. Telephone No. *(inc. area code)*	Name of Well Technician (Last Name, First Name)
9054647919	Halladay Phil

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
3832		2016/09/07

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☐ Yes ☐ No	YYYY MM DD	2016/08/28

Ministry Use Only

Audit No. Z233022

Received

0506E (2014/11)

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LEGEND

STRATIGRAPHY


ASPHALT


COBBLES and GRAVEL


SAND


SILTY SAND


BEDROCK


COBBLES and SAND


SAND and GRAVEL


TOPSOIL


CLAY


FILL


SHALE


CLAYEY SILT


PEAT


SILT


COAL


SANDY SILT


SILTY CLAY

WELL CONSTRUCTION DETAILS


RISER IN BENTONITE


SLOTTED SECTION


FLUSHMOUNT ROADBOX


RISER IN SAND


STICKUP PIPE


SLOUGH

LIST OF APPLICABLE ABBREVIATIONS

▽	GROUNDWATER LEVEL
%LEL	LOWER EXPLOSIVE LIMIT
µS/cm	MICROSIEMENS PER CENTIMETRE
1,2-DBA	1,2-DIBROMOETHANE
1,2-DCA	1,2-DICHLOROETHANE
ARS	AIR RETURN SAMPLE
AS	AUGER SAMPLE
B	BENZENE
T	TOLUENE
E	ETHYLBENZENE
X	XYLENES
Cl	CHLORIDE
CS	CORE SAMPLE
DP	DIRECT PUSH
dS/m	DECISIEMENS PER METRE
EC	ELECTRICAL CONDUCTIVITY
EPH	EXTRACTABLE PETROLEUM HYDROCARBONS
ELEV.	ELEVATION
F1-F4	PETROLEUM HYDROCARBON FRACTION 1 TO FRACTION 4
FOC	FRACTION ORGANIC CARBON
GRAB	GRAB SAMPLE
HEPH	HEAVY EXTRACTABLE PETROLEUM HYDROCARBONS
LEPH	LIGHT EXTRACTABLE PETROLEUM HYDROCARBONS
m	METRE
mald	METRES ABOVE LOCAL DATUM
mard	METRES ABOVE RELATIVE DATUM
masl	METRES ABOVE SEA LEVEL
mS/cm	MILLISIEMENS PER CENTIMETRE
MTBE	METHYL TERT-BUTYL ETHER
mTPH	MODIFIED TOTAL PETROLEUM HYDROCARBONS
n/a	NOT APPLICABLE
n/d	NOT DETECTED
NA	NOT AVAILABLE
Na	SODIUM
OVM	ORGANIC VAPOUR MONITOR
PAH	POLYCYCLIC AROMATIC HYDROCARBONS
Pb	LEAD
PCB	POLYCHLORINATED BIPHENYL
PHC	PETROLEUM HYDROCARBONS
PJ	PION JAR
ppmv	PARTS PER MILLION BY VOLUME
SAL	SALINITY
SPT	STANDARD PENETRATION TEST
SS	SPLIT SPOON
VPH	VOLATILE PETROLEUM HYDROCARBONS
VOC	VOLATILE ORGANIC COMPOUNDS
WS	WET SAMPLE
Zn	ZINC

\\golder.gds\CALIM\CAD\CLIENTS\Imperial Oil Limited\Templates\gINT\Coverpage-Legend\dwg files\BH_MW_Legend.dwg Sep 11, 2016 - 11:08am

LOCATION: 1660 Merivale Road, Ottawa, Ontario
CONTRACTOR: Strata Drilling Group
EQUIPMENT USED: Hydrovac, GeoProbe 7822T
OVM TYPE: RKI Eagle
BORING DATE: August 22, 2016
DATUM: Local (Referenced to the north side of manhole cover located 5 m west of kiosk on site with an assumed elevation of 100.00 m)

RECORD OF MONITORING WELL: MW16-01

DEPTH SCALE METRES	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY %	Soil Vapour Concentration (ppmv) ⊕ 50 100 150 200 / Soil Vapour Concentration (%LEL) □ 20 40 60 80	ADDITIONAL LAB TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Ground Surface		100.30						
	MW re-installed. See stratigraphy on TH10		0.00						Flushmount Roadbox
1									
2									
3									31-Aug-16 ▽
4									
			95.36						
5	End of MONITORING WELL.		4.94						
6									
7									
8									
9									
10									

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: BMP
CHECKED: BMP/SC

IOL (AUTO) 1544125-1125.GPJ IOL.GDT 11/21/16

APPENDIX C LABORATORY CERTIFICATES OF ANALYSIS AND DATA QUALITY REVIEW CHECKLISTS QUALITY ASSURANCE/QUALITY CONTROL

Maxxam
A Bureau Veritas Group Company

Task Order#: 4410393424
Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007
Your C.O.C. #: 572973-04-01

Attention:Leon Burger

Golder Associates Ltd.
6925 Century Avenue
Suite #100
Mississauga, ON
Canada L5N 7K2

Report Date: 2016/08/19
Report #: R4121847
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B6H0949
Received: 2016/08/12, 11:39

Sample Matrix: Water
Samples Received: 3

Analyses	Quantity	Laboratory Method	Primary Reference
Petroleum Hydro. CCME F1 & BTEX in Water	3	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1)	3	CAM SOP-00316	CCME PHC-CWS m
Dissolved Metals by ICPMS	3	CAM SOP-00447	EPA 6020A m

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act.

Maxxam Analytics is accredited by SCC (Lab ID 97) for all specific parameters as required by GUCSO and O.Reg 153/04. Maxxam Analytics is limited in liability to the actual cost of analysis unless otherwise agreed in writing. There is no other warranty expressed or implied. Samples will be retained at Maxxam Analytics for three weeks from receipt of data or as per contract.

All data is in statistical control and has met all QC and method performance criteria unless otherwise flagged. All samples were analysed within hold time unless otherwise flagged. All soil samples for BTEX analysis were methanol extracted within 24 hours unless otherwise flagged.

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following “Alberta Environment’s Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003”. Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Encryption Key



Melissa White
Senior Project Manager
19 Aug 2016 13:47:39 -04:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kudrat Bajwa, B.Sc., Project Manager
Email: KBajwa@maxxam.ca
Phone# (905)817-5822

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6H0949
Report Date: 2016/08/19

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007

LEAD (DISSOLVED) IN WATER

Maxxam ID		CWM500	CWM500	CWM501	CWM502		
Sampling Date		2016/08/10 21:30	2016/08/10 21:30	2016/08/10 21:45	2016/08/10 23:15		
COC Number		572973-04-01	572973-04-01	572973-04-01	572973-04-01		
	UNITS	**TH8**	**TH8 Lab-Dup**	**TH9**	**TH100**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	0.77	0.73	1.1	<0.50	0.50	4618938

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B6H0949
Report Date: 2016/08/19

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007

HBTEX/F1-F4 PET. HYDROCARBONS IN WATER (WATER)

Maxxam ID		CWM500	CWM501	CWM502		
Sampling Date		2016/08/10 21:30	2016/08/10 21:45	2016/08/10 23:15		
COC Number		572973-04-01	572973-04-01	572973-04-01		
	UNITS	**TH8**	**TH9**	**TH100**	**RDL**	**QC Batch**
Benzene	ug/L	3.0	23	<0.20	0.20	4621969
Toluene	ug/L	<0.20	1.8	<0.20	0.20	4621969
Ethylbenzene	ug/L	0.66	250	<0.20	0.20	4621969
o-Xylene	ug/L	<0.20	1.9	<0.20	0.20	4621969
p+m-Xylene	ug/L	<0.40	68	<0.40	0.40	4621969
Total Xylenes	ug/L	<0.40	70	<0.40	0.40	4621969
Hexane	ug/L	<5.0	11	<5.0	5.0	4621969
F1 (C6-C10)	ug/L	74	1900	<25	25	4621969
F1 (C6-C10) - BTEX	ug/L	70	1600	<25	25	4621969
F2 (C10-C16 Hydrocarbons)	ug/L	<100	350	<100	100	4623186
F3 (C16-C34 Hydrocarbons)	ug/L	<200	<200	<200	200	4623186
F4 (C34-C50 Hydrocarbons)	ug/L	<200	<200	<200	200	4623186
Reached Baseline at C50	ug/L	Yes	Yes	Yes		4623186
Extraction Surrogate Recovery (%)						
o-Terphenyl	%	104	105	108		4623186
Instrument Surrogate Recovery (%)						
1,4-Difluorobenzene	%	91	92	100		4621969
4-Bromofluorobenzene	%	88	90	94		4621969
D10-Ethylbenzene	%	100	101	98		4621969
D4-1,2-Dichloroethane	%	90	86	100		4621969

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B6H0949
Report Date: 2016/08/19

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007

TEST SUMMARY

Maxxam ID: CWM500
Sample ID: TH8
Matrix: Water

Collected: 2016/08/10
Relinquished: 2016/08/11
Received: 2016/08/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	4621969	N/A	2016/08/16	Jiaxuan (Simon) Xi
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	4623186	2016/08/17	2016/08/18	Zhiyue (Frank) Zhu
Dissolved Metals by ICPMS	ICP/MS	4618938	N/A	2016/08/18	Kevin Comerford

Maxxam ID: CWM500 Dup
Sample ID: TH8
Matrix: Water

Collected: 2016/08/10
Relinquished: 2016/08/11
Received: 2016/08/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Metals by ICPMS	ICP/MS	4618938	N/A	2016/08/18	Kevin Comerford

Maxxam ID: CWM501
Sample ID: TH9
Matrix: Water

Collected: 2016/08/10
Relinquished: 2016/08/11
Received: 2016/08/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	4621969	N/A	2016/08/17	Jiaxuan (Simon) Xi
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	4623186	2016/08/17	2016/08/18	Zhiyue (Frank) Zhu
Dissolved Metals by ICPMS	ICP/MS	4618938	N/A	2016/08/18	Kevin Comerford

Maxxam ID: CWM502
Sample ID: TH100
Matrix: Water

Collected: 2016/08/10
Relinquished: 2016/08/11
Received: 2016/08/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	4621969	N/A	2016/08/16	Jiaxuan (Simon) Xi
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	4623186	2016/08/17	2016/08/18	Zhiyue (Frank) Zhu
Dissolved Metals by ICPMS	ICP/MS	4618938	N/A	2016/08/18	Kevin Comerford

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6H0949
Report Date: 2016/08/19

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	2.3°C

Results relate only to the items tested.

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Maxxam Job #: B6H0949
Report Date: 2016/08/19

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
4618938	KCO	Method Blank	Dissolved Lead (Pb)	2016/08/18	<0.50		ug/L	
4621969	JXI	Method Blank	1,4-Difluorobenzene	2016/08/16		103	%	70 - 130
			4-Bromofluorobenzene	2016/08/16		97	%	70 - 130
			D10-Ethylbenzene	2016/08/16		102	%	70 - 130
			D4-1,2-Dichloroethane	2016/08/16		103	%	70 - 130
			Benzene	2016/08/16	<0.20		ug/L	
			Toluene	2016/08/16	<0.20		ug/L	
			Ethylbenzene	2016/08/16	<0.20		ug/L	
			o-Xylene	2016/08/16	<0.20		ug/L	
			p+m-Xylene	2016/08/16	<0.40		ug/L	
			Total Xylenes	2016/08/16	<0.40		ug/L	
			Hexane	2016/08/16	<5.0		ug/L	
			F1 (C6-C10)	2016/08/16	<25		ug/L	
			F1 (C6-C10) - BTEX	2016/08/16	<25		ug/L	
4623186	ZZ	Method Blank	o-Terphenyl	2016/08/17		104	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2016/08/17	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2016/08/17	<200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2016/08/17	<200		ug/L	
4618938	KCO	RPD [CWM500-03]	Dissolved Lead (Pb)	2016/08/18	NC		%	20
4618938	KCO	Matrix Spike [CWM500-03]	Dissolved Lead (Pb)	2016/08/18		97	%	80 - 120
4618938	KCO	LCS	Dissolved Lead (Pb)	2016/08/18		100	%	80 - 120
4621969	JXI	LCS	1,4-Difluorobenzene	2016/08/17		91	%	70 - 130
			4-Bromofluorobenzene	2016/08/17		104	%	70 - 130
			D10-Ethylbenzene	2016/08/17		103	%	70 - 130
			D4-1,2-Dichloroethane	2016/08/17		95	%	70 - 130
			Benzene	2016/08/17		104	%	70 - 130
			Toluene	2016/08/17		102	%	70 - 130
			Ethylbenzene	2016/08/17		109	%	70 - 130
			o-Xylene	2016/08/17		103	%	70 - 130
			p+m-Xylene	2016/08/17		101	%	70 - 130
			Hexane	2016/08/17		100	%	70 - 130
			F1 (C6-C10)	2016/08/17		97	%	70 - 130
4623186	ZZ	LCS	o-Terphenyl	2016/08/17		103	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2016/08/17		101	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2016/08/17		100	%	60 - 130
			F4 (C34-C50 Hydrocarbons)	2016/08/17		94	%	60 - 130

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6H0949
Report Date: 2016/08/19

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam

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Fax: (905) 817-5777
Toll Free: 800-563-6266

EXXONMOBIL/IMPERIAL OIL - MAXXAM
CHAIN-OF-CUSTODY RECORD
ANALYSIS REQUESTED

C of C # 572973-04-01

572973

INVOICE INFORMATION	REPORT INFORMATION
Company Name: Imperial Oil, a partnership of Imperial Oil Limited and McColl Frontenac Petrole	Company Name: Golder Associates Ltd.
Contact Name: Jordan Hardy	Contact Name: Leon Burger
Address: 1 Duncan Mill Road North York ON M3B 1Z2	Address: 6925 Century Avenue Suite #100 Mississauga ON L5N 7K2
Email: Jordan.P.Hardy@esso.ca	Email: Leon_Burger@golder.com,
Phone: (587) 476-3858	Phone: (226) 220-6879
Sampler Name (Print): Ian Atkeson & Brandon McFarlane	Consultant Project #: 1544125-1155-2007

	FIELD SAMPLE ID	MATRIX: GROUND WATER	MATRIX: SURFACE WATER	MATRIX: SOIL	MATRIX: OTHER	# CONTAINERS	SAMPLING: DATE (YYYY/MM/DD)	SAMPLING: TIME (24 HR)	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	F1 & BTEX (including n-hexane)	F2-F4	Lead
1	TH8	X				6	2016/08/10	21:30	X		X	X	X
2	TH9	X				6	"	21:45	X		X	X	X
3	TH100	X				6	2016/08/10	23:15	X		X	X	X
4													
5													
6													
7													
8													
9													
10													

IOL SITE LOCATION:
1660 Merivale Road, Ottawa, ON

IOL PROJECT # (if applicable):
MZ.00277

MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM:
4410393424-10

REGULATORY CRITERIA / DETECTION LIMITS
(Please indicate which Reg. version and if RSC required)
☒ REG 153 Table 3 ☐ 2004 ☒ 2011 ☐ RSC
☐ ODWS ☐ PWQO
☐ Other

SPECIAL INSTRUCTIONS:
Upload to ESS SAP: 88001627
Samples may contain sediments

JARS USED AND NOT SUBMITTED
Enter N/A for Water
N/A

TURNAROUND TIME
Standard (5 days) ☒
Rush (3 days) ☐
(2 days) ☐
(1 day) ☐
(same day) ☐
Date Required:

	YES	NO	COOLER ID: 1				COOLER ID:				COOLER ID:			
SEAL PRESENT	✓		TEMP °C	0 (1)	3 (2)	4 (3)								
SEAL INTACT	✓													
COOLING MEDIA PRESENT	✓													

RELINQUISHED BY:		DATE:	TIME (24 HR):	RECEIVED BY:		DATE:	TIME (24 HR):
1.	Ian Atkeson	2016/08/11	14:00	1.	Jenny Lin	2016/08/12	17:39
2.				2.			
3.				3.			

LAB USE ONLY
MAXXAM JOB # B6H0949 (HGR 2016/08/12)
SAMPLES
LABELED BY: HGR
VERIFIED BY: JT3

COC – 1012 (2013) IOL – ON White: Maxxam Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: August 10, 2016

Location: 1660 Merivlae Road, Ottawa, ON

Laboratory: Maxxam Analytics Mississauga

Consultant Project Number: 1544125-1155

Sample Submission Number: B6H0949

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within
Extraction Surrogate Recovery	X			acceptance criteria.
Method Blank Concentration	X			
Matrix Duplicate RPD	X			
Matrix Spike Recovery	X			
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	No field QC samples were collected.
Trip Blank Concentration			X	
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Was a Data Quality Waiver (DQW) issued (Yes/No)?: No

Date Issued: n/a

Date of Response: n/a

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Anita Colbert

Data Reviewed by (Signature): Anita Colbert

Date: August 23, 2016

Maxxam
A Bureau Veritas Group Company

Task Order#: 4410393424
Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007
Your C.O.C. #: 572973-05-01

Attention:Leon Burger

Golder Associates Ltd.
6925 Century Avenue
Suite #100
Mississauga, ON
Canada L5N 7K2

Report Date: 2016/08/18
Report #: R4120857
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B6H0953
Received: 2016/08/12, 11:39

Sample Matrix: Water
Samples Received: 2

Analyses	Quantity	Laboratory Method	Primary Reference
Petroleum Hydro. CCME F1 & BTEX in Water	2	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1)	2	CAM SOP-00316	CCME PHC-CWS m

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act.

Maxxam Analytics is accredited by SCC (Lab ID 97) for all specific parameters as required by GUCSO and O.Reg 153/04. Maxxam Analytics is limited in liability to the actual cost of analysis unless otherwise agreed in writing. There is no other warranty expressed or implied. Samples will be retained at Maxxam Analytics for three weeks from receipt of data or as per contract.

All data is in statistical control and has met all QC and method performance criteria unless otherwise flagged. All samples were analysed within hold time unless otherwise flagged. All soil samples for BTEX analysis were methanol extracted within 24 hours unless otherwise flagged.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following "Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003". Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Encryption Key



Patricia Legette
Project Manager
18 Aug 2016 16:48:57 -04:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kudrat Bajwa, B.Sc., Project Manager
Email: KBajwa@maxxam.ca
Phone# (905)817-5822

==========

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Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6H0953
Report Date: 2016/08/18

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007

HBTEX/F1-F4 PET. HYDROCARBONS IN WATER (WATER)

Maxxam ID		CWM514	CWM515		
Sampling Date		2016/08/11 03:00	2016/08/11 03:30		
COC Number		572973-05-01	572973-05-01		
	UNITS	**FIELD BLANK**	**TRIP BLANK**	**RDL**	**QC Batch**
Benzene	ug/L	<0.20	<0.20	0.20	4623498
Toluene	ug/L	<0.20	<0.20	0.20	4623498
Ethylbenzene	ug/L	<0.20	<0.20	0.20	4623498
o-Xylene	ug/L	<0.20	<0.20	0.20	4623498
p+m-Xylene	ug/L	<0.40	<0.40	0.40	4623498
Total Xylenes	ug/L	<0.40	<0.40	0.40	4623498
Hexane	ug/L	<5.0	<5.0	5.0	4623498
F1 (C6-C10)	ug/L	<25	<25	25	4623498
F1 (C6-C10) - BTEX	ug/L	<25	<25	25	4623498
F2 (C10-C16 Hydrocarbons)	ug/L	<100	<100	100	4623595
F3 (C16-C34 Hydrocarbons)	ug/L	<200	<200	200	4623595
F4 (C34-C50 Hydrocarbons)	ug/L	<200	<200	200	4623595
Reached Baseline at C50	ug/L	Yes	Yes		4623595
Extraction Surrogate Recovery (%)					
o-Terphenyl	%	102	108		4623595
Instrument Surrogate Recovery (%)					
1,4-Difluorobenzene	%	93	93		4623498
4-Bromofluorobenzene	%	100	100		4623498
D10-Ethylbenzene	%	94	106		4623498
D4-1,2-Dichloroethane	%	99	97		4623498

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B6H0953
Report Date: 2016/08/18

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007

TEST SUMMARY

Maxxam ID: CWM514
Sample ID: FIELD BLANK
Matrix: Water

Collected: 2016/08/11
Relinquished: 2016/08/11
Received: 2016/08/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	4623498	N/A	2016/08/17	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	4623595	2016/08/17	2016/08/18	Zhiyue (Frank) Zhu

Maxxam ID: CWM515
Sample ID: TRIP BLANK
Matrix: Water

Collected: 2016/08/11
Relinquished: 2016/08/11
Received: 2016/08/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	4623498	N/A	2016/08/17	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	4623595	2016/08/17	2016/08/18	Zhiyue (Frank) Zhu

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Maxxam Job #: B6H0953
Report Date: 2016/08/18

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	2.3°C

Results relate only to the items tested.

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Maxxam Job #: B6H0953
Report Date: 2016/08/18

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
4623498	LRA	Method Blank	1,4-Difluorobenzene	2016/08/17		97	%	70 - 130
			4-Bromofluorobenzene	2016/08/17		96	%	70 - 130
			D10-Ethylbenzene	2016/08/17		86	%	70 - 130
			D4-1,2-Dichloroethane	2016/08/17		97	%	70 - 130
			Benzene	2016/08/17	<0.20		ug/L	
			Toluene	2016/08/17	<0.20		ug/L	
			Ethylbenzene	2016/08/17	<0.20		ug/L	
			o-Xylene	2016/08/17	<0.20		ug/L	
			p+m-Xylene	2016/08/17	<0.40		ug/L	
			Total Xylenes	2016/08/17	<0.40		ug/L	
			Hexane	2016/08/17	<5.0		ug/L	
			F1 (C6-C10)	2016/08/17	<25		ug/L	
			F1 (C6-C10) - BTEX	2016/08/17	<25		ug/L	
4623595	ZZ	Method Blank	o-Terphenyl	2016/08/18		104	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2016/08/18	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2016/08/18	<200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2016/08/18	<200		ug/L	
4623498	LRA	LCS	1,4-Difluorobenzene	2016/08/17		99	%	70 - 130
			4-Bromofluorobenzene	2016/08/17		103	%	70 - 130
			D10-Ethylbenzene	2016/08/17		108	%	70 - 130
			D4-1,2-Dichloroethane	2016/08/17		101	%	70 - 130
			Benzene	2016/08/17		105	%	70 - 130
			Toluene	2016/08/17		97	%	70 - 130
			Ethylbenzene	2016/08/17		103	%	70 - 130
			o-Xylene	2016/08/17		94	%	70 - 130
			p+m-Xylene	2016/08/17		96	%	70 - 130
			Hexane	2016/08/17		82	%	70 - 130
			F1 (C6-C10)	2016/08/17		95	%	70 - 130
4623595	ZZ	LCS	o-Terphenyl	2016/08/18		111	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2016/08/18		109	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2016/08/18		108	%	60 - 130
			F4 (C34-C50 Hydrocarbons)	2016/08/18		100	%	60 - 130

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

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Maxxam Job #: B6H0953
Report Date: 2016/08/18

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Cristina Carriere

Cristina Carriere, Scientific Services

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Maxxam

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Mississauga, Ontario L5N 2L8
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Phone: (905) 817-5700
Fax: (905) 817-5777
Toll Free: 800-563-6266

EXXONMOBIL/IMPERIAL OIL - MAXXAM
CHAIN-OF-CUSTODY RECORD
ANALYSIS REQUESTED

C of C #:572973-05-01

572973

INVOICE INFORMATION	REPORT INFORMATION
Company Name: Imperial Oil, a partnership of Imperial Oil Limited and McColl Frontenac Petrole	Company Name: Golder Associates Ltd.
Contact Name: Jordan Hardy	Contact Name: Leon Burger
Address: 1 Duncan Mill Road North York ON M3B 1Z2	Address: 6925 Century Avenue Suite #100 Mississauga ON L5N 7K2
Email: Jordan.P.Hardy@esso.ca	Email: Leon_Burger@golder.com;
Phone: (587) 476-3858	Phone: (226) 220-6879
Sampler Name (Print): Ian Adkison & Brandon McFarlan	Consultant Project #: 1544125-1155-2007

	FIELD SAMPLE ID	MATRIX: GROUND WATER	MATRIX: SURFACE WATER	MATRIX: SOIL	MATRIX: OTHER	# CONTAINERS	SAMPLING: DATE (YYYY/MM/DD)	SAMPLING: TIME (24 HR)	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	F1 & BTEX (including n-hexane)	F2-F4	Lead
1	Field Blank				X	5	2016/08/11	03:00			X	X	
2	Trip Blank				X	3	2016/08/11	03:30			X		
3													
4													
5													
6													
7													
8													
9													
10													

IOL SITE LOCATION:
1660 Merivale Road, Ottawa, ON

IOL PROJECT # (if applicable):
MZ.00277

MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM:
4410393424-10

REGULATORY CRITERIA / DETECTION LIMITS:
☒ REG 153 Table 3 ☐ 2004 ☒ 2011 ☐ RSC
(Please indicate which Reg. version and if RSC required)
☐ ODWS ☐ PWQO
☐ Other

SPECIAL INSTRUCTIONS:
Upload to SAP: 88001627

JARS USED AND NOT SUBMITTED
Enter N/A for Water
N/A

TURNAROUND TIME
Standard (5 days) ☒
Rush (3 days) ☐
(2 days) ☐
(1 day) ☐
(same day) ☐
Date Required

	YES	NO	COOLER ID: 1			
SEAL PRESENT	✓					
SEAL INTACT	✓		TEMP °C	0 (1)	3 (2)	4 (3)
COOLING MEDIA PRESENT	✓					

	YES	NO	COOLER ID:			
SEAL PRESENT						
SEAL INTACT			TEMP °C	(1)	(2)	(3)
COOLING MEDIA PRESENT						

	YES	NO	COOLER ID:			
SEAL PRESENT						
SEAL INTACT			TEMP °C	(1)	(2)	(3)
COOLING MEDIA PRESENT						

LAB USE ONLY
MAXXAM JOB #
B6H0953

RELINQUISHED BY:		DATE:	TIME (24 HR):	RECEIVED BY:		DATE:	TIME (24 HR):
1.	Ian Adkison	2016/08/11	14:00	1.	Jimmy Lee	2016/08/12	11:39
2.				2.			
3.				3.			

SAMPLES
LABELED BY: HGR
VERIFIED BY: JTZ

COC – 1012 (2013) IOL – ON White: Maxxam Yellow: Client

Maxxam
A Bureau Veritas Group Company

EXXONMOBIL / IMPERIAL OIL - MAXXAM ADDITIONAL ANALYSIS REQUEST RECORD

Company Name: Golder Associates Ltd.
Contact Name: Leon Burger
Consultant Project #: 1544125-1155-2007
Maxxam Job #: B6H0953
(Please complete this form on a per job basis - i.e. one form per original Maxxam Job#)

IOL Project Manager: Jordan Hardy
IOL Site Location: 1660 Merivale Road, Ottawa. ON
IOL Site #: NA
IOL Project #: MZ.00277
IOL Task Order or Service Order #: 4410393424
Line Item (if applicable): 10
Maxxam Location: Mississauga, Ontario

TURNAROUND TIME		
Standard	(5 days)	☑
Rush	(3 days)	☐
	(2 days)	☐
	(1 day)	☐
	(same day)	☐
Date Required :		

Applicable Guidelines (please specify):
O.Reg. 153/04, 2011, Table 3

ADDITIONAL ANALYSIS REQUEST

CLIENT SAMPLE ID	Original COC #	LAB ID	Matrix	SAMPLING DATE (YYYY/MM/DD)	SAMPLING Time HH:MM	F2-F4	Sample previously submitted on hold (Y/N)
Trip Blank	572973-05-01	CWM515	Other	2016/08/11	3:30	x	n

LAB USE ONLY
Original COC analysis completed and invoiced at time of add-on (circle one)
YES (NO)
(if yes original coc in invoice package is for reference only)
New Maxxam Job # (if applicable)
N/A

SPECIAL INSTRUCTIONS

REQUESTED BY: (Please Sign & Print) Leon Burger	DATE: (YYYY/MM/DD) 2016/08/17	TIME: (HH:MM) 09:55	
RECEIVED BY: (Please Sign & Print) PATRICIA LEGETTE	DATE: (YYYY/MM/DD) 2016/08/17	TIME: (HH:MM) 10:21	

COR FCD-00106 / 5

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: August 11, 2016

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Maxxam Analytics Mississauga

Consultant Project Number: 1544125-1155

Sample Submission Number: B6H0953

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within
Extraction Surrogate Recovery	X			acceptance criteria.
Method Blank Concentration	X			
Matrix Duplicate RPD			X	
Matrix Spike Recovery			X	
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration	X			All field QC samples are within
Trip Blank Concentration	X			alert limits.
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Was a Data Quality Waiver (DQW) issued (Yes/No)?: No

Date Issued: n/a

Date of Response: n/a

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): Amanda Newberry

Date: August 19, 2016

Maxxam
A Bureau Veritas Group Company

Task Order#: 4410393424
Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007
Your C.O.C. #: 572973-06-01

Attention:Leon Burger

Golder Associates Ltd.
6925 Century Avenue
Suite #100
Mississauga, ON
Canada L5N 7K2

Report Date: 2016/08/19
Report #: R4121850
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B6H0955
Received: 2016/08/12, 11:39

Sample Matrix: Water
Samples Received: 5

Analyses	Quantity	Laboratory Method	Primary Reference
Petroleum Hydro. CCME F1 & BTEX in Water	5	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1)	5	CAM SOP-00316	CCME PHC-CWS m
Dissolved Metals by ICPMS	5	CAM SOP-00447	EPA 6020A m

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act.

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All data is in statistical control and has met all QC and method performance criteria unless otherwise flagged. All samples were analysed within hold time unless otherwise flagged. All soil samples for BTEX analysis were methanol extracted within 24 hours unless otherwise flagged.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following "Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003". Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Encryption Key

Melissa White
Senior Project Manager
19 Aug 2016 14:06:22 -04:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kudrat Bajwa, B.Sc., Project Manager
Email: KBajwa@maxxam.ca
Phone# (905)817-5822

==========

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Maxxam Job #: B6H0955
Report Date: 2016/08/19

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007

LEAD (DISSOLVED) IN WATER

Maxxam ID		CWM521	CWM522	CWM523	CWM524	CWM525		
Sampling Date		2016/08/11 00:30	2016/08/11 00:20	2016/08/11 00:30	2016/08/11 02:20	2016/08/11 02:45		
COC Number		572973-06-01	572973-06-01	572973-06-01	572973-06-01	572973-06-01		
	UNITS	**TH11**	**TH12**	**DUP B**	**TH101**	**TH102**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	6.0	2.1	3.3	0.63	1.4	0.50	4618938

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6H0955
Report Date: 2016/08/19

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007

HBTEX/F1-F4 PET. HYDROCARBONS IN WATER (WATER)

Maxxam ID		CWM521		CWM522		CWM523	CWM524		CWM525		
Sampling Date		2016/08/11 00:30		2016/08/11 00:20		2016/08/11 00:30	2016/08/11 02:20		2016/08/11 02:45		
COC Number		572973-06-01		572973-06-01		572973-06-01	572973-06-01		572973-06-01		
	UNITS	**TH11**	**RDL**	**TH12**	**RDL**	**DUP B**	**TH101**	**RDL**	**TH102**	**RDL**	**QC Batch**
Benzene	ug/L	100	0.40	130	1.0	110	49	0.40	8.3	0.20	4621969
Toluene	ug/L	6.3	0.40	17	1.0	7.1	8.6	0.40	<0.20	0.20	4621969
Ethylbenzene	ug/L	590	0.40	1100	1.0	610	580	0.40	33	0.20	4621969
o-Xylene	ug/L	6.3	0.40	35	1.0	6.8	28	0.40	0.41	0.20	4621969
p+m-Xylene	ug/L	150	0.80	590	2.0	160	360	0.80	21	0.40	4621969
Total Xylenes	ug/L	160	0.80	630	2.0	170	390	0.80	21	0.40	4621969
Hexane	ug/L	37	10	120	25	43	23	10	18	5.0	4621969
F1 (C6-C10)	ug/L	5900	50	8700	130	5800	3200	50	580	25	4621969
F1 (C6-C10) - BTEX	ug/L	5000	50	6800	130	4900	2200	50	510	25	4621969
F2 (C10-C16 Hydrocarbons)	ug/L	6700	100	1800	100	7100	590	100	180	100	4623186
F3 (C16-C34 Hydrocarbons)	ug/L	2200	200	900	200	2400	<200	200	<200	200	4623186
F4 (C34-C50 Hydrocarbons)	ug/L	1300	200	510	200	1400	<200	200	<200	200	4623186
Reached Baseline at C50	ug/L	Yes		Yes		Yes	Yes		Yes		4623186
Extraction Surrogate Recovery (%)											
o-Terphenyl	%	103		106		106	109		104		4623186
Instrument Surrogate Recovery (%)											
1,4-Difluorobenzene	%	99		93		102	90		102		4621969
4-Bromofluorobenzene	%	101		91		103	104		102		4621969
D10-Ethylbenzene	%	94		94		96	94		104		4621969
D4-1,2-Dichloroethane	%	97		88		101	87		102		4621969

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6H0955
Report Date: 2016/08/19

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007

TEST SUMMARY

Maxxam ID: CWM521
Sample ID: TH11
Matrix: Water

Collected: 2016/08/11
Relinquished: 2016/08/11
Received: 2016/08/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	4621969	N/A	2016/08/17	Jiaxuan (Simon) Xi
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	4623186	2016/08/17	2016/08/18	Zhiyue (Frank) Zhu
Dissolved Metals by ICPMS	ICP/MS	4618938	N/A	2016/08/18	Kevin Comerford

Maxxam ID: CWM522
Sample ID: TH12
Matrix: Water

Collected: 2016/08/11
Relinquished: 2016/08/11
Received: 2016/08/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	4621969	N/A	2016/08/17	Jiaxuan (Simon) Xi
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	4623186	2016/08/17	2016/08/18	Zhiyue (Frank) Zhu
Dissolved Metals by ICPMS	ICP/MS	4618938	N/A	2016/08/18	Kevin Comerford

Maxxam ID: CWM523
Sample ID: DUP B
Matrix: Water

Collected: 2016/08/11
Relinquished: 2016/08/11
Received: 2016/08/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	4621969	N/A	2016/08/17	Jiaxuan (Simon) Xi
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	4623186	2016/08/17	2016/08/18	Zhiyue (Frank) Zhu
Dissolved Metals by ICPMS	ICP/MS	4618938	N/A	2016/08/18	Kevin Comerford

Maxxam ID: CWM524
Sample ID: TH101
Matrix: Water

Collected: 2016/08/11
Relinquished: 2016/08/11
Received: 2016/08/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	4621969	N/A	2016/08/17	Jiaxuan (Simon) Xi
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	4623186	2016/08/17	2016/08/18	Zhiyue (Frank) Zhu
Dissolved Metals by ICPMS	ICP/MS	4618938	N/A	2016/08/18	Kevin Comerford

Maxxam ID: CWM525
Sample ID: TH102
Matrix: Water

Collected: 2016/08/11
Relinquished: 2016/08/11
Received: 2016/08/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	4621969	N/A	2016/08/16	Jiaxuan (Simon) Xi
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	4623186	2016/08/17	2016/08/18	Zhiyue (Frank) Zhu
Dissolved Metals by ICPMS	ICP/MS	4618938	N/A	2016/08/18	Kevin Comerford

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Maxxam Job #: B6H0955
Report Date: 2016/08/19

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	5.3°C

Results relate only to the items tested.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6H0955
Report Date: 2016/08/19

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
4618938	KCO	Method Blank	Dissolved Lead (Pb)	2016/08/18	<0.50		ug/L	
4621969	JXI	Method Blank	1,4-Difluorobenzene	2016/08/16		103	%	70 - 130
			4-Bromofluorobenzene	2016/08/16		97	%	70 - 130
			D10-Ethylbenzene	2016/08/16		102	%	70 - 130
			D4-1,2-Dichloroethane	2016/08/16		103	%	70 - 130
			Benzene	2016/08/16	<0.20		ug/L	
			Toluene	2016/08/16	<0.20		ug/L	
			Ethylbenzene	2016/08/16	<0.20		ug/L	
			o-Xylene	2016/08/16	<0.20		ug/L	
			p+m-Xylene	2016/08/16	<0.40		ug/L	
			Total Xylenes	2016/08/16	<0.40		ug/L	
			Hexane	2016/08/16	<5.0		ug/L	
			F1 (C6-C10)	2016/08/16	<25		ug/L	
			F1 (C6-C10) - BTEX	2016/08/16	<25		ug/L	
4623186	ZZ	Method Blank	o-Terphenyl	2016/08/17		104	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2016/08/17	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2016/08/17	<200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2016/08/17	<200		ug/L	
4618938	KCO	LCS	Dissolved Lead (Pb)	2016/08/18		100	%	80 - 120
4621969	JXI	LCS	1,4-Difluorobenzene	2016/08/17		91	%	70 - 130
			4-Bromofluorobenzene	2016/08/17		104	%	70 - 130
			D10-Ethylbenzene	2016/08/17		103	%	70 - 130
			D4-1,2-Dichloroethane	2016/08/17		95	%	70 - 130
			Benzene	2016/08/17		104	%	70 - 130
			Toluene	2016/08/17		102	%	70 - 130
			Ethylbenzene	2016/08/17		109	%	70 - 130
			o-Xylene	2016/08/17		103	%	70 - 130
			p+m-Xylene	2016/08/17		101	%	70 - 130
			Hexane	2016/08/17		100	%	70 - 130
			F1 (C6-C10)	2016/08/17		97	%	70 - 130
4623186	ZZ	LCS	o-Terphenyl	2016/08/17		103	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2016/08/17		101	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2016/08/17		100	%	60 - 130
			F4 (C34-C50 Hydrocarbons)	2016/08/17		94	%	60 - 130

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6H0955
Report Date: 2016/08/19

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155-2007

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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6740 Campobello Road
Mississauga, Ontario L5N 2L8
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Phone: (905) 817-5700
Fax: (905) 817-5777
Toll Free: 800-563-6266

EXXONMOBIL/IMPERIAL OIL - MAXXAM CHAIN-OF-CUSTODY RECORD

ANALYSIS REQUESTED

C of C # 572973-06-01

572973

INVOICE INFORMATION	REPORT INFORMATION
Company Name: Imperial Oil, a partnership of Imperial Oil Limited and McColl Frontenac Petrole	Company Name: Golder Associates Ltd.
Contact Name: Jordan Hardy	Contact Name: Leon Burger
Address: 1 Duncan Mill Road North York ON M3B 1Z2	Address: 6925 Century Avenue Suite #100 Mississauga ON L5N 7K2
Email: Jordan.P.Hardy@esso.ca	Email: Leon_Burger@golder.com,
Phone: (587) 476-3858	Phone: (226) 220-6879
Sampler Name (Print): Ian Atkinson & Brandon McPastor	Consultant Project #: 1544125-1155-2007

	FIELD SAMPLE ID	MATRIX: GROUND WATER	MATRIX: SURFACE WATER	MATRIX: SOIL	MATRIX: OTHER	# CONTAINERS	SAMPLING: DATE (YYYY/MM/DD)	SAMPLING: TIME (24 HR)	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	F1 & BTEX (including n-hexane)	F2-F4	Lead
1	TH11	X				6	2016/08/11	00:30	X		X	X	X
2	TH12	X				6		00:20	X		X	X	X
3	DUP. B	X				6		00:30	X		X	X	X
4	TH101	X				6		02:20	X		X	X	X
5	TH102	X				6	2016/08/11	02:45	X		X	X	X
6													
7													
8													
9													
10													

IOL SITE LOCATION:
1660 Merivale Road, Ottawa, ON

IOL PROJECT # (if applicable):
MZ.00277

MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM:
4410393424-10

REGULATORY CRITERIA / DETECTION LIMITS:
☒ REG 153 Table 3 ☐ 2004 ☒ 2011 ☐ RSC
(Please indicate which Reg. version and if RSC required)
☐ ODWS ☐ PWQO
☐ Other

SPECIAL INSTRUCTIONS:
Upload to SAP: 88001627
Samples may contain sediments.

JARS USED AND NOT SUBMITTED
Enter N/A for Water
N/A

TURNAROUND TIME
Standard (5 days) ☒
Rush (3 days) ☐
(2 days) ☐
(1 day) ☐
(same day) ☐
Date Required

	YES	NO	COOLER ID: 1				YES	NO	COOLER ID:				YES	NO	COOLER ID:			
SEAL PRESENT	✓																	
SEAL INTACT	✓		TEMP °C	3	6	7			TEMP °C						TEMP °C			
COOLING MEDIA PRESENT	✓			1	2	3				1	2	3				1	2	3

RELINQUISHED BY:		DATE:	TIME (24 HR):	RECEIVED BY:		DATE:	TIME (24 HR):
1.	Ian Atkinson	2016/08/11	14:00	1.	Jimmy Lam	2016/08/12	11:39
2.				2.			
3.				3.			

LAB USE ONLY
MAXXAM JOB #: B6H0955
SAMPLES
LABELED BY: HCR
VERIFIED BY: JTB

COC – 1012 (2013) IOL – ON

White: Maxxam

Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: August 11, 2016

Location: 1660 Merivlae Road, Ottawa, ON

Laboratory: Maxxam Analytics Mississauga

Consultant Project Number: 1544125-1155

Sample Submission Number: B6H0955

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within
Extraction Surrogate Recovery	X			acceptance criteria.
Method Blank Concentration	X			
Matrix Duplicate RPD			X	
Matrix Spike Recovery			X	
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	Samples TH11 and DUP B exceed the alert limit for
Trip Blank Concentration			X	dissolved lead (58%).
Field Duplicate RPD		X		

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Was a Data Quality Waiver (DQW) issued (Yes/No)?: No

Date Issued: n/a

Date of Response: n/a

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Anita Colbert

Data Reviewed by (Signature): Anita Colbert

Date: August 24, 2016

Maxxam
A Bureau Veritas Group Company

Task Order#: 4410393424
Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155
Your C.O.C. #: 574167-06-01

Attention:Leon Burger

Golder Associates Ltd.
6925 Century Avenue
Suite #100
Mississauga, ON
Canada L5N 7K2

Report Date: 2016/09/09
Report #: R4161211
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B6I8170
Received: 2016/09/02, 07:57

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Laboratory Method	Primary Reference
Petroleum Hydro. CCME F1 & BTEX in Water	1	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1)	1	CAM SOP-00316	CCME PHC-CWS m
Dissolved Metals by ICPMS	1	CAM SOP-00447	EPA 6020A m

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act.

Maxxam Analytics is accredited by SCC (Lab ID 97) for all specific parameters as required by GUCSO and O.Reg 153/04. Maxxam Analytics is limited in liability to the actual cost of analysis unless otherwise agreed in writing. There is no other warranty expressed or implied. Samples will be retained at Maxxam Analytics for three weeks from receipt of data or as per contract.

All data is in statistical control and has met all QC and method performance criteria unless otherwise flagged. All samples were analysed within hold time unless otherwise flagged. All soil samples for BTEX analysis were methanol extracted within 24 hours unless otherwise flagged.

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following “Alberta Environment’s Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003”. Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Encryption Key



Patricia Legette
Project Manager
09 Sep 2016 16:53:24 -04:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kudrat Bajwa, B.Sc., Project Manager
Email: KBajwa@maxxam.ca
Phone# (905)817-5822

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam Job #: B6I8170
Report Date: 2016/09/09

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155

LEAD (DISSOLVED) IN WATER

Maxxam ID		CZS332		
Sampling Date		2016/08/31 22:40		
COC Number		574167-06-01		
	UNITS	**MW16-01**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	0.53	0.50	4647843

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B6I8170
Report Date: 2016/09/09

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155

O.REG 153 PHCS IN WATER (WATER)

Maxxam ID		CZS332		
Sampling Date		2016/08/31 22:40		
COC Number		574167-06-01		
	UNITS	**MW16-01**	**RDL**	**QC Batch**
Benzene	ug/L	18	0.20	4652782
Toluene	ug/L	3.8	0.20	4652782
Ethylbenzene	ug/L	41	0.20	4652782
o-Xylene	ug/L	2.6	0.20	4652782
p+m-Xylene	ug/L	56	0.40	4652782
Total Xylenes	ug/L	59	0.40	4652782
F1 (C6-C10)	ug/L	380	25	4652782
F1 (C6-C10) - BTEX	ug/L	250	25	4652782
F2 (C10-C16 Hydrocarbons)	ug/L	<100	100	4652367
F3 (C16-C34 Hydrocarbons)	ug/L	<200	200	4652367
F4 (C34-C50 Hydrocarbons)	ug/L	<200	200	4652367
Reached Baseline at C50	ug/L	Yes		4652367
Extraction Surrogate Recovery (%)				
o-Terphenyl	%	107		4652367
Instrument Surrogate Recovery (%)				
1,4-Difluorobenzene	%	103		4652782
4-Bromofluorobenzene	%	99		4652782
D10-Ethylbenzene	%	105		4652782
D4-1,2-Dichloroethane	%	100		4652782

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6I8170
Report Date: 2016/09/09

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155

TEST SUMMARY

Maxxam ID: CZS332
Sample ID: MW16-01
Matrix: Water

Collected: 2016/08/31
Relinquished: 2016/09/01
Received: 2016/09/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	4652782	N/A	2016/09/09	Georgeta Rusu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	4652367	2016/09/08	2016/09/09	Zhiyue (Frank) Zhu
Dissolved Metals by ICPMS	ICP/MS	4647843	N/A	2016/09/06	Kevin Comerford

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6I8170
Report Date: 2016/09/09

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	1.3°C

Results relate only to the items tested.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6I8170
Report Date: 2016/09/09

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
4647843	KCO	Method Blank	Dissolved Lead (Pb)	2016/09/06	<0.50		ug/L	
4652367	ZZ	Method Blank	o-Terphenyl	2016/09/09		104	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2016/09/09	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2016/09/09	<200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2016/09/09	<200		ug/L	
4652782	GRU	Method Blank	1,4-Difluorobenzene	2016/09/08		99	%	70 - 130
			4-Bromofluorobenzene	2016/09/08		102	%	70 - 130
			D10-Ethylbenzene	2016/09/08		103	%	70 - 130
			D4-1,2-Dichloroethane	2016/09/08		98	%	70 - 130
			Benzene	2016/09/08	<0.20		ug/L	
			Toluene	2016/09/08	<0.20		ug/L	
			Ethylbenzene	2016/09/08	<0.20		ug/L	
			o-Xylene	2016/09/08	<0.20		ug/L	
			p+m-Xylene	2016/09/08	<0.40		ug/L	
			Total Xylenes	2016/09/08	<0.40		ug/L	
			F1 (C6-C10)	2016/09/08	<25		ug/L	
			F1 (C6-C10) - BTEX	2016/09/08	<25		ug/L	
4647843	KCO	LCS	Dissolved Lead (Pb)	2016/09/06		97	%	80 - 120
4652367	ZZ	LCS	o-Terphenyl	2016/09/09		104	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2016/09/09		97	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2016/09/09		97	%	60 - 130
			F4 (C34-C50 Hydrocarbons)	2016/09/09		93	%	60 - 130
4652782	GRU	LCS	1,4-Difluorobenzene	2016/09/08		99	%	70 - 130
			4-Bromofluorobenzene	2016/09/08		101	%	70 - 130
			D10-Ethylbenzene	2016/09/08		99	%	70 - 130
			D4-1,2-Dichloroethane	2016/09/08		98	%	70 - 130
			Benzene	2016/09/08		88	%	70 - 130
			Toluene	2016/09/08		84	%	70 - 130
			Ethylbenzene	2016/09/08		91	%	70 - 130
			o-Xylene	2016/09/08		95	%	70 - 130
			p+m-Xylene	2016/09/08		87	%	70 - 130
			F1 (C6-C10)	2016/09/08		89	%	70 - 130

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

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Maxxam Job #: B6I8170
Report Date: 2016/09/09

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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www.maxxam.ca

Phone: (905) 817-5700
Fax: (905) 817-5777
Toll Free: 800-563-6266

EXXONMOBIL/IMPERIAL OIL - MAXXAM
CHAIN-OF-CUSTODY RECORD
ANALYSIS REQUESTED

Page 1 of 1

C of C # 574167-06-01

574167

INVOICE INFORMATION	REPORT INFORMATION
Company Name: Imperial Oil, a partnership of Imperial Oil Limited and McColl Frontenac Petrole	Company Name: Golder Associates Ltd.
Contact Name: ~~Lorne Wedge~~ Jordan Hardy	Contact Name: Leon Burger
Address: 505 Quarry Park Blvd SE ~~1 Duncan Mill Road~~ Central Building, 4th Floor ~~North York ON M3B 1Z2~~ Calgary, AB, T2C 5N1	Address: 6925 Century Avenue Suite #100 Mississauga ON L5N 7K2
Email: ~~jordan.p.~~ hardy ~~lorne.wedge~~@esso.ca	Email: Leon_Burger@golder.com,
Phone: ~~(416) 442-5138~~ x 587-476-3858	Phone: (226) 220-6879 x
Sampler Name (Print): Brandon McParlan	Consultant Project #: ~~1544055/1086~~ 1544125 - 1155

	FIELD SAMPLE ID	MATRIX: GROUNDWATER	MATRIX: SURFACE WATER	MATRIX: SOIL	MATRIX: OTHER	# CONTAINERS	SAMPLING: DATE (YYYY/MM/DD)	SAMPLING: TIME (24 HR)	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	F1 & BTEX	F2-F4	Lead
1	MW16-01	X				6	2016/08/31	22:40	X		X	X	X
2													
3													
4													
5													
6													
7													
8													
9													
10													

IOL SITE LOCATION:
~~844 Bronson Avenue, Ottawa ON~~ 1660 Merivale Road, Ottawa, ON

IOL PROJECT # (if applicable):
~~JF 00214~~ MZ.00277

MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM:
~~4410309553-10~~ 4410343424-10

REGULATORY CRITERIA / DETECTION LIMITS:
☒ REG 153 Table 3 ☐ 2004 ☒ 2011 ☐ RSC
(Please indicate which Reg. version and if RSC required)
☐ ODWS ☐ PWQO
☐ Other

SPECIAL INSTRUCTIONS:
Bubbles may be present due to degassing. Sediment may be present.
Upload to 8800627

JARS USED AND NOT SUBMITTED
Enter N/A for Water
N/A

TURNAROUND TIME
Standard (5 days) ☒
Rush (3 days) ☐
(2 days) ☐
(1 day) ☐
(same day) ☐
Date Required

	YES	NO	COOLER ID: 1			
SEAL PRESENT	✓					
SEAL INTACT	✓					
COOLING MEDIA PRESENT	✓		TEMP °C	2	1	1
				1	2	3

	YES	NO	COOLER ID:			
SEAL PRESENT						
SEAL INTACT						
COOLING MEDIA PRESENT			TEMP °C	1	2	3

	YES	NO	COOLER ID:			
SEAL PRESENT						
SEAL INTACT						
COOLING MEDIA PRESENT			TEMP °C	1	2	3

LAB USE ONLY
MAXXAM JOB #
B6I8170

RELINQUISHED BY:		DATE:	TIME (24 HR)	RECEIVED BY:		DATE:	TIME (24 HR)
1. B McParlan	Brandon McParlan	2016/09/01	14:00	1.	DANY MARQASS	2016/09/02	07:57
2.				2.			
3.				3.			

SAMPLES
LABELED BY: GK2
VERIFIED BY: ABH

COC – 1012 (2013) IOL – ON White: Maxxam Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: August 31, 2016

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Maxxam Analytics Mississauga

Consultant Project Number: 1544125-1155

Sample Submission Number: B6I8170

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within
Extraction Surrogate Recovery	X			acceptance criteria.
Method Blank Concentration	X			
Matrix Duplicate RPD			X	
Matrix Spike Recovery			X	
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	No field QC samples were collected.
Trip Blank Concentration			X	
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Was a Data Quality Waiver (DQW) issued (Yes/No)?: No

Date Issued: n/a

Date of Response: n/a

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): Amanda Newberry

Date: September 12, 2016

Maxxam
A Bureau Veritas Group Company

Task Order#: 4410393424
Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155
Your C.O.C. #: 574167-07-01

Attention:Leon Burger

Golder Associates Ltd.
6925 Century Avenue
Suite #100
Mississauga, ON
Canada L5N 7K2

Report Date: 2016/09/09
Report #: R4161210
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B6I8172
Received: 2016/09/02, 07:57

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Laboratory Method	Primary Reference
Petroleum Hydro. CCME F1 & BTEX in Water	1	CAM SOP-00315	CCME PHC-CWS m

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act.

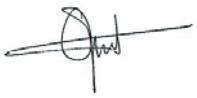
Maxxam Analytics is accredited by SCC (Lab ID 97) for all specific parameters as required by GUCSO and O.Reg 153/04. Maxxam Analytics is limited in liability to the actual cost of analysis unless otherwise agreed in writing. There is no other warranty expressed or implied. Samples will be retained at Maxxam Analytics for three weeks from receipt of data or as per contract.

All data is in statistical control and has met all QC and method performance criteria unless otherwise flagged. All samples were analysed within hold time unless otherwise flagged. All soil samples for BTEX analysis were methanol extracted within 24 hours unless otherwise flagged.

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key



Patricia Legette
Project Manager
09 Sep 2016 16:51:35 -04:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Kudrat Bajwa, B.Sc., Project Manager
Email: KBajwa@maxxam.ca
Phone# (905)817-5822

==========

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Maxxam Job #: B6I8172
Report Date: 2016/09/09

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		CZS362		
Sampling Date		2016/08/31 23:00		
COC Number		574167-07-01		
	UNITS	**TRIP BLANK**	**RDL**	**QC Batch**
Benzene	ug/L	<0.20	0.20	4652782
Toluene	ug/L	<0.20	0.20	4652782
Ethylbenzene	ug/L	<0.20	0.20	4652782
o-Xylene	ug/L	<0.20	0.20	4652782
p+m-Xylene	ug/L	<0.40	0.40	4652782
Total Xylenes	ug/L	<0.40	0.40	4652782
F1 (C6-C10)	ug/L	<25	25	4652782
F1 (C6-C10) - BTEX	ug/L	<25	25	4652782
Instrument Surrogate Recovery (%)				
1,4-Difluorobenzene	%	100		4652782
4-Bromofluorobenzene	%	100		4652782
D10-Ethylbenzene	%	102		4652782
D4-1,2-Dichloroethane	%	94		4652782

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B6I8172
Report Date: 2016/09/09

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155

TEST SUMMARY

Maxxam ID: CZS362
Sample ID: TRIP BLANK
Matrix: Water

Collected: 2016/08/31
Relinquished: 2016/09/01
Received: 2016/09/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	4652782	N/A	2016/09/09	Georgeta Rusu

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Maxxam Job #: B6I8172
Report Date: 2016/09/09

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	1.3°C

Note: Labelling issue (label missing and /or incorrect). Sample ID is Trip Blank as indicated on the chain of custody, however vials were received labelled Trip Blank 30.

Results relate only to the items tested.

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Maxxam Job #: B6I8172
Report Date: 2016/09/09

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
4652782	GRU	Method Blank	1,4-Difluorobenzene	2016/09/08		99	%	70 - 130
			4-Bromofluorobenzene	2016/09/08		102	%	70 - 130
			D10-Ethylbenzene	2016/09/08		103	%	70 - 130
			D4-1,2-Dichloroethane	2016/09/08		98	%	70 - 130
			Benzene	2016/09/08	<0.20		ug/L	
			Toluene	2016/09/08	<0.20		ug/L	
			Ethylbenzene	2016/09/08	<0.20		ug/L	
			o-Xylene	2016/09/08	<0.20		ug/L	
			p+m-Xylene	2016/09/08	<0.40		ug/L	
			Total Xylenes	2016/09/08	<0.40		ug/L	
			F1 (C6-C10)	2016/09/08	<25		ug/L	
			F1 (C6-C10) - BTEX	2016/09/08	<25		ug/L	
4652782	GRU	LCS	1,4-Difluorobenzene	2016/09/08		99	%	70 - 130
			4-Bromofluorobenzene	2016/09/08		101	%	70 - 130
			D10-Ethylbenzene	2016/09/08		99	%	70 - 130
			D4-1,2-Dichloroethane	2016/09/08		98	%	70 - 130
			Benzene	2016/09/08		88	%	70 - 130
			Toluene	2016/09/08		84	%	70 - 130
			Ethylbenzene	2016/09/08		91	%	70 - 130
			o-Xylene	2016/09/08		95	%	70 - 130
			p+m-Xylene	2016/09/08		87	%	70 - 130
			F1 (C6-C10)	2016/09/08		89	%	70 - 130

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

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Maxxam Job #: B6I8172
Report Date: 2016/09/09

Golder Associates Ltd.
Task Order#: 4410393424, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 1544125-1155

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Specialist

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Maxxam

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Mississauga, Ontario L5N 2L8
www.maxxam.ca

Phone: (905) 817-5700
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Toll Free: 800-563-6266

EXXONMOBIL/IMPERIAL OIL - MAXXAM
CHAIN-OF-GUSTODY RECORD
ANALYSIS REQUESTED

C of C # 574167-07-01

574167

INVOICE INFORMATION	REPORT INFORMATION
Company Name: Imperial Oil, a partnership of Imperial Oil Limited and McColl Frontenac Petrole	Company Name: Golder Associates Ltd.
Contact Name: ~~Lorna Wedge~~ Jordan Hardy	Contact Name: Leon Burger
Address: 505 Quarry Park Blvd SE ~~1 Duncan Mill Road~~ Central Building, 4th Floor ~~North York ON M3B 1Z2~~ Calgary, AB, T2C 5N1	Address: 6925 Century Avenue Suite #100 Mississauga ON L5N 7K2
Email: ~~jordan.hardy@lorna.wedge~~@esso.ca	Email: Leon_Burger@golder.com;
Phone: ~~(416) 442-5138 x~~ 587-476-3858	Phone: (226) 220-6879 x
Sampler Name (Print): Brandan McFarlan	Consultant Project #: ~~4544055/1085~~ 1544125-1155

	FIELD SAMPLE ID	MATRIX: GROUND WATER	MATRIX: SURFACE WATER	MATRIX: SOIL	MATRIX: OTHER	# CONTAINERS	SAMPLING: DATE (YYYY/MM/DD)	SAMPLING: TIME (24 HR)	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	F1 & BTEX	F2-F4
1	TRIP BLANK				X	3	2016/08/31	23:00			X	
2												
3												
4												
5												
6												
7												
8												
9												
10												

IOL SITE LOCATION: ~~644 Bronson Avenue, Ottawa, ON~~ 1660 Merivale Rodd, Ottawa, ON.

IOL PROJECT # (if applicable): ~~SF 08214~~ MZ.00277

MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM: ~~4410390653-10~~ 4410393424-10

REGULATORY CRITERIA / DETECTION LIMITS:
(Please indicate which Reg. version and if RSC required)
- [X] REG 153 Table 3 [ ] 2004 [X] 2011 [ ] RSC
- [ ] ODWS [ ] PWQO
- [ ] Other

SPECIAL INSTRUCTIONS:
Please upload to 88001627
Bubbles may be present.

JARS USED AND NOT SUBMITTED
Enter N/A for Water
N/A

TURNAROUND TIME
- Standard (5 days) [X]
- Rush (3 days) [ ]
- (2 days) [ ]
- (1 day) [ ]
- (same day) [ ]

Date Required

	YES	NO	COOLER ID: 1			
SEAL PRESENT	✓					
SEAL INTACT	✓					
COOLING MEDIA PRESENT	✓		TEMP °C	2	1	1
				1	2	3

	YES	NO	COOLER ID:			
SEAL PRESENT						
SEAL INTACT						
COOLING MEDIA PRESENT			TEMP °C	1	2	3

	YES	NO	COOLER ID:			
SEAL PRESENT						
SEAL INTACT						
COOLING MEDIA PRESENT			TEMP °C	1	2	3

LAB USE ONLY
MAXXAM JOB #: B6I8172

RELINQUISHED BY:		DATE:	TIME (24 HR)	RECEIVED BY:		DATE:	TIME (24 HR)
1. BMcFarlan	Brandan McFarlan	2016/09/01	14:00	1.	DANY MARCOASS	2016/09/02	07:57
2.				2.			
3.				3.			

SAMPLES
LABELED BY: GKJ
VERIFIED BY: ABM

COC – 1012 (2013) IOL – ON White: Maxxam Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Golder Associates

Sampling Date: August 31, 2016

Location: 1660 Merivale Road, Ottawa, ON

Laboratory: Maxxam Analytics Mississauga

Consultant Project Number: 1544125-1155

Sample Submission Number: B6I8172

Are All Laboratory QC Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC results are within
Extraction Surrogate Recovery			X	acceptance criteria.
Method Blank Concentration	X			
Matrix Duplicate RPD			X	
Matrix Spike Recovery			X	
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	All field QC samples are within
Trip Blank Concentration	X			alert limits.
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 24 hours (Yes/No)?:	n/a
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Was a Data Quality Waiver (DQW) issued (Yes/No)?: No

Date Issued: n/a

Date of Response: n/a

Is data considered to be reliable (Yes/No/Suspect)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Amanda Newberry

Data Reviewed by (Signature): Amanda Newberry

Date: September 12, 2016

APPENDIX D QUALITY ASSURANCE/QUALITY CONTROL

QUALITY ASSURANCE/QUALITY CONTROL

In conjunction with the field investigations completed to date, a Quality Assurance/Quality Control (QA/QC) program was implemented to ensure the integrity of the soil and groundwater sampling and analytical testing results.

1.0 FIELD PROGRAM

All sampling activities were completed in accordance with Golder's Technical Field Procedures by trained Golder personnel. All field activities were documented in field notes and results were recorded on standard field forms. All field equipment involved in sampling and monitoring was decontaminated in accordance with Golder's Technical Procedures. Soil and groundwater samples were collected using appropriate handling protocols and were placed in sample containers provided by Maxxam Analytics Inc. (Maxxam).

All re-useable field equipment involved in collecting samples was decontaminated between each sampling location. To help prevent cross-contamination, a new pair of clean nitrile gloves was used for the collection of each sample.

Samples were given unique identification numbers and the sampling containers were preserved in ice-filled coolers. Samples were logged onto formal chain-of-custody documents and transported to Maxxam's Mississauga Laboratory for chemical analysis. Maxxam's Mississauga laboratory is accredited by the Standards Council of Canada (SCC).

Blind field duplicate samples were submitted for analysis. Trip and field blanks were submitted for analysis, as necessary, to evaluate the potential for cross-contamination during the sampling and transportation of the samples. Submission of blind field duplicate QC samples was at a minimum rate of 10% of total samples.

2.0 LABORATORY PROGRAM

The laboratory QA/QC program included adherence to laboratory sampling and analysis protocols (e.g., hold times, sample containers, preservatives, detection limits and approved methodology) and the analysis of laboratory method blanks, laboratory sample duplicates, surrogate recovery and chemical spikes.

The laboratory method blank analysis results were used to detect interferences or impurities introduced by the laboratory equipment, reagents, or solvents. Surrogate recovery is analyzed for organics by spiking samples with known quantities of surrogate chemicals which have similar chemical properties to the parameters being analyzed. The reported recovery provides an indication of the analytical method accuracy for that sample. Matrix spikes were conducted by adding known concentrations of the analyte of interest to a sample to evaluate the effects of the sample matrix on the analytical method. The analysis of selected samples in duplicate is used to evaluate the reproducibility of the analytical method.

3.0 DATA RECEPTION

Once laboratory analytical results were received, Golder completed a review of field and laboratory quality. This included review of laboratory QC performance to confirm results are within acceptance criteria, as well as evaluation of field duplicate and blank results to confirm they were within alert limits. Upon receipt of the analytical results, Relative Percent Difference (RPD) values between the original samples and their blind field duplicates were calculated as follows:

$$RPD = \frac{|x_2 - x_1|}{\left(\frac{x_1 + x_2}{2}\right)} \times 100$$

Where: RPD = relative percent difference
X_2 = sample value
X_1 = blind field duplicate or replicate value.

Since analytical error increases near the Reportable Detection Limit (RDL), an RPD was only calculated where the concentrations of both the original and blind field duplicate samples were greater than five times the RDL. The calculated RPDs were then compared to parameter specific alert limits.

Exceedances of the QC acceptance or alert criteria were investigated with the laboratory and, if warranted, a corrective action report was requested from the laboratory.

4.0 DATA QUALITY REVIEW RESULTS

Results of the data quality review are summarized in Table D1. The RPD calculations and QC results are presented in Table D2 and D3.

One groundwater field duplicate sample was submitted to the laboratory for analysis of BTEX, PHC F1 to F4, Lead, and hexane as part of the QC program.

Based on the RPD calculations, the field duplicate samples TH11 and DUP B exceed the alert limit for dissolved lead (58%). A quality check of the data yielded similar results. Dissolved lead concentrations in both the sample and the field duplicate were below the regulatory standard, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the dissolved lead data reported can be considered reliable.

Additional information is provided in Table D1.

5.0 SUMMARY OF RESULTS

Based on the review of the QA/QC results, the data presented in this report are considered to be reliable.

Table D1
Summary of Quality Control Sample Results - Groundwater Monitoring
Adjacent to 1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Maxxam Job Number	Data Quality Waiver Issued (Yes/No)	Data Quality Waiver Number	Matrix	Maxxam Sample ID Affected	Test Affected	Data Quality Issue	Comments
B6H0949	No	n/a	Groundwater	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
B6H0953	No	n/a	Groundwater	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
B6H0955	No	n/a	Groundwater	CWM521 and CWM523	Dissolved Lead (Pb)	Field duplicate samples TH11 and DUP B exceed the alert limit for dissolved lead (58%).	A quality check of the data yielded similar results. Dissolved lead concentrations in both the sample and the field duplicate were below the regulatory standard, indicating that there will not be a material effect on the interpretation of the results of this parameter. Under these circumstances, the dissolved lead data reported can be considered reliable.
B6I8170	No	n/a	Groundwater	n/a	n/a	No data quality issues were identified.	The data are considered reliable.
B6I8172	No	n/a	Groundwater	n/a	n/a	No data quality issues were identified.	The data are considered reliable.

Notes:
n/a - not applicable

Summary of Field Duplicate Sample Results - Groundwater Monitoring
Adjacent to 1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Sample Location Sample Collection Date Maxxam Sample ID	Units	Alert Limit	RDL	5X RDL	Are the results >5X RDL	TH11 11/Aug/16 CWM521	DUP B 11/Aug/16 CWM523	RPD %
Benzene	ug/L	>80%	0.4	2	yes	100	110	10
Toluene	ug/L	>80%	0.4	2	yes	6.3	7.1	12
Ethylbenzene	ug/L	>80%	0.4	2	yes	590	610	3
o-Xylene	ug/L	>80%	0.4	2	yes	6.3	6.8	8
p+m-Xylene	ug/L	>80%	0.8	4	yes	150	160	6
Total Xylenes	ug/L	>80%	0.8	4	yes	160	170	6
Hexane	ug/L	>80%	10	50	no	37	43	n/c
F1 (C6-C10)	ug/L	>80%	50	250	yes	5900	5800	2
F1 (C6-C10) - BTEX	ug/L	>80%	50	250	yes	5000	4900	2
F2 (C10-C16 Hydrocarbons)	ug/L	>80%	100	500	yes	6700	7100	6
F3 (C16-C34 Hydrocarbons)	ug/L	>80%	200	1000	yes	2200	2400	9
F4 (C34-C50 Hydrocarbons)	ug/L	>80%	200	1000	yes	1300	1400	7
Dissolved Lead (Pb)	ug/L	>50%	0.5	2.5	yes	6	3.3	**58**

Notes:
Bold/Underlined - value exceeds alert limit
BTEX - benzene, toluene, ethylbenzene, xylenes
F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3 and 4
mbgs - metres below ground surface
µg/L - micrograms per Litre
n/a - not analyzed
n/c - not calculable
RDL - reportable detection limit
RPD - relative percent difference
> - greater than
< - less than
RPD is not calculated if either the original or field duplicate sample has a result less than 5X the RDL

Table D3
Summary Field Blank and Trip Blank Sample Results - PHC Parameters
Adjacent to 1660 Merivale Road, Ottawa, Ontario
Imperial Oil Limited

Sample ID **Sample Collection Date** **Maxxam Sample ID**	**Units**	**RDL**	**Field Blank** August 11, 2016 CWM514	**Alert Limit**	**Do the results exceed the Alert Limit?**	**Trip Blank** August 11, 2016 CWM515	**Alert Limit**	**Do the results exceed the Alert Limit?**	**Trip Blank** August 31, 2016 CZS362	**Alert Limit**	**Do the results exceed the Alert Limit?**
Benzene	ug/L	0.2	<0.20	>5X RDL	no	<0.20	>5X RDL	no	<0.20	>5X RDL	no
Toluene	ug/L	0.2	<0.20	>5X RDL	no	<0.20	>5X RDL	no	<0.20	>5X RDL	no
Ethylbenzene	ug/L	0.2	<0.20	>5X RDL	no	<0.20	>5X RDL	no	<0.20	>5X RDL	no
o-Xylene	ug/L	0.2	<0.20	>5X RDL	no	<0.20	>5X RDL	no	<0.20	>5X RDL	no
p+m-Xylene	ug/L	0.4	<0.40	>5X RDL	no	<0.40	>5X RDL	no	<0.40	>5X RDL	no
Total Xylenes	ug/L	0.4	<0.40	>5X RDL	no	<0.40	>5X RDL	no	<0.40	>5X RDL	no
Hexane	ug/L	5	<5.0	>5X RDL	no	<5.0	>5X RDL	no	NA	NA	NA
F1 (C6-C10)	ug/L	25	<25	>2X RDL	no	<25	>2X RDL	no	<25	>2X RDL	no
F1 (C6-C10) - BTEX	ug/L	25	<25	>2X RDL	no	<25	>2X RDL	no	<25	>2X RDL	no
F2 (C10-C16 Hydrocarbons)	ug/L	100	<100	>2X RDL	no	<100	>2X RDL	no	NA	NA	NA
F3 (C16-C34 Hydrocarbons)	ug/L	200	<200	>2X RDL	no	<200	>2X RDL	no	NA	NA	NA
F4 (C34-C50 Hydrocarbons)	ug/L	200	<200	>2X RDL	no	<200	>2X RDL	no	NA	NA	NA

Notes:

Bold/Underlined - value exceeds alert limit

BTEX - benzene, toluene, ethylbenzene, xylenes

F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3 and 4

RDL - reportable detection limit

> - greater than

< - less than

NA - not analyzed

Alert limit is 5X the RDL for BTEX and 2X the RDL for F1 to F4.

All values reported in µg/L (micrograms per litre)

May 3, 2016 1536518-1155

THIS REPORT CONTAINS PROVISIONS LIMITING LIABILITY, THE SCOPE OF THE REPORT AND THIRD PARTY RELIANCE

These documents and the information contained therein are confidential property of Imperial Oil Limited and any disclosure of same is governed by the provisions of each of the applicable provincial and territorial freedom of information legislation, the Privacy Act (Canada) 1980-81-83, c.111, Sch. II"1", and the Access to Information Act (Canada) 1980-81-82-83, c.111, Sch.I"1", as such, legislation may be amended from time to time.

Imperial Oil Limited
Luana Mutihac, M.Env.Sc.
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M3B 1Z2

SCREENING LEVEL RISK ASSESSMENT
RIGHT-OF-WAY ADJACENT TO 1660 MERIVALE ROAD, OTTAWA, ON (SAP NO. 88001627)

INTRODUCTION

Golder Associates Limited (Golder) was retained by Imperial Oil Limited (Imperial) to conduct a screening level risk assessment (SLRA) for the Right-of-Way (RoW) located adjacent to 1660 Merivale Road in Ottawa, Ontario (referred to as the Site), as shown on Figures 1 and 2. The purpose of the SLRA is to identify if soil and groundwater concentrations present within the RoW represent a risk to above ground receptors or workers who may be required to conduct subsurface work.

Based on the results of the environmental assessments (ESAs) completed at the Site by exp Energy Services Ltd. (exp) and Golder (2016), exceedances of petroleum hydrocarbon (PHC) fractions F1 to F4 in groundwater were identified within the RoW. These exceedances were identified based on a comparison to the Ministry of Environment and Climate Change (MOECC) fine-grained standards based on grain-size analyses completed at the adjacent site (1660 Merivale Road). A review of the borehole logs for the boreholes advanced within the RoW was completed as part of the SLRA. Subsurface conditions were reported to consist predominately of sand and gravel fill in the RoW (i.e., coarse-grained material). Given that vapour migration can occur more readily through coarse-grained material, and in consideration of the subsurface worker that may be working in a trench within the RoW, comparison to the coarse-textured standards is considered to be more conservative and appropriate in the SLRA. As such, identification of contaminants of concern (COCs) in this SLRA is based on a comparison of maximum measured concentrations of soil and groundwater within the RoW to the MOECC Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Commercial/ Industrial/Community Property Use, coarse-textured soil, April 15, 2011 (Ontario Table 3 Standards). No sheen or light non-aqueous phase liquid (LNAPL) were noted while conducting intrusive sampling during previous investigations (exp, 2013, exp, 2014) or during Golder's recent groundwater sampling event (Golder, 2016).

SCOPE OF WORK

As indicated above, the purpose of the SLRA is to identify whether there are potential risks to human health and the environment based on the maximum measured concentrations of PHCs in groundwater within the RoW. The

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scope of the SLRA is limited to a qualitative evaluation of potential risks to receptors present within the RoW and does not consider receptors present on adjacent properties that may be exposed to COCs migrating from the RoW via groundwater or vapour migration. It is not sufficient to be submitted as part of the process to obtain a Record of Site Condition (RSC). The SLRA is based on the results of current and previous investigations as well as current conditions within the RoW. In the case of any changes to the current conditions or if new data is collected, a re-evaluation of the SLRA will be required.

IDENTIFICATION OF CONTAMINANTS OF CONCERN

As indicated above, the use of coarse-grained standards were considered to be applicable for the identification of COCs in soil and groundwater within the RoW. The maximum measured concentrations of the parameters analyzed in soil and groundwater along with their respective MOECC Table 3 Standards are provided in Tables 1 and 2 below and shown on Figures 3 and 4. Select polycyclic aromatic hydrocarbon (PAH) parameters were analyzed in soil as part of the previous investigations by exp. Concentrations were below the laboratory detection limit, as such, they were not included in Table 1 below.

Table 1: Potential for Contaminants of Concern in Soil

Potential Contaminant of Concern	MOECC Table 3 Standard (µg/g)	Maximum Measured Concentration (µg/g)	Retain as COC?
Benzene	0.32	<0.020	No
Toluene	68	0.024	No
Ethylbenzene	9.5	<0.020	No
Xylenes	26	<0.040	No
Hexane	46	<0.5	No
Methyl tert-Butyl Ether	11	<0.05	No
PHC F1 (C6-C10)-BTEX	55	<10	No
PHC F2 (C10-C16)	230	<10	No
PHC F3 (C16-C34)	1700	120	No
PHC F4 (C34-C50)	3300	1700	No
Lead	120	14	No

Notes: BTEX - Benzene, toluene, ethylbenzene, xylene
PHC - Petroleum hydrocarbon
COC – Contaminant of concern
Bold indicates an exceedance of the applicable standard

Table 2: Potential Contaminants of Concern in Groundwater

Potential Contaminant of Concern	MOECC Table 3 Standard (µg/L)	Maximum Measured Concentration (µg/L)	Retain as COC?
Benzene	44	**380**	**Yes**
Toluene	18000	58	No
Ethylbenzene	2300	2300	No
Xylenes	4200	3500	No
Hexane	51	**130**	**Yes**
Methyl tert-Butyl Ether	190	0.75	No
PHC F1 (C6-C10)-BTEX	750	**11,000**	**Yes**
PHC F2 (C10-C16)	150	**3,100**	**Yes**

Potential Contaminant of Concern	MOECC Table 3 Standard (µg/L)	Maximum Measured Concentration (µg/L)	Retain as COC?
PHC F3 (C16-C34)	500	**1,300**	**Yes**
PHC F4 (C34-C50)	500	**820**	**Yes**
Lead	25	6.9	No

Notes: BTEX - Benzene, toluene, ethylbenzene, xylene
PHC - Petroleum hydrocarbon
COC – Contaminant of concern
Bold indicates an exceedance of the applicable standard

Based on the above, benzene, hexane and PHC F1 to F4 in groundwater were retained for further assessment in the SLRA. No COCs were identified in soil.

ASSESSMENT OF CONTAMINANTS OF CONCERN FOR HUMAN AND ECOLOGICAL HEALTH

The generic MOECC Site Condition Standards (SCS) (i.e., MOECC Table 3 Standards) have been established through the use of a number of component values. These component values have been developed to provide protection to a receptor or group of receptors from a contaminant via a specific pathway. Generally, the lowest value of the component values is then applied as the generic SCS. For the purpose of identifying COCs related specifically to human or ecological receptors, maximum measured concentrations of these COCs were compared to pathway specific guidelines for the protection of human health (referred to as human health component values) or the protection of ecological health (referred to as ecological component values). MOECC Table 3 component values for a non-potable groundwater scenario, commercial/industrial/community land use and fine-grained soil were used (MOECC, 2011).

Human Health

For human health, the screening against the MOECC Table 3 component values is shown below in Table 2. Groundwater in the area is not potable; therefore, exposure due to ingestion of potable groundwater is not applicable within the RoW. There are no buildings within the RoW; therefore, exposure due to inhalation of indoor air containing soil vapour from groundwater is not applicable. In the absence of component values for the inhalation of air in a trench containing soil vapour from groundwater for a subsurface worker, the GW2 component value was considered to be applicable. This component value is protective of humans coming into contact with volatile chemicals in groundwater through inhalation of indoor air containing soil vapour. Additionally, subsurface workers could potentially be exposed to groundwater from splashing or hand-to-mouth contact during subsurface work, if groundwater is encountered. The MOECC Table 2 GW1 component values for the ingestion of potable groundwater were conservatively applied with an adjustment factor of 100 as it was considered that the incidental ingestion of surface water was 100 times lower than the daily drinking water consumption rate (Virginia Department of Environmental Quality (VDEQ), 2014.

PHC F3 and F4 are not considered volatile, and as such, exposure pathways related to the inhalation of vapours were not considered in the SLRA for these parameters.

Table 3: Contaminants of Concern in Groundwater Screening Against Human Health Component Values

Contaminant of Concern	MOECC Component Values (µg/L)		Maximum Measured Concentration (µg/L)	Retain as COC?
	GW2[1]	GW1x100[2]		
Benzene	830	500	380	No
Hexane	980	NG	130	No
PHC F1 (C6-C10)-BTEX	28,000	82,000	11,000	No

Contaminant of Concern	MOECC Component Values (µg/L)		Maximum Measured Concentration (µg/L)	Retain as COC?
	GW2[1]	GW1x100[2]		
PHC F2 (C10-C16)	47,000	30,000	3,100	No
PHC F3 (C16-C34)	NA	100,000	1,300	No
PHC F4 (C34-C50)	NA	110,000	820	No

Notes: COC – Contaminant of concern
NA – Not applicable
NG – No guideline
GW2 – Human health component value for groundwater to indoor air (inhalation of indoor air)
GW1 – Human health component value for the ingestion of groundwater
1. MOECC Table 3 component value (GW2)
2. MOECC Table 2 component value (GW1) multiplied by an adjustment factor of 100 to account for incidental ingestion of groundwater

Prepared by: SR
Checked by: TR

As shown in Table 2, maximum measured concentrations of COCs in groundwater were below the GW2 and the adjusted GW1 component values and although the component values are above the solubility limits for PHC F1 and F2 no sheen or LNAPL were noted during the previous investigations therefore the COCs were not retained for further consideration. As such, risks were not identified for the subsurface worker.

Ecological Health

As indicated above, the SLRA is limited to a qualitative evaluation of potential risks to receptors present within the RoW. Given that the RoW is paved with a roadway, groundwater is not accessible to ecological receptors (e.g., plants, soil invertebrates, mammals and birds) and as such, risks were not identified for ecological receptors.

CONCLUSIONS/RECOMMENDATIONS

A SLRA was conducted to identify whether there are potential risks to human and ecological receptors within the RoW associated with the presence of PHC impacts in groundwater. For the purposes of the SLRA, only receptors present within the RoW were considered. After screening these COCs against their respective applicable human health MOECC Table 3 component values, no COCs were retained for further consideration and no risks were identified for human receptors. Pathways for ecological receptors were considered to be incomplete; therefore, no risks were identified.

As indicated above, no sheen or LNAPL were noted during the previous investigations at the locations investigated; however, conditions may vary between these locations. If evidence of sheen or LNAPL is noted during future excavation activities, sampling, laboratory analysis and evaluation of the results should be conducted to identify the appropriate actions required.

REFERENCES

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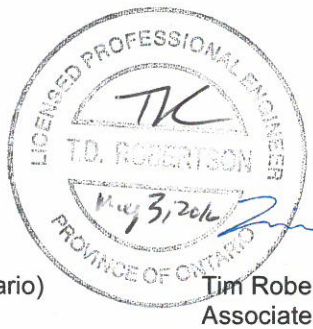
CLOSURE

We trust the information provided herein meets your requirements. If you have any questions about the contents of the letter, please contact the undersigned.

Yours truly,

GOLDER ASSOCIATES LTD.



Sasha Richards, M.Sc., P.Eng. (Ontario)
Risk Assessor

Tim Robertson, P.Eng. (Ontario)
Associate

Attachments: Statement of Limitations
Figure 1: Site Locality Map
Figure 2: Site Plan with Monitoring Well Locations
Figure 3:Soil Analytical Results – BTEX, PHC Fractions F1 – F1, Hexane and Lead
Figure 4: Groundwater Analytical Results – BTEX, PHC Fractions F1 – F4, Hexane and Lead

STATEMENT OF LIMITATIONS

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The investigation undertaken by Golder Associates Ltd. with respect to this report and any conclusions or recommendations made in this report reflect Golder Associates Ltd.'s judgement based on the site conditions observed at the time of the site inspection on the date(s) set out in this report and on information available at the time of preparation of this report. This report has been prepared for specific application to this site and it is based, in part, upon visual observation of the site, subsurface investigation at discrete locations and depths, and specific analysis of specific chemical parameters and materials during a specific time interval, all as described in this report. Unless otherwise stated, the findings cannot be extended to previous or future site conditions, portions of the site which were unavailable for direct investigation, subsurface locations which were not investigated directly, or chemical parameters, materials or analysis which were not addressed. Substances other than those addressed by the investigation described in this report may exist within the site, substances addressed by the investigation may exist in areas of the site not investigated and concentrations of substances addressed which are different than those reported may exist in areas other than the locations from which samples were taken.

If site conditions or applicable standards change or if any additional information becomes available at a future date, modifications to the findings, conclusions and recommendations in this report may be necessary.

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FIGURES



REFERENCE

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ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No.: 11010-LAND USE-AUG11; SCALE: UNKNOWN; DATE: AUGUST 2011.

0 50 100
(APPROX.) METRES

CLIENT
IMPERIAL OIL LIMITED

CONSULTANT
Golder Associates

YYYY-MM-DD	2016-04-15
DESIGNED	BMcParlan
PREPARED	EHernandez
REVIEWED	LBurger
APPROVED	SCarrelas

PROJECT
ADJACENT TO
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
SITE LOCALITY MAP

PROJECT NO.	CONTROL	REV.	FIGURE
1536518	1155-2016	0	1

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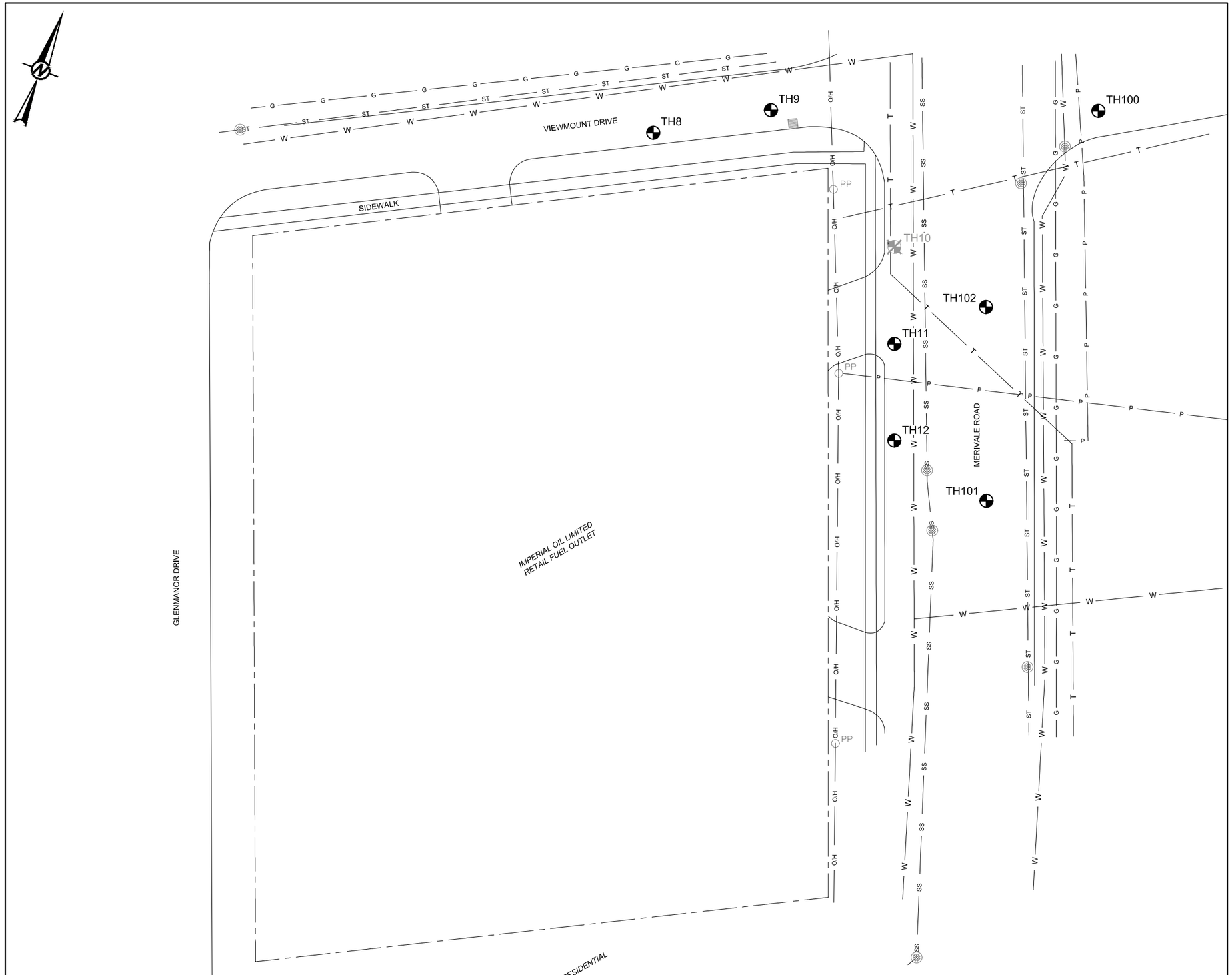
IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A

0 25 mm



LEGEND

- PROPERTY BOUNDARY
- O/H — OVERHEAD POWER LINE
- G — UNDERGROUND GAS LINE
- P — UNDERGROUND POWER LINE
- SS — UNDERGROUND SANITARY LINE
- ST — UNDERGROUND STORM SEWER LINE
- T — UNDERGROUND TELEPHONE LINE
- W — UNDERGROUND WATERLINE
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL (DESTROYED)
- CATCH BASIN
- MANHOLE
- PP — POWER POLE

REFERENCE

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No.: 11010-SITE PLAN OFFSITE-OCT14; SCALE: UNKNOWN; DATE: OCTOBER 2014.

0 10 20
1:500 METRES

CLIENT
IMPERIAL OIL LIMITED

PROJECT
ADJACENT TO
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
SITE PLAN WITH MONITORING WELL LOCATIONS

CONSULTANT

Golder Associates

YYYY-MM-DD	2016-04-15
DESIGNED	BMcParlan
PREPARED	EHernandez
REVIEWED	LBurger
APPROVED	SCarrelas

PROJECT NO.	CONTROL	REV.	FIGURE
1536518	1155-2016	0	2

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B
25 mm

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TH8										Date Sampled - August 28/12
Depth (mbgs)	**B**	**T**	**E**	**X**	**F1**	**F2**	**F3**	**F4**	**H**	**Pb**
1.7 - 1.8	<0.020	<0.020	<0.020	<0.040	<10	<10	<10	<10	<0.050	10

TH9										Date Sampled - August 29/12
Depth (mbgs)	**B**	**T**	**E**	**X**	**F1**	**F2**	**F3**	**F4**	**H**	**Pb**
1.7 - 1.8	<0.020	<0.020	<0.020	<0.040	<10	<10	<10	<10	<0.050	9.6

TH10										Date Sampled - August 29/12
Depth (mbgs)	**B**	**T**	**E**	**X**	**F1**	**F2**	**F3**	**F4**	**H**	**Pb**
1.7 - 1.8	<0.020	<0.020	<0.020	<0.040	<10	<10	<10	<10	<0.050	9.1
1.7 - 1.8 (DUP)	<0.020	<0.020	<0.020	<0.040	<10	<10	<10	<10	<0.050	8.2

TH11										Date Sampled - August 30/12
Depth (mbgs)	**B**	**T**	**E**	**X**	**F1**	**F2**	**F3**	**F4**	**H**	**Pb**
1.7 - 1.8	<0.020	<0.020	<0.020	<0.040	<10	<10	120	1700	<0.050	7.8

TH12										Date Sampled - August 30/12
Depth (mbgs)	**B**	**T**	**E**	**X**	**F1**	**F2**	**F3**	**F4**	**H**	**Pb**
1.1 - 1.2	<0.020	<0.020	<0.020	<0.040	<10	<10	<10	<10	<0.050	14

TH100										Date Sampled - September 17/14
Depth (mbgs)	**B**	**T**	**E**	**X**	**F1**	**F2**	**F3**	**F4**	**H**	**Pb**
1.1 - 1.2	<0.020	<0.020	<0.020	<0.040	<10	<10	<50	<50	<0.050	7.8

TH101										Date Sampled - September 17/14
Depth (mbgs)	**B**	**T**	**E**	**X**	**F1**	**F2**	**F3**	**F4**	**H**	**Pb**
1.7 - 2.0	<0.020	<0.020	<0.020	<0.040	<10	<10	<50	<50	<0.050	5.5
1.7 - 2.0 (DUP)	<0.020	0.024	<0.020	<0.040	<10	<10	<50	<50	<0.050	6.1

TH102										Date Sampled - September 17/14
Depth (mbgs)	**B**	**T**	**E**	**X**	**F1**	**F2**	**F3**	**F4**	**H**	**Pb**
1.7 - 2.0	<0.020	<0.020	<0.020	<0.040	<10	<10	<50	<50	<0.050	<5.0

ONTARIO STANDARDS

PARAMETERS	**B**	**T**	**E**	**X**	**F1**	**F2**	**F3**	**F4**	**H**	**Pb**
CRITERIA[a]	0.32	68	9.5	26	55	230	1,700	3,300	46	120
RDL	0.020	0.020	0.020	0.040	10	10	50	50	0.50	5.0

LEGEND

PROPERTY BOUNDARY

BOREHOLE LOCATION COMPLETED AS A MONITORING WELL

BOREHOLE LOCATION COMPLETED AS A MONITORING WELL (DESTROYED)

LIST OF APPLICABLE ABBREVIATIONS

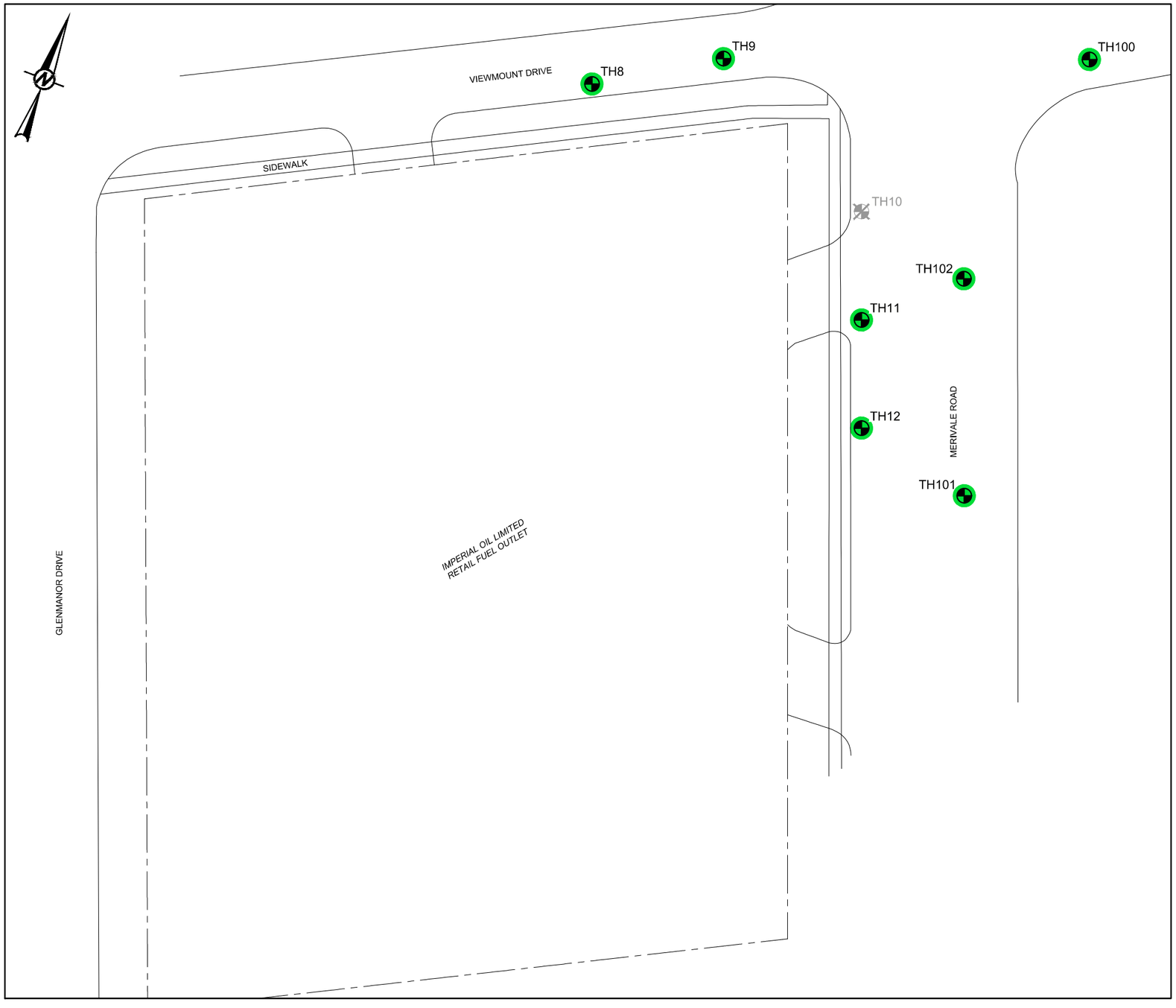
(a)	ONTARIO REGULATION 153 (2011) TABLE 3 FULL DEPTH GENERIC SITE CONDITION STANDARDS FOR ALL TYPES OF PROPERTY USE FOR GROUNDWATER IN COARSE TEXTURED SOIL IN A NON-POTABLE GROUND WATER CONDITION.		
<	LESS THAN	F2	PETROLEUM HYDROCARBON FRACTION 2 (C_{10}-C_{16})
µg/g	MICROGRAMS PER GRAM	F3	PETROLEUM HYDROCARBON FRACTION 3 (C_{16}-C_{34})
B	BENZENE	F4	PETROLEUM HYDROCARBON FRACTION 4 (C_{34}-C_{50})
T	TOLUENE	H	HEXANE
E	ETHYLBENZENE	mbgs	METRES BELOW GROUND SURFACE
X	XYLENES	Pb	LEAD
DUP	DUPLICATE FIELD SAMPLE	RDL	REPORTABLE DETECTION LIMIT
F1	PETROLEUM HYDROCARBON FRACTION 1 (C_6-C_{10}) MINUS BTEX		

NOTES

1. LOCATIONS WHERE ALL SOIL SAMPLE MEETS APPLICABLE FOR ALL PARAMETERS ANALYZED SHOWN IN **GREEN.**
2. LOCATIONS WHERE AT LEASE SAMPLE EXCEEDS APPLICABLE STANDARDS FOR AT LEAST ONE OF THE PARAMETERS ANALYZED SHOWN IN **RED.**
3. EXCEEDANCES OF APPLICABLE STANDARDS IN TEXT ARE SHOWN IN **RED.**
4. ALL RESULTS IN µg/g.
5. SAMPLING EVENTS COMPLETED IN OCTOBER AND NOVEMBER 2015 WERE CONDUCTED BY GOLDER FIELD STAFF. PREVIOUS DATA TAKEN FROM EXP 2014.

REFERENCE

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No.: 11010-SITE PLAN OFFSITE-OCT14; SCALE: UNKNOWN; DATE: OCTOBER 2014.



0 10 20
1:500 METRES

CLIENT
IMPERIAL OIL LIMITED

CONSULTANT
Golder Associates

YYYY-MM-DD	2016-04-15
DESIGNED	BMcParlan
PREPARED	EHernandez
REVIEWED	LBurger
APPROVED	SCarrelas

PROJECT
ADJACENT TO
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
SOIL ANALYTICAL RESULTS - BTEX, PHC FRACTIONS F1 - F4, HEXANE AND LEAD

PROJECT NO.	CONTROL	REV.	FIGURE
1536518	1155-2016	0	3

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

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TH100										Screen Interval: 3.0 to 4.9 mbgs
Date	**B**	**T**	**E**	**X**	**F1**	**F2**	**F3**	**F4**	**H**	**Pb**
06-Oct-14	<0.20	<0.20	0.31	0.91	<25	<100	<200	<200	<5.0	<0.50
27-Oct-15	<0.20	<0.20	0.94	1.1	<25	<100	<200	<200	<5.0	<0.50
27-Oct-15 (DUP A)	<0.20	<0.20	0.24	<0.40	<25	<100	<200	<200	<5.0	<0.50

TH101										Screen Interval: 3.0 to 4.9 mbgs
Date	**B**	**T**	**E**	**X**	**F1**	**F2**	**F3**	**F4**	**H**	**Pb**
06-Oct-14	**85**	12	580	500	**4,100**	**830**	<200	<200	44	2.9
06-Oct-14 (DUP)	**84**	12	580	510	**4,100**	**910**	<200	<200	**54**	4.2
28-Oct-15	**110**	16	740	590	**3,400**	**830**	<200	<200	**64**	4.6

TH102										Screen Interval: 3.0 to 4.9 mbgs
Date	**B**	**T**	**E**	**X**	**F1**	**F2**	**F3**	**F4**	**H**	**Pb**
06-Oct-14	0.72	0.52	16	42	360	**360**	<200	<200	7.2	3.9
28-Oct-15	42	1.6	100	140	**970**	**350**	<200	<200	23	1.5

TH8										Screen Interval: 3.3 to 4.9 mbgs
Date	**B**	**T**	**E**	**X**	**F1**	**F2**	**F3**	**F4**	**H**	**Pb**
13-Jun-13	3.9	<0.20	4.1	0.61	48	<100	<200	<200	<0.5	1.1
27-Oct-15	4.4	<0.20	0.51	0.41	<25	<100	<200	<200	<5.0	0.82

TH9										Screen Interval: 3.4 to 4.9 mbgs
Date	**B**	**T**	**E**	**X**	**F1**	**F2**	**F3**	**F4**	**H**	**Pb**
06-Oct-14	31	3	230	290	**1,000**	**570**	**610**	420	15	1.1
27-Oct-15	**51**	7.2	390	350	**2,500**	**1,100**	220	360	35	2.6

TH10										Screen Interval: 3.3 to 4.9 mbgs
Date	**B**	**T**	**E**	**X**	**F1**	**F2**	**F3**	**F4**	**H**	**Pb**
11-Jun-13	**73**	58	52	200	**1400**	**560**	<200	<200	35	1.2

TH11										Screen Interval: 3.3 to 4.9 mbgs
Date	**B**	**T**	**E**	**X**	**F1**	**F2**	**F3**	**F4**	**H**	**Pb**
11-Jun-13	**370**	34	2,200	3,400	**11,000**	**1,400**	<200	<200	**130**	2.6
28-Oct-15	**96**	8.1	710	120	**4,400**	**2,500**	**1,300**	**820**	**72**	4.6

TH12										Screen Interval: 3.3 to 4.9 mbgs
Date	**B**	**T**	**E**	**X**	**F1**	**F2**	**F3**	**F4**	**H**	**Pb**
11-Jun-13	**380**	35	2,300	3,500	**11,000**	**3,100**	<200	<200	**<100**	6.8
11-Jun-13 (DUP)	**360**	34	2,300	3,500	**11,000**	**2,800**	<200	<200	**<100**	6.9
28-Oct-15	**95**	14	620	400	**4,500**	**1,600**	**540**	320	**140**	4.5

ONTARIO STANDARDS

PARAMETERS	B	T	E	X	F1	F2	F3	F4	H	Pb
CRITERIA[a]	44	18,000	2,300	4,200	750	150	500	500	51	25
RDL	0.20	0.20	0.20	0.40	25	100	200	200	5.0	0.50

LEGEND

PROPERTY BOUNDARY

BOREHOLE LOCATION COMPLETED AS A MONITORING WELL

BOREHOLE LOCATION COMPLETED AS A MONITORING WELL (DESTROYED)

LIST OF APPLICABLE ABBREVIATIONS

(a) ONTARIO REGULATION 153 (2011) TABLE 3 FULL DEPTH GENERIC SITE CONDITION STANDARDS FOR ALL TYPES OF PROPERTY USE FOR GROUNDWATER IN COARSE TEXTURED SOIL IN A NON-POTABLE GROUND WATER CONDITION.

<	LESS THAN	F2	PETROLEUM HYDROCARBON FRACTION 2 (C_{10}-C_{16})
µg/L	MICROGRAMS PER LITRE	F3	PETROLEUM HYDROCARBON FRACTION 3 (C_{16}-C_{34})
B	BENZENE	F4	PETROLEUM HYDROCARBON FRACTION 4 (C_{34}-C_{50})
T	TOLUENE	H	HEXANE
E	ETHYLBENZENE	mbgs	METRES BELOW GROUND SURFACE
X	XYLENES	Pb	LEAD
DUP	DUPLICATE FIELD SAMPLE	RDL	REPORTABLE DETECTION LIMIT
F1	PETROLEUM HYDROCARBON FRACTION 1 (C_6-C_{10}) MINUS BTEX		

NOTES

1. LOCATIONS WHERE MOST RECENT GROUNDWATER SAMPLE MEETS APPLICABLE STANDARDS FOR ALL PARAMETERS ANALYZED SHOWN IN **GREEN.**
2. LOCATIONS WHERE MOST RECENT GROUNDWATER SAMPLE EXCEEDS APPLICABLE STANDARDS FOR AT LEAST ONE OF THE PARAMETERS ANALYZED SHOWN IN **RED.**
3. EXCEEDANCES OF APPLICABLE STANDARDS IN TEXT ARE SHOWN IN **RED.**
4. ALL RESULTS IN µg/L.
5. SAMPLING EVENTS COMPLETED IN OCTOBER AND NOVEMBER 2015 WERE CONDUCTED BY GOLDER FIELD STAFF. PREVIOUS DATA TAKEN FROM EXP 2014.

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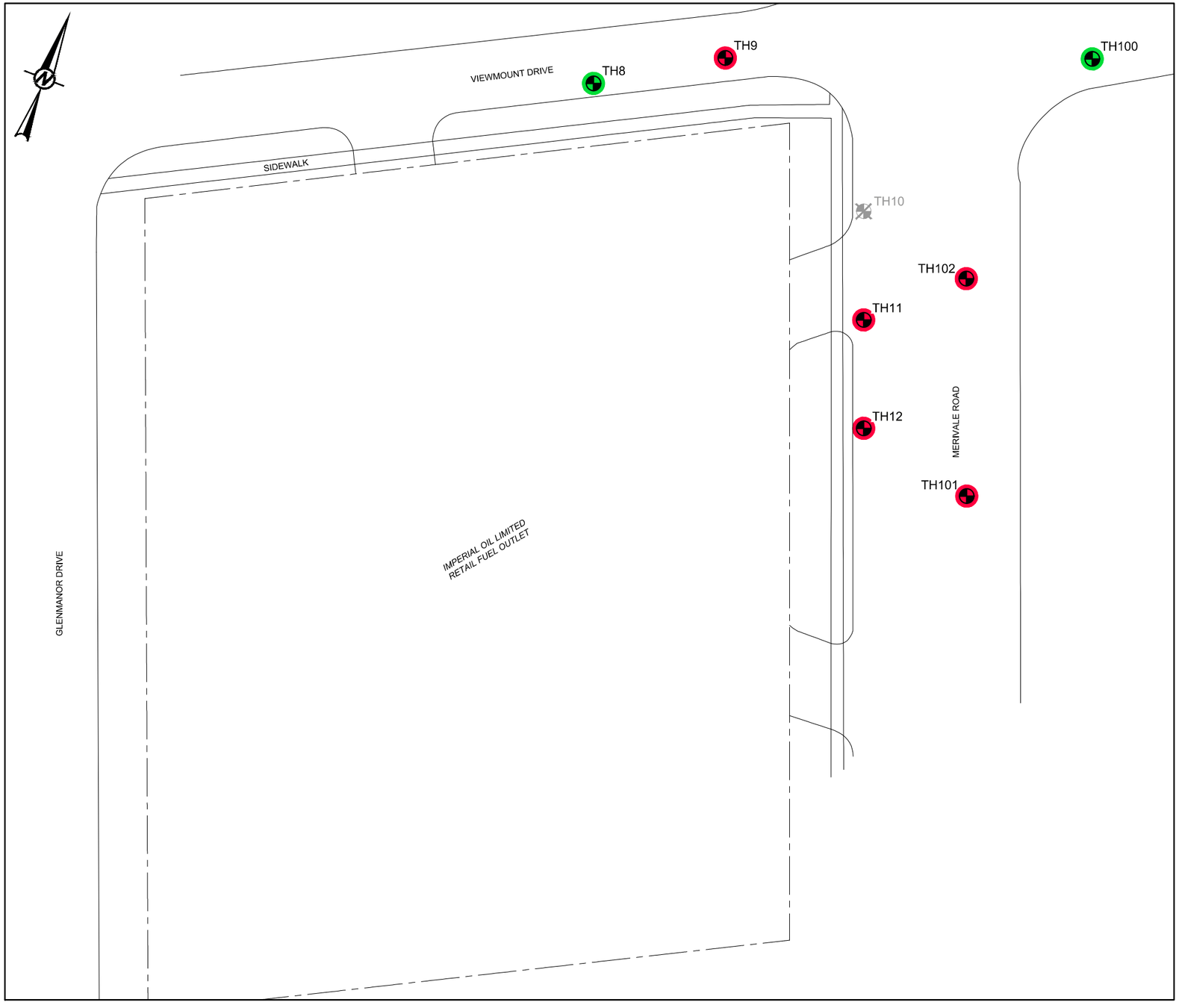

0 10 20
1:500 METRES

CLIENT
IMPERIAL OIL LIMITED

CONSULTANT
Golder Associates

YYYY-MM-DD	2016-04-15
DESIGNED	BMcParlan
PREPARED	EHernandez
REVIEWED	LBurger
APPROVED	SCarrelas

PROJECT
ADJACENT TO
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
GROUNDWATER ANALYTICAL RESULTS - BTEX, PHC FRACTIONS F1 - F4, HEXANE AND LEAD

PROJECT NO.	CONTROL	REV.	FIGURE
1536518	1155-2016	0	4

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

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TECHNICAL STANDARDS and SAFETY AUTHORITY

14th Floor, Centre Tower
3300 Bloor Street West
Toronto, Ontario M8X 2X4
Toll free 1-877-682-8772
www.tssa.org

FS Inspection Report

Service Request #	**1676980**
Inspection Report #	**5653298**

Inspection Address: **1660 MERIVALE RD** **NEPEAN;ON** **CA K2G 3K4**	Reference Number(s): **000203342**	Inspection Completion Date: **SEP 30, 2015**
	Facility Type: **FS Gasoline Station - Self Serve**	Equipment Type:
Customer Name and Address: **CANADIAN TIRE CORP LTD C/O CANADIAN TIRE PETROLEUM** **2180 YONGE ST PO BOX 770 STN K** **TORONTO;ON** **CA M4P 2V8**	Task Type: FS-Periodic LF Inspection	
	The facility/equipment is inspected in accordance with Ontario's Technical Standards & Safety Act and the appropriate regulations and codes. When an Inspector's order is issued, time limits for compliance reflect the severity of the violation and serve to avoid disruption of service.	

Task Notes

FIND ATTACHED YOUR COPY OF THE FUEL SAFETY INSPECTION ON SEPT 30 2015. SHOULD YOU HAVE ANY QUESTIONS ABOUT THIS REPORT, CONTACT DAVID NORMAN AT 613-2977422

If you have questions regarding your invoice, when received, contact TSSA billing department by telephone at 1-877-682-TSSA (8772)or customerservices@tssa.org

TRAVEL, SITE INSPECTION DOCUMENTATION AND REPORT PREPARATION BILLED IN ACCORDANCE WITH TSSA POLICY

This inspector has no control over billing.

ON SITE FOR REGULAR AUDIT. ALL SUMP SENSORS INSTALLED AND WORKING. ALL FIRE EQUIPMENT AND SIGNAGE IN PLACE AND UP TO DATE. STAFF ON SITE SIGNED OFF. SITE HAS TLC 350 TO MONITOR TANKS AND SENSORS. YEARLY INSPECTION UP TO DATE. STAFF TRAINED AND SIGNED OFF. SITE IN COMPLIANCE AT THE TIME OF THIS INSPECTION.

Standard Notes

TSSA inspected the above mentioned location and did not find any non-compliances at the time of inspection.

Customer Signature & Position / Date:		**Inspector Name:** Norman, David	**Inspector Contact Number:** 613-284-8284
Report Received By:	**Customer Contact Number:**	**Inspector Email**: DNorman@tssa.org	**Inspector Fax**: 613-284-8296

As a not-for-profit regulatory authority, TSSA operates on a cost recovery basis. An Invoice will be issued for the Total Charges Incurred.
(Note: This is not an invoice)

BARENCO

April 2, 2015

Imperial Oil Limited
1 Duncan Mills Road
North York, Ontario
M3B 1Z2

Re: 1660 Merivale Road, Ottawa, ON
Imperial Site Number: 302620
Interim Contaminant Management Plan

INTRODUCTION

Exp Energy Services Ltd. (**exp**) was retained by Imperial Oil Limited (Imperial) to prepare a contaminant management plan (CMP) to address subsurface petroleum hydrocarbon impacts for the property located at 1660 Merivale Road, in Ottawa, Ontario (henceforth referred to as the subject property). The subject property is located on southwest corner of Merivale Road and Viewmount Drive. The site is currently a retail gas station operated by Canadian Tire. The surrounding properties are used for commercial and institutional purposes. A locality plan and site plan are provided as Figures 1 and 2.

Exp prepared the CMP in accordance with the Technical Standards and Safety Authority (TSSA) August 2012 document entitled *Environmental Management Protocol for Fuel Handling Sites in Ontario* (EMP) and with generally accepted professional practices. Subject to this standard of care, **exp** makes no express or implied warranties regarding its services and no third party beneficiaries are intended. Limitation of liability, scope of report and third party reliance are outlined in Appendix A.

BACKGROUND

Barenco Inc (now **exp**) conducted an environmental assessment at the subject property, as detailed in the report Phase II *Environmental Assessment, 1660 Merivale Road, Ottawa, Ontario*, dated September 14, 2011. This assessment involved drilling five test holes (TH1 to

Professional Engineers Ontario

APGO ASSOCIATION OF PROFESSIONAL GEOSCIENTISTS OF ONTARIO

THIS REPORT CONTAINS PROVISIONS LIMITING LIABILITY, THE SCOPE OF THE REPORT AND THIRD PARTY RELIANCE

These documents and the information contained therein are confidential, property of Imperial Oil Limited and any disclosure of same is governed by the provisions of each of the applicable provincial and territorial freedom of information legislation, the Privacy Act (Canada) 1980-81-82-83, c.111, Sch. II"1", and the Access to Information Act (Canada) 1980-81-82-83, c.111, Sch .I"1", as such legislation may be amended from time to time.

TH5) across the site following the tank replacement program. Monitors were installed in all five of the test hole locations. The test hole locations are shown on Figure 2.

The Ontario Regulation 153/04, as amended, Table 3 standards for industrial/commercial/ community property use and medium and fine textured soils in a non-potable ground water condition were deemed to be appropriate for evaluating subsurface conditions at the subject property. These standards were selected based on the land use for the subject property, the absence of potable water use in the vicinity of the site and the soil grain size and pH analysis completed during the 2011 investigation.

Soil samples were collected from all five test holes and submitted for laboratory analysis. All of the soil samples were within the applicable Table 3 standards for petroleum-related parameters (benzene, toluene, ethylbenzene, xylenes [BTEX], n-hexane, petroleum hydrocarbon fractions [PHC] F1 to F4, and lead). Bedrock limestone was encounter at approximately 2.7 metres below grade surface (mbgs). No soil samples were submitted from the bedrock and the screens in the monitors were installed completely within in the bedrock. Ground water samples were collected from all five monitors and submitted for laboratory analysis. All of the ground water samples were within the applicable Table 3 standards for petroleum-related parameters except TH 3 to TH5. Ground water was determined to be between 3.0 to 4.0 mbgs, with ground water flow direction measured to be southwesterly. Soil and ground water analytical results are shown on Figures 3 and 4, respectively.

To delineate the impacts in TH3 to TH5, two additional test holes (TH6 and TH7) were advanced south (down-gradient) of TH5 in October 2011, as detailed in the report, *Baseline Environmental Assessement, 1660 Merivale Road, Ottawa, Ontario,* dated December 5, 2011. The additional test hole locations onsite are shown on Figure 2.

Soil samples were collected from both test holes and submitted for laboratory analysis. All soil samples were within the applicable Table 3 standards for all petroleum-related parameters analyzed. Bedrock was encountered at approximately 4.2 mbgs. No soil samples were submitted from the bedrock and the screens in the monitors were installed completely within in the bedrock. Ground water samples were collected from the newly installed existing monitoring wells and submitted for laboratory analysis. All of the ground water samples were within the applicable Table 3 standards for petroleum-related parameters. Soil and ground water analytical results for the additional test holes onsite are shown on Figures 3 and 4, respectively.

Hydraulic conductivity was conducted on existing monitors (TH2, TH3, and TH4) in the bedrock during this investigation, and was determined to 2.5 X 10^{-6} centimetres/ second (cm/s). The depth to ground water was determined to be between 3.7 and 5.0 mbgs, with the ground water flow direction estimated to be southeasterly.

Annual ground water monitoring and sampling of all onsite monitors was completed, as detailed in the report, *2013 Ground Water Monitoring and Sampling Report, 1660 Merivale*

Avenue, Ottawa, Ontario dated July 22, 2013. Ground water samples were collected from all onsite monitoring wells and submitted for laboratory analysis of petroleum-related parameters. All of the ground water samples were within the applicable Table 3 standards for petroleum-related parameters, except TH3 to TH5, and TH7. The depth to ground water was determined to be between 3.0 and 3.5 mbgs, with the ground water flow direction estimated to be southerly. Ground water analytical results are shown on Figure 4.

To further delineate the ground water impacts in TH3 to TH5 and TH7, five additional test holes (TH8 to TH12) were advanced to the north and east (up-gradient and cross-gradient) of the zone of impacts in the public right of way, as detailed in the report, *Phase II Environmental Assessement, Adjacent to 1660 Merivale Road, Ottawa, Ontario*, dated December 5, 2013. The additional test hole locations are shown on Figure 2.

Soil samples were collected from all offsite test holes and submitted for laboratory analysis. All soil samples were within the applicable Table 3 standards for all petroleum-related parameters analyzed. Bedrock was encountered at approximately 2.4 mbgs. No soil samples were submitted from the bedrock and the screens in the monitors were installed completely within in the bedrock. Ground water samples were collected from the newly installed offsite monitoring wells and submitted for laboratory analysis, with the exception of TH9, which was paved over before sampling could be completed. All of the ground water samples were within the applicable Table 3 standards for petroleum-related parameters, except TH10 to TH12. Soil and ground water analytical results for the additional test holes are shown on Figures 3 and 4, respectively.

Annual ground water monitoring and sampling of all onsite monitors was completed, as detailed in the report, *2014 Ground Water Monitoring and Sampling, 1660 Merivale Avenue, Ottawa, Ontario*, dated October 8, 2014. Ground water samples were collected from all onsite monitoring wells and submitted for laboratory analysis of petroleum-related parameters. All of the ground water samples were within the applicable Table 3 standards for petroleum-related parameters, except TH3 to TH5, and TH7 which exceeded for one or more petroleum-related parameters. The depth to ground water was determined to be between 3.0 and 4.0 mbgs with the ground water flow direction estimated to be southeasterly. Ground water analytical results are shown on Figure 4. A ground water contour plan from the most recent ground water sampling event, completed in August 2014, is shown as Figure 5.

To further delineate the offsite ground water impacts in TH10 to TH12, three additional test holes (TH100 to TH102) were advanced further east offsite (cross-gradient) of the subject property in the public right of way, as detailed in the report, *Supplemental Phase II Environmental Assessement, Adjacent to 1660 Merivale Road, Ottawa Ontario,* dated November 20, 2014. The additional test hole locations are shown on Figure 2.

Soil samples were collected from all new offsite test holes and submitted for laboratory analysis. All soil samples were within the applicable Table 3 standards for all petroleum related parameters analyzed (with the addition of MTBE). Bedrock was encountered at

approximately 2.4 mbgs. No soil samples were submitted from the bedrock and the screens in the monitors were installed completely within in the bedrock. Ground water samples were collected from the newly installed monitoring wells and submitted for laboratory analysis. Monitor TH9 was uncovered and inspected during this event; it was found to be in good condition and was repaired to grade and sampled. All of the ground water samples exceeded the applicable Table 3 standards for one or more petroleum-related parameters, except TH100. Soil and ground water analytical results for the additional test holes are shown on Figures 3 and 4, respectively.

The depth to ground water was determined to be between 3.0 and 3.6 mbgs, with the ground water flow direction estimated to be southwesterly. A ground water contour plan from the October 2014 event is shown as Figure 6.

PROPOSED CONTAMINANT MANAGEMENT PLAN

In accordance with the TSSA EMP, Imperial will continue to manage the petroleum-related impacts per the following proposed CMP:

- The on-site monitors (TH1 to TH7) and the off-site monitors (TH8 to TH12, and TH100 to TH102) will be inspected for subsurface vapour concentrations, ground water levels and the presence or absence of phase-separated liquid petroleum on an annual basis

- All on-site monitors (TH1 to TH7) and the off-site monitors (TH8 to TH12, and TH100 to TH102) will be sampled for petroleum related parameters (BTEX, F1 to F4, and lead) on an annual basis

- A report summarising the findings onsite will be provided to the TSSA annually

- A report summarising the findings of the off-site monitors (TH8 to TH12, and TH100 to TH102) will be provided to the City of Ottawa and the TSSA annually; TSSA will be copied on all relevant communications with the municipality

- Up to three additional test holes planned to be installed to further delineate offsite ground water impacts to the north (up-gradient) and east (cross-gradient) of the subject property. Timing of this work will depend upon third party access

- Up to two additional test hole will be installed on the subject property to the south of TH7 (down- gradient), to further delineate ground water impacts. Delineation work is planned for 2015

RATIONALE FOR PROPOSED CMP

We rationalize the above noted proposed CMP based on the following:

Extent and Severity of Petroleum-Related Contamination

- Based on previous assessment findings, the full extent of on- and offsite soil petroleum-related impacts in the overburden soil above the native limestone bedrock have been delineated. Parameters analyzed, which includes lead, were either well below the Table 3 standards or non-detectable

- Based on the previous assessment findings, the full extent of the on- and offsite petroleum-related impacts in ground water have not been delineated to the north, south, and east

- MTBE and n-hexane have been removed from the parameters to be analyzed, as on and offsite results for those parameters have been either non-detectable or well below the applicable Table 3 Standards

Receptor Evaluation

- There is no likelihood of adverse effect from soil or ground water impacts to on- or off-site receptors:

    - The concentrations of petroleum-related parameters in soil at the subject property boundaries east and southeast of the kiosk, pump island and underground storage tanks are below the applicable Table 3 soil standards

    - The concentrations of petroleum-related parameters in ground water at the property boundaries and east of the subject property boundary are above the applicable Table 3 ground water standards

    - Concentration of petroleum-related parameters in ground water on- and offsite delineation wells (TH7, TH9, TH10, TH101 and TH102) are below the applicable MOECC GW2 MGRA component value for residential property use and well below the GW2 MGRA component value for commercial property use for all on- and offsite monitors. Thus impacts from vapour intrusion due to ground water impacts on- and offsite are a low risk to on-site receptors and surrounding properties

    - Ground water is contained in the limestone bedrock on and offsite at depths between 3.0 and 4.0 mbgs

- Impacts in ground water will not migrate to potable wells, as the site and surrounding properties are supplied by municipal water. The source of municipal water is the Ottawa River, according to the City of Ottawa. The Ottawa River is located over 5 km north of the subject property. A search of water well records revealed the possibility of one water well within 250 metres of the subject property. It was installed in 1953 at a house that was present in a 1952 air photograph. The house is no longer present. Therefore, it is our opinion that there are no potable water receptors within 250 metres of the subject property

- There is no risk of ground water migration to a surface water body, as the subject property is located more than 3.6 kilometres southeast of the nearest surface water receptor (Nepean Creek)

Contaminant Migration Evaluation

- The mean hydraulic conductivity of the water within onsite monitors was determined to be 2.5 X 10^{-6} cm/s. Ground water velocity has been calculated to be 19 cm/year towards the southeast

- Once enough ground water data has been collected onsite (a minimum of 4 sampling events with reliable data), a Mann-Kendall Trend analysis of onsite results be completed, to determine the ground water plume trend

Acknowledgement from Off-Site Property Owners

- The City of Ottawa has been notified, in writing, of the environmental conditions in the public right of way to the east of the subject property and will receive our proposal to implement the CMP

- The City of Ottawa Legal Department will be preparing an Offsite Contaminant Management Agreement

- Once the City of Ottawa has provided written acknowledgement of the CMP proposal to be implemented at this location, the acknowledgement letter will be forwarded to the TSSA

CLOSURE

We trust this CMP meets your current needs. The TSSA will be notified if the results of any monitoring event indicate statistically significant degradation of environmental conditions.

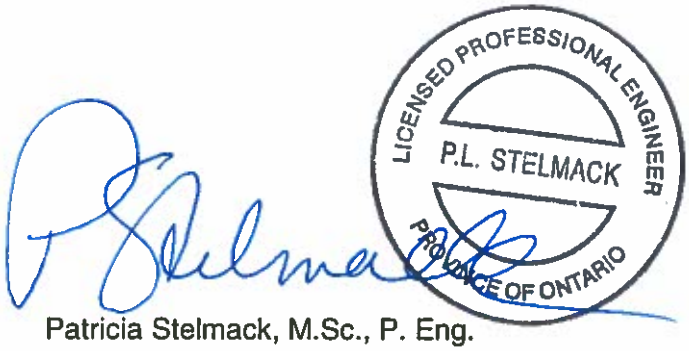
The TSSA will also be notified in writing, prior to implementation, if any changes are proposed to this CMP.

If you require further information pertaining to the investigations undertaken by **exp**, please do not hesitate to contact the undersigned.

Sincerely,
exp Energy Services Ltd.



Tanya Fernandes-Peters, M.Sc. (Env. P)
Project Manager



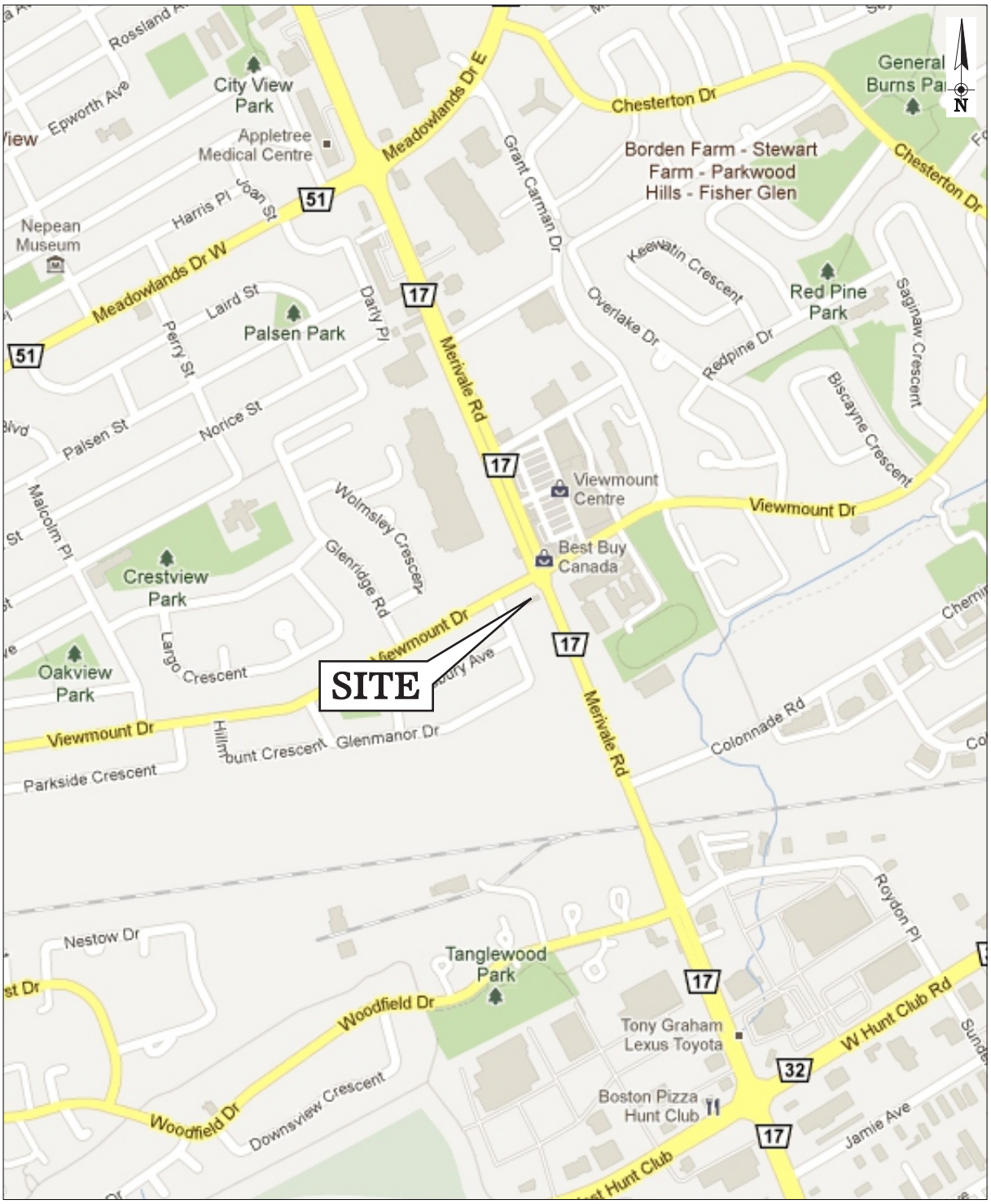
Patricia Stelmack, M.Sc., P. Eng.
Senior Project Manager/ Team Lead

Attachments:

Figure 1 - Locality Plan
Figure 2 - Site Plan
Figure 3 - Soil Analytical Results – Petroleum Related Parameters
Figure 4 - Current and Historical Ground Water Analytical Results – Petroleum Related Parameters
Figure 5 - Ground Water Contour Plan (August 26, 2014) [Onsite]
Figure 6 - Ground Water Contour Plan (October 6, 2014) [Offsite]

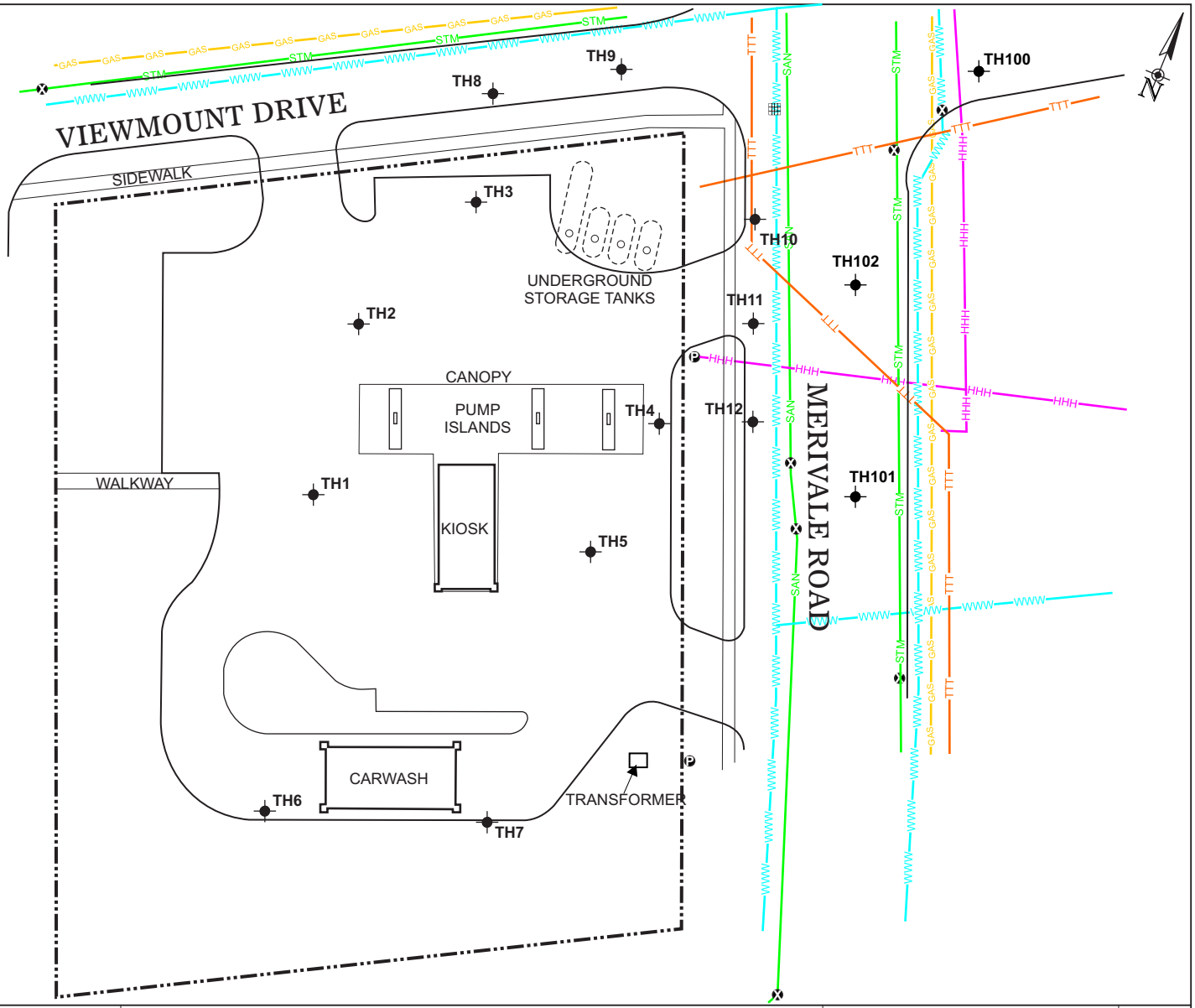
Appendix A - Limitation of Liability, Scope of Report and Third Party Reliance

Figures



SCALE: 0 200 400m (APPROXIMATE)	**SOURCE:** GOOGLE MAPS		LOCALITY PLAN	FIGURE 1
exp.	DRAWN BY: K.G.	CHECKED BY: T.F.P.	**IMPERIAL** 1660 MERIVALE ROAD OTTAWA, ONTARIO	
			PROJECT NUMBER: 11010	DATE: MARCH 2015

11010-LOCALITY-MAR15



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0 10 20m
(APPROXIMATE)

DRAWN BY	CHECKED BY
J.D.H.	T.F.P.

SOURCE:
BASED ON 'PLAN N-04-12' BY OTTAWA UCC DATED FEB. 2014, 'SITE PLAN' BY IMPERIAL OIL A0765 DATED JAN. 16, 1984, LOCATES BY PROMARK TELECON ON OCT. 13, 2011, AND FIELD OBSERVATIONS BY **exp** STAFF

NOTES:
UTILITIES ARE UNDERGROUND UNLESS OTHERWISE NOTED, LOCATIONS OF UTILITIES ARE APPROXIMATE

LEGEND:
- PROPERTY BOUNDARY
- TEST HOLE WITH MONITOR TH1-TH7 (BARENCO, 2011) TH8-TH12 (**exp**, 2012) TH100 SERIES (**exp**, 2014)
- MANHOLE
- UTILITY POLE
- CATCH BASIN
- STM — STORM SEWER
- SAN — SANITARY SEWER
- WWW — WATER
- HHH — HYDRO
- GAS — GAS
- TTT — TELEPHONE

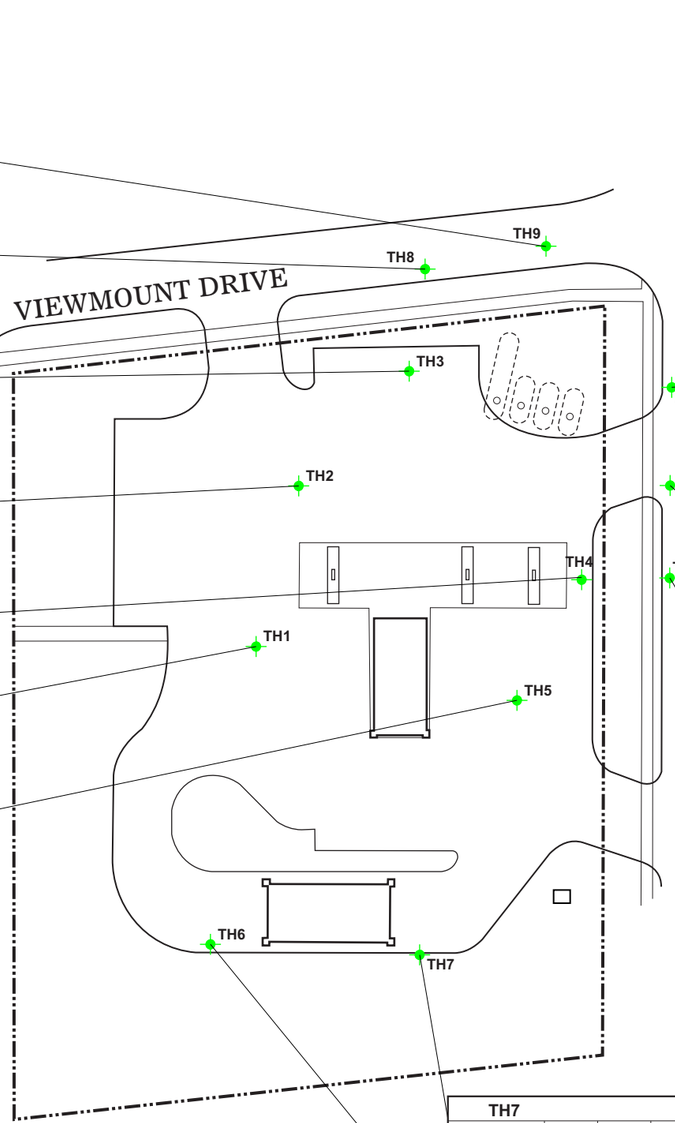
SITE PLAN

FIGURE 2

IMPERIAL
1660 MERIVALE ROAD
OTTAWA, ONTARIO

PROJECT NUMBER: 11010 | DATE: MARCH 2015

11010-SITE PLAN COM CMP-MAR15



TH9 AUG29/12

DEPTH(mbgs)	B	T	E	X	H	F1	F2	F3	F4	Pb
1.7-1.8	<0.020	<0.020	<0.020	<0.040	<0.050	<10	<10	<10	<10	9.6

TH8 AUG28/12

DEPTH(mbgs)	B	T	E	X	H	F1	F2	F3	F4	Pb
1.7-1.8	<0.020	<0.020	<0.020	<0.040	<0.050	<10	<10	<10	<10	10

TH3 AUG23/11

DEPTH(mbgs)	B	T	E	X	H	F1	F2	F3	F4	Pb
2.3-0.9	<0.020	<0.020	<0.020	<0.040	<0.05	<10	<10	<10	<10	7
2.3-0.9(DUP)	<0.020	<0.020	<0.020	<0.040	<0.05	<10	<10	<10	<10	8

TH2 AUG23/11

DEPTH(mbgs)	B	T	E	X	H	F1	F2	F3	F4	Pb
2.3-0.9	0.02	<0.020	0.29	<0.040	<0.05	<10	<10	<10	<10	12

TH4 AUG24/11

DEPTH(mbgs)	B	T	E	X	H	F1	F2	F3	F4	Pb
2.4-3.0	<0.020	<0.020	<0.020	<0.040	<0.05	<10	<10	<10	<10	4

TH1 AUG23/11

DEPTH(mbgs)	B	T	E	X	H	F1	F2	F3	F4	Pb
3.0-3.7	<0.020	0.13	<0.020	<0.040	<0.05	<10	<10	<10	<10	7

TH5 AUG24/11

DEPTH(mbgs)	B	T	E	X	H	F1	F2	F3	F4	Pb
2.3-0.9	<0.020	<0.020	0.05	<0.040	<0.05	<10	<10	<10	<10	7
2.3-0.9(DUP)	<0.020	<0.020	0.06	<0.040	<0.05	<10	<10	<10	<10	7

TH100 SEP17/14

DEPTH(mbgs)	B	T	E	X	H	F1	F2	F3	F4	Pb
1.1-1.4	<0.020	<0.020	<0.020	<0.040	<0.050	<10	<10	<50	<50	7.8

TH10 AUG29/12

DEPTH(mbgs)	B	T	E	X	H	F1	F2	F3	F4	Pb
1.7-1.8	<0.020	<0.020	<0.020	<0.040	<0.050	<10	<10	<10	<10	9.1
1.7-1.8(DUP)	<0.020	<0.020	<0.020	<0.040	<0.050	<10	<10	<10	<10	8.2

TH102 SEP17/14

DEPTH(mbgs)	B	T	E	X	H	F1	F2	F3	F4	Pb
1.7-2.0	<0.020	<0.020	<0.020	<0.040	<0.050	<10	<10	<50	<50	<5.0

TH11 AUG30/12

DEPTH(mbgs)	B	T	E	X	H	F1	F2	F3	F4	Pb
1.7-1.8	<0.020	<0.020	<0.020	<0.040	<0.050	<10	<10	120	1700	7.8

TH101 SEP17/14

DEPTH(mbgs)	B	T	E	X	H	F1	F2	F3	F4	Pb
1.7-2.0	<0.020	<0.020	<0.020	<0.040	<0.050	<10	<10	<50	<50	5.5
1.7-2.0(DUP)	<0.020	0.024	<0.020	<0.040	<0.050	<10	<10	<50	<50	6.1

TH12 AUG30/12

DEPTH(mbgs)	B	T	E	X	H	F1	F2	F3	F4	Pb
1.1-1.2	<0.020	<0.020	<0.020	<0.040	<0.050	<10	<10	<10	<10	14

TH7 OCT19/11

DEPTH(mbgs)	B	T	E	X	H	F1	F2	F3	F4	Pb
2.1-2.7	<0.02	<0.02	<0.02	<0.04	<0.5	<10	<10	<10	<10	4.8
3.4-4.0	<0.02	<0.02	<0.02	<0.04	<0.5	<10	<10	<10	<10	8.0
3.4-4.0(DUP)	<0.02	<0.02	<0.02	<0.04	<0.5	<10	<10	<10	<10	7.5

TH6 OCT18/11

DEPTH(mbgs)	B	T	E	X	H	F1	F2	F3	F4	Pb
4.3-4.9	<0.02	<0.02	<0.02	<0.04	<0.5	<10	<10	<10	<10	7.1

PARAMETER	ABBREVIATION	REG 153/04 TABLE 3 STANDARDS*
BENZENE	**B**	0.4
TOLUENE	**T**	78
ETHYLBENZENE	**E**	19
XYLENES	**X**	30
HEXANE	**H**	88
F1 (C6-C10) - BTEX	**F1**	65
F2 (C10-C16)	**F2**	250
F3 (C16-C34)	**F3**	2500
F4 (C34-C50)	**F4**	6600
LEAD	**Pb**	120

SCALE:

0 15 30m

(APPROXIMATE)

DRAWN BY	CHECKED BY
J.D.H.	T.F.P.

SOURCE:

BASED ON 'SITE PLAN' BY IMPERIAL OIL A0765 DATED JAN. 16, 1984, AND FIELD OBSERVATIONS BY **exp** STAFF

LEGEND:

PROPERTY BOUNDARY

TEST HOLE WITH MONITOR
TH1-TH7 (BARENCO, 2011)
TH8-TH12 (**exp**, 2012)
TH100 SERIES (**exp**, 2014)

LOCATION WHERE ALL SOIL SAMPLES MEET **REG 153/04 TABLE 3** STANDARDS FOR ALL PARAMETERS THAT WERE ANALYSED

LOCATION WHERE AT LEAST ONE SOIL SAMPLE EXCEEDS **REG 153/04 TABLE 3** STANDARDS FOR AT LEAST ONE PARAMETER ANALYSED

LOCATION WHERE NO SOIL SAMPLE WAS ANALYSED

TEXT EXCEEDANCES OF **REG 153/04 TABLE 3** STANDARDS

ALL ANALYTICAL RESULTS ARE IN MICROGRAMS PER GRAM (µg/g), DRY WEIGHT BASIS
'DEPTH(m)' MEANS DEPTH IN METRES BELOW GROUND SURFACE
'-' MEANS NOT ANALYSED OR NOT APPLICABLE
'NM' MEANS NOT MEASURED
'<RDL' MEANS NOT DETECTED AT REPORTING DETECTION LIMIT (RDL)
'RDL' ARE SHOWN FOR NON-DETECTED RESULTS; FOR RDL OF REPORTABLE RESULTS, SEE APPLICABLE DATA TABLE
(DUP) REPRESENTS FIELD DUPLICATE OF PRECEDING SAMPLE

*STANDARDS SHOWN ARE FOR AN INDUSTRIAL/COMMERCIAL/COMMUNITY PROPERTY USE AND MEDIUM AND FINE TEXTURED SOILS IN A NON-POTABLE GROUND WATER CONDITION

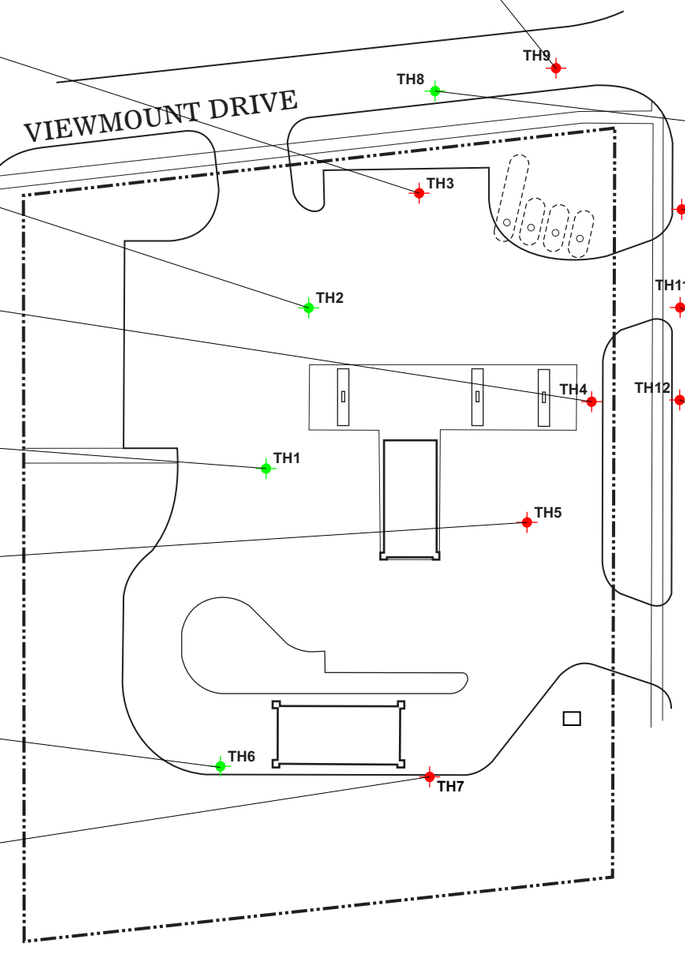
SOIL ANALYTICAL RESULTS - PETROLEUM RELATED PARAMETERS

FIGURE 3

IMPERIAL
1660 MERIVALE ROAD
OTTAWA, ONTARIO

PROJECT NUMBER: 11010

DATE: MARCH 2015



TH9 — SCREEN INTERVAL = 3.4-4.9mbgs

DATE	B	T	E	X	H	F1	F2	F3	F4	Pb
OCT06/14	31	3.0	230	290	15	**1000**	**570**	**610**	420	1.1

TH3 — SCREEN INTERVAL = 3.2 to 4.7mbgs

DATE	B	T	E	X	H	F1	F2	F3	F4	Pb
AUG31/11	27	2.4	79	150	20	**1100**	**430**	<100	130	3.8
AUG31/11(DUP)	23	2.1	69	130	17	**1100**	**380**	<100	110	3.9
JUN13/13	11	0.61	66	85	<5.0	**900**	**350**	<200	<200	3.1
AUG26/14	14	0.28	19	5.2	<5.0	520	**180**	<200	<200	2.2

TH2 — SCREEN INTERVAL = 3.2 to 4.7mbgs

DATE	B	T	E	X	H	F1	F2	F3	F4	Pb
AUG31/11	0.77	<0.20	1.3	0.48	<5.0	<25	<100	<100	<100	<0.5
JUN13/13	0.62	<0.20	2.2	<0.40	<5.0	<25	<100	<200	<200	<0.5
AUG27/14	<0.20	<0.20	<0.20	<0.40	<5.0	<25	<100	<200	<200	<0.50

TH4 — SCREEN INTERVAL = 3.4 to 4.9mbgs

DATE	B	T	E	X	H	F1	F2	F3	F4	Pb
AUG31/11	**610**	610	**3400**	**19000**	**540**	**26000**	**17000**	360	170	2.6
JUN13/13	200	35	1200	**4300**	<100	**6200**	**19000**	**580**	430	5.8
AUG26/14	**500**	37	1400	2600	58	**4700**	**1400**	<200	<200	3.0
AUG26/14(DUP)	**540**	40	1600	2700	62	**4000**	**1400**	<200	<200	1.9

TH1 — SCREEN INTERVAL = 2.6 to 5.6mbgs

DATE	B	T	E	X	H	F1	F2	F3	F4	Pb
AUG31/11	<0.20	<0.20	<0.20	<0.40	<5.0	<25	<100	<100	<100	<0.5
JUN13/13	<0.20	<0.20	<0.20	<0.40	<5.0	<25	<100	<200	<200	0.53
AUG26/14	<0.20	0.75	<0.20	1.2	<5.0	<25	<100	<200	<200	<0.50

TH5 — SCREEN INTERVAL = 3.5 to 5.0mbgs

DATE	B	T	E	X	H	F1	F2	F3	F4	Pb
AUG31/11	**750**	140	**3000**	**13000**	**1400**	**85000**	**20000**	**690**	**620**	5.5
JUN13/13	**530**	44	1600	3800	<100	**9900**	**16000**	**12000**	**6800**	8.3
JUN13/13(DUP)	**550**	44	1600	3800	<100	**9200**	**11000**	**7000**	**4300**	8.0
AUG27/14	**450**	46	1500	3100	210	**11000**	**2800**	<200	<200	4.1

TH6 — SCREEN INTERVAL = 3.6 to 5.1mbgs

DATE	B	T	E	X	H	F1	F2	F3	F4	Pb
OCT20/11	<0.20	<0.20	<0.20	<0.40	<5.0	<25	<100	<100	<100	<0.5
OCT20/11(DUP)	<0.20	<0.20	<0.20	<0.40	<5.0	<25	<100	<100	<100	<0.5
JUN13/13	<0.20	<0.20	<0.20	<0.40	<5.0	<25	<100	<200	<200	0.60
AUG27/14	<0.20	<0.20	<0.20	<0.40	<5.0	<25	<100	<200	<200	<0.50

TH7 — SCREEN INTERVAL = 4.4 to 5.8mbgs

DATE	B	T	E	X	H	F1	F2	F3	F4	Pb
NOV14/11	31	5.4	160	340	<30	430	<100	<100	<100	<0.5
JUN13/13	37	2.8	140	130	<5.0	550	**460**	<200	<200	3.2
AUG27/14	150	18	610	730	22	**1900**	**540**	<200	<200	2.1

TH100 — SCREEN INTERVAL = 3.0-4.9mbgs

DATE	B	T	E	X	H	F1	F2	F3	F4	Pb
OCT06/14	<0.20	<0.20	0.31	0.91	<5.0	<25	<100	<200	<200	<0.50

TH8 — SCREEN INTERVAL = 3.3-4.9mbgs

DATE	B	T	E	X	H	F1	F2	F3	F4	Pb
JUN10/13	3.9	<0.20	4.1	0.61	<5.0	48	<100	<200	<200	1.1

TH10 — SCREEN INTERVAL = 3.3-4.9mbgs

DATE	B	T	E	X	H	F1	F2	F3	F4	Pb
JUN11/13	73	58	52	200	35	**1400**	**560**	<200	<200	1.2

TH102 — SCREEN INTERVAL = 3.0-4.9mbgs

DATE	B	T	E	X	H	F1	F2	F3	F4	Pb
OCT06/14	0.72	0.52	16	42	7.2	360	**360**	<200	<200	3.9

TH11 — SCREEN INTERVAL = 3.3-4.9mbgs

DATE	B	T	E	X	H	F1	F2	F3	F4	Pb
JUN11/13	370	34	2200	3400	130	**11000**	**1400**	<200	<200	2.6

TH12 — SCREEN INTERVAL = 3.3-4.9mbgs

DATE	B	T	E	X	H	F1	F2	F3	F4	Pb
JUN11/13	380	35	2300	3500	<100	**11000**	**3100**	<200	<200	6.8
JUN11/13(DUP)	360	34	2100	3300	<100	**11000**	**2800**	<200	<200	6.9

TH101 — SCREEN INTERVAL = 3.0-4.9mbgs

DATE	B	T	E	X	H	F1	F2	F3	F4	Pb
OCT06/14	85	12	580	500	44	**4100**	**830**	<200	<200	2.9
OCT06/14(DUP)	84	12	580	510	54	**4100**	**910**	<200	<200	4.2

PARAMETER	ABBREVIATION	REG 153/04 TABLE 3 STANDARDS*
BENZENE	**B**	430
TOLUENE	**T**	18000
ETHYLBENZENE	**E**	2300
XYLENES	**X**	4200
HEXANE	**H**	520
F1 (C_6-C_{10}) - BTEX	**F1**	750
F2 (C_{10}-C_{16})	**F2**	150
F3 (C_{16}-C_{34})	**F3**	500
F4 (C_{34}-C_{50})	**F4**	500
LEAD	**Pb**	25

SCALE:

0 — 15 — 30m

(APPROXIMATE)

SOURCE:

BASED ON 'SITE PLAN' BY IMPERIAL OIL A0765 DATED JAN. 16, 1984, AND FIELD OBSERVATIONS BY **exp** STAFF

LEGEND:

- PROPERTY BOUNDARY
- TEST HOLE WITH MONITOR TH1-TH7 (BARENCO, 2011) TH8-TH12 (**exp**, 2012) TH100 SERIES (**exp**, 2014)
- MONITOR LOCATION WHERE MOST RECENT GROUND WATER SAMPLE MEETS **REG 153/04 TABLE 3** STANDARDS FOR ALL PARAMETERS THAT WERE ANALYSED
- MONITOR LOCATION WHERE MOST RECENT GROUND WATER SAMPLE EXCEEDS **REG 153/04 TABLE 3** STANDARDS FOR AT LEAST ONE PARAMETER ANALYSED
- MONITOR LOCATION WITH MEASURABLE OR OBSERVABLE LIQUID PETROLEUM DURING THE MOST RECENT GROUND WATER SAMPLING EVENT
- MONITOR LOCATION WHERE NO GROUND WATER SAMPLE SUBMITTED FOR ANALYSIS DURING THE MOST RECENT GROUND WATER SAMPLING EVENT

TEXT EXCEEDANCES OF **REG 153/04 TABLE 3** STANDARDS

TEXT LIQUID PETROLEUM THICKNESS [IN METRES(m)]

ALL ANALYTICAL RESULTS ARE IN MICROGRAMS PER LITRE (µg/L)
'mbgs ' MEANS METRES BELOW GROUND SURFACE
'-' MEANS NOT ANALYSED OR NOT APPLICABLE
'NM' MEANS NOT MEASURED
'<RDL' MEANS NOT DETECTED AT REPORTING DETECTION LIMIT (RDL)
'RDL' ARE SHOWN FOR NON-DETECTED RESULTS; FOR RDL OF REPORTABLE RESULTS, SEE APPLICABLE DATA TABLE
(DUP) REPRESENTS FIELD DUPLICATE OF PRECEDING SAMPLE

*STANDARDS SHOWN ARE FOR ALL TYPES OF PROPERTY USE AND MEDIUM AND FINE TEXTURED SOILS IN A NON-POTABLE GROUND WATER CONDITION

DRAWN BY	CHECKED BY
J.D.H.	T.F.P.

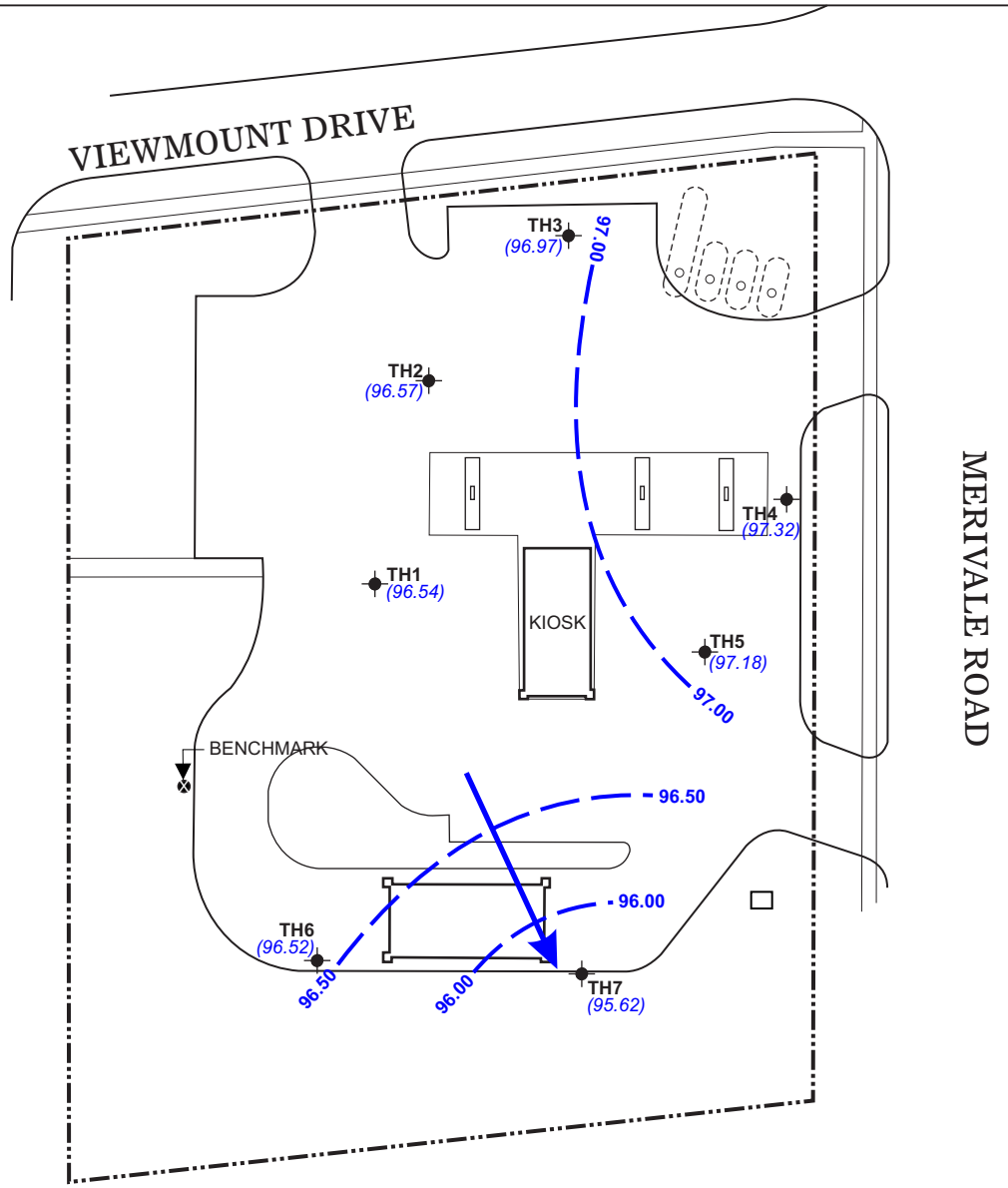
CURRENT & HISTORICAL GROUND WATER ANALYTICAL RESULTS – PETROLEUM RELATED PARAMETERS

FIGURE 4

IMPERIAL
1660 MERIVALE ROAD
OTTAWA, ONTARIO

PROJECT NUMBER: 11010 | DATE: MARCH 2015

11010-GW RESULTS PET CMP-MAR15



SCALE:

0 10 20m

(APPROXIMATE)

DRAWN BY	CHECKED BY
J.DH.	T.F.P.

SOURCE:

BASED ON 'SITE PLAN' BY IMPERIAL OIL A0765 DATED JAN. 16, 1984, AND FIELD OBSERVATIONS BY **exp** STAFF

NOTE:

BENCHMARK NORTH SIDE OF MANHOLE COVER ON THE WEST SIDE OF THE KIOSK WITH AN ASSUMED ELEVATION OF 100.00M

LEGEND:

- PROPERTY BOUNDARY
- TEST HOLE WITH MONITOR (BARENCO, 2011)
- (100.00) GROUND WATER ELEVATION (m)
- (100.00)* GROUND WATER ELEVATION NOT USED IN CONTOURING (m)
- 100.00 GROUND WATER ELEVATION CONTOUR (m)
- GROUND WATER FLOW DIRECTION
- (NM) NOT MONITORED
- (NA) NOT ACCESSIBLE

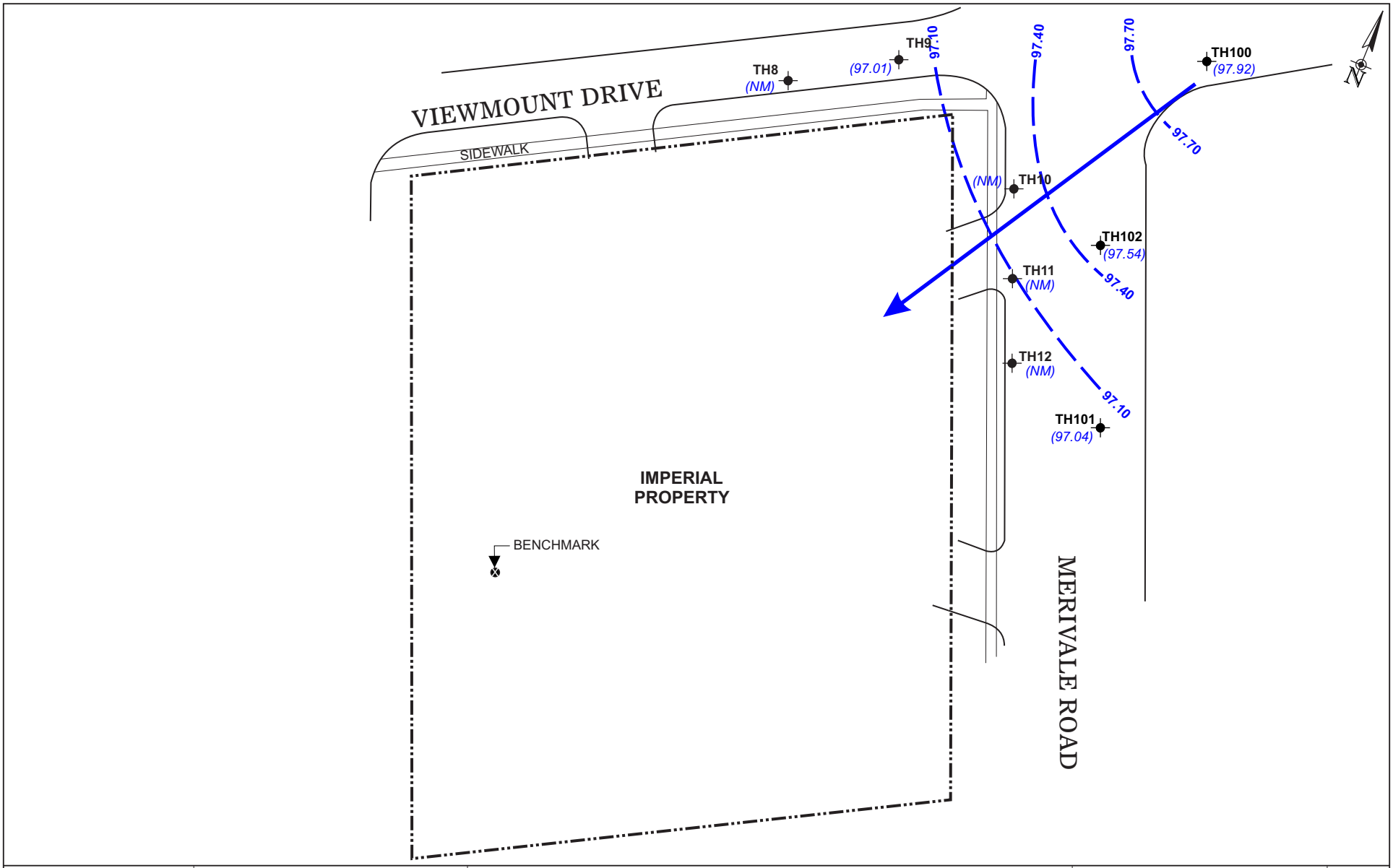
GROUND WATER CONTOUR PLAN (AUGUST 26, 2014)

FIGURE 5

IMPERIAL
1660 MERIVALE ROAD
OTTAWA, ONTARIO

PROJECT NUMBER: 11010 | DATE: MARCH 2015

11010-GWC PLAN CMP ONSITE-AUG14-MAR15



SCALE:
0 10 20m
(APPROXIMATE)

DRAWN BY	CHECKED BY
K.G.	T.F.P.

SOURCE:
BASED ON 'PLAN N-04-12' BY OTTAWA UCC DATED FEB. 2014, 'SITE PLAN' BY IMPERIAL OIL A0765 DATED JAN. 16, 1984, LOCATES BY PROMARK TELECON ON OCT. 13, 2011, AND FIELD OBSERVATIONS BY **exp** STAFF

NOTES:
BENCHMARK NORTH SIDE OF MANHOLE COVER ON THE WEST SIDE OF THE KIOSK WITH AN ASSUMED ELEVATION OF 100.00M

LEGEND:

PROPERTY BOUNDARY	
TEST HOLE WITH MONITOR TH1 SERIES (**exp**, 2012) TH100 SERIES (**exp**, 2014)	
(100.00)	GROUND WATER ELEVATION (m)
*(100.00)**	GROUND WATER ELEVATION NOT USED IN CONTOURING (m)
100.00	GROUND WATER ELEVATION CONTOUR (m)
→	GROUND WATER FLOW DIRECTION
(NM)	NOT MONITORED
(NA)	NOT ACCESSIBLE

GROUND WATER CONTOUR PLAN (OCTOBER 6, 2014)

FIGURE 6

IMPERIAL
ADJACENT TO 1660 MERIVALE ROAD
OTTAWA, ONTARIO

PROJECT NUMBER: 11010 | DATE: MARCH 2015

11010-GWC PLAN CMP OFFSITE OCT14-MAR15

Appendix A –
Limitation of Liability, Scope of Report and Third Party Reliance

LIMITATION OF LIABILITY, SCOPE OF REPORT AND THIRD PARTY RELIANCE

This report has been prepared and the work referred to in this report has been undertaken by **exp** Energy Services Ltd. (**exp**) for Imperial Oil Limited. It is intended for the sole and exclusive use of Imperial Oil Limited, its affiliated companies and partners and the respective insurers, agents, employees and advisors (collectively, "Imperial"). Any use, reliance on or decision made by any person other than Imperial based on this report is the sole responsibility of such other person. Imperial and **exp** make no representation or warranty to any other person with regard to this report and the work referred to in this report and they accept no duty of care to any other person or any liability or responsibility whatsoever for any losses, expenses, damages, fines, penalties, or other harm that may be suffered or incurred by any other person as a result of the use of, reliance on, any decision made or any action taken based on this report or the work referred to in this report.

The investigation undertaken by **exp** with respect to this report and any conclusions or recommendations made in this report reflect **exp's** judgment based on the site conditions observed at the time of the site inspection on the date(s) set out in this report and on information available at the time of preparation of this report. This report has been prepared for specific application to this site and it is based, in part, upon visual observation of the site, subsurface investigation at discrete locations and depths, and specific analysis of specific chemical parameters and materials during a specific time interval, all as described in this report. Unless otherwise stated, the findings cannot be extended to previous or future site conditions, portions of the site which were unavailable for direct investigation, subsurface locations which were not investigated directly, or chemical parameters, materials or analysis which were not addressed. Substances other than those addressed by the investigation described in this report may exist within the site, substances addressed by the investigation may exist in areas of the site not investigated and concentrations of substances addressed which are different than those reported may exist in areas other than the locations from which the samples were taken.

If site conditions or applicable standards change or if any additional information becomes available at a future date, modifications to the findings, conclusions and recommendations in this report may be necessary.

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BARENCO

Supplemental Phase II Environmental Site Assessment

Project Name
Adjacent to 1660 Merivale Road,
Ottawa, ON

IOL Site Number
302620

Project Number
11010

Prepared For: **Imperial Oil**
1 Duncan Mill Road
North York, ON M3B 1Z2

Prepared By: **exp Energy Services Ltd.**
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Markham, ON L3T 0A8
Canada
t: 905.695.3217
f: 289.695.2411
www.exp.com

Date
November 20, 2014

THIS REPORT CONTAINS PROVISIONS LIMITING LIABILITY, THE SCOPE OF THE REPORT AND THIRD PARTY RELIANCE

"These documents and the information contained therein are confidential, property of Imperial Oil and any disclosure of same is governed by the provisions of each of the applicable provincial and territorial freedom of information legislation, the Privacy Act (Canada) 1980-81-82-83, c.111, Sch. II"1", and the Access to Information Act (Canada) 1980-81-82-83, c.111, Sch. I "1", as such legislation may be amended from time to time."

Summary Sheet

1. Site and Adjacent Land Conditions

Land Use	Public Right-of-Way
Date of Soil Sampling	September 17, 2014
Date of Ground Water Sampling	October 6, 2014
Number of Test Holes Drilled	3 (TH100 to TH102)
Number of Monitoring Wells Installed	3 (TH100 to TH102)
Type of OVM Meter	Gastechtor 1238 ME
Adjacent Land Use (current)	North – Commercial East – Community (High School) South – Residential West – Operating Gas Station and Car Wash (Imperial Oil site)
Aquifer Usage in 250 metre Radius	No

2. Site Soil Conditions

Soil Type	Maximum Depths (mbgs)	Comments
Asphalt	0.3	
Sand and Gravel	2.1	Fill material
Limestone	5.0	Bedrock encountered at 2 mbgs

3. Ground Water

Depth (mbgs)	Approximately 3
Inferred Ground Water Flow Direction	Southwesterly
Liquid Petroleum Detected	No

4. Selected Soil and Ground Water Standards

Regulation 153/04, as amended, Table 3 (industrial/commercial/community property use and medium and fine textured soils in a non-potable ground water condition)

5. Analytical Results (Samples exceeding applicable Regulation 153/04 standards)

Location	Medium	Depth (mbgs)	Parameters
TH9	Water	n/a	PHC F1 to F3
TH101/DUP1	Water	n/a	PHC F1 and F2
TH102	Water	n/a	PHC F2

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1 Introduction

Exp Energy Services Ltd. (**exp**) was retained by Imperial Oil to conduct a supplemental Phase II environmental site assessment (ESA) in the public right-of-way along Merivale Road and Viewmount Drive, adjacent to the Imperial Oil site located at 1660 Merivale Road, Ottawa, Ontario. This area of Merivale Road and Viewmount Drive will henceforth be referred to as the subject property. A locality plan is provided as Figure 1.

The objective of the supplemental Phase II ESA was to gain an understanding of subsurface conditions at the subject property. The Phase II ESA involved a soil and ground water sampling program. Parameters chosen for analysis during the investigation were based upon the use of the adjacent Imperial Oil site as an operating gas station.

The environmental assessment standards for the subject property were determined using Ontario Regulation 153/04, as amended (Regulation 153/04), under Part XV.1 of the *Environmental Protection Act*. Soil and ground water samples were collected, preserved, and submitted to the Mississauga facility of Maxxam Analytics (Maxxam), a Standards Council of Canada (SCC) accredited laboratory.

Exp performed the environmental site assessment work in accordance with generally accepted professional practices. Subject to this standard of care, **exp** makes no express or implied warranties regarding its services and no third party beneficiaries are intended. Limitation of liability, scope of report and third party reliance are outlined in Appendix A.

2 Site Background

2.1 Site Description

The subject property is located north and east of the Imperial Oil property in the public right of way on Merivale Road and Viewmount Drive, in Ottawa, Ontario. A locality plan is provided as Figure 1 and a site plan is provided as Figure 2.

Surrounding properties are used primarily for residential, commercial, and institutional purposes. Directly north of Viewmount Drive is a large shopping centre. Directly east of Merivale Road is a high school. Residential dwellings are located south and a gas station and car wash are located directly southwest of the subject property.

2.2 Native Soils and Topography

The subject property is located in the physiographic region known as the Russell and Prescott Sand Plains. The surface soils are composed of sand and sandy loams

(*Physiography of Southern Ontario*, Chapman and Putnam, 1984). Based on field observation during this investigation, the water table is located in the limestone bedrock. Merivale Road slopes slightly downwards towards the southeast and Viewmount Drive slopes slightly downward toward the southwest.

The hydraulic conductivity of the limestone at the Imperial Oil site was measured to be 2.74 x 10^{-6} cm/s. Based on the grain size analysis performed during a previous investigation on the adjacent Imperial Oil site, the soil at the subject property has been classified as a medium and fine grained.

2.3 Ground Water and Municipal Services

The subject and surrounding properties are serviced with municipal water, storm sewers and sanitary sewers by the City of Ottawa. According to the City of Ottawa, its municipal water supply comes from the Ottawa River.

The nearest surface water body is Nepean Creek (a tributary of the Rideau River), located approximately 360 metres southeast of the subject property. Table 1 summarizes the environmental setting and site characteristics.

3 Assessment Standards

Ontario Regulation 153/04, as amended, under Part XV.1 of the *Environmental Protection Act* provides generic remediation standards based on land use (agricultural, residential/ parkland/institutional, or industrial/commercial/community), ground water use (potable or non-potable), soil type (coarse or medium and fine textured), and restoration depth (full or stratified).

Regulation 153/04 also provides alternate methods for assessment and remediation based on either restoring soil and/or ground water to background conditions or the use of a risk assessment. Generic standards for both soil and ground water are outlined in a document entitled *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act*, April 15, 2011.

According to Regulation 153/04, a property is considered to be an environmentally sensitive area if one or more of the following applies:

a) The property is
   i) within an area of natural significance,
   ii) includes or is adjacent to an area of natural significance or part of such an area, or,
   iii) includes land that is within 30 metres of an area of natural significance or part of such an area.

b) The soil at the property has a pH value as follows:
   i) for surface soil, less than 5 or greater than 9
   ii) for sub-surface soil, less than 5 or greater than 11

c) A qualified person is of the opinion that, given the characteristics of the property and the certification the qualified person would be required to make in a record of site condition in relation to the property as specified in Schedule A, it is appropriate to deem the property environmentally sensitive.

An "area of natural significance" means any of the following:

1. An area reserved or set apart as a provincial park or conservation reserve under the *Provincial Parks and Conservation Reserves Act, 2006*
2. An area of natural and scientific interest (life science or earth science) identified by the Ministry of Natural Resources as having provincial significance
3. A wetland identified by the Ministry of Natural Resources as having provincial significance
4. An area designated by a municipality in its official plan as environmentally significant, however expressed, including designations of areas as environmentally sensitive, as being of environmental concern and as being ecologically significant
5. An area designated as an escarpment natural area or an escarpment protection area by the Niagara Escarpment Plan under the *Niagara Escarpment Planning and Development Act*
6. An area identified by the Ministry of Natural Resources as significant habitat of a threatened or endangered species
7. An area which is habitat of a species that is classified under section 7 of the *Endangered Species Act, 2007* as a threatened or endangered species
8. Property within an area designated as a natural core area or natural linkage area within the area to which the Oak Ridges Moraine Conservation Plan under the *Oak Ridges Moraine Conservation Act, 2001* applies
9. An area set apart as a wilderness area under the *Wilderness Areas Act*

The subject property would not be considered environmentally sensitive as none of the conditions above apply, and based on our knowledge of the subject property the pH of soil of the Imperial Oil site where previous assessment work has been completed; the pH of the soil is likely to be within the applicable ranges for surface and subsurface soils.

In addition, the site condition standards for a shallow soil property or a surface water body in or near the property are not applicable to the subject property. At least 2/3 of the area of the subject property has soil to depths greater than 2 metres. It does not include all or part of a

water body, nor is it adjacent to a water body, nor does it include land within 30 metres of a water body.

Based on the land use of the subject property as discussed in Section 2.1, the soil texture as discussed in Section 2.2, as well as the environmental setting data shown in Table 1, the subject property would be classified as having industrial/commercial/ community property use in a non-potable ground water condition. Regulation 153/04 Table 3 standards for industrial/commercial/community property use and medium and fine textured soils are appropriate for evaluating conditions at the subject property.

4 Site Investigation

The objective of the site investigation was to evaluate subsurface conditions at the subject property. The investigation included the following activities:

- Inspecting soil conditions by drilling three test holes across the subject property and installing ground water monitors in all of the test holes
- Field screening of all recovered soil samples for the presence of environmental impact (i.e. soil headspace petroleum vapour measurements, physical observations)
- Submitting selected soil samples for laboratory analysis of the potential contaminants of concern (PCOC) based upon the use of the adjacent Imperial Oil site as an operating gas station
- Monitoring ground water levels in one existing monitor and three newly installed monitors to determine ground water elevations and ground water flow direction
- Submitting ground water samples from one existing monitor and three newly installed monitors for laboratory analysis of the PCOC based upon the use of the adjacent property as an operating gas station
- Conducting soil and ground water sampling in accordance with the Ministry of the Environment (MOE) *Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario*, dated December 1996, in accordance with the MOE *Protocol for Analytical Methods used in the Assessment of Properties* under *Part XV.1 of the Environmental Protection Act*, March 2004, as amended, and per **exp** Standard Operating Procedures (SOP), and generally accepted professional practices
- Determining the appropriate Site Condition Standards in accordance with Regulation 153/04

- Comparing the results of the soil and ground water analyses to the applicable Standards

All work was carried out following the Quality Management, Control and Assurance procedures outlined in Appendix B.

4.1 Potential Contaminants of Concern

The PCOC for this assessment were benzene, toluene, ethylbenzene, xylenes (BTEX), hexane, methyl t-butyl ether (MTBE), petroleum hydrocarbon (PHC) fractions F1 to F4, and lead. The PCOC were chosen based upon the use of the adjacent property as an operating gas station

4.2 Drilling Investigation

The drilling investigation was conducted from September 16 to 19, 2014. George Downing Estate Drilling Ltd. was contracted by **exp** to drill three test holes (TH100 to TH102). The test holes were drilled to a maximum depth of 5 metres below ground surface (mbgs) using a CME 75 track-mounted hollow stem auger. The test holes were daylighted to a maximum depth of 2 mbgs (depth to bedrock) using a hydrovacuum truck. Daylighting activities were performed to reduce the possibility that an unknown subsurface structure would be struck as drilling activities progressed. **Exp** retained Scotts Environmental Group Ltd. to provide the daylighting services. Bedrock cores from daylighting were disposed of at the Scotts Environmental Group Ltd. facility at 633 & 650 Fortune Crescent in Kingston, a MOE approved waste receiver.

Soil samples were collected as the drilling progressed at 0.5 metre intervals using a hand auger in the daylighted portion of the test holes. These samples were examined for geologic information and for physical evidence of chemical impact. No samples were collected below the daylighted portion as it was bedrock.

Soil samples were submitted to the laboratory from the "worst case" depth. Soil samples were not collected from "clean bottom" as bedrock was encountered at approximately 2 mbgs, which is above the water table depth. Contaminant indicators such as physical observations and measured soil headspace vapour concentrations were used to direct sampling of "worst case" samples.

After each sample collection, the hand auger was thoroughly cleaned with phosphate-free soap and tap water and rinsed with distilled water, then methanol, to prevent cross-contamination of subsequent soil samples. Hollow stem auger flights were cleaned with a brush between test hole locations. Following the conclusion of the drilling investigation, the drill rig was steam cleaned to decontaminate the equipment.

During the drilling investigation the following ground conditions were generally encountered:

0.0 to 0.3 mbgs	Asphalt
0.3 to 2.1 mbgs	Brown SAND and GRAVEL (Fill Material)
2.1 to 5.0 mbgs	Grey fractured LIMESTONE

Readings of petroleum vapour concentrations in the soil samples collected were recorded using a Gastechtor 1238 ME. This instrument is designed to detect and measure concentrations of combustible gas in the atmosphere. It is equipped with two ranges of measurement, reading concentrations in parts per million by volume (ppmv) or in percentage lower explosive limit (%LEL). The Gastechtor 1238 ME instrument can determine combustible vapour concentrations in the range equivalent to 0 to 11,000 ppmv of hexane. The instrument was configured to eliminate any response from methane for all sampling conducted at the subject property.

Instrument calibration is checked on a daily basis in both the ppmv range and %LEL range using standard gases comprised of known concentrations of hexane (400 ppmv, 40% LEL) in air. If the instrument readings are within ±10% of the standard gas value, then the instrument is deemed to be calibrated, however if the readings are greater than ±10% of the standard gas value then the instrument is re-calibrated prior to use.

Soil samples are collected from the hand auger using a stainless-steel spoon and placed into plastic bags. The samples are left to equilibrate within the bag at a temperature above 15° C for 30 minutes before measurement of the peak headspace concentration is taken. Petroleum vapours ranged from non-detectable to 100% LEL in samples where there was sufficient recovery to perform vapour measurements.

The test hole logs are provided in Appendix C along with the MOE well record.

All test holes were completed as subsurface monitors. The monitors were constructed of 50 millimetre diameter threaded polyvinylchloride (PVC) pipe. The lower section of pipe was slotted (0.254 millimetre slot) above and below the water table, as observed during drilling. The upper section of the pipe is a solid riser. The lower part of the annulus of the hole was backfilled with clean sand (fine graded silica sand with a uniformity coefficient of 1.1 to 1.7 and an effective size of 1.5 to 3.0 mm, usually K&E Well Pack #3 Silica Sand) up to approximately 0.3 metres above the top of the slotted section. A bentonite seal (dry chipped sodium montmorillonite in 9.52 mm diameter chips) was placed above the sand to just below grade. Concrete was used to seal the monitor at grade. The monitors were equipped with protective casings and locking lids. A diagram showing a typical monitor installation is provided in Appendix C.

Following the conclusion of the drilling investigation and installation of the monitors, all new monitors were developed by purging a minimum of three well volumes of water.

4.3 Soil Chemical Analysis

Four soil samples, including one field duplicate sample, were collected during this investigation and submitted to Maxxam for analysis of BTEX, hexane, MTBE, PHC fractions F1 to F4, and lead. All work was carried out following the Quality Management, Control and Assurance procedures outlined in Appendix B.

The results of the soil chemical analysis for petroleum related parameters are provided in Table 2 and Figure 3, along with the applicable Regulation 153/04 Table 3 standards. All soil samples were within the applicable Table 3 standards for all parameters analysed.

Copies of the laboratory Certificates of Analysis are provided in Appendix D.

4.4 Coring Water Chemical Analysis

A sample of the coring water used during the drill work was submitted to Maxxam for analysis of BTEX, hexane, MTBE, PHC fractions F1 to F4, and lead.

The results of the coring water chemical analysis are provided in Table 3, along with the applicable Ontario Regulation 153/04 Table 3 standards. The sample was within the applicable Table 3 standards for all parameters analysed.

A copy of the laboratory Certificates of Analysis is provided in Appendix D.

4.5 Ground Water Monitoring

One existing monitor (TH9) and the newly installed monitors were inspected for general physical condition, ground water depth, the presence of liquid petroleum and petroleum vapour concentrations on October 6, 2014.

All measurements of ground water and phase-separated liquid petroleum depth are made with a Solinst Model 122 oil/water interface probe. Both the probe and the measuring tape that come into contact with liquids within a monitor are cleaned with phosphate-free soap and water, rinsed with distilled water and then methanol after each measurement.

For all monitors in which phase-separated liquid petroleum is detected with the interface probe, the presence of liquid petroleum is verified with a bailer. For all monitors in which phase-separated liquid petroleum is not detected with the interface probe but that have a petroleum vapour reading of 5% LEL or higher, a bailer is used to check the monitor for the presence of phase-separated liquid petroleum. If there is measurable or observable phase-separated liquid petroleum in the bailer, then a ground water sample is not submitted for laboratory analysis from this location.

Following calibration of the Gastector 1238 ME, as described in Section 4.2, the ground water vapour concentrations were measured by placing the nozzle inside the monitoring well casing no less than six inches and no more than twelve inches below the top of pipe, immediately after the water well cap is removed. The peak reading is recorded.

Petroleum vapours ranged from 200 ppmv to 100% LEL. Liquid petroleum was not detected in any of the monitors. The depth to the ground water table ranged from 3.02 mbgs (TH101) to 3.60 mbgs (TH100).

Based on the ground water depths measured during the October monitoring event and ground water elevation data shown in Table 4, ground water contours were plotted, as shown on Figure 4. The benchmark used for the monitor survey was the north side of a manhole cover located approximately 5 metres west of the kiosk at 1660 Merivale Road, Ottawa, Ontario, with an assigned elevation of 100.00 metres. Based on the data, the ground water flow direction is interpreted to be southwesterly.

The horizontal gradient was calculated based on the ground water contour plan provided in Figure 4. The hydraulic gradient is approximately 0.022 m/m (change in hydraulic head per unit distance) towards the southwest.

Table 5 shows the Darcy's Law calculation of the estimated ground water flow velocity at the subject property. Based on the literature for the hydraulic conductivity of bedrock (Freeze and Cherry, 1979) and the hydraulic gradient determined during the current investigation, the ground water flow velocity was estimated to be approximately 10 centimetres per year.

4.6 Ground Water Chemical Analysis

On October 6, 2014, ground water samples were collected from TH9 and TH100 to TH102. All ground water samples were collected using a low-flow sampling technique. This technique involves pumping ground water at low rates, typically less than 500 mL per minute, to minimize drawdown.

Prior to collecting the ground water samples, the monitors were purged with the low flow sampling equipment and field parameters (pH, conductivity, turbidity, dissolved oxygen, temperature and oxidation reduction potential) were monitored until stable readings were achieved. These parameters are considered to be stable when three consecutive readings are within 10% of one another. When stabilization occurs, equilibrium between ground water within a monitor and the surrounding formation water is attained. As such, samples collected when stabilization occurs are considered to be representative of formation water. Five ground water samples, including one field duplicate sample, were collected and submitted to the Mississauga facility of Maxxam for chemical analysis of BTEX, hexane, MTBE, PHC fractions F1 to F4, and lead.

All work was carried out following the Quality Management, Control and Assurance procedures outlined in Appendix B.

The results of the ground water chemical analysis for petroleum related parameters are provided in Table 6 and Figure 5, along with the applicable Regulation 153/04 Table 3 standards. All ground water samples exceeded the applicable Table 3 standards except for the sample from TH100.

Copies of the laboratory Certificates of Analysis are provided in Appendix D.

5 Quality Management, Control and Assurance

The quality assurance and quality control measures are discussed in the Quality Management, Control and Assurance procedures outlined in Appendix B.

No field or laboratory QA/QC issues were identified that would affect the overall conclusions presented in this report. Overall, the results reported are considered to be reliable.

6 Current Site Status

During the drilling investigation, soil and ground water quality at the subject property were assessed. The results of soil and ground water sampling were compared to the Regulation 153/04 Table 3 standards for industrial/commercial/community property use and medium and fine textured soils. Soil and ground water samples were analysed for BTEX, hexane, MTBE, PHC fractions F1 to F4, and lead.

All soil samples were within the Table 3 standards for all parameters analysed. All ground water samples exceeded the Table 3 standards except the sample from TH100.

We trust this report meets your current needs. If you require further information pertaining to this investigation, please do not hesitate to contact the undersigned.

Sincerely,
exp Energy Services Ltd.

Melanie Thomson, B.Sc. (Hons.)
Environmental Scientist

Tanya Fernandes-Peters, M.Sc. (Env.P)
Project Manager

Patricia Stelmack, M.Sc., P.Eng.
Team Lead/Senior Project Manager



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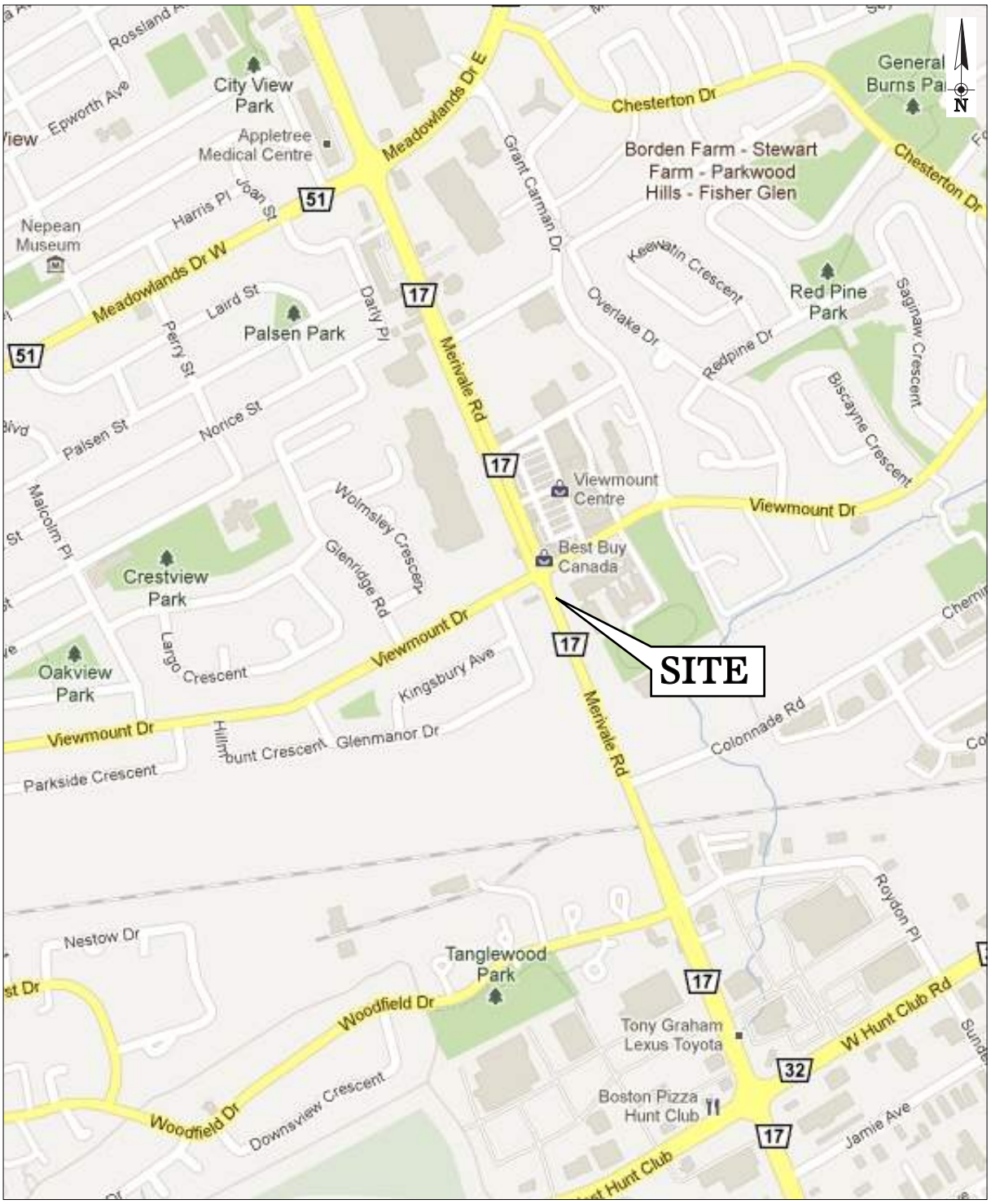
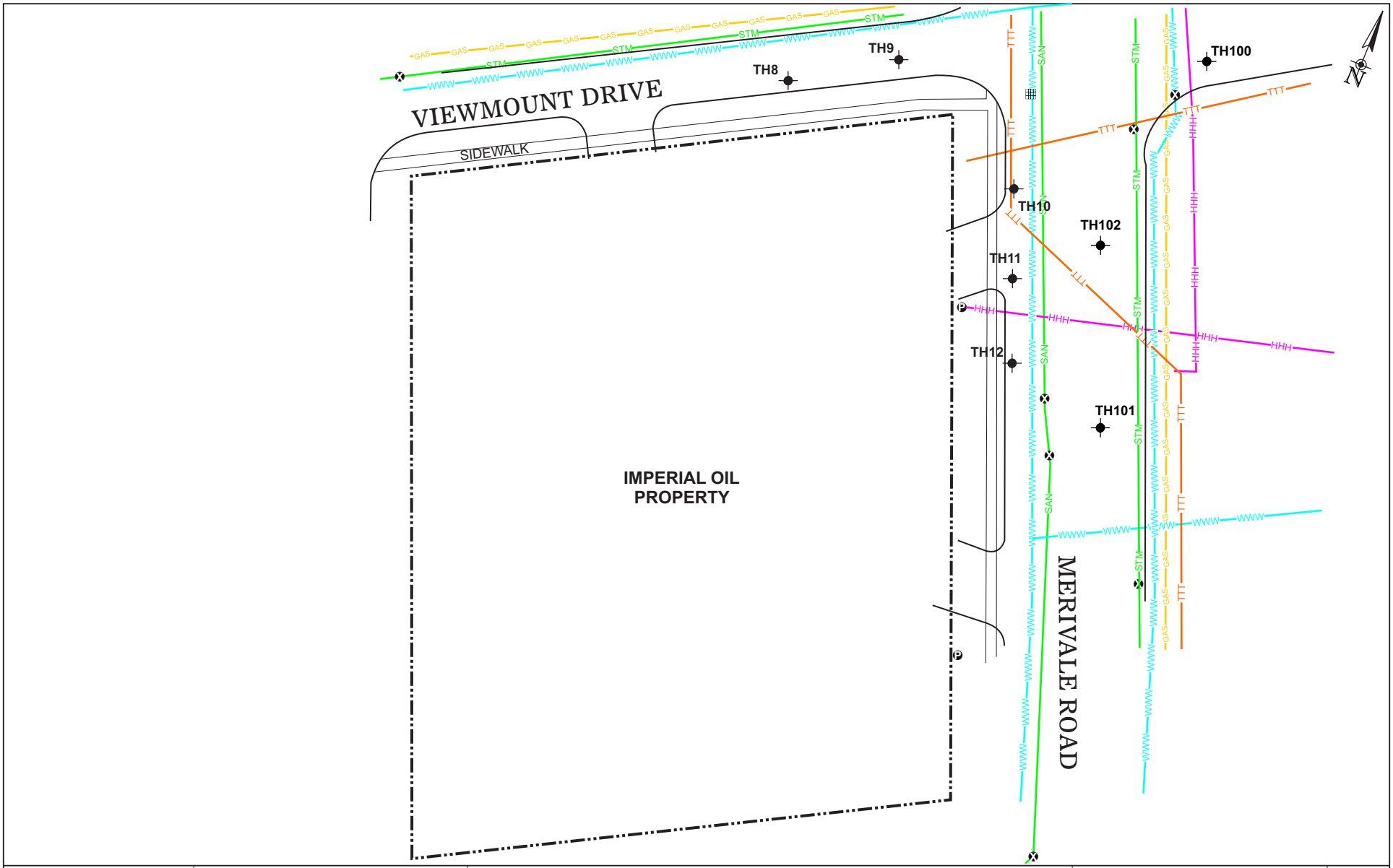
Figures



SCALE: 0 200 400m (APPROXIMATE)	**SOURCE:** GOOGLE MAPS		LOCALITY PLAN	FIGURE 1
exp.	DRAWN BY	CHECKED BY	**IMPERIAL OIL** ADJACENT TO 1660 MERIVALE ROAD OTTAWA, ONTARIO	
	K.G.	T.F.P.	PROJECT NUMBER: 11010	DATE: OCTOBER 2014



SCALE:
0 10 20m
(APPROXIMATE)

DRAWN BY	CHECKED BY
K.G.	T.F.P.

exp.

SOURCE:

BASED ON 'PLAN N-04-12' BY OTTAWA UCC DATED FEB. 2014, 'SITE PLAN' BY IMPERIAL OIL DRAWING # A0765 DATED JAN. 16, 1984 AND FIELD OBSERVATIONS BY **exp** STAFF

NOTES:

UTILITIES ARE UNDERGROUND UNLESS OTHERWISE NOTED, LOCATIONS OF UTILITIES ARE APPROXIMATE

LEGEND:

- PROPERTY BOUNDARY
- TEST HOLE WITH MONITOR TH1 SERIES (**exp**, 2012) TH100 SERIES (**exp**, 2014)
- MANHOLE
- UTILITY POLE
- CATCH BASIN
- STORM SEWER
- SANITARY SEWER
- WATER
- HYDRO
- GAS
- TELEPHONE

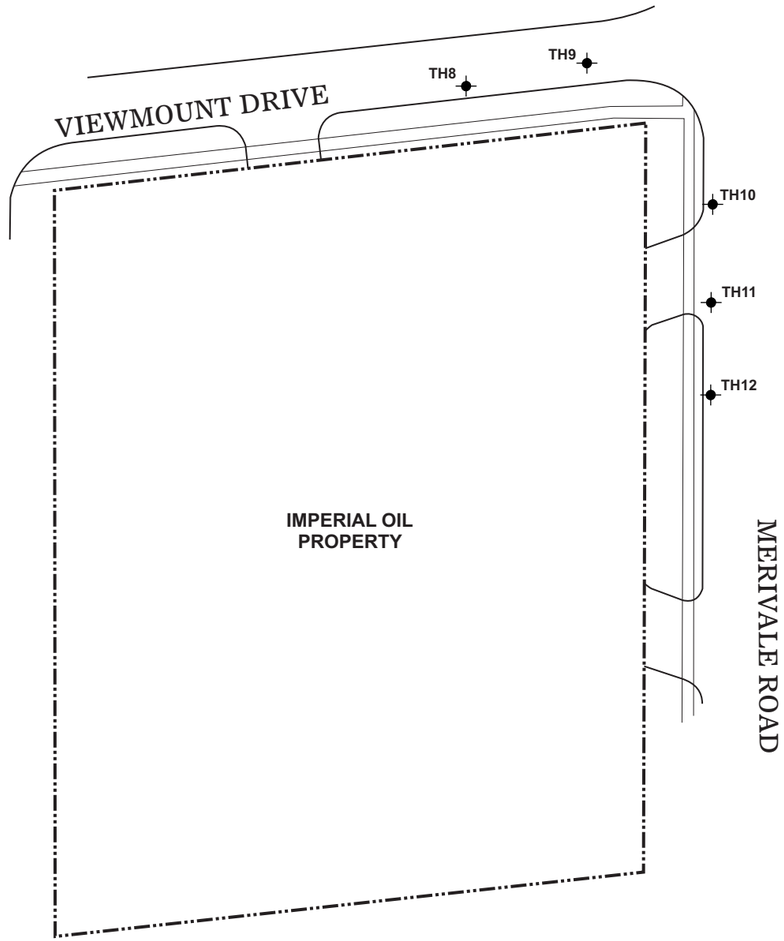
SITE PLAN

FIGURE 2

IMPERIAL OIL
ADJACENT TO 1660 MERIVALE ROAD
OTTAWA, ONTARIO

PROJECT NUMBER: 11010 | DATE: NOVEMBER 2014

11010-SITE PLAN OFFSITE-NOV14



TH100 SEP17/14

DEPTH(mbgs)	B	T	E	X	H	MTBE	F1	F2	F3	F4	Pb
1.1-1.4	<0.020	<0.020	<0.020	<0.040	<0.050	<0.050	<10	<10	<50	<50	7.8

TH102 SEP17/14

DEPTH(mbgs)	B	T	E	X	H	MTBE	F1	F2	F3	F4	Pb
1.7-2.0	<0.020	<0.020	<0.020	<0.040	<0.050	<0.050	<10	<10	<50	<50	<5.0

TH101 SEP17/14

DEPTH(mbgs)	B	T	E	X	H	MTBE	F1	F2	F3	F4	Pb
1.7-2.0	<0.020	<0.020	<0.020	<0.040	<0.050	<0.050	<10	<10	<50	<50	5.5
1.7-2.0(DUP)	<0.020	0.024	<0.020	<0.040	<0.050	<0.050	<10	<10	<50	<50	6.1

PARAMETER	ABBREVIATION	REG 153/04 TABLE 3 STANDARDS*
BENZENE	**B**	0.4
TOLUENE	**T**	78
ETHYLBENZENE	**E**	19
XYLENES	**X**	30
HEXANE	**H**	88
METHYL T-BUTYL ETHER	**MTBE**	3.2
F1 (C6-C10) - BTEX	**F1**	65
F2 (C10-C16)	**F2**	250
F3 (C16-C34)	**F3**	2500
F4 (C34-C50)	**F4**	6600
LEAD	**Pb**	120

SCALE:

0 15 30m

(APPROXIMATE)

DRAWN BY	CHECKED BY
K.G.	T.F.P.

SOURCE:

BASED ON 'SITE PLAN' BY IMPERIAL OIL A0765 DATED JAN. 16, 1984, AND FIELD OBSERVATIONS BY **exp** STAFF

LEGEND:

- PROPERTY BOUNDARY
- TEST HOLE WITH MONITOR TH1 SERIES (**exp**, 2012) TH100 SERIES (**exp**, 2014)
- LOCATION WHERE ALL SOIL SAMPLES MEET **REG 153/04 TABLE 3** STANDARDS FOR ALL PARAMETERS THAT WERE ANALYSED
- LOCATION WHERE AT LEAST ONE SOIL SAMPLE EXCEEDS **REG 153/04 TABLE 3** STANDARDS FOR AT LEAST ONE PARAMETER ANALYSED
- LOCATION WHERE NO SOIL SAMPLE WAS ANALYSED
- **TEXT** EXCEEDANCES OF **REG 153/04 TABLE 3** STANDARDS

ALL ANALYTICAL RESULTS ARE IN MICROGRAMS PER GRAM (µg/g), DRY WEIGHT BASIS
'DEPTH(m)' MEANS DEPTH IN METRES BELOW GROUND SURFACE
'-' MEANS NOT ANALYSED OR NOT APPLICABLE
'NM' MEANS NOT MEASURED
'<RDL' MEANS NOT DETECTED AT REPORTING DETECTION LIMIT (RDL)
'RDL' ARE SHOWN FOR NON-DETECTED RESULTS; FOR RDL OF REPORTABLE RESULTS, SEE APPLICABLE DATA TABLE
(DUP) REPRESENTS FIELD DUPLICATE OF PRECEDING SAMPLE

*STANDARDS SHOWN ARE FOR AN INDUSTRIAL/COMMERCIAL/COMMUNITY PROPERTY USE AND MEDIUM AND FINE TEXTURED SOILS IN A NON-POTABLE GROUND WATER CONDITION

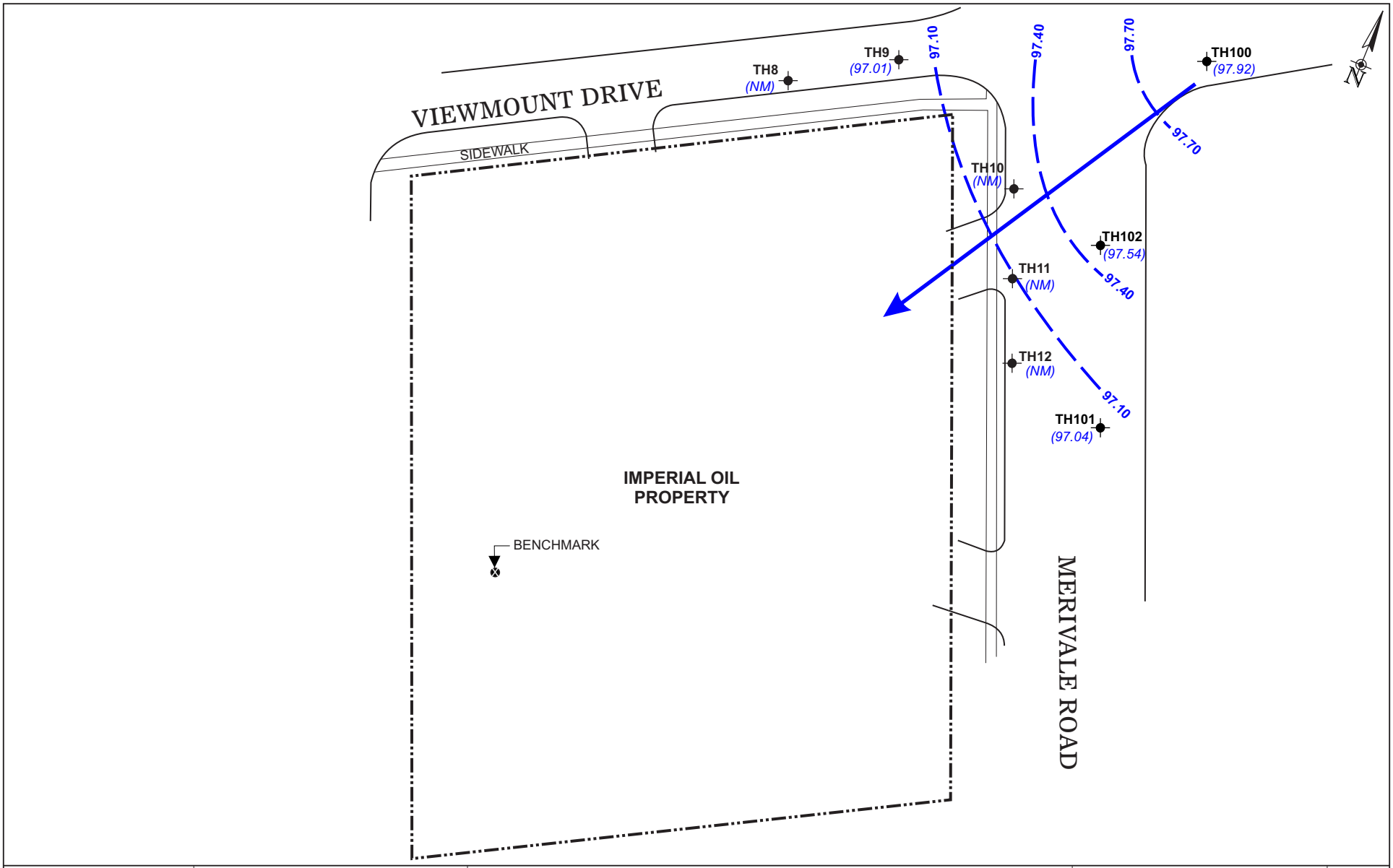
SOIL ANALYTICAL RESULTS - PETROLEUM RELATED PARAMETERS

FIGURE 3

IMPERIAL OIL
ADJACENT TO 1660 MERIVALE ROAD
OTTAWA, ONTARIO

PROJECT NUMBER: 11010

DATE: NOVEMBER 2014



SCALE:
0 10 20m
(APPROXIMATE)

DRAWN BY	CHECKED BY
K.G.	T.F.P.

SOURCE:
BASED ON 'PLAN N-04-12' BY OTTAWA UCC DATED FEB. 2014, 'SITE PLAN' BY IMPERIAL OIL DRAWING #A0765 DATED JAN. 16, 1984 AND FIELD OBSERVATIONS BY **exp** STAFF

NOTES:
THE BENCHMARK USED FOR THE MONITOR SURVEY WAS THE NORTH SIDE OF A MANHOLE COVER LOCATED APPROXIMATELY 5 METRES WEST OF THE KIOSK ON THE IMPERIAL OIL PROPERTY, WITH AN ELEVATION OF 100.00 m

LEGEND:

PROPERTY BOUNDARY	
TEST HOLE WITH MONITOR TH1 SERIES (**exp**, 2012) TH100 SERIES (**exp**, 2014)	
MANHOLE	
(100.00)	GROUND WATER ELEVATION (m)
*(100.00)**	GROUND WATER ELEVATION NOT USED IN CONTOURING (m)
100.00	GROUND WATER ELEVATION CONTOUR (m)
	GROUND WATER FLOW DIRECTION
(NM)	NOT MONITORED
(NA)	NOT ACCESSIBLE

GROUND WATER CONTOUR PLAN (OCTOBER 6, 2014)

FIGURE 4

IMPERIAL OIL
ADJACENT TO 1660 MERIVALE ROAD
OTTAWA, ONTARIO

PROJECT NUMBER: 11010 | DATE: NOVEMBER 2014

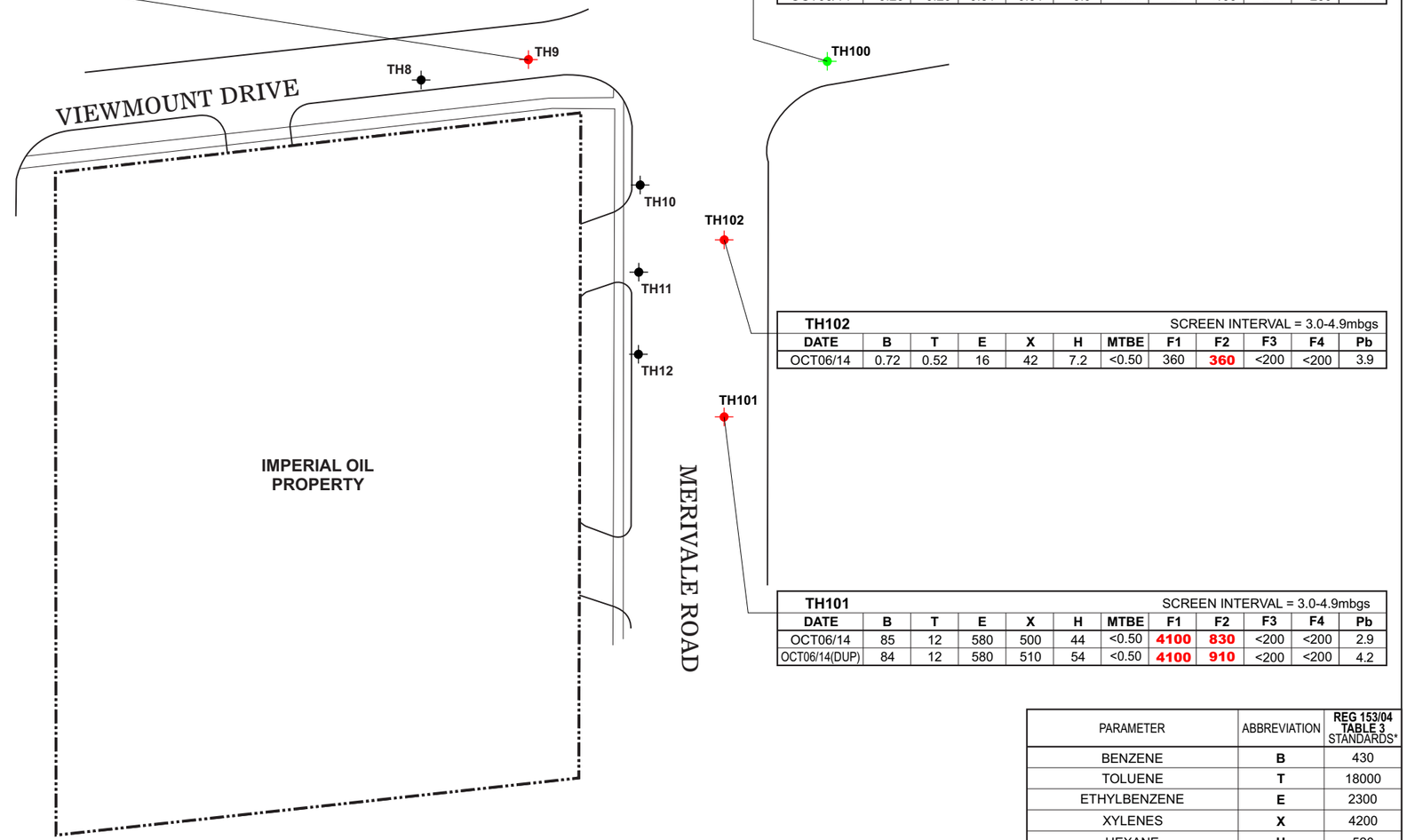
11010-GWC PLAN OFFSITE OCT14-NOV14

TH9											SCREEN INTERVAL = 3.4-4.9mbgs
DATE	B	T	E	X	H	MTBE	F1	F2	F3	F4	Pb
OCT06/14	31	3.0	230	290	15	0.75	**1000**	**570**	**610**	420	1.1

TH100											SCREEN INTERVAL = 3.0-4.9mbgs
DATE	B	T	E	X	H	MTBE	F1	F2	F3	F4	Pb
OCT06/14	<0.20	<0.20	0.31	0.91	<5.0	<0.50	<25	<100	<200	<200	<0.50

TH102											SCREEN INTERVAL = 3.0-4.9mbgs
DATE	B	T	E	X	H	MTBE	F1	F2	F3	F4	Pb
OCT06/14	0.72	0.52	16	42	7.2	<0.50	360	**360**	<200	<200	3.9

TH101											SCREEN INTERVAL = 3.0-4.9mbgs
DATE	B	T	E	X	H	MTBE	F1	F2	F3	F4	Pb
OCT06/14	85	12	580	500	44	<0.50	**4100**	**830**	<200	<200	2.9
OCT06/14(DUP)	84	12	580	510	54	<0.50	**4100**	**910**	<200	<200	4.2



PARAMETER	ABBREVIATION	REG 153/04 TABLE 3 STANDARDS*
BENZENE	**B**	430
TOLUENE	**T**	18000
ETHYLBENZENE	**E**	2300
XYLENES	**X**	4200
HEXANE	**H**	520
METHYL T-BUTYL ETHER	**MTBE**	1400
F1 (C6-C10) - BTEX	**F1**	750
F2 (C10-C16)	**F2**	150
F3 (C16-C34)	**F3**	500
F4 (C34-C50)	**F4**	500
LEAD	**Pb**	25

SCALE:

0 15 30m

(APPROXIMATE)

DRAWN BY	CHECKED BY
K.G.	T.F.P.

SOURCE:

BASED ON 'SITE PLAN' BY IMPERIAL OIL A0765 DATED JAN. 16, 1984, AND FIELD OBSERVATIONS BY **exp** STAFF

LEGEND:

PROPERTY BOUNDARY

TEST HOLE WITH MONITOR
TH1 SERIES (**exp**, 2012)
TH100 SERIES (**exp**, 2014)

MONITOR LOCATION WHERE MOST RECENT GROUND WATER SAMPLE MEETS **REG 153/04 TABLE 3** STANDARDS FOR ALL PARAMETERS THAT WERE ANALYSED

MONITOR LOCATION WHERE MOST RECENT GROUND WATER SAMPLE EXCEEDS **REG 153/04 TABLE 3** STANDARDS FOR AT LEAST ONE PARAMETER ANALYSED

MONITOR LOCATION WITH MEASURABLE OR OBSERVABLE LIQUID PETROLEUM DURING THE MOST RECENT GROUND WATER SAMPLING EVENT

MONITOR LOCATION WHERE NO GROUND WATER SAMPLE SUBMITTED FOR ANALYSIS DURING THE MOST RECENT GROUND WATER SAMPLING EVENT

TEXT EXCEEDANCES OF **REG 153/04 TABLE 3** STANDARDS

TEXT LIQUID PETROLEUM THICKNESS [IN METRES(m)]

ALL ANALYTICAL RESULTS ARE IN MICROGRAMS PER LITRE (µg/L)
'mbgs ' MEANS METRES BELOW GROUND SURFACE
'-' MEANS NOT ANALYSED OR NOT APPLICABLE
'NM' MEANS NOT MEASURED
'<RDL' MEANS NOT DETECTED AT REPORTING DETECTION LIMIT (RDL)
'RDL' ARE SHOWN FOR NON-DETECTED RESULTS; FOR RDL OF REPORTABLE RESULTS, SEE APPLICABLE DATA TABLE
(DUP) REPRESENTS FIELD DUPLICATE OF PRECEDING SAMPLE

*STANDARDS SHOWN ARE FOR ALL TYPES OF PROPERTY USE AND MEDIUM AND FINE TEXTURED SOILS IN A NON-POTABLE GROUND WATER CONDITION

GROUND WATER ANALYTICAL RESULTS - PETROLEUM RELATED PARAMETERS

FIGURE 5

IMPERIAL OIL
ADJACENT TO 1660 MERIVALE ROAD
OTTAWA, ONTARIO

PROJECT NUMBER: 11010

DATE: NOVEMBER 2014

Tables

Table 1

SITE ENVIRONMENTAL SETTING DATA

Site Location: Adjacent to 1660 Merivale Road, Ottawa, Ontario
Date: October 2014

SOIL TYPE AND BEDROCK

Type:	Sand and Gravel
Hydraulic Conductivity:	2.74 X 10^{-6} cm/s (measured on adjacent property)
Texture:	Medium and fine
Depth to Bedrock:	Approximately 2 mbgs
Bedrock Type:	Limestone

GROUND WATER

Depth to Water Table:	Approximately 3 mbgs
Estimated or Measured:	Measured during current investigation
Direction of Flow:	Southerwesterly
Estimated or Measured:	Measured during current investigation

POTABLE WATER AND SEWERS

Potable Water Source:	Municipal
Municipal Water Source:	Surface Water (Ottawa River)
Distance to Nearest Municipal Water Well:	n/a
Distance to Nearest Private Water Well:	n/a
Sanitary Sewer System:	Municipal
Storm Sewer System:	Municipal

OTHER UTILITIES

Power:	Hydro Ottawa
Natural Gas:	Enbridge
Telephone:	Bell Canada

SURFACE WATER

Name of Nearest Water Body:	Nepean Creek (tributary of the Rideau River)
Distance from Site:	Approximately 360 metres southeast
Elevation Drop from Site:	Unknown
Direct Drainage from Site:	No

Table 2

SOIL CHEMICAL ANALYSIS - Petroleum Related Parameters

Adjacent to 1660 Merivale Road, Ottawa, Ontario

Sample	Test Hole TH100-2	Test Hole TH101-3	Test Hole DUP1 (TH101-3)	Test Hole TH102-3			
Depth (mbgs)	1.1 to 1.4	1.7 to 2.0	1.7 to 2.0	1.7 to 2.0			
Soil Type	Sand and Gravel	Sand and Gravel	Sand and Gravel	Sand and Gravel			
Sample Date	17-Sep-14	17-Sep-14	17-Sep-14	17-Sep-14			
Maxxam I.D.	XP9537	XP9538	XP9540	XP9539			
Maxxam Job #	B4H2865	B4H2865	B4H2865	B4H2865			
Field Vapour Reading	25 ppmv	50 ppmv	50 ppmv	50 ppmv			
PARAMETERS							Ontario Regulation 153/04 Table 3 Soil Standards *
Volatile Organic Compounds							
Benzene	<0.020	<0.020	<0.020	<0.020			0.4
Toluene	<0.020	<0.020	0.024	<0.020			78
Ethylbenzene	<0.020	<0.020	<0.020	<0.020			19
Xylenes	<0.040	<0.040	<0.040	<0.040			30
Hexane	<0.050	<0.050	<0.050	<0.050			88
Methyl t-Butyl Ether	<0.050	<0.050	<0.050	<0.050			3.2
Petroleum Hydrocarbons							
F1 (C6 to C10 - BTEX)	<10	<10	<10	<10			65
F2 (C10 to C16)	<10	<10	<10	<10			250
F3 (C16 to C34)	<50	<50	<50	<50			2500
F4 (C34 to C50)	<50	<50	<50	<50			6600
Inorganic Parameters							
Lead	7.8	5.5	6.1	<5.0			120

Analysis by Maxxam Analytics

All results in ppm (ug/g) on dry weight basis; mbgs means "metres below ground surface"; <RDL means not detected at reporting detection limit (RDL); na means "not analysed"; nm means "not monitored"

RDL are shown for non-detected results; for RDL of reportable results, see the respective laboratory certificate of analysis (refer to Maxxam Job #)

* Standards shown are for an industrial/commercial/community property use and medium and fine textured soils in a non-potable ground water condition

Exceedances of Table 3 standards are shown in **bold**

Table 3

CORING WATER CHEMICAL ANALYSIS - Petroleum Related Parameters

Adjacent to 1660 Merivale Road, Ottawa, Ontario

Sample	Coring Water						
	W1						Ontario Regulation 153/04
Sample Date	17-Sep-14						Table 3
Maxxam I.D.	XP9631						Ground Water Standards*
Maxxam Job #	B4H2890						
PARAMETERS							
Volatile Organic Compounds							
Benzene	<0.20						430
Toluene	<0.20						18000
Ethylbenzene	<0.20						2300
Xylenes	<0.40						4200
Hexane	<0.50						520
Methyl t-Butyl Ether	<0.20						1400
Petroleum Hydrocarbons							
F1 (C6 to C10 - BTEX)	<25						750
F2 (C10 to C16)	<100						150
F3 (C16 to C34)	<200						500
F4 (C34 to C50)	<200						500
Inorganic Parameters							
Lead	<0.50						25

Analysis by Maxxam Analytics

All results in ppb (ug/L); mbgs means "metres below ground surface"; <RDL means not detected at reporting detection limit (RDL); na means "not analysed"

RDL are shown for non-detected results; for RDL of reportable results, see the respective laboratory certificate of analysis (refer to Maxxam Job #)

* Standards shown are for all types of property use and medium and fine textured soils in a non-potable ground water condition

Exceedances of Table 3 standards are shown in **bold**

GROUND WATER MONITORING DATA

Table 4

Adjacent to 1660 Merivale Road, Ottawa, Ontario

Monitor	Top of Pipe Elevation (m)	Ground Surface Elevation (m)	Screen Interval (mbgs)	Date	Petroleum Vapour Concentrations	Liquid Petroleum Thickness (m)*	Water Depth (mbgs)	Water Table Elevation (m)
TH8	100.03	100.16	3.4 to 4.9	10-Jun-13 6-Oct-14	100 nm	nd nm	3.01 nm	97.15 n/a
TH9	100.46	100.59	3.4 to 4.9	10-Jun-13 6-Oct-14	nm 100%	nm nd	nm 3.58	n/a 97.01
TH10	100.17	100.26	3.4 to 4.9	10-Jun-13 6-Oct-14	170 nm	nd nm	3.03 nm	97.24 n/a
TH11	99.90	100.04	3.4 to 4.9	10-Jun-13 6-Oct-14	50 nm	nd nm	2.92 nm	97.12 n/a
TH12	99.60	99.74	3.4 to 4.9	10-Jun-13 6-Oct-14	18% nm	nd nm	2.75 nm	96.98 n/a
TH100**	101.40	101.52	3.0 to 4.9	6-Oct-14	200	nd	3.60	97.92
TH101**	99.94	100.06	3.0 to 4.9	6-Oct-14	50%	nd	3.02	97.04
TH102**	100.59	100.69	3.0 to 4.9	6-Oct-14	10%	nd	3.15	97.54

Note:

All measurements shown in metres (m)

Elevations are relative to the north side of a manhole cover located approximately 5 metres west of kiosk at 1660 Merrivalle Road, Ottawa elevation = 100.00 metres (**exp,** 2013)

nd means "not detected"; nm means "not monitored"; na means "not accessible"; n/a means "not applicable"; mbgs means "metres below ground surface"

Vapour concentrations measured using Gastechtor 1238 ME operated in methane elimination mode

Petroleum vapour concentrations <500 ppmv shown in parts per million volume (ppmv), >500 ppmv shown in percent of lower explosive limit (% LEL)

* If liquid petroleum was measured, the water table elevations were corrected assuming a liquid petroleum specific gravity of 0.75

** Monitoring well installed in September 2014

Table 5

DARCY'S LAW CALCULATIONS

Adjacent to 1660 Merivale Road, Ottawa, Ontario
October 2014

v=Ki/n

Bedrock

Hydraulic conductivity* K (m/sec) =	2.74E-08		
(cm/sec) =	2.74E-06		
Gradient i (m/m) =	0.022		
Porosity ** n =	0.20	Velocity v (m/sec) =	3.01E-09
		(feet/sec) =	9.89E-09
		(feet/day) =	8.54E-04
		(feet/year) =	3.12E-01
		(metres/year) =	9.50E-02

* Hydraulic conductivity measured at 1660 Merrivale Road during previous investigation

** C.W. Fetter, 2001

Gradient measured across site during current investigation using monitors installed in bedrock

Table 6

GROUND WATER CHEMICAL ANALYSIS - Petroleum Related Parameters

Adjacent to 1660 Merivale Road, Ottawa, Ontario

Sample	Monitor TH9	Monitor TH100	Monitor TH101	Monitor DUP1 (TH101)	Monitor TH102		Ontario Regulation 153/04 Table 3 Ground Water Standards*
Screen Interval (mbgs)	3.4 to 4.9	3.0 to 4.9	3.0 to 4.9	3.0 to 4.9	3.0 to 4.9		
Sample Date	6-Oct-14	6-Oct-14	6-Oct-14	6-Oct-14	6-Oct-14		
Maxxam I.D.	XX8574	XX8571	XX8572	XX8575	XX8573		
Maxxam Job #	B4I8260	B4I8260	B4I8260	B4I8260	B4I8260		
PARAMETERS							
Volatile Organic Compounds							
Benzene	31	<0.20	85	84	0.72		430
Toluene	3.0	<0.20	12	12	0.52		18000
Ethylbenzene	230	0.31	580	580	16		2300
Xylenes	290	0.91	500	510	42		4200
Hexane	15	<5.0	44	54	7.2		520
Methyl t-Butyl Ether	0.75	<0.50	<0.50	<0.50	<0.50		1400
Petroleum Hydrocarbons							
F1 (C6 to C10 - BTEX)	**1000**	<25	**4100**	**4100**	360		750
F2 (C10 to C16)	**570**	<100	**830**	**910**	**360**		150
F3 (C16 to C34)	**610**	<200	<200	<200	<200		500
F4 (C34 to C50)	420	<200	<200	<200	<200		500
Inorganic Parameters							
Lead	1.1	<0.50	2.9	4.2	3.9		25

Analysis by Maxxam Analytics

All results in ppb (ug/L); mbgs means "metres below ground surface"; <RDL means not detected at reporting detection limit (RDL); na means "not analysed"

RDL are shown for non-detected results; for RDL of reportable results, see the respective laboratory certificate of analysis (refer to Maxxam Job #)

* Standards shown are for all types of property use and medium and fine textured soils in a non-potable ground water condition

Exceedances of Table 3 standards are shown in **bold**

Appendix A –
Limitation of Liability, Scope of Report and Third Party Reliance

LIMITATION OF LIABILITY, SCOPE OF REPORT AND THIRD PARTY RELIANCE

This report has been prepared and the work referred to in this report has been undertaken by **exp** Energy Services Ltd. (**exp**) for Imperial Oil. It is intended for the sole and exclusive use of Imperial Oil, its affiliated companies and partners and the respective insurers, agents, employees and advisors (collectively, "Imperial Oil"). Any use, reliance on or decision made by any person other than Imperial Oil based on this report is the sole responsibility of such other person. Imperial Oil and **exp** make no representation or warranty to any other person with regard to this report and the work referred to in this report and they accept no duty of care to any other person or any liability or responsibility whatsoever for any losses, expenses, damages, fines, penalties, or other harm that may be suffered or incurred by any other person as a result of the use of, reliance on, any decision made or any action taken based on this report or the work referred to in this report.

The investigation undertaken by **exp** with respect to this report and any conclusions or recommendations made in this report reflect **exp's** judgement based on the site conditions observed at the time of the site inspection on the date(s) set out in this report and on information available at the time of preparation of this report. This report has been prepared for specific application to this site and it is based, in part, upon visual observation of the site, subsurface investigation at discrete locations and depths, and specific analysis of specific chemical parameters and materials during a specific time interval, all as described in this report. Unless otherwise stated, the findings cannot be extended to previous or future site conditions, portions of the site which were unavailable for direct investigation, subsurface locations which were not investigated directly, or chemical parameters, materials or analysis which were not addressed. Substances other than those addressed by the investigation described in this report may exist within the site, substances addressed by the investigation may exist in areas of the site not investigated and concentrations of substances addressed which are different than those reported may exist in areas other than the locations from which the samples were taken.

If site conditions or applicable standards change or if any additional information becomes available at a future date, modifications to the findings, conclusions and recommendations in this report may be necessary.

Other than by Imperial Oil, copying or distribution of this report or the use of or reliance on the information contained herein, in whole or in part, is not permitted without the express written permission of **exp.** Nothing in this report is intended to constitute or provide a legal opinion.

exp.

Appendix B –
Quality Management, Control and Assurance

QUALITY MANAGEMENT, CONTROL AND ASSURANCE

Project Quality Management

The field work documented in this report and the preparation of this report were overseen by a Qualified Person, as defined in Ontario Regulation 153/04, as amended (Regulation 153/04).

Sampling analysis was performed using generally accepted principles and with appropriate sampling equipment. Written field and laboratory sampling procedures for soil and ground water developed by **exp** Energy Services Ltd. (**exp**) were used to ensure consistency in sample collection and preparation of samples for submission to the laboratory.

The staff involved in the field sampling have participated in regular, ongoing training programs and were qualified and experienced in collecting, describing, and preparing environmental samples for laboratory analysis.

Laboratory analysis was performed using generally accepted principles in accordance with the *Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the* Environmental Protection Act, March 9, 2004 amended as of July 1, 2011 (Protocol).

Data quality objectives for the parameters of concern were set to meet acceptable RDLs to achieve the goal of defining areas where such parameters are present at levels in excess of applicable generic standards, as defined in Regulation 153/04. Sampling programs included providing written instruction to the analytical laboratory describing the required analyses on the Chain of Custody prepared and delivered with the samples.

The laboratory has a standing contract with Imperial Oil which sets out specific data quality requirements. Any non-compliance with this contract is documented using a data quality waiver issued by the laboratory. When a data quality waiver is issued by the laboratory, it must be reviewed, signed by **exp**, and returned to the laboratory. Data quality waivers are included with all reports, along with the complete Certificate of Analysis.

Field Quality Assurance/ Quality Control

The soil and ground water sampling plan was prepared and executed based on previous assessment work on the subject property, and on professional judgment at the time of the investigation.

Field observations were made and documented in a field book in accordance with generally accepted practices and with the procedures developed and utilized by **exp**.

Exp field sampling Quality Assurance and Quality Control (QA/QC) protocols are tailored to the investigation and include:

- The collection of at least one field duplicate sample for both soil and ground water for every ten samples or less (where three or more such samples are collected)

- For soil samples analysed for volatile organic compounds, including BTEX, the collection of discrete samples directly into vials containing methanol

- For soil samples analysed for all other parameters, the collection of discrete samples directly into jars

- For ground water samples, the collection of samples directly into vials or bottles with Teflon-lined lids containing an appropriate preservative, where required

- For ground water samples analysed for dissolved metals, including mercury and hexavalent chromium, filtration of the sample in the field using a 45 micron disposable filter prior to collection in a bottle containing preservative

- For ground water samples analysed for benzo(a)pyrene, where deemed necessary by the Qualified Person overseeing this work, the collection of an additional bottle for laboratory filtration prior to analysis

- The immediate placement, upon collection, of both soil and ground water samples into a cooler with free ice to lower the temperature to less than 10° C

- For soil sampling, the thorough cleaning of soil sampling equipment using soap and water, followed by a distilled water rinse and a methanol rinse between sample locations

- For ground water sampling, the use of dedicated sampling equipment at different monitors (including the use of dedicated tubing when low flow ground water sampling techniques are used)

- Ensuring that neither the bare hand nor latex glove comes into contact with the soil or ground water as it is being placed into the sample container

- The inclusion of one soil trip blank, at a frequency determined by the Qualified Person, when samples are being analysed for volatile organic compounds, including BTEX. The methanol-charged vials containing the trip blank are prepared by the laboratory: placed in a cooler with ice no later than the morning of the day of sampling (trip blank vials are not placed on ice by the laboratory); and returned to the laboratory unopened for analysis as part of the submission

- The inclusion of one soil field blank for PAH analysis at a frequency determined by the Qualified Person. The field blanks are prepared in the field with laboratory-

supplied silica during the sample collection process and returned to the laboratory for analysis as part of the submission

- The inclusion of one ground water field blank and trip blank per submission for all parameters in ground water except pH and electrical conductivity. The field blanks are prepared in the field during the sample collection process using laboratory-supplied water and returned to the laboratory for analysis as part of the submission. The trip blanks are prepared by the laboratory, kept in the cooler on ice for the duration of the sampling event and returned to the laboratory unopened for analysis as part of the submission

- All samples were shipped to the laboratory in custody sealed coolers, filled with ice at less than 10° C

- All sample shipments are accompanied by standard chain of custody forms

- For each analysis and matrix, Table B-1 describes the type of sample container and preservation technique used

The results of the field duplicate samples are presented along with the tabulated data in this appendix. Tabulated data are presented to a maximum of two significant digits.

Laboratory Quality Assurance/Quality Control

All laboratory analyses were completed by the Mississauga facility of Maxxam Analytics (Maxxam). This Maxxam laboratory has been accredited by the Standards Council of Canada (SCC) for all of the parameters that were analysed in accordance with the latest version of the International Standard ISO/IEC 17025 – "*General Requirement for the Competence of Testing and Calibration Laboratories*". Maxxam performed the work following formal written methods and procedures. These methods include all the minimum requirements as specified in the Protocol.

Exp has accepted the data provided by Maxxam based on the assurance from Maxxam that, as a minimum, the following requirements have been met and documentation to demonstrate compliance can be produced on request:

- The method performance criteria identified in the Protocol were met

- Sample storage requirements, pre-analysis processing techniques, and holding times for all sample types as identified in the Protocol were met following receipt and sign-off of the samples from **exp** staff

- The results of all laboratory QC samples were within statistically determined control limits and if not, reasons were provided

- Surrogate recoveries for organic analyses were monitored and recorded

- Details on the precision and accuracy of the data have been recorded and retained and are available from the laboratory should they be required as a result of a Ministry of the Environment (MOE) audit

- The analytical data were reported without blank correction (unless the correction was clearly identified on the Certificate of Analysis)

- All soil sampling results were reported on a dry weight basis

- All laboratory QA/QC sample data, including method blanks, matrix spikes, matrix duplicates, laboratory control samples, and surrogate recoveries, were included in the Certificate of Analysis

All Certificates of Analysis were reviewed by the Qualified Person to ensure that data quality objectives have been met and that any anomalies have been identified. A data quality review checklist has been prepared by an **exp** staff member under the supervision of the Qualified Person for each laboratory submission. The checklist is appended with each Certificate of Analysis. All Certificates of Analysis meet the requirements under Section 47(3) of Regulation 153/04.

Quality Assurance/Quality Control Program

A summary of laboratory data quality waivers and other laboratory and field data quality issues is provided in Table B-2. No issues were identified that would have a material effect on the interpretation of results presented in this report.

The laboratory QA/QC program consisted of one or more of the following analysis: a) instrument and extraction surrogate recoveries for soil and/or ground water samples that were analysed and b) the analysis of a method blank, laboratory duplicate, matrix spike and/or laboratory control samples for the analytical batches that were analysed. The laboratory QA/QC results are included in the certificates of analysis. As indicated, no laboratory QA/QC issues were identified that would have a material effect on the interpretation of results presented in this report.

The soil field QA/QC program consisted of the following submission for laboratory analysis: one field duplicate and trip blank for BTEX, hexane, MTBE, and petroleum hydrocarbon (PHC) fractions F1.

The ground water field QA/QC program consisted of the following submission for laboratory analysis: one field duplicate, field blank, and trip blank sample were analyzed for BTEX, hexane, MTBE, PHC fractions F1 to F4, and lead.

For the field duplicate samples, evaluation of the QA/QC results were determined by calculating the relative percent difference (RPD) between the field duplicate and original sample results, and comparison of the RPD to designated alert limits. Consistent with laboratory practices and to permit reliable calculations, an RPD is only calculated when the original and duplicate sample concentrations are at least five times the reportable detections limits.

$$RPD = \left| \frac{(x_1 - x_2)}{\left(\frac{(x_1 + x_2)}{2}\right)} \right| \times 100\%$$

The RPD for the soil field duplicate samples are provided in Tables B-3, along with the designated field duplicate alert limits. All of the RPD were not calculable.

The soil trip blank data was compared to the alert limits and are provided in Tables B-4. All of the results were within the alert limits.

The RPD for the ground water field duplicate sample are provided in Table B-5, along with the designated field duplicate alert limits. All of the RPD were either within the alert limits or not calculable.

The ground water trip blank and field blank data were compared to the alert limits and are provided in Table B-6. All of the results were within the alert limits.

No field or laboratory QA/QC issues were identified that would affect the overall conclusions presented in this report. Overall, the results reported are considered to be reliable.

Table B-1

SAMPLE CONTAINERS AND PRESERVATIVES

Adjacent to 1660 Merivale Road, Ottawa, Ontario

Parameter Group	Matrix	Container	Preservative
BTEX/F1	Soil	2 x 40 mL C/G TL septum cap vial	Less than 10°C Methanol
VOC	Soil	2 x 40 mL C/G TL septum cap vial	Less than 10°C Methanol
F2-F4	Soil	60 or 120 mL C/G TL	Less than 10°C
Lead	Soil	120 or 250 mL C/G	Less than 10°C
BTEX/F1	Ground Water	4 x 40 mL C/G TL septum cap vial	Less than 10°C 18% $NaHSO_4$
VOC	Ground Water	4 x 40 mL C/G TL septum cap vial	Less than 10°C 18% $NaHSO_4$
F2-F4	Ground Water	2 x 500mL A/G TL	Less than 10°C 15% $NaHSO_4$
Lead	Ground Water	120 mL HDPE	Less than 10°C 18% HNO_3

A/G means "amber glass"; C/G means "clear glass"; HDPE means "High Density Polyethylene"; TL means "Teflon-lined lid"

Table B-2

DATA QUALITY WAIVERS AND OTHER DATA ISSUES

Adjacent to 1660 Merivale Road, Ottawa, Ontario

Maxxam Job #	DQW #	Matrix	Sample ID	Test Affected	Deviation	Interpretation
B4H2890	N/A	Water	W1	PHC F1	d10-ethylbenzene instrument surrogate recovery (4.7%) is below the acceptance criteria (60-140%)	Possible low bias in reported F1 result for this sample. Since the F1 result was below the detection limit and the detection limit is well below the Table 3 standard, the possible low bias in surrogate recovery should have no material effect on the interpretation of the data
	2128	Water	W1	BTEX/PHC F1	Matrix spike for toluene (6.5%), ethylbenzene (12%), o-xylene (0.82%), and p+m-xylene (1.3%) are below acceptance criteria (50-140%)	Possible low bias in reported toluene, ethylbenzene, and xylenes result for this sample. Since toluene, ethylbenzene, and xylenes results for this sample were below the detection limits and the detection limits are well below the Table 3 standards, the possible low bias in matrix spike recovery should have no material effect on the interpretation of the data
B4I8260	N/A	Water	Batch 3783712	Metals	Trend rule failure for selenium and beryllium: EWMA greater than 1.5 standard deviation below the mean	Possible low bias of selenium and beryllium results. Since analyses of selenium and beryllium were not requested as part of this submission and these parameters are not contaminants of concern at the subject property, the possible low bias should have no material effect on the interpretation of the results for this batch
B4I8266	N/A	Water	Batch 3783712	Metals	Trend rule failure for selenium and beryllium: EWMA greater than 1.5 standard deviation below the mean	Possible low bias of selenium and beryllium results. Since selenium and beryllium were not requested as part of this submission and these parameters are not contaminants of concern at the subject property, the possible low bias should have no material effect on the interpretation of the results for this batch

Table B-3

SOIL FIELD DUPLICATE

Relative Percent Differences - Petroleum Related Parameters

Adjacent to 1660 Merivale Road, Ottawa, Ontario

September 17, 2014

Location		TH101-3	DUP1 (TH101-3)	RPD(%)	Alert Limit (%)
Depth (mbgs)		1.7 to 2.0	1.7 to 2.0		
Maxxam I.D.		XP9538	XP9540		
PARAMETERS	**RDL***				
Volatile Organic Compounds					
Benzene	0.020	<0.020	<0.020	nc	100
Toluene	0.020	<0.020	0.024	nc	100
Ethylbenzene	0.020	<0.020	<0.020	nc	100
Xylenes	0.040	<0.040	<0.040	nc	100
Hexane	0.050	<0.050	<0.050	nc	100
Methyl t-Butyl Ether	0.050	<0.050	<0.050	nc	100
Petroleum Hydrocarbons					
F1 (C6 to C10 - BTEX)	10	<10	<10	nc	100
F2 (C10 to C16)	10	<10	<10	nc	100
F3 (C16 to C34)	50	<50	<50	nc	100
F4 (C34 to C50)	50	<50	<50	nc	100
Inorganic Parameters					
Lead	5.0	5.5	6.1	nc	100

Analysis by Maxxam Analytics

All results in ppm (ug/g) on dry weight basis; <RDL means not detected at reporting detection limit (RDL)

na means "not analysed"

nc means "not calculable" - one (or both) of the results are <5x RDL

mbgs means "metres below ground surface"

* Analytical RDL are shown for comparison with detectable results; if RDL differ for each sample, both are shown (sample RDL/duplicate RDL)

Exceedances of alert limits are shown in **bold**

Table B-4

SOIL CHEMICAL ANALYSIS - Petroleum Related Parameters

Trip Blank

Adjacent to 1660 Merivale Road, Ottawa, Ontario

Sample	TRIP BLANK						Alert Limit
Sample Date	17-Sep-14						
Maxxam I.D.	XP9596						
Maxxam Job #	B4H2879						
PARAMETERS							
Volatile Organic Compounds							
Benzene	<0.020						1X RDL
Toluene	<0.020						1X RDL
Ethylbenzene	<0.020						1X RDL
Xylenes	<0.040						1X RDL
Hexane	<0.050						1X RDL
Methyl t-Butyl Ether	<0.050						1X RDL
Petroleum Hydrocarbons							
F1 (C6 to C10 - BTEX)	<10						2X RDL

Analysis by Maxxam Analytics

All results in ppm (ug/g) on dry weight basis; <RDL means not detected at reporting detection limit (RDL); na means "not analysed";

RDL are shown for non-detected results; for RDL of reportable results, see the respective laboratory certificate of analysis (refer to Maxxam Job #)

Exceedances of alert limits are shown in **bold**

Table B-5

GROUND WATER FIELD DUPLICATE

Relative Percent Differences - Petroleum Related Parameters

Adjacent to 1660 Merivale Road, Ottawa, Ontario

October 6, 2014

Location Maxxam I.D.		TH101 XX8572	DUP1 (TH101) XX8575	RPD (%)	Alert Limit (%)
PARAMETERS	**RDL***				
Volatile Organic Compounds					
Benzene	1.0	85	84	1	80
Toluene	1.0	12	12	0	80
Ethylbenzene	1.0	580	580	0	80
Xylenes	2.0	500	510	2	80
Hexane	25	44	54	nc	80
Methyl t-Butyl Ether	0.50	<0.50	<0.50	nc	80
Petroleum Hydrocarbons					
F1 (C6 to C10 - BTEX)	130	4100	4100	0	80
F2 (C10 to C16)	100	830	910	9	80
F3 (C16 to C34)	100	<200	<200	nc	80
F4 (C34 to C50)	200	<200	<200	nc	80
Inorganic Parameters					
Lead	0.50	2.9	4.2	37	50

Analysis by Maxxam Analytics

All results in ppb (ug/L) unless otherwise indicated; <RDL means not detected at reporting detection limit (RDL)

na means "not analysed"

nc means "not calculable" - one (or both) of the results are <5x RDL

* Analytical RDL are shown for comparison with detectable results; if RDL differ for each sample, both are shown (sample RDL/duplicate RDL)

Exceedances of alert limits are shown in **bold**

Table B-6

GROUND WATER CHEMICAL ANALYSIS - Petroleum Related Parameters

Field Blank and Trip Blank

Adjacent to 1660 Merivale Road, Ottawa, Ontario

Sample	F. BLANK	TRIP BLANK					Alert Limit
Sample Date	7-Oct-14	7-Oct-14					
Maxxam I.D.	XX8593	XX8594					
Maxxam Job #	B4I8266	B4I8266					
PARAMETERS							
Volatile Organic Compounds							
Benzene	<0.20	<0.20					1X RDL
Toluene	<0.20	<0.20					1X RDL
Ethylbenzene	<0.20	<0.20					1X RDL
Xylenes	<0.40	<0.40					1X RDL
Hexane	<5.0	<5.0					1X RDL
Methyl t-Butyl Ether (MTBE)	<0.20	<0.20					1X RDL
Petroleum Hydrocarbons							
F1 (C6 to C10 - BTEX)	<25	<25					2X RDL
F2 (C10 to C16)	<100	<100					2X RDL
F3 (C16 to C34)	<200	<200					2X RDL
F4 (C34 to C50)	<200	<200					2X RDL
Inorganic Parameters							
Lead	<0.50	<0.50					5X RDL

Analysis by Maxxam Analytics

All results in ppb (ug/L) unless otherwise indicated; <RDL means not detected at reporting detection limit (RDL); na means "not analysed"

RDL are shown for non-detected results; for RDL of reportable results, see the respective laboratory certificate of analysis (refer to Maxxam Job #)

Exceedances of alert limits are shown in **bold**

Appendix C –
Test Hole Logs and MOE Well Record

LEGEND
exp TEST HOLE LOGS

STANDARD INFORMATION (applies to all test holes on this project, unless otherwise noted in the legend or log)

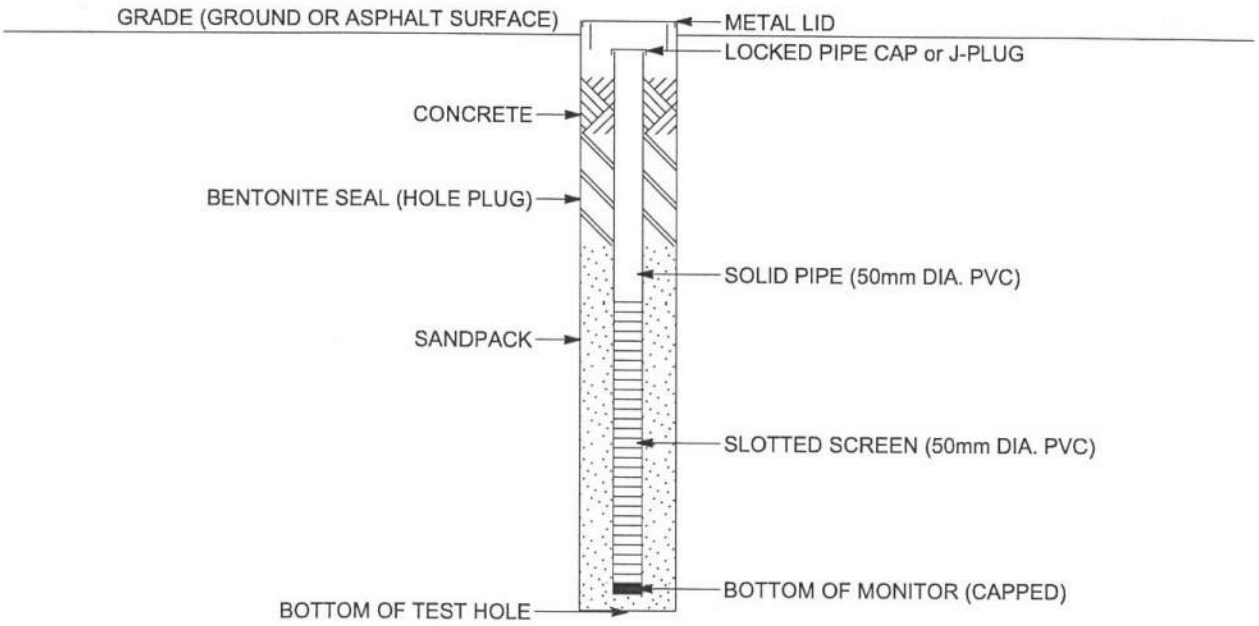
Project Site & Number:	Adjacent to 1660 Merivale Road, Ottawa, Ontario Job #11010
Drilling Contractor:	George Downing Estate Drilling Ltd.
Test Hole Diameter:	200 mm
Monitor Details:	Casing Type = Steel Flush Mounted Casing Screen Type = PVC 50 mm diameter with a 0.254mm slot Riser Type = PVC 50 mm diameter (see typical monitor legend for further details)
Dedicated Sampling Equipment:	Bailer
Site Benchmark:	Elevations are related to the north side of the manhole cover on the west side of the kiosk at 1660 Merrivale Road, assumed elevation = 100.00 metres (**exp**, 2013)
Other Notes:	The attached test hole logs are part of the complete report and are to be used only in conjunction with the report. The test holes were drilled using a CME 75 rotary hollow stem auger rig to the maximum depth of the investigation
Attached Graphical Legends:	Refer to Soil Symbol Identification Detail Refer to Typical Monitor Construction Detail

exp.

exp Energy Services Ltd.
220 Commerce Valley Drive West
Markham, Ontario, L3T 0A8
Telephone: (905) 695-3217
Fax: (289) 695-2411

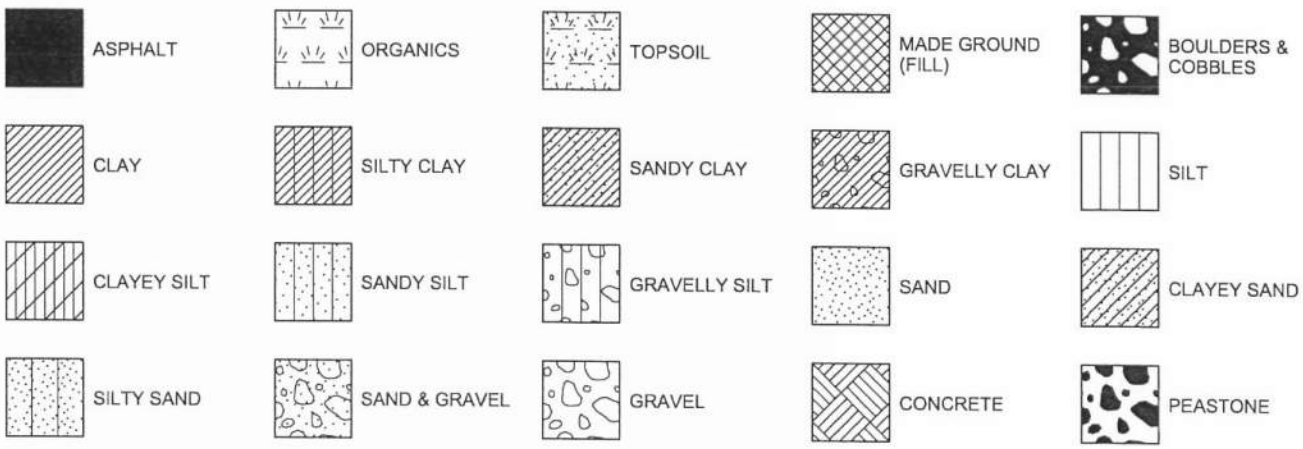
CONVENTIONS USED IN TEST HOLE LOGS

MONITOR INFORMATION



GEOLOGIC SYMBOLS

SOILS



ROCK



SAMPLE SYMBOLS



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Markham, Ontario, L3T 0A8
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Fax: (289) 695-2411

CONVENTIONS USED IN PARAMETER ANALYSIS

ABBREVIATIONS	PARAMETERS INCLUDED
F1-F4	Petroleum Hydrocarbon Fractions F1 to F4
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
BTEXH	Benzene, Toluene, Ethylbenzene, Xylenes, Hexane
VOC	Full Suite of Volatile Organic Compounds
CVOC	Chlorinated Volatile Organic Compounds (1,1-Dichloroethane, 1,2-Dichloroethane, 1,1-Dichloroethylene, cis-1,2-Dichloroethylene, trans-1,2-Dichloroethylene, Ethylene Dibromide, Methyl t-Butyl Ether, Tetrachloroethylene, 1,1,1-Trichloroethane, 1,1,2-Trichloroethane, Trichloroethylene, Vinyl Chloride)
CFC	Chlorofluorocarbons (Dichlorodifluoromethane (FREON 12), Trichlorofluoromethane (FREON 11))
1,2-DCA, EDB, MTBE	1,2-Dichloroethane, Ethylene Dibromide, Methyl t-Butyl Ether only
Selected VOC	Any variation of Volatile Organic Parameters not listed above
SVOC	Semivolatile Organic Compounds (Includes PAH, CP, ABN)
PAH	Full Suite of Polycyclic Aromatic Hydrocarbons
2 & 3 Ring PAH	2- & 3- Ring Polycyclic Aromatic Hydrocarbons (Acenaphthene, Acenaphthylene, Anthracene, Fluoranthane, Fluorene, 1-Methylnaphthalene, 2-Methylnaphthalene, Total Methylnaphthalene, Naphthalene, Phenanthrene)
Selected PAH	Any variation of Polycyclic Aromatic Hydrocarbons not listed above
CP	Chlorophenols
ABN	Acid-Base Neutral Compounds
Inorganics	Full Suite of Inorganics (may or may not include Chromium (VI), Hot Water Soluble Boron, Mercury and/or any other Inorganic parameter)
Pb	Lead only
Selected Inorganics	Any variation of Inorganic parameters not listed above
pH	Hydrogen Ion Concentration
OCP	Organochlorine Pesticides
PCB	Total Polychlorinated Biphenyls (includes Aroclor 1242, 1248, 1252, 1262)
1,4 - Dioxane	1,4 - Dioxane
D/F	Dioxins/Furans
SAR	Sodium Adsorption Ratio
EC	Conductivity
FOC	Fraction of Organic Carbon

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TEST HOLE # TH100

CLIENT Imperial Oil

PROJECT LOCATION Adjacent to 1660 Merivale Road, Ottawa, Ontario **PROJECT NUMBER** 11010

DATE STARTED 16-Sep-14 **COMPLETED** 19-Sep-14 **WEATHER** Overcast 7°C **GAS METER TYPE** Gastech 1238 ME

DRILLING CONTRACTOR George Downing Estate Drilling Ltd. **GROUND ELEV.** 101.52 m **TOP OF PIPE ELEV.** 101.40 m

DRILLING EQUIPMENT CME 75 Truckmount **DAYLIGHTING TO** 2.13 mbgs **MONITOR DIA** 0.05 m **TH DIA** 0.20 m

DRILLING METHOD Hollow Stem Auger **WATER LEVEL** 3.60 mbgs / Elev 97.92 m 06-Oct-14

FIELD STAFF DD **LOGGED BY** DY **CHECKED BY** TFP **NORTHING** 502 14 22 **EASTING** 44 28 84

BENCHMARK North side of manhole cover approximately 5 metres west of kiosk at 1660 Merivale Road, elevation = 100.00 metres

DEPTH (mbgs)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	ANALYSIS	GRAPHIC LOG	MATERIAL DESCRIPTION	◆ SOIL VAPOUR CONCENTRATION (ppmv) ○ (nm) ⊗ (is) 100 200 300 400	⊕ SOIL VAPOUR CONCENTRATION (%LEL) 20 40 60 80	WELL CONSTRUCTION Casing Type: Flushmount	ELEVATION (m)
						mbgs				
						ASPHALT				
						0.24				
	GB TH100-1					Brown SAND & GRAVEL, some cobbles, trace silt, moist, no staining, no odour	◆ nd			101
1										
	GB TH100-2			BTEXH, F1-F4, Pb, MTBE			◆ 25			
	GB TH100-3						◆ nd			100
2										
	RC					2.13				
						Grey fractured LIMESTONE, no staining, no odour				99
3										
										98
4										
										97
5						5.03				

TEST HOLE LOG - January 2014

ppmv = parts per million by volume; %LEL = % lower explosive limit; nd = not detected; is = insufficient sample for screening; nm = not measured; n/a = not applicable; mbgs = metres below ground surface; masl = metres above sea level

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TEST HOLE # TH101

CLIENT Imperial Oil

PROJECT LOCATION Adjacent to 1660 Merivale Road, Ottawa, Ontario **PROJECT NUMBER** 11010

DATE STARTED 16-Sep-14 **COMPLETED** 18-Sep-14 **WEATHER** Overcast 7°C **GAS METER TYPE** Gastech 1238 ME

DRILLING CONTRACTOR George Downing Estate Drilling Ltd. **GROUND ELEV.** 100.06 m **TOP OF PIPE ELEV.** 99.94 m

DRILLING EQUIPMENT CME 75 Truckmount **DAYLIGHTING TO** 2.07 mbgs **MONITOR DIA** 0.05 m **TH DIA** 0.20 m

DRILLING METHOD Hollow Stem Auger **WATER LEVEL** 3.02 mbgs / Elev 97.04 m 06-Oct-14

FIELD STAFF DD **LOGGED BY** DY **CHECKED BY** TFP **NORTHING** 502 13 63 **EASTING** 44 28 87

BENCHMARK North side of manhole cover approximately 5 metres west of kiosk at 1660 Merivale Road, elevation = 100.00 metres

DEPTH (mbgs)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	ANALYSIS	GRAPHIC LOG	MATERIAL DESCRIPTION	◆ SOIL VAPOUR CONCENTRATION (ppmv) ○ (nm) ⊗ (is) 100 200 300 400	⊕ SOIL VAPOUR CONCENTRATION (%LEL) 20 40 60 80	WELL CONSTRUCTION Casing Type: Flushmount	ELEVATION (m)
mbgs										
						ASPHALT				100
						0.30				
	GB TH101-1					Brown SAND & GRAVEL, trace silt, moist, no staining, no odour	◆ nd			
1										99
	GB TH101-2						◆ 25			
	GB TH101-3			BTEXH, F1-F4, Pb, MTBE			◆ 50			
2										98
	RC					2.07				
						Grey fractured LIMESTONE, wet, no staining, petroleum odour				
3										97
4										96
5						5.03				

TEST HOLE LOG - January 2014

ppmv = parts per million by volume; %LEL = % lower explosive limit; nd = not detected; is = insufficient sample for screening; nm = not measured; n/a = not applicable; mbgs = metres below ground surface; masl = metres above sea level

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Markham, Ontario, L3T 0A8
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Fax: (289) 695-2411

TEST HOLE # TH102

CLIENT Imperial Oil

PROJECT LOCATION Adjacent to 1660 Merivale Road, Ottawa, Ontario **PROJECT NUMBER** 11010

DATE STARTED 16-Sep-14 **COMPLETED** 18-Sep-14 **WEATHER** Overcast 7°C **GAS METER TYPE** Gastech 1238 ME

DRILLING CONTRACTOR George Downing Estate Drilling Ltd. **GROUND ELEV.** 100.69 m **TOP OF PIPE ELEV.** 100.59 m

DRILLING EQUIPMENT CME 75 Truckmount **DAYLIGHTING TO** 1.98 mbgs **MONITOR DIA** 0.05 m **TH DIA** 0.20 m

DRILLING METHOD Hollow Stem Auger **WATER LEVEL** 3.15 mbgs / Elev 97.54 m 06-Oct-14

FIELD STAFF DD **LOGGED BY** DY **CHECKED BY** TFP **NORTHING** 502 13 91 **EASTING** 44 28 76

BENCHMARK North side of manhole cover approximately 5 metres west of kiosk at 1660 Merivale Road, elevation = 100.00 metres

DEPTH (mbgs)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	ANALYSIS	GRAPHIC LOG	MATERIAL DESCRIPTION	◆ SOIL VAPOUR CONCENTRATION (ppmv) ○ (nm) ⊗ (is) 100 200 300 400	⊕ SOIL VAPOUR CONCENTRATION (%LEL) 20 40 60 80	WELL CONSTRUCTION Casing Type: Flushmount	ELEVATION (m)
mbgs										
						ASPHALT				
						0.30				
	GB TH102-1					Brown SAND & GRAVEL, some cobbles, trace silt, moist, no staining, no odour	◆ nd			100
1										
	GB TH102-2						◆ nd			
	GB TH102-3			BTEXH, F1-F4, Pb, MTBE			◆ 50			99
2	RC					1.98				
						Grey fractured LIMESTONE, no staining, no odour				98
3										
										97
4										
										96
5						5.03				

TEST HOLE LOG - January 2014

ppmv = parts per million by volume; %LEL = % lower explosive limit; nd = not detected; is = insufficient sample for screening; nm = not measured; n/a = not applicable; mbgs = metres below ground surface; masl = metres above sea level

Ontario Ministry of the Environment

Well Record for Well Cluster - Part 1 of 3

(Only for Multiple Test Holes or Dewatering Wells)

Regulation 903 Ontario Water Resources Act

Page 1 of 1

All measurements recorded in: [X] Metric [ ] Imperial

Follow instructions on the front and back of this form. Print or Type

Well Tag No. of Deepest Well: *(Print Well Tag No.)* A156973

Well # on Drawing of Deepest Well:

Well Cluster Location Information

Address of Well Location (Street Number(s)/Name(s), RR, if available)	Lot(s)	Concession(s)	Geographic Township	County/District/Upper Tier Municipality
1640 MERIVALE ROAD				

City, Town, Village or Hamlet	Province	GPS Unit Make	Model	Unit Mode of Operation
OTTAWA	Ontario	GARMIN	ETREX	[ ] Undifferentiated [X] Averaged [ ] Differentiated, specify:

Mandatory Attachments/Additional Information

[X] Land Owner Consent Form must be attached

[X] Detailed Drawing of All Well Locations must be attached

I, the person constructing the well, will promptly submit to the Director, on request, any additional information in my custody or control related to any well in the well cluster that I have constructed

Signature of Technician/Contractor — Date (yyyy/mm/dd): 2014/10/31

Well Details

Well # on Drawing	UTM Coordinates Zone	Easting	Northing	Hole Depth (m/ft)	Hole Diameter (cm/in)	Method of Construction	Casing Material; Diameter (cm/in)	Casing (m/ft) From	Casing (m/ft) To	Screen Interval (m/ft) From	Screen Interval (m/ft) To	Annular Space Material (m/ft) From	Annular Space Material (m/ft) To	Annular Space Material Material	Overburden/Bedrock or Abandonment Filing Material Intervals (m/ft)	Static Water Level (m/ft)	Date of Completion (yyyy/mm/dd)
1	18	442887	5021363	5.18	10 in	DIAMOND (HQ)	5.08	0	2.28	2.28	5.18	0	1.9	BENTONITE	FILL, SAND & GRAVEL, BED ROCK		2014/09/17
2	18	442876	5021391	5.18	10 in	DIAMOND (HQ)	5.08	0	2.28	2.28	5.18	0	1.9	BENTONITE	" " "		2014/09/17
3	18	442884	5021422	5.18	10 in	DIAMOND (HQ)	5.08	0	2.28	2.28	5.18	0	1.9	BENTONITE	" " "		2014/09/18

Well Contractor and Well Technician Information

Business Name of Well Contractor	Business Address (Street Number/Name, RR)	Municipality	Province
GEORGE DOWNING ESTATE (DOWNING DRILLING)	410 RUE PRINCIPALE	GRENVILLE-SUR-LA-ROUGE	QC

Postal Code	Bus. Telephone No.	Well Contractor's Licence No.	Business E-mail Address
J0V 1B0	(819)242-6469	1844	downing@tnk.qc.net

Name of Well Technician (First Name, Last Name)	Well Technician's Licence No.	Signature of Well Technician	Date Submitted (yyyy/mm/dd)
BRUCE DOWNING	2173		2014/10/31

Ministry's Copy

Date First Well in Cluster Constructed or Abandoned (yyyy/mm/dd)	Date Last Well in Cluster Completed (yyyy/mm/dd)
2014/09/17	2014/09/17

Well Abandonment

Person Abandoning the Well

Name (Print or Type) — See instruction 11 on the back of this form: n/a

Ministry Use Only

Date Received (yyyy/mm/dd):

Audit No: C22637

Comments:

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Ontario Ministry of the Environment

Well Record for Well Cluster - Part 2 of 3
Land Owner Consent

This form is to be completed by the person who constructs or abandons test holes or dewatering wells that form all or part of a well cluster. If this form is being used to report any well abandonment, these wells must have been previously reported as part of a single well cluster.

Note: For well cluster records, only the owners of the land on which the wells are situated are to give written consent. If the well purchaser (e.g. a consultant who hires the driller) is not the owner of the land, then the well purchaser cannot sign the consent form.

By signing this form, land owners are providing consent to use one well record to report a well cluster of test holes or dewatering wells in accordance with section 16.4 of Regulation 903 made under the *Ontario Water Resources Act*.

This completed **Well Record for Well Cluster Part 2 - Land Owner Consent** must be attached to Parts 1 and 3.

* Please PRINT if completing by hand.

Well Tag Number: # A156973

"Well Record for Well Cluster" Audit Number: # C22637

Well # on Detailed Drawing	Property Location Description	Land Owner's Name	Signature of Land Owner	Date Signed (yyyy/mm/dd)
TH-101 TH-102 TH-100	1460 MERIVALE ROAD OTTAWA, ON	IMPERIAL OIL LTD 1 DUNCAN MILL ROAD TORONTO ON M3B 1Z2	FOR IMPERIAL OIL.	2004/11/03

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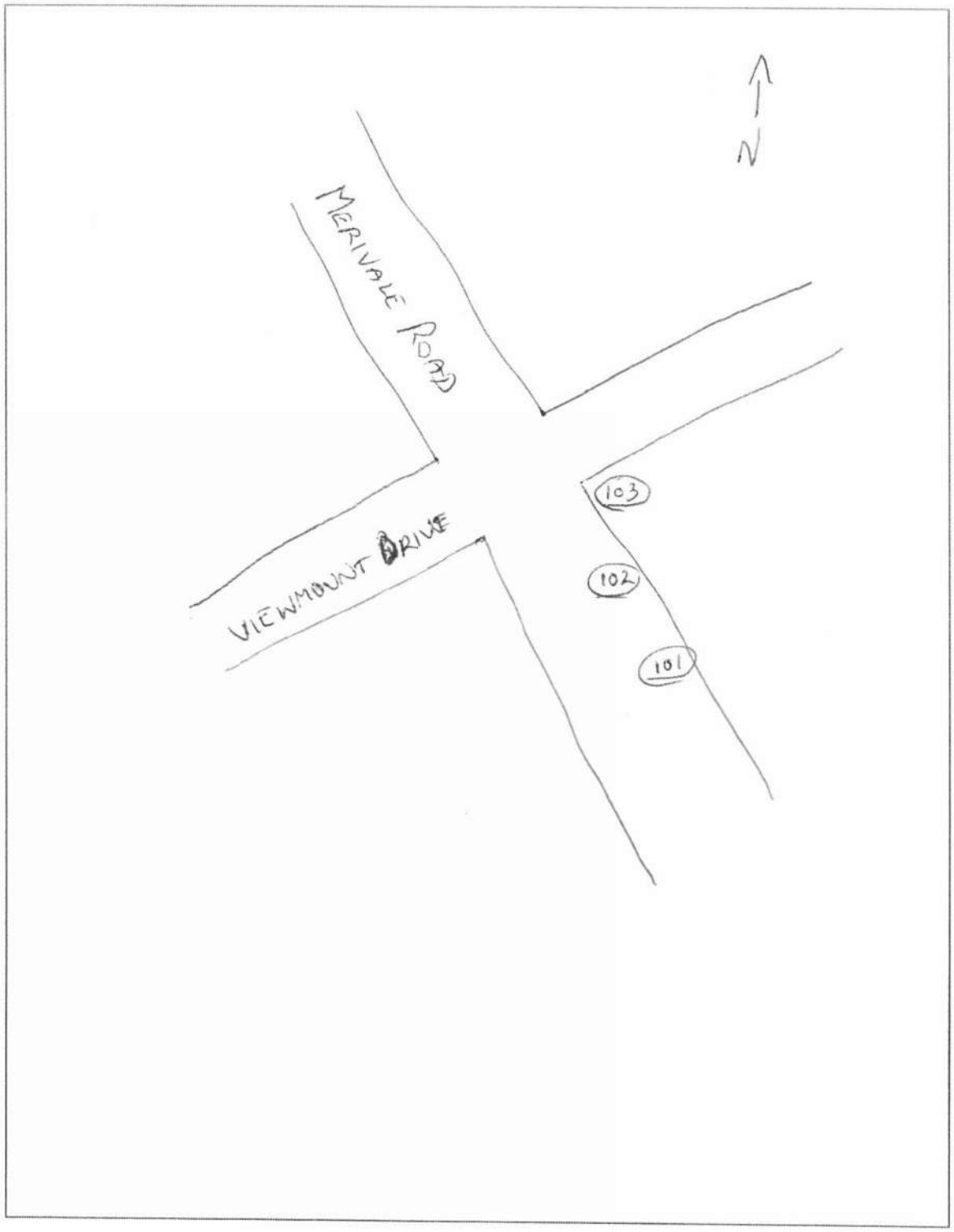
Ontario Ministry of the Environment

Well Record for Well Cluster - Part 3 of 3
Detailed Drawing of All Well Locations

Note: This **Well Record for Well Cluster Part 3 - Detailed Drawing of all Well Locations,** must be attached to Parts 1 and 2. The drawing must include all property boundaries, an arrow indicating the North direction, all named roads and sufficient measurements to locate all wells in the cluster in relation to fixed points. The drawing must show the location of each well and each well must be numbered on the drawing to match number used for that well on the **Well Record for Well Cluster Parts 1 and 2.** The well with the well tag must be clearly identified on the Drawing.
UTM coordinates should appear beside each well, if space permits. Additional comments on wells can be included on the drawing.

Well Tag Number: # A156973

"Well Record for Well Cluster" Form Audit Number: # C22637



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Ministry's Copy

Disponible en français

Appendix D –
Laboratory Certificates of Analysis

Attached are copies of the original Certificates of Analysis provided by the laboratory. The data contained in these analyses is to be read only in conjunction with the report to which it is attached. For interpretation of the chemical data, see the attached text.

Since the laboratory data contains scientific terms and references, only trained persons familiar with sampling and laboratory methods should attempt to interpret the data contained in the Certificates of Analysis.

Maxxam
A Bureau Veritas Group Company

Success Through Science®

Task Order#: 4410180847
Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010
Your C.O.C. #: 482475-03-01

Attention:Tanya Fernandes-Peters

exp Energy Services Ltd.
220 Commerce Valley Dr. W
Suite 500
Markham, ON
L3T 0A8

Report Date: 2014/09/26
Report #: R3169297
Version: 1

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B4H2865
Received: 2014/09/18, 15:20

Sample Matrix: Soil
Samples Received: 4

Analyses	Quantity	Laboratory Method	Primary Reference
Petroleum Hydro. CCME F1 & BTEX in Soil	4	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Soil	4	CAM SOP-00316	CCME CWS
Acid Extractable Metals Analysis by ICP	4	CAM SOP-00408	EPA 6010C m
Moisture	4	CAM SOP-00445	R.Carter,1993
Volatile Organic Compounds in Soil	4	CAM SOP-00226	EPA 8260 m

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act.

The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following the 'Alberta Environment Draft Addenda to the CWS-PHC, Appendix 6, Validation of Alternate Methods'. Documentation is available upon request. Maxxam has made the following improvements to the CWS-PHC reference benchmark method: (i) Headspace for F1; and, (ii) Mechanical extraction for F2-F4. Note: F4G cannot be added to the C6 to C50 hydrocarbons.

Maxxam Analytics is accredited by SCC (Lab ID 97) for all specific parameters as required by GUCSO and O.Reg 153/04. Maxxam Analytics is limited in liability to the actual cost of analysis unless otherwise agreed in writing. There is no other warranty expressed or implied. Samples will be retained at Maxxam Analytics for three weeks from receipt of data or as per contract.

All data is in statistical control and has met all QC and method performance criteria unless otherwise flagged. All samples were analysed within hold time unless otherwise flagged. All soil samples for BTEX analysis were methanol extracted within 24 hours unless otherwise flagged.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Task Order#: 4410180847
Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010
Your C.O.C. #: 482475-03-01

Attention:Tanya Fernandes-Peters

exp Energy Services Ltd.
220 Commerce Valley Dr. W
Suite 500
Markham, ON
L3T 0A8

Report Date: 2014/09/26
Report #: R3169297
Version: 1

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B4H2865
Received: 2014/09/18, 15:20

Encryption Key

Patricia Legette
26 Sep 2014 09:44:00 -04:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Patricia Legette, Project Manager
Email: PLegette@maxxam.ca
Phone# (905)817-5799

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B4H2865
Report Date: 2014/09/26

exp Energy Services Ltd.
Task Order#: 4410180847, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

LEAD IN SOIL (SOIL)

Maxxam ID		XP9537	XP9538	XP9539	XP9540		
Sampling Date		2014/09/17 01:00	2014/09/17 01:30	2014/09/17 02:00	2014/09/17 01:30		
COC Number		482475-03-01	482475-03-01	482475-03-01	482475-03-01		
	Units	**TH100-2**	**TH101-3**	**TH102-3**	**DUP1**	**RDL**	**QC Batch**
Acid Extractable Lead (Pb)	ug/g	7.8	5.5	<5.0	6.1	5.0	3758260

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B4H2865
Report Date: 2014/09/26

exp Energy Services Ltd.
Task Order#: 4410180847, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

O.REG 153 PHCS IN SOIL (SOIL)

Maxxam ID		XP9537	XP9538	XP9539	XP9540		
Sampling Date		2014/09/17 01:00	2014/09/17 01:30	2014/09/17 02:00	2014/09/17 01:30		
COC Number		482475-03-01	482475-03-01	482475-03-01	482475-03-01		
	Units	**TH100-2**	**TH101-3**	**TH102-3**	**DUP1**	**RDL**	**QC Batch**
Moisture	%	7.9	20	16	20	1.0	3757520
Benzene	ug/g	<0.020	<0.020	<0.020	<0.020	0.020	3759916
Toluene	ug/g	<0.020	<0.020	<0.020	0.024	0.020	3759916
Ethylbenzene	ug/g	<0.020	<0.020	<0.020	<0.020	0.020	3759916
o-Xylene	ug/g	<0.020	<0.020	<0.020	<0.020	0.020	3759916
p+m-Xylene	ug/g	<0.040	<0.040	<0.040	<0.040	0.040	3759916
Total Xylenes	ug/g	<0.040	<0.040	<0.040	<0.040	0.040	3759916
F1 (C6-C10)	ug/g	<10	<10	<10	<10	10	3759916
F1 (C6-C10) - BTEX	ug/g	<10	<10	<10	<10	10	3759916
F2 (C10-C16 Hydrocarbons)	ug/g	<10	<10	<10	<10	10	3759178
F3 (C16-C34 Hydrocarbons)	ug/g	<50	<50	<50	<50	50	3759178
F4 (C34-C50 Hydrocarbons)	ug/g	<50	<50	<50	<50	50	3759178
Reached Baseline at C50	ug/g	Yes	Yes	Yes	Yes		3759178
Extraction Surrogate Recovery (%)							
D10-Ethylbenzene	%	84	96	95	94		3759916
o-Terphenyl	%	86	86	81	81		3759178
Instrument Surrogate Recovery (%)							
1,4-Difluorobenzene	%	98	100	100	99		3759916
4-Bromofluorobenzene	%	100	99	100	101		3759916
D4-1,2-Dichloroethane	%	92	94	93	92		3759916

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B4H2865
Report Date: 2014/09/26

exp Energy Services Ltd.
Task Order#: 4410180847, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

VOLATILE ORGANICS BY GC/MS (SOIL)

Maxxam ID		XP9537	XP9537	XP9538	XP9539	XP9540		
Sampling Date		2014/09/17 01:00	2014/09/17 01:00	2014/09/17 01:30	2014/09/17 02:00	2014/09/17 01:30		
COC Number		482475-03-01	482475-03-01	482475-03-01	482475-03-01	482475-03-01		
	Units	**TH100-2**	**TH100-2 Lab-Dup**	**TH101-3**	**TH102-3**	**DUP1**	**RDL**	**QC Batch**
Hexane	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	3754275
Methyl t-butyl ether (MTBE)	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	3754275
Extraction Surrogate Recovery (%)								
D10-o-Xylene	%	109	109	111	110	111		3754275
Instrument Surrogate Recovery (%)								
4-Bromofluorobenzene	%	95	94	95	93	94		3754275
D4-1,2-Dichloroethane	%	100	102	100	100	100		3754275
D8-Toluene	%	102	102	103	103	102		3754275

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B4H2865
Report Date: 2014/09/26

exp Energy Services Ltd.
Task Order#: 4410180847, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

TEST SUMMARY

Maxxam ID: XP9537
Sample ID: TH100-2
Matrix: Soil

Collected: 2014/09/17
Relinquished: 2014/09/18
Received: 2014/09/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	3759916	2014/09/19	2014/09/24	Abdi Mohamud
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	3759178	2014/09/23	2014/09/24	Jolanta Kawzowicz
Acid Extractable Metals Analysis by ICP	ICP	3758260	2014/09/23	2014/09/23	Azita Fazaeli
Moisture	BAL	3757520	N/A	2014/09/22	Valentina Kaftani
Volatile Organic Compounds in Soil	P&T/MS	3754275	2014/09/19	2014/09/22	Karen Huynh

Maxxam ID: XP9537 Dup
Sample ID: TH100-2
Matrix: Soil

Collected: 2014/09/17
Relinquished: 2014/09/18
Received: 2014/09/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Volatile Organic Compounds in Soil	P&T/MS	3754275	2014/09/19	2014/09/22	Karen Huynh

Maxxam ID: XP9538
Sample ID: TH101-3
Matrix: Soil

Collected: 2014/09/17
Relinquished: 2014/09/18
Received: 2014/09/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	3759916	2014/09/19	2014/09/24	Abdi Mohamud
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	3759178	2014/09/23	2014/09/24	Jolanta Kawzowicz
Acid Extractable Metals Analysis by ICP	ICP	3758260	2014/09/23	2014/09/23	Azita Fazaeli
Moisture	BAL	3757520	N/A	2014/09/22	Valentina Kaftani
Volatile Organic Compounds in Soil	P&T/MS	3754275	2014/09/19	2014/09/22	Karen Huynh

Maxxam ID: XP9539
Sample ID: TH102-3
Matrix: Soil

Collected: 2014/09/17
Relinquished: 2014/09/18
Received: 2014/09/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	3759916	2014/09/19	2014/09/24	Abdi Mohamud
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	3759178	2014/09/23	2014/09/24	Jolanta Kawzowicz
Acid Extractable Metals Analysis by ICP	ICP	3758260	2014/09/23	2014/09/23	Azita Fazaeli
Moisture	BAL	3757520	N/A	2014/09/22	Valentina Kaftani
Volatile Organic Compounds in Soil	P&T/MS	3754275	2014/09/19	2014/09/22	Karen Huynh

Maxxam ID: XP9540
Sample ID: DUP1
Matrix: Soil

Collected: 2014/09/17
Relinquished: 2014/09/18
Received: 2014/09/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	3759916	2014/09/19	2014/09/24	Abdi Mohamud
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	3759178	2014/09/23	2014/09/24	Jolanta Kawzowicz
Acid Extractable Metals Analysis by ICP	ICP	3758260	2014/09/23	2014/09/23	Azita Fazaeli
Moisture	BAL	3757520	N/A	2014/09/22	Valentina Kaftani

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Maxxam Job #: B4H2865
Report Date: 2014/09/26

exp Energy Services Ltd.
Task Order#: 4410180847, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

TEST SUMMARY

Maxxam ID: XP9540
Sample ID: DUP1
Matrix: Soil

Collected: 2014/09/17
Relinquished: 2014/09/18
Received: 2014/09/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Volatile Organic Compounds in Soil	P&T/MS	3754275	2014/09/19	2014/09/22	Karen Huynh

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Maxxam Job #: B4H2865
Report Date: 2014/09/26

exp Energy Services Ltd.
Task Order#: 4410180847, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	2.7°C

Results relate only to the items tested.

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Maxxam Job #: B4H2865
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exp Energy Services Ltd.
Task Order#: 4410180847, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
3754275	KH1	Method Blank	4-Bromofluorobenzene	2014/09/22		94	%	60 - 140
			D10-o-Xylene	2014/09/22		102	%	60 - 130
			D4-1,2-Dichloroethane	2014/09/22		101	%	60 - 140
			D8-Toluene	2014/09/22		102	%	60 - 140
			Hexane	2014/09/22	<0.050		ug/g	
			Methyl t-butyl ether (MTBE)	2014/09/22	<0.050		ug/g	
3758260	AFZ	Method Blank	Acid Extractable Lead (Pb)	2014/09/23	<5.0		ug/g	
3759178	JKA	Method Blank	o-Terphenyl	2014/09/24		90	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2014/09/24	<10		ug/g	
			F3 (C16-C34 Hydrocarbons)	2014/09/24	<50		ug/g	
			F4 (C34-C50 Hydrocarbons)	2014/09/24	<50		ug/g	
3759916	ABD	Method Blank	1,4-Difluorobenzene	2014/09/24		100	%	60 - 140
			4-Bromofluorobenzene	2014/09/24		103	%	60 - 140
			D10-Ethylbenzene	2014/09/24		94	%	60 - 140
			D4-1,2-Dichloroethane	2014/09/24		91	%	60 - 140
			Benzene	2014/09/24	<0.020		ug/g	
			Toluene	2014/09/24	<0.020		ug/g	
			Ethylbenzene	2014/09/24	<0.020		ug/g	
			o-Xylene	2014/09/24	<0.020		ug/g	
			p+m-Xylene	2014/09/24	<0.040		ug/g	
			Total Xylenes	2014/09/24	<0.040		ug/g	
			F1 (C6-C10)	2014/09/24	<10		ug/g	
			F1 (C6-C10) - BTEX	2014/09/24	<10		ug/g	
3754275	KH1	RPD [XP9537-04]	Hexane	2014/09/22	NC		%	50
			Methyl t-butyl ether (MTBE)	2014/09/22	NC		%	50
3754275	KH1	Matrix Spike [XP9537-04]	4-Bromofluorobenzene	2014/09/22		101	%	60 - 140
			D10-o-Xylene	2014/09/22		104	%	60 - 130
			D4-1,2-Dichloroethane	2014/09/22		100	%	60 - 140
			D8-Toluene	2014/09/22		99	%	60 - 140
			Hexane	2014/09/22		100	%	60 - 140
			Methyl t-butyl ether (MTBE)	2014/09/22		97	%	60 - 140
3754275	KH1	LCS	4-Bromofluorobenzene	2014/09/22		102	%	60 - 140
			D10-o-Xylene	2014/09/22		95	%	60 - 130
			D4-1,2-Dichloroethane	2014/09/22		101	%	60 - 140
			D8-Toluene	2014/09/22		100	%	60 - 140
			Hexane	2014/09/22		100	%	60 - 130
			Methyl t-butyl ether (MTBE)	2014/09/22		100	%	60 - 130
3758260	AFZ	LCS	Acid Extractable Lead (Pb)	2014/09/23		102	%	80 - 120
3759178	JKA	LCS	o-Terphenyl	2014/09/24		88	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2014/09/24		85	%	80 - 120
			F3 (C16-C34 Hydrocarbons)	2014/09/24		86	%	80 - 120
			F4 (C34-C50 Hydrocarbons)	2014/09/24		89	%	80 - 120
3759916	ABD	LCS	1,4-Difluorobenzene	2014/09/24		98	%	60 - 140
			4-Bromofluorobenzene	2014/09/24		106	%	60 - 140
			D10-Ethylbenzene	2014/09/24		92	%	60 - 140
			D4-1,2-Dichloroethane	2014/09/24		92	%	60 - 140
			Benzene	2014/09/24		85	%	60 - 140
			Toluene	2014/09/24		88	%	60 - 140
			Ethylbenzene	2014/09/24		99	%	60 - 140
			o-Xylene	2014/09/24		99	%	60 - 140
			p+m-Xylene	2014/09/24		94	%	60 - 140

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Maxxam Job #: B4H2865
Report Date: 2014/09/26

exp Energy Services Ltd.
Task Order#: 4410180847, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			F1 (C6-C10)	2014/09/24		88	%	80 - 120

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

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Maxxam Job #: B4H2865
Report Date: 2014/09/26

exp Energy Services Ltd.
Task Order#: 4410180847, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam

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EXXONMOBIL/IMPERIAL OIL - MAXXAM
CHAIN-OF-CUSTODY RECORD
ANALYSIS REQUESTED

Page 1 of 1

C of C # 482475-03-01

482475

INVOICE INFORMATION	REPORT INFORMATION
Company Name: Imperial Oil, a partnership of Imperial Oil Limited and McColl Frontenac Petrole	Company Name: exp Energy Services Ltd.
Contact Name: ~~Kelly Gorman~~ Jessica Snelgrove	Contact Name: Tanya Fernandes-Peters
Address: 1 Duncan Mill Road North York ON M3B 1Z2	Address: 220 Commerce Valley Dr W Suite 500 Markham ON L3T 0A8
Email: ~~kelly.gorman@exxonmo~~	Email: tanya.fernandes@exp.com;
Phone: (416) 442-~~5100~~ 5140	Phone: (905) 695-3217 x3611
Sampler Name (Print): DARREN DOHERTY	Consultant Project #: 11010

	FIELD SAMPLE ID	MATRIX: GROUNDWATER	MATRIX: SURFACE WATER	MATRIX: SOIL	MATRIX: OTHER	# CONTAINERS	SAMPLING: DATE (YYYY/MM/DD)	SAMPLING: TIME (24 HR)	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	F1 / BTEX + Hexane	F2 - F4	LEAD	MTBE + HEXANE
1	TH100-2			X		6	2014/09/17	0100			X	X	X	X
2	TH101-3			X		6		0130			X	X	X	X
3	TH102-3			X		6		0200			X	X	X	X
4	DUP1			X		6		0130			X	X	X	X
5														
6														
7														
8														
9														
10														

IOL SITE LOCATION: 1660 MERIVALE ROAD, OTTAWA, ON

IOL SITE # (if applicable): N/A

IOL PROJECT # (if applicable): MZ.00277

MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM: 4410180847-10

REGULATORY CRITERIA / DETECTION LIMITS:
- [X] REG 153 Table 3 [ ] 2004 [X] 2011 [ ] RSC
  (Please indicate which Reg. version and if RSC required)
- [ ] ODWS [ ] PWQO
- [ ] Other

SPECIAL INSTRUCTIONS:
- Voids are present in jars due to nature of material
- Stones may be present in vials

ICE - YES

JARS USED AND NOT SUBMITTED Enter N/A for Water: 0

TURNAROUND TIME
- Standard (5 days) [X]
- Rush (3 days) [ ]
- (2 days) [ ]
- (1 day) [ ]
- (same day) [ ]

Date Required

COOLER ID: 1	YES	NO	TEMP	1	2	3
CUSTODY SEAL						
PRESENT	✓		2	3	3	
INTACT	✓					

COOLER ID:	YES	NO	TEMP	1	2	3
CUSTODY SEAL						
PRESENT						
INTACT						

COOLER ID:	YES	NO	TEMP	1	2	3
CUSTODY SEAL						
PRESENT						
INTACT						

LAB USE ONLY
MAXXAM JOB #: B4H2865
SAMPLES

	RELINQUISHED BY:	DATE:	TIME (24 HR)	RECEIVED BY:	DATE:	TIME (24 HR)
1.	DARREN DOHERTY	2014/09/17	0300	1.		
2.	Great Pettypiece	2014/09/18	1030	2. Great Pettypiece	2014/09/18	0930
3.				3. FANG WANG	2014/09/18	15:20

LABELED BY: ABH
VERIFIED BY: CGZ

COC - 1012 (2013) IOL - ON White: Maxxam Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: **exp** Energy Services Ltd.

Sampling Date: September 17, 2014

Location: Adjacent to 1660 Merivale Road, Ottawa, Ontario

Laboratory : Maxxam Analytics

Consultant Project Number: 11010

Sample Submission Number: B4H2865

Are All Laboratory QC Samples Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC met acceptance criteria
Extraction Surrogate Recovery	X			
Method Blank Concentration	X			
Matrix Duplicate RPD	X			
Matrix Spike Recovery	X			
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	All field QC samples are within alert limits
Trip Blank Concentration			X	
Field Duplicate RPD	X			

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 48 hours (Yes/No)?:	Yes
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Was a Data Quality Waiver (DQW) issued (Yes/No)?: No

Date Issued: NA

Date of Response: NA

Is data considered to be reliable (Yes/No)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Melanie Thomson

Data Reviewed by (Signature): M. Thomson

Date: October 3, 2014

Maxxam
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Success Through Science®

Task Order#: 4410180847
Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010
Your C.O.C. #: 482475-01-01

Attention:Tanya Fernandes-Peters

exp Energy Services Ltd.
220 Commerce Valley Dr. W
Suite 500
Markham, ON
L3T 0A8

Report Date: 2014/09/26
Report #: R3169295
Version: 1

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B4H2879
Received: 2014/09/18, 15:20

Sample Matrix: Soil
Samples Received: 1

Analyses	Quantity	Laboratory Method	Primary Reference
Petroleum Hydro. CCME F1 & BTEX in Soil	1	CAM SOP-00315	CCME PHC-CWS m
Volatile Organic Compounds in Soil	1	CAM SOP-00226	EPA 8260 m

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act.

The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following the 'Alberta Environment Draft Addenda to the CWS-PHC, Appendix 6, Validation of Alternate Methods'. Documentation is available upon request. Maxxam has made the following improvements to the CWS-PHC reference benchmark method: (i) Headspace for F1; and, (ii) Mechanical extraction for F2-F4. Note: F4G cannot be added to the C6 to C50 hydrocarbons.

Maxxam Analytics is accredited by SCC (Lab ID 97) for all specific parameters as required by GUCSO and O.Reg 153/04. Maxxam Analytics is limited in liability to the actual cost of analysis unless otherwise agreed in writing. There is no other warranty expressed or implied. Samples will be retained at Maxxam Analytics for three weeks from receipt of data or as per contract.

All data is in statistical control and has met all QC and method performance criteria unless otherwise flagged. All samples were analysed within hold time unless otherwise flagged. All soil samples for BTEX analysis were methanol extracted within 24 hours unless otherwise flagged.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Patricia Legette
26 Sep 2014 09:41:02 -04:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Patricia Legette, Project Manager
Email: PLegette@maxxam.ca
Phone# (905)817-5799

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B4H2879
Report Date: 2014/09/26

exp Energy Services Ltd.
Task Order#: 4410180847, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

VOLATILE ORGANICS BY GC/MS (SOIL)

Maxxam ID		XP9596		
Sampling Date		2014/09/17 03:00		
COC Number		482475-01-01		
	Units	**TRIP BLANK**	**RDL**	**QC Batch**
Hexane	ug/g	<0.050	0.050	3754275
Methyl t-butyl ether (MTBE)	ug/g	<0.050	0.050	3754275
Extraction Surrogate Recovery (%)				
D10-o-Xylene	%	106		3754275
Instrument Surrogate Recovery (%)				
4-Bromofluorobenzene	%	95		3754275
D4-1,2-Dichloroethane	%	100		3754275
D8-Toluene	%	102		3754275

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B4H2879
Report Date: 2014/09/26

exp Energy Services Ltd.
Task Order#: 4410180847, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		XP9596		
Sampling Date		2014/09/17 03:00		
COC Number		482475-01-01		
	Units	**TRIP BLANK**	**RDL**	**QC Batch**
Benzene	ug/g	<0.020	0.020	3759916
Toluene	ug/g	<0.020	0.020	3759916
Ethylbenzene	ug/g	<0.020	0.020	3759916
o-Xylene	ug/g	<0.020	0.020	3759916
p+m-Xylene	ug/g	<0.040	0.040	3759916
Total Xylenes	ug/g	<0.040	0.040	3759916
F1 (C6-C10)	ug/g	<10	10	3759916
F1 (C6-C10) - BTEX	ug/g	<10	10	3759916
Extraction Surrogate Recovery (%)				
D10-Ethylbenzene	%	87		3759916
Instrument Surrogate Recovery (%)				
1,4-Difluorobenzene	%	100		3759916
4-Bromofluorobenzene	%	100		3759916
D4-1,2-Dichloroethane	%	97		3759916

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B4H2879
Report Date: 2014/09/26

exp Energy Services Ltd.
Task Order#: 4410180847, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

TEST SUMMARY

Maxxam ID: XP9596
Sample ID: TRIP BLANK
Matrix: Soil

Collected: 2014/09/17
Relinquished: 2014/09/18
Received: 2014/09/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	3759916	2014/09/19	2014/09/24	Abdi Mohamud
Volatile Organic Compounds in Soil	P&T/MS	3754275	2014/09/19	2014/09/22	Karen Huynh

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Maxxam Job #: B4H2879
Report Date: 2014/09/26

exp Energy Services Ltd.
Task Order#: 4410180847, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	2.7°C

Results relate only to the items tested.

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Maxxam Job #: B4H2879
Report Date: 2014/09/26

exp Energy Services Ltd.
Task Order#: 4410180847, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
3754275	KH1	Method Blank	4-Bromofluorobenzene	2014/09/22		94	%	60 - 140
			D10-o-Xylene	2014/09/22		102	%	60 - 130
			D4-1,2-Dichloroethane	2014/09/22		101	%	60 - 140
			D8-Toluene	2014/09/22		102	%	60 - 140
			Hexane	2014/09/22	<0.050		ug/g	
			Methyl t-butyl ether (MTBE)	2014/09/22	<0.050		ug/g	
3759916	ABD	Method Blank	1,4-Difluorobenzene	2014/09/24		100	%	60 - 140
			4-Bromofluorobenzene	2014/09/24		103	%	60 - 140
			D10-Ethylbenzene	2014/09/24		94	%	60 - 140
			D4-1,2-Dichloroethane	2014/09/24		91	%	60 - 140
			Benzene	2014/09/24	<0.020		ug/g	
			Toluene	2014/09/24	<0.020		ug/g	
			Ethylbenzene	2014/09/24	<0.020		ug/g	
			o-Xylene	2014/09/24	<0.020		ug/g	
			p+m-Xylene	2014/09/24	<0.040		ug/g	
			Total Xylenes	2014/09/24	<0.040		ug/g	
			F1 (C6-C10)	2014/09/24	<10		ug/g	
			F1 (C6-C10) - BTEX	2014/09/24	<10		ug/g	
3754275	KH1	LCS	4-Bromofluorobenzene	2014/09/22		102	%	60 - 140
			D10-o-Xylene	2014/09/22		95	%	60 - 130
			D4-1,2-Dichloroethane	2014/09/22		101	%	60 - 140
			D8-Toluene	2014/09/22		100	%	60 - 140
			Hexane	2014/09/22		100	%	60 - 130
			Methyl t-butyl ether (MTBE)	2014/09/22		100	%	60 - 130
3759916	ABD	LCS	1,4-Difluorobenzene	2014/09/24		98	%	60 - 140
			4-Bromofluorobenzene	2014/09/24		106	%	60 - 140
			D10-Ethylbenzene	2014/09/24		92	%	60 - 140
			D4-1,2-Dichloroethane	2014/09/24		92	%	60 - 140
			Benzene	2014/09/24		85	%	60 - 140
			Toluene	2014/09/24		88	%	60 - 140
			Ethylbenzene	2014/09/24		99	%	60 - 140
			o-Xylene	2014/09/24		99	%	60 - 140
			p+m-Xylene	2014/09/24		94	%	60 - 140
			F1 (C6-C10)	2014/09/24		88	%	80 - 120

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

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Maxxam Job #: B4H2879
Report Date: 2014/09/26

exp Energy Services Ltd.
Task Order#: 4410180847, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam

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Toll Free: 800-563-6266

EXXONMOBIL/IMPERIAL OIL - MAXXAM CHAIN-OF-CUSTODY RECORD

ANALYSIS REQUESTED

Page 1 of 1

C of C # 482475-01-01

482475

INVOICE INFORMATION	REPORT INFORMATION
Company Name:Imperial Oil, a partnership of Imperial Oil Limited and McColl Frontenac Petrole	Company Name:exp Energy Services Ltd.
Contact Name: Jessica Snelgrove	Contact Name: Tanya Fernandes-Peters
Address: 1 Duncan Mill Road North York ON M3B 1Z2	Address: 220 Commerce Valley Dr. W Suite 500 Markham ON L3T 0A8
Email:	Email: tanya.fernandes@exp.com
Phone: (416) 442-5140	Phone: (905) 695-3217 x3611
Sampler Name (Print): DARREN DOHERTY	Consultant Project #: 11010

	FIELD SAMPLE ID	MATRIX: GROUNDWATER	MATRIX: SURFACE WATER	MATRIX: SOIL	MATRIX: OTHER	# CONTAINERS	SAMPLING: DATE (YYYY/MM/DD)	SAMPLING: TIME (24 HR)	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	F1 / BTEX	F2 - F4	LEAD	MTBE + HEXANE
1	Trip Blank				X	4	2014/09/17	0300			X			X
2														
3														
4														
5														
6														
7														
8														
9														
10														

IOL SITE LOCATION:
1660 MERIVALE ROAD, OTTAWA, ON

IOL SITE # (if applicable):
N/A

IOL PROJECT # (if applicable):
MZ.00277

MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM:
4410180847-10

REGULATORY CRITERIA / DETECTION LIMITS:
☒ REG 153 Table 3 ☐ 2004 ☒ 2011 ☐ RSC
(Please indicate which Reg. version and if RSC required)
☐ ODWS ☐ PWQO
☐ Other

SPECIAL INSTRUCTIONS:
ICE - YES

JARS USED AND NOT SUBMITTED
Enter N/A for Water
NA

TURNAROUND TIME
Standard (5 days) ☒
Rush (3 days) ☐
(2 days) ☐
(1 day) ☐
(same day) ☐
Date Required

COOLER ID: 11010-1	YES	NO	TEMP	1	2	3
CUSTODY SEAL						
PRESENT	✓			2	3	3
INTACT	✓					

COOLER ID:	YES	NO	TEMP	1	2	3
CUSTODY SEAL						
PRESENT						
INTACT						

COOLER ID:	YES	NO	TEMP	1	2	3
CUSTODY SEAL						
PRESENT						
INTACT						

RELINQUISHED BY:		DATE:	TIME (24 HR)	RECEIVED BY:		DATE:	TIME (24 HR)
1.	DARREN DOHERTY	2014/09/17	0300	1.	Grant Pettypiece	2014/09/18	0930
2.	Grant Pettypiece	2014/09/18	1030	2.	FANG WANG	2014/09/18	17:20
3.				3.			

LAB USE ONLY
MAXXAM JOB #
B4H2879
SAMPLES
LABELED BY: ABH
VERIFIED BY: CG2

COC – 1012 (2013) IOL – ON

White: Maxxam

Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: **exp** Energy Services Ltd. Sampling Date: September 17, 2014

Location: Adjacent to 1660 Merivale Road, Ottawa, Ontario Laboratory : Maxxam Analytics

Consultant Project Number: 11010 Sample Submission Number: B4H2879

Are All Laboratory QC Samples Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC met acceptance criteria
Extraction Surrogate Recovery	X			
Method Blank Concentration	X			
Matrix Duplicate RPD			X	
Matrix Spike Recovery			X	
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	All field QC samples are within alert limits
Trip Blank Concentration	X			
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 48 hours (Yes/No)?:	Yes
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Was a Data Quality Waiver (DQW) issued (Yes/No)?: No

Date Issued: NA Date of Response: NA

Is data considered to be reliable (Yes/No)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Melanie Thomson Data Reviewed by (Signature): M. Thomson

Date: October 3, 2014

Maxxam
A Bureau Veritas Group Company

Success Through Science®

Task Order#: 4410180847
Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010
Your C.O.C. #: 482475-02-01

Attention:Tanya Fernandes-Peters

exp Energy Services Ltd.
220 Commerce Valley Dr. W
Suite 500
Markham, ON
L3T 0A8

Report Date: 2014/09/26
Report #: R3169757
Version: 2R

CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B4H2890
Received: 2014/09/18, 15:20

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Laboratory Method	Primary Reference
Petroleum Hydro. CCME F1 & BTEX in Water	1	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water	1	CAM SOP-00316	CCME PHC-CWS m
Dissolved Metals by ICPMS	1	CAM SOP-00447	EPA 6020 m
Volatile Organic Compounds in Water	1	CAM SOP-00226	EPA 8260 m

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act.

The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following the 'Alberta Environment Draft Addenda to the CWS-PHC, Appendix 6, Validation of Alternate Methods'. Documentation is available upon request. Maxxam has made the following improvements to the CWS-PHC reference benchmark method: (i) Headspace for F1; and, (ii) Mechanical extraction for F2-F4. Note: F4G cannot be added to the C6 to C50 hydrocarbons.

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All data is in statistical control and has met all QC and method performance criteria unless otherwise flagged. All samples were analysed within hold time unless otherwise flagged. All soil samples for BTEX analysis were methanol extracted within 24 hours unless otherwise flagged.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Patricia Legette
26 Sep 2014 13:06:56 -04:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Patricia Legette, Project Manager
Email: PLegette@maxxam.ca
Phone# (905)817-5799

==========

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Maxxam Job #: B4H2890
Report Date: 2014/09/26

exp Energy Services Ltd.
Task Order#: 4410180847, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

LEAD (DISSOLVED) IN WATER

Maxxam ID		XP9631		
Sampling Date		2014/09/17 12:00		
COC Number		482475-02-01		
	Units	**W1**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	<0.50	0.50	3757019

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B4H2890
Report Date: 2014/09/26

exp Energy Services Ltd.
Task Order#: 4410180847, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

O.REG 153 PHCS IN WATER (WATER)

Maxxam ID		XP9631	XP9631		
Sampling Date		2014/09/17 12:00	2014/09/17 12:00		
COC Number		482475-02-01	482475-02-01		
	Units	**W1**	**W1 Lab-Dup**	**RDL**	**QC Batch**
Benzene	ug/L	<0.20	<0.20	0.20	3759292
Toluene	ug/L	<0.20	<0.20	0.20	3759292
Ethylbenzene	ug/L	<0.20	<0.20	0.20	3759292
o-Xylene	ug/L	<0.20	<0.20	0.20	3759292
p+m-Xylene	ug/L	<0.40	<0.40	0.40	3759292
Total Xylenes	ug/L	<0.40	<0.40	0.40	3759292
F1 (C6-C10)	ug/L	<25	<25	25	3759292
F1 (C6-C10) - BTEX	ug/L	<25	<25	25	3759292
F2 (C10-C16 Hydrocarbons)	ug/L	<100		100	3759046
F3 (C16-C34 Hydrocarbons)	ug/L	<200		200	3759046
F4 (C34-C50 Hydrocarbons)	ug/L	<200		200	3759046
Reached Baseline at C50	ug/L	Yes			3759046
Extraction Surrogate Recovery (%)					
o-Terphenyl	%	91			3759046
Instrument Surrogate Recovery (%)					
1,4-Difluorobenzene	%	106	105		3759292
4-Bromofluorobenzene	%	99	100		3759292
D10-Ethylbenzene	%	4.7 (1)	6.6 (1)		3759292
D4-1,2-Dichloroethane	%	95	94		3759292

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
(1) The surrogate recovery for the sample was below the acceptance criteria. The sample was reanalyzed with the same results. It was concluded that the sample matrix is reacting with the surrogate resulting in low recoveries.

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Maxxam Job #: B4H2890
Report Date: 2014/09/26

exp Energy Services Ltd.
Task Order#: 4410180847, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

VOLATILE ORGANICS BY GC/MS (WATER)

Maxxam ID		XP9631		
Sampling Date		2014/09/17 12:00		
COC Number		482475-02-01		
	Units	**W1**	**RDL**	**QC Batch**
Hexane	ug/L	<0.50	0.50	3755203
Methyl t-butyl ether (MTBE)	ug/L	<0.20	0.20	3755203
Instrument Surrogate Recovery (%)				
4-Bromofluorobenzene	%	101		3755203
D4-1,2-Dichloroethane	%	103		3755203
D8-Toluene	%	100		3755203

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B4H2890
Report Date: 2014/09/26

exp Energy Services Ltd.
Task Order#: 4410180847, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

TEST SUMMARY

Maxxam ID: XP9631
Sample ID: W1
Matrix: Water

Collected: 2014/09/17
Relinquished: 2014/09/18
Received: 2014/09/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	3759292	N/A	2014/09/24	Anca Ganea
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	3759046	2014/09/23	2014/09/24	Dorina Popa
Dissolved Metals by ICPMS	ICP/MS	3757019	N/A	2014/09/23	John Bowman
Volatile Organic Compounds in Water	P&T/MS	3755203	N/A	2014/09/22	Sarah Lam

Maxxam ID: XP9631 Dup
Sample ID: W1
Matrix: Water

Collected: 2014/09/17
Relinquished: 2014/09/18
Received: 2014/09/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	3759292	N/A	2014/09/24	Anca Ganea

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Maxxam Job #: B4H2890
Report Date: 2014/09/26

exp Energy Services Ltd.
Task Order#: 4410180847, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	2.7°C

Revised Report: Report re-issued with accepted Data Quality Waiver.

Results relate only to the items tested.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B4H2890
Report Date: 2014/09/26

exp Energy Services Ltd.
Task Order#: 4410180847, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
3755203	SLM	Method Blank	4-Bromofluorobenzene	2014/09/22		98	%	70 - 130
			D4-1,2-Dichloroethane	2014/09/22		97	%	70 - 130
			D8-Toluene	2014/09/22		99	%	70 - 130
			Hexane	2014/09/22	<0.50		ug/L	
			Methyl t-butyl ether (MTBE)	2014/09/22	<0.20		ug/L	
3757019	JBW	Method Blank	Dissolved Lead (Pb)	2014/09/23	<0.50		ug/L	
3759046	DPO	Method Blank	o-Terphenyl	2014/09/24		89	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2014/09/24	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2014/09/24	<200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2014/09/24	<200		ug/L	
3759292	AGA	Method Blank	1,4-Difluorobenzene	2014/09/24		102	%	70 - 130
			4-Bromofluorobenzene	2014/09/24		96	%	70 - 130
			D10-Ethylbenzene	2014/09/24		93	%	70 - 130
			D4-1,2-Dichloroethane	2014/09/24		99	%	70 - 130
			Benzene	2014/09/24	<0.20		ug/L	
			Toluene	2014/09/24	<0.20		ug/L	
			Ethylbenzene	2014/09/24	<0.20		ug/L	
			o-Xylene	2014/09/24	<0.20		ug/L	
			p+m-Xylene	2014/09/24	<0.40		ug/L	
			Total Xylenes	2014/09/24	<0.40		ug/L	
			F1 (C6-C10)	2014/09/24	<25		ug/L	
			F1 (C6-C10) - BTEX	2014/09/24	<25		ug/L	
3759292	AGA	RPD [XP9631-04]	Benzene	2014/09/24	NC		%	30
			Toluene	2014/09/24	NC		%	30
			Ethylbenzene	2014/09/24	NC		%	30
			o-Xylene	2014/09/24	NC		%	30
			p+m-Xylene	2014/09/24	NC		%	30
			Total Xylenes	2014/09/24	NC		%	30
			F1 (C6-C10)	2014/09/24	NC		%	30
			F1 (C6-C10) - BTEX	2014/09/24	NC		%	30
3759046	DPO	Matrix Spike [XP9631-02]	o-Terphenyl	2014/09/24		91	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2014/09/24		94	%	50 - 130
			F3 (C16-C34 Hydrocarbons)	2014/09/24		95	%	50 - 130
			F4 (C34-C50 Hydrocarbons)	2014/09/24		99	%	50 - 130
3759292	AGA	Matrix Spike [XP9631-04]	1,4-Difluorobenzene	2014/09/24		104	%	70 - 130
			4-Bromofluorobenzene	2014/09/24		103	%	70 - 130
			D10-Ethylbenzene	2014/09/24		12 (1)	%	70 - 130
			D4-1,2-Dichloroethane	2014/09/24		97	%	70 - 130
			Benzene	2014/09/24		103	%	70 - 130
			Toluene	2014/09/24		6.5 (2)	%	70 - 130
			Ethylbenzene	2014/09/24		12 (2)	%	70 - 130
			o-Xylene	2014/09/24		0.82 (2)	%	70 - 130
			p+m-Xylene	2014/09/24		1.3 (2)	%	70 - 130
			F1 (C6-C10)	2014/09/24		61 (2)	%	70 - 130
3755203	SLM	LCS	4-Bromofluorobenzene	2014/09/22		104	%	70 - 130
			D4-1,2-Dichloroethane	2014/09/22		98	%	70 - 130
			D8-Toluene	2014/09/22		100	%	70 - 130
			Hexane	2014/09/22		96	%	70 - 130
			Methyl t-butyl ether (MTBE)	2014/09/22		100	%	70 - 130
3757019	JBW	LCS	Dissolved Lead (Pb)	2014/09/23		96	%	80 - 120
3759046	DPO	LCS	o-Terphenyl	2014/09/24		93	%	60 - 130

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B4H2890
Report Date: 2014/09/26

exp Energy Services Ltd.
Task Order#: 4410180847, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			F2 (C10-C16 Hydrocarbons)	2014/09/24		97	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2014/09/24		97	%	60 - 130
			F4 (C34-C50 Hydrocarbons)	2014/09/24		100	%	60 - 130
3759292	AGA	LCS	1,4-Difluorobenzene	2014/09/24		102	%	70 - 130
			4-Bromofluorobenzene	2014/09/24		103	%	70 - 130
			D10-Ethylbenzene	2014/09/24		95	%	70 - 130
			D4-1,2-Dichloroethane	2014/09/24		99	%	70 - 130
			Benzene	2014/09/24		97	%	70 - 130
			Toluene	2014/09/24		97	%	70 - 130
			Ethylbenzene	2014/09/24		106	%	70 - 130
			o-Xylene	2014/09/24		104	%	70 - 130
			p+m-Xylene	2014/09/24		95	%	70 - 130
			F1 (C6-C10)	2014/09/24		102	%	70 - 130

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

(1) The surrogate recovery for the sample was below the acceptance criteria. The sample was reanalyzed with the same results. It was concluded that the sample matrix is reacting with the surrogate resulting in low recoveries.

(2) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

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Maxxam Job #: B4H2890
Report Date: 2014/09/26

exp Energy Services Ltd.
Task Order#: 4410180847, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam
A Bureau Veritas Group Company

DATA QUALITY WAIVER

2014/09/26 11:26 AM

Invoice Client Name: Imperial Oil, a partnership of Imperial Oil Limited and McColl Frontenac Petrole
Invoice Client ID #: 2209
Invoice Project Manager: Jessica Snelgrove

Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Client Project #: 11010

Maxxam Job #: B4H2890

Report To Client Name: exp Energy Services Ltd.
Report To Client ID #: 4883
Report To Project Manager: Tanya Fernandes-Peters

Task #: 4410180847
Quote: B41723
COC/Submission #: 482475-02-01

Received By: Chantal Gagnon
Received: 2014/09/18 15:20

Maxxam Project Manager: Patricia Legette

TAT: 8 Days
Rush: No

DQW #: 2128
DQW Created By: Patricia Legette
DQW Created: 2014/09/26 10:38

Lab ID	Client Sample ID	Matrix	Test Code	Analysis Type	Parameters	Deviation	Root Cause	Potential Impact
XP9631	W1	Water	F1BTEXHS-W	F1BTEX	Ethylbenzene	#1 Matrix Spike Recovery Below Control Limit	#1 Matrix Interference	This may represent a low bias for this parameter(s) in this sample.
XP9631	W1	Water	F1BTEXHS-W	F1BTEX	F1 (C6-C10)	#1 Matrix Spike Recovery Below Control Limit	#1 Matrix Interference	This may represent a low bias for this parameter(s) in this sample.
XP9631	W1	Water	F1BTEXHS-W	F1BTEX	o-Xylene	#1 Matrix Spike Recovery Below Control Limit	#1 Matrix Interference	This may represent a low bias for this parameter(s) in this sample.
XP9631	W1	Water	F1BTEXHS-W	F1BTEX	p+m-Xylene	#1 Matrix Spike Recovery Below Control Limit	#1 Matrix Interference	This may represent a low bias for this parameter(s) in this sample.
XP9631	W1	Water	F1BTEXHS-W	F1BTEX	Toluene	#1 Matrix Spike Recovery Below Control Limit	#1 Matrix Interference	This may represent a low bias for this parameter(s) in this sample.

Waiver Issued By:

Signature: _____ Date: 2014/09/26 10:39

Name: Patricia Legette

Title: Project Manager

Data Quality Waiver Reviewed and Accepted By:

Signature: _____ Date: SEPT 26, 2014

Name: TANYA FERNANDES-PETERS.

Title: PROJECT MANAGER.

Data Quality Waiver Reviewed and Declined By:

Signature: _____ Date: _____

Name: _____

Title: _____

Comments / Requested Actions: _____

If this waiver is not returned within 7 calendar days of issuance, the associated data will be deemed acceptable as reported by the issuing laboratory. Closure of the Data Quality Waiver Request requires written acceptance, or declining with comments. Failure to return a signed waiver within 7 calendar days will be reported to Imperial Oil as a failure to close the Data Quality Waiver Request by the recipient of the data.

Maxxam

6740 Campobello Road
Mississauga, Ontario L5N 2L8
www.maxxam.ca

Phone: (905) 817-5700
Fax: (905) 817-5777
Toll Free: 800-563-6266

EXXONMOBIL/IMPERIAL OIL - MAXXAM
CHAIN-OF-CUSTODY RECORD
ANALYSIS REQUESTED

Page 1 of 1

C of C # 482475-02-01

482475

INVOICE INFORMATION	REPORT INFORMATION
Company Name: Imperial Oil, a partnership of Imperial Oil Limited and McColl Frontenac Petrole	Company Name: exp Energy Services Ltd.
Contact Name: JESSICA SNELGROVE	Contact Name: Tanya Fernandes-Peters
Address: 1 Duncan Mill Road North York ON M3B 1Z2	Address: 220 Commerce Valley Dr W Suite 500 Markham ON L3T 0A8
Email: [redacted]	Email: tanya.fernandes@exp.com;
Phone: (416) 442-[redacted] 5140	Phone: (905) 695-3217 x3611
Sampler Name (Print): DARREN DOHERTY	Consultant Project #: 11010

	FIELD SAMPLE ID	MATRIX: GROUNDWATER	MATRIX: SURFACE WATER	MATRIX: SOIL	MATRIX: OTHER	# CONTAINERS	SAMPLING: DATE (YYYY/MM/DD)	SAMPLING: TIME (24 HR)	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	F1 / BTEX + Hexane + MTBE	F2 - F4	LEAD	[redacted]	LIMITED SAMPLE
1	W1				X	8	2014/09/17	1200	X		X	X	X	#	X
2															
3															
4															
5															
6															
7															
8															
9															
10															

IOL SITE LOCATION:
1660 MERIVALE ROAD, OTTAWA, ON

IOL SITE # (if applicable):
N/A

IOL PROJECT # (if applicable):
MZ.00277

MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM:
4410180847-10

REGULATORY CRITERIA / DETECTION LIMITS:
☑ REG 153 Table 3 ☐ 2004 ☑ 2011 ☐ RSC
(Please indicate which Reg version and if RSC required)
☐ ODWS ☐ PWQO
☐ Other

SPECIAL INSTRUCTIONS:
-Tiny bubbles may occur due to degassing
-Particulates may be present
ICE - YES

JARS USED AND NOT SUBMITTED
Enter N/A for Water N/A

TURNAROUND TIME

Standard	(5 days)	☑
Rush	(3 days)	☐
	(2 days)	☐
	(1 day)	☐
	(same day)	☐

Date Required

COOLER ID: 11010-1							COOLER ID:							COOLER ID:						
CUSTODY SEAL	YES	NO	TEMP	1	2	3	CUSTODY SEAL	YES	NO	TEMP	1	2	3	CUSTODY SEAL	YES	NO	TEMP	1	2	3
PRESENT	✓			2	3	3	PRESENT							PRESENT						
INTACT	✓						INTACT							INTACT						

RELINQUISHED BY:	DATE:	TIME (24 HR)	RECEIVED BY:	DATE:	TIME (24 HR)
1. [signature] DARREN DOHERTY	2014/09/17	1300	1. [signature] Grant Pettypiece	2014/09/18	0930
2. [signature] Grant Pettypiece	2014/09/18	1030	2. [signature] FANG WANG	2014/09/18	15:20
3.			3.		

LAB USE ONLY
MAXXAM JOB #: B4H2390

SAMPLES

LABELED BY:	VERIFIED BY:
CG2	ABH

COC - 1012 (2013) IOL - ON White: Maxxam Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: **exp** Energy Services Ltd. Sampling Date: September 17, 2014

Location: Adjacent to 1660 Merivale Road, Ottawa, Ontario Laboratory : Maxxam Analytics

Consultant Project Number: 11010 Sample Submission Number: B4H2890

Are All Laboratory QC Samples Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery		X		Instrument surrogate recoveries of d10-ethylbenzene in W1 (4.7%) is below the acceptance criteria (60-140%). Matrix spike recoveries for toluene (6.5%), ethylbenzene (12%), o-xylene (0.82%) and p+m-xylene (1.3%) in W1 were below acceptance criteria (50-140%). Matrix spike recovery for PHC F1 (61%) was flagged by the lab as it was below their QC limits (70-130%); however it is within the MOE acceptance criteria (60-140%). All other laboratory QC met acceptance criteria.
Extraction Surrogate Recovery	X			
Method Blank Concentration	X			
Matrix Duplicate RPD	X			
Matrix Spike Recovery		X		
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	No field QC samples were submitted
Trip Blank Concentration			X	
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 48 hours (Yes/No)?:	Not Required
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Was a Data Quality Waiver (DQW) issued (Yes/No)?: Yes

Date Issued: 26-Sep-14 Date of Response: 26-Sep-14

Is data considered to be reliable (Yes/No)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Melanie Thomson Data Reviewed by (Signature): M. Thomson

Date: October 3, 2014

Task Order#: 4410180847
Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010
Your C.O.C. #: 487951-02-01

Attention:Tanya Fernandes-Peters

exp Energy Services Ltd.
220 Commerce Valley Dr. W
Suite 500
Markham, ON
L3T 0A8

Report Date: 2014/10/16
Report #: R3190869
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B4I8260
Received: 2014/10/08, 15:00

Sample Matrix: Water
Samples Received: 5

Analyses	Quantity	Laboratory Method	Primary Reference
Petroleum Hydro. CCME F1 & BTEX in Water	5	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water	5	CAM SOP-00316	CCME PHC-CWS m
Dissolved Metals by ICPMS	5	CAM SOP-00447	EPA 6020 m
Volatile Organic Compounds in Water	5	CAM SOP 00228	EPA 8260 m

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act.

The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following the 'Alberta Environment Draft Addenda to the CWS-PHC, Appendix 6, Validation of Alternate Methods'. Documentation is available upon request. Maxxam has made the following improvements to the CWS-PHC reference benchmark method: (i) Headspace for F1; and, (ii) Mechanical extraction for F2-F4. Note: F4G cannot be added to the C6 to C50 hydrocarbons.

Maxxam Analytics is accredited by SCC (Lab ID 97) for all specific parameters as required by GUCSO and O.Reg 153/04. Maxxam Analytics is limited in liability to the actual cost of analysis unless otherwise agreed in writing. There is no other warranty expressed or implied. Samples will be retained at Maxxam Analytics for three weeks from receipt of data or as per contract.

All data is in statistical control and has met all QC and method performance criteria unless otherwise flagged. All samples were analysed within hold time unless otherwise flagged. All soil samples for BTEX analysis were methanol extracted within 24 hours unless otherwise flagged.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Patricia Legette
16 Oct 2014 17:54:58 -04:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Patricia Legette, Project Manager
Email: PLegette@maxxam.ca
Phone# (905)817-5799

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B4I8260
Report Date: 2014/10/16

exp Energy Services Ltd.
Task Order#: 4410180847, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

LEAD (DISSOLVED) IN WATER

Maxxam ID		XX8571	XX8572	XX8573	XX8574	XX8575		
Sampling Date		2014/10/06 21:00	2014/10/06 21:30	2014/10/06 22:00	2014/10/06 22:30	2014/10/06 21:30		
COC Number		487951-02-01	487951-02-01	487951-02-01	487951-02-01	487951-02-01		
	Units	**TH100**	**TH101**	**TH102**	**TH9**	**DUP1**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	<0.50	2.9	3.9	1.1	4.2	0.50	3783712

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B4I8260
Report Date: 2014/10/16

exp Energy Services Ltd.
Task Order#: 4410180847, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

HBTEX/F1-F4 PET. HYDROCARBONS IN WATER (WATER)

Maxxam ID		XX8571		XX8572		XX8573	XX8574		XX8575		
Sampling Date		2014/10/06 21:00		2014/10/06 21:30		2014/10/06 22:00	2014/10/06 22:30		2014/10/06 21:30		
COC Number		487951-02-01		487951-02-01		487951-02-01	487951-02-01		487951-02-01		
	Units	**TH100**	**RDL**	**TH101**	**RDL**	**TH102**	**TH9**	**RDL**	**DUP1**	**RDL**	**QC Batch**
Benzene	ug/L	<0.20	0.20	85	1.0	0.72	31	0.20	84	1.0	3785161
Toluene	ug/L	<0.20	0.20	12	1.0	0.52	3.0	0.20	12	1.0	3785161
Ethylbenzene	ug/L	0.31	0.20	580	1.0	16	230	0.20	580	1.0	3785161
o-Xylene	ug/L	<0.20	0.20	16	1.0	0.67	2.9	0.20	16	1.0	3785161
p+m-Xylene	ug/L	0.91	0.40	480	2.0	41	290	0.40	500	2.0	3785161
Total Xylenes	ug/L	0.91	0.40	500	2.0	42	290	0.40	510	2.0	3785161
Hexane	ug/L	<5.0	5.0	44	25	7.2	15	5.0	54	25	3785161
F1 (C6-C10)	ug/L	<25	25	5300	130	420	1600	25	5300	130	3785161
F1 (C6-C10) - BTEX	ug/L	<25	25	4100	130	360	1000	25	4100	130	3785161
F2 (C10-C16 Hydrocarbons)	ug/L	<100	100	830	100	360	570	100	910	100	3785458
F3 (C16-C34 Hydrocarbons)	ug/L	<200	200	<200	200	<200	610	200	<200	200	3785458
F4 (C34-C50 Hydrocarbons)	ug/L	<200	200	<200	200	<200	420	200	<200	200	3785458
Reached Baseline at C50	ug/L	Yes		Yes		Yes	Yes		Yes		3785458
Extraction Surrogate Recovery (%)											
o-Terphenyl	%	91		92		91	90		92		3785458
Instrument Surrogate Recovery (%)											
1,4-Difluorobenzene	%	101		100		99	100		100		3785161
4-Bromofluorobenzene	%	101		109		107	108		110		3785161
D10-Ethylbenzene	%	102		98		101	105		96		3785161
D4-1,2-Dichloroethane	%	85		90		85	88		91		3785161

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B4I8260
Report Date: 2014/10/16

exp Energy Services Ltd.
Task Order#: 4410180847, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

VOLATILE ORGANICS BY GC/MS (WATER)

Maxxam ID		XX8571	XX8572	XX8573	XX8573	XX8574	XX8575		
Sampling Date		2014/10/06 21:00	2014/10/06 21:30	2014/10/06 22:00	2014/10/06 22:00	2014/10/06 22:30	2014/10/06 21:30		
COC Number		487951-02-01	487951-02-01	487951-02-01	487951-02-01	487951-02-01	487951-02-01		
	Units	**TH100**	**TH101**	**TH102**	**TH102 Lab-Dup**	**TH9**	**DUP1**	**RDL**	**QC Batch**
Methyl t-butyl ether (MTBE)	ug/L	<0.50	<0.50	<0.50	<0.50	0.75	<0.50	0.50	3781488
Instrument Surrogate Recovery (%)									
4-Bromofluorobenzene	%	86	95	89	89	91	95		3781488
D4-1,2-Dichloroethane	%	113	98	105	104	98	94		3781488
D8-Toluene	%	101	109	87	106	113	89		3781488

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B4I8260
Report Date: 2014/10/16

exp Energy Services Ltd.
Task Order#: 4410180847, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

TEST SUMMARY

Maxxam ID: XX8571
Sample ID: TH100
Matrix: Water

Collected: 2014/10/06
Relinquished: 2014/10/08
Received: 2014/10/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	3785161	N/A	2014/10/15	Sung Ho Kim
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	3785458	2014/10/15	2014/10/16	Biljana Lazovic
Dissolved Metals by ICPMS	ICP/MS	3783712	N/A	2014/10/16	Prempal Bhatti
Volatile Organic Compounds in Water	GC/MS	3781488	N/A	2014/10/14	Manpreet Sarao

Maxxam ID: XX8572
Sample ID: TH101
Matrix: Water

Collected: 2014/10/06
Relinquished: 2014/10/08
Received: 2014/10/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	3785161	N/A	2014/10/16	Sung Ho Kim
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	3785458	2014/10/15	2014/10/16	Biljana Lazovic
Dissolved Metals by ICPMS	ICP/MS	3783712	N/A	2014/10/16	Prempal Bhatti
Volatile Organic Compounds in Water	GC/MS	3781488	N/A	2014/10/14	Manpreet Sarao

Maxxam ID: XX8573
Sample ID: TH102
Matrix: Water

Collected: 2014/10/06
Relinquished: 2014/10/08
Received: 2014/10/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	3785161	N/A	2014/10/15	Sung Ho Kim
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	3785458	2014/10/15	2014/10/16	Biljana Lazovic
Dissolved Metals by ICPMS	ICP/MS	3783712	N/A	2014/10/16	Prempal Bhatti
Volatile Organic Compounds in Water	GC/MS	3781488	N/A	2014/10/14	Manpreet Sarao

Maxxam ID: XX8573 Dup
Sample ID: TH102
Matrix: Water

Collected: 2014/10/06
Relinquished: 2014/10/08
Received: 2014/10/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Volatile Organic Compounds in Water	GC/MS	3781488	N/A	2014/10/14	Manpreet Sarao

Maxxam ID: XX8574
Sample ID: TH9
Matrix: Water

Collected: 2014/10/06
Relinquished: 2014/10/08
Received: 2014/10/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	3785161	N/A	2014/10/16	Sung Ho Kim
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	3785458	2014/10/15	2014/10/16	Biljana Lazovic
Dissolved Metals by ICPMS	ICP/MS	3783712	N/A	2014/10/16	Prempal Bhatti
Volatile Organic Compounds in Water	GC/MS	3781488	N/A	2014/10/14	Manpreet Sarao

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Maxxam Job #: B4I8260
Report Date: 2014/10/16

exp Energy Services Ltd.
Task Order#: 4410180847, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

TEST SUMMARY

Maxxam ID: XX8575
Sample ID: DUP1
Matrix: Water

Collected: 2014/10/06
Relinquished: 2014/10/08
Received: 2014/10/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	3785161	N/A	2014/10/16	Sung Ho Kim
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	3785458	2014/10/15	2014/10/16	Biljana Lazovic
Dissolved Metals by ICPMS	ICP/MS	3783712	N/A	2014/10/16	Prempal Bhatti
Volatile Organic Compounds in Water	GC/MS	3781488	N/A	2014/10/14	Manpreet Sarao

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Maxxam Job #: B4I8260
Report Date: 2014/10/16

exp Energy Services Ltd.
Task Order#: 4410180847, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	6.3°C
Package 2	7.0°C
Package 3	5.3°C

SQC trend rule failure for Beryllium, Batch 3783712. EWMA greater than 1.5 SD below the mean.

SQC trend rule failure for Selenium, Batch 3783712. EWMA greater than 1.5 SD below the mean.

Results relate only to the items tested.

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Maxxam Job #: B4I8260
Report Date: 2014/10/16

exp Energy Services Ltd.
Task Order#: 4410180847, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
3781488	MS4	Method Blank	4-Bromofluorobenzene	2014/10/14		89	%	70 - 130
			D4-1,2-Dichloroethane	2014/10/14		106	%	70 - 130
			D8-Toluene	2014/10/14		101	%	70 - 130
			Methyl t-butyl ether (MTBE)	2014/10/14	<0.50		ug/L	
3783712	PBA	Method Blank	Dissolved Lead (Pb)	2014/10/16	<0.50		ug/L	
3785161	SHK	Method Blank	1,4-Difluorobenzene	2014/10/15		99	%	70 - 130
			4-Bromofluorobenzene	2014/10/15		104	%	70 - 130
			D10-Ethylbenzene	2014/10/15		103	%	70 - 130
			D4-1,2-Dichloroethane	2014/10/15		90	%	70 - 130
			Benzene	2014/10/15	<0.20		ug/L	
			Toluene	2014/10/15	<0.20		ug/L	
			Ethylbenzene	2014/10/15	<0.20		ug/L	
			o-Xylene	2014/10/15	<0.20		ug/L	
			p+m-Xylene	2014/10/15	<0.40		ug/L	
			Total Xylenes	2014/10/15	<0.40		ug/L	
			Hexane	2014/10/15	<5.0		ug/L	
			F1 (C6-C10)	2014/10/15	<25		ug/L	
			F1 (C6-C10) - BTEX	2014/10/15	<25		ug/L	
3785458	BLZ	Method Blank	o-Terphenyl	2014/10/16		90	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2014/10/16	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2014/10/16	<200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2014/10/16	<200		ug/L	
3781488	MS4	RPD [XX8573-04]	Methyl t-butyl ether (MTBE)	2014/10/14	NC		%	30
3781488	MS4	Matrix Spike [XX8572-04]	4-Bromofluorobenzene	2014/10/14		94	%	70 - 130
			D4-1,2-Dichloroethane	2014/10/14		97	%	70 - 130
			D8-Toluene	2014/10/14		112	%	70 - 130
			Methyl t-butyl ether (MTBE)	2014/10/14		95	%	70 - 130
3781488	MS4	LCS	4-Bromofluorobenzene	2014/10/14		95	%	70 - 130
			D4-1,2-Dichloroethane	2014/10/14		107	%	70 - 130
			D8-Toluene	2014/10/14		92	%	70 - 130
			Methyl t-butyl ether (MTBE)	2014/10/14		97	%	70 - 130
3783712	PBA	LCS	Dissolved Lead (Pb)	2014/10/16		96	%	80 - 120
3785161	SHK	LCS	1,4-Difluorobenzene	2014/10/15		99	%	70 - 130
			4-Bromofluorobenzene	2014/10/15		108	%	70 - 130
			D10-Ethylbenzene	2014/10/15		101	%	70 - 130
			D4-1,2-Dichloroethane	2014/10/15		89	%	70 - 130
			Benzene	2014/10/15		105	%	70 - 130
			Toluene	2014/10/15		107	%	70 - 130
			Ethylbenzene	2014/10/15		118	%	70 - 130
			o-Xylene	2014/10/15		111	%	70 - 130
			p+m-Xylene	2014/10/15		107	%	70 - 130
			Hexane	2014/10/15		98	%	70 - 130
			F1 (C6-C10)	2014/10/15		97	%	70 - 130
3785458	BLZ	LCS	o-Terphenyl	2014/10/16		93	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2014/10/16		90	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2014/10/16		94	%	60 - 130

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Maxxam Job #: B4I8260
Report Date: 2014/10/16

exp Energy Services Ltd.
Task Order#: 4410180847, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			F4 (C34-C50 Hydrocarbons)	2014/10/16		96	%	60 - 130

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

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Maxxam Job #: B4I8260
Report Date: 2014/10/16

exp Energy Services Ltd.
Task Order#: 4410180847, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam

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Toll Free: 800-563-6266

EXXONMOBIL/IMPERIAL OIL - MAXXAM
CHAIN-OF-CUSTODY RECORD
ANALYSIS REQUESTED

C of C # 487951-02-01

487951

INVOICE INFORMATION	REPORT INFORMATION
Company Name: Imperial Oil, a partnership of Imperial Oil Limited and McColl Frontenac Petrole	Company Name: exp Energy Services Ltd.
Contact Name: Jessica Snelgrove	Contact Name: Tanya Fernandes-Peters
Address: 1 Duncan Mill Road North York ON M3B 1Z2	Address: 220 Commerce Valley Dr. W Suite 500 Markham ON L3T 0A8
Email: Jessica.j.snelgrove@esso.ca	Email: tanya.fernandes@exp.com;
Phone: (416) 442-5140 x	Phone: (905) 695-3217 x3611
Sampler Name (Print): DAN CLARKE, DARREN DOHERTY	Consultant Project #: 11010

	FIELD SAMPLE ID	MATRIX: GROUND WATER	MATRIX: SURFACE WATER	MATRIX: SOIL	MATRIX: OTHER	# CONTAINERS	SAMPLING: DATE (YYYY/MM/DD)	SAMPLING: TIME (24 HR)	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	F1 / BTEX + Hexane	F2 - F4	LEAD	MTBE
1	TH100	X				12	2014/10/06	2100	X		X	X	X	X
2	TH101	X				12	YYYY/MM/DD	2130	X		X	X	X	X
3	TH102	X				12	YYYY/MM/DD	2200	X		X	X	X	X
4	TH9	X				12	YYYY/MM/DD	2230	X		X	X	X	X
5	DUP1	X				12	YYYY/MM/DD	2130	X		X	X	X	X
6							YYYY/MM/DD	HH:MM						
7							YYYY/MM/DD	HH:MM						
8							YYYY/MM/DD	HH:MM						
9							YYYY/MM/DD	HH:MM						
10							YYYY/MM/DD	HH:MM						

IOL SITE LOCATION:
1660 MERIVALE ROAD, OTTAWA, ON

IOL SITE # (if applicable):
N/A

IOL PROJECT # (if applicable):
MZ.00277

MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM:
4410180847-10

REGULATORY CRITERIA / DETECTION LIMITS:
[X] REG 153 Table 3 [ ] 2004 [X] 2011 [ ] RSC
(Please indicate which Reg. version and if RSC required)
[ ] ODWS [ ] PWQO
[ ] Other

SPECIAL INSTRUCTIONS:
-Tiny bubbles may occur due to degassing
-Particulate may be present
ICE-YES

JARS USED AND NOT SUBMITTED
Enter N/A for Water
NA

TURNAROUND TIME
Standard (5 days) [X]
Rush (3 days) [ ]
(2 days) [ ]
(1 day) [ ]
(same day) [ ]
Date Required

COOLER ID: 11010-1							COOLER ID: 11010-2							COOLER ID: 11010-3						
CUSTODY SEAL	YES	NO	TEMP	6	6	7	CUSTODY SEAL	YES	NO	TEMP	6	7	8	CUSTODY SEAL	YES	NO	TEMP	5	5	6
PRESENT	✓			1	2	3	PRESENT	✓			1	2	3	PRESENT	✓			1	2	3
INTACT	✓						INTACT	✓						INTACT	✓					

LAB USE ONLY
MAXXAM JOB #
B418260
SAMPLES
LABELED BY: FW
VERIFIED BY: ASR

RELINQUISHED BY:		DATE:	TIME (24 HR)	RECEIVED BY:		DATE:	TIME (24 HR)
1. signature	DARREN DOHERTY printed name	2014/10/07 YYYY/MM/DD	0700 HH:MM	1. signature	Grant Pettipiece printed name	2014/10/08 YYYY/MM/DD	0900 HH:MM
2. signature	Grant Pettipiece printed name	2014/10/08 YYYY/MM/DD	1100 HH:MM	2. signature	FANA and WANG printed name	2014/10/08 YYYY/MM/DD	1500 HH:MM
3. signature	printed name	YYYY/MM/DD	HH:MM	3. signature	printed name	YYYY/MM/DD	HH:MM

COC – 1012 (2013) IOL – ON White: Maxxam Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: **exp** Energy Services Ltd.

Sampling Date: October 6, 2014

Location: Adjacent to 1660 Merivale Road, Ottawa, Ontario

Laboratory : Maxxam Analytics

Consultant Project Number: 11010

Sample Submission Number: B4I8260

Are All Laboratory QC Samples Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC met acceptance criteria
Extraction Surrogate Recovery	X			
Method Blank Concentration	X			
Matrix Duplicate RPD	X			
Matrix Spike Recovery	X			
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	All field QC samples are within alert limits
Trip Blank Concentration			X	
Field Duplicate RPD	X			

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	No
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 48 hours (Yes/No)?:	Not Required
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Was a Data Quality Waiver (DQW) issued (Yes/No)?: No

Date Issued: NA

Date of Response: NA

Is data considered to be reliable (Yes/No)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Melanie Thomson

Data Reviewed by (Signature): M. Thomson

Date: October 28, 2014

Task Order#: 4410180847
Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010
Your C.O.C. #: 487951-04-01

Attention:Tanya Fernandes-Peters

exp Energy Services Ltd.
220 Commerce Valley Dr. W
Suite 500
Markham, ON
L3T 0A8

Report Date: 2014/10/17
Report #: R3191428
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B4I8266
Received: 2014/10/08, 15:00

Sample Matrix: Water
Samples Received: 2

Analyses	Quantity	Laboratory Method	Primary Reference
Petroleum Hydro. CCME F1 & BTEX in Water	2	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water	2	CAM SOP-00316	CCME PHC-CWS m
Dissolved Metals by ICPMS	2	CAM SOP-00447	EPA 6020 m
Volatile Organic Compounds in Water	2	CAM SOP-00226	EPA 8260 m

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act.

The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following the 'Alberta Environment Draft Addenda to the CWS-PHC, Appendix 6, Validation of Alternate Methods'. Documentation is available upon request. Maxxam has made the following improvements to the CWS-PHC reference benchmark method: (i) Headspace for F1; and, (ii) Mechanical extraction for F2-F4. Note: F4G cannot be added to the C6 to C50 hydrocarbons.

Maxxam Analytics is accredited by SCC (Lab ID 97) for all specific parameters as required by GUCSO and O.Reg 153/04. Maxxam Analytics is limited in liability to the actual cost of analysis unless otherwise agreed in writing. There is no other warranty expressed or implied. Samples will be retained at Maxxam Analytics for three weeks from receipt of data or as per contract.

All data is in statistical control and has met all QC and method performance criteria unless otherwise flagged. All samples were analysed within hold time unless otherwise flagged. All soil samples for BTEX analysis were methanol extracted within 24 hours unless otherwise flagged.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Patricia Legette
17 Oct 2014 11:22:52 -04:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Patricia Legette, Project Manager
Email: PLegette@maxxam.ca
Phone# (905)817-5799

==========

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Maxxam Job #: B4I8266
Report Date: 2014/10/17

exp Energy Services Ltd.
Task Order#: 4410180847, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

LEAD (DISSOLVED) IN WATER

Maxxam ID		XX8593	XX8594		
Sampling Date		2014/10/07 00:30	2014/10/07 01:00		
COC Number		487951-04-01	487951-04-01		
	Units	**F. BLANK**	**TRIP BLANK**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	<0.50	<0.50	0.50	3783712

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B4I8266
Report Date: 2014/10/17

exp Energy Services Ltd.
Task Order#: 4410180847, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

HBTEX/F1-F4 PET. HYDROCARBONS IN WATER (WATER)

Maxxam ID		XX8593	XX8594		
Sampling Date		2014/10/07 00:30	2014/10/07 01:00		
COC Number		487951-04-01	487951-04-01		
	Units	**F. BLANK**	**TRIP BLANK**	**RDL**	**QC Batch**
Benzene	ug/L	<0.20	<0.20	0.20	3785161
Toluene	ug/L	<0.20	<0.20	0.20	3785161
Ethylbenzene	ug/L	<0.20	<0.20	0.20	3785161
o-Xylene	ug/L	<0.20	<0.20	0.20	3785161
p+m-Xylene	ug/L	<0.40	<0.40	0.40	3785161
Total Xylenes	ug/L	<0.40	<0.40	0.40	3785161
Hexane	ug/L	<5.0	<5.0	5.0	3785161
F1 (C6-C10)	ug/L	<25	<25	25	3785161
F1 (C6-C10) - BTEX	ug/L	<25	<25	25	3785161
F2 (C10-C16 Hydrocarbons)	ug/L	<100	<100	100	3784466
F3 (C16-C34 Hydrocarbons)	ug/L	<200	<200	200	3784466
F4 (C34-C50 Hydrocarbons)	ug/L	<200	<200	200	3784466
Reached Baseline at C50	ug/L	Yes	Yes		3784466
Extraction Surrogate Recovery (%)					
o-Terphenyl	%	95	95		3784466
Instrument Surrogate Recovery (%)					
1,4-Difluorobenzene	%	101	103		3785161
4-Bromofluorobenzene	%	96	100		3785161
D10-Ethylbenzene	%	101	103		3785161
D4-1,2-Dichloroethane	%	85	86		3785161

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B4I8266
Report Date: 2014/10/17

exp Energy Services Ltd.
Task Order#: 4410180847, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

VOLATILE ORGANICS BY GC/MS (WATER)

Maxxam ID		XX8593	XX8594		
Sampling Date		2014/10/07 00:30	2014/10/07 01:00		
COC Number		487951-04-01	487951-04-01		
	Units	**F. BLANK**	**TRIP BLANK**	**RDL**	**QC Batch**
Methyl t-butyl ether (MTBE)	ug/L	<0.20	<0.20	0.20	3777486
Instrument Surrogate Recovery (%)					
4-Bromofluorobenzene	%	100	99		3777486
D4-1,2-Dichloroethane	%	96	95		3777486
D8-Toluene	%	95	95		3777486

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B4I8266
Report Date: 2014/10/17

exp Energy Services Ltd.
Task Order#: 4410180847, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

TEST SUMMARY

Maxxam ID: XX8593
Sample ID: F. BLANK
Matrix: Water

Collected: 2014/10/07
Relinquished: 2014/10/08
Received: 2014/10/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	3785161	N/A	2014/10/15	Sung Ho Kim
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	3784466	2014/10/14	2014/10/15	Zhiyue (Frank) Zhu
Dissolved Metals by ICPMS	ICP/MS	3783712	N/A	2014/10/16	Prempal Bhatti
Volatile Organic Compounds in Water	P&T/MS	3777486	N/A	2014/10/10	Rebecca Schultz

Maxxam ID: XX8594
Sample ID: TRIP BLANK
Matrix: Water

Collected: 2014/10/07
Relinquished: 2014/10/08
Received: 2014/10/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	3785161	N/A	2014/10/15	Sung Ho Kim
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	3784466	2014/10/14	2014/10/15	Zhiyue (Frank) Zhu
Dissolved Metals by ICPMS	ICP/MS	3783712	N/A	2014/10/16	Prempal Bhatti
Volatile Organic Compounds in Water	P&T/MS	3777486	N/A	2014/10/10	Rebecca Schultz

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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	6.3°C
Package 2	7.0°C
Package 3	5.3°C

SQC trend rule failure for Beryllium, Batch 3783712. EWMA greater than 1.5 SD below the mean.

SQC trend rule failure for Selenium, Batch 3783712. EWMA greater than 1.5 SD below the mean.

Results relate only to the items tested.

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Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
3777486	RSC	Method Blank	4-Bromofluorobenzene	2014/10/10		101	%	70 - 130
			D4-1,2-Dichloroethane	2014/10/10		92	%	70 - 130
			D8-Toluene	2014/10/10		97	%	70 - 130
			Methyl t-butyl ether (MTBE)	2014/10/10	<0.20		ug/L	
3783712	PBA	Method Blank	Dissolved Lead (Pb)	2014/10/16	<0.50		ug/L	
3784466	ZZ	Method Blank	o-Terphenyl	2014/10/15		94	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2014/10/15	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2014/10/15	<200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2014/10/15	<200		ug/L	
3785161	SHK	Method Blank	1,4-Difluorobenzene	2014/10/15		99	%	70 - 130
			4-Bromofluorobenzene	2014/10/15		104	%	70 - 130
			D10-Ethylbenzene	2014/10/15		103	%	70 - 130
			D4-1,2-Dichloroethane	2014/10/15		90	%	70 - 130
			Benzene	2014/10/15	<0.20		ug/L	
			Toluene	2014/10/15	<0.20		ug/L	
			Ethylbenzene	2014/10/15	<0.20		ug/L	
			o-Xylene	2014/10/15	<0.20		ug/L	
			p+m-Xylene	2014/10/15	<0.40		ug/L	
			Total Xylenes	2014/10/15	<0.40		ug/L	
			Hexane	2014/10/15	<5.0		ug/L	
			F1 (C6-C10)	2014/10/15	<25		ug/L	
			F1 (C6-C10) - BTEX	2014/10/15	<25		ug/L	
3777486	RSC	LCS	4-Bromofluorobenzene	2014/10/10		102	%	70 - 130
			D4-1,2-Dichloroethane	2014/10/10		91	%	70 - 130
			D8-Toluene	2014/10/10		99	%	70 - 130
			Methyl t-butyl ether (MTBE)	2014/10/10		92	%	70 - 130
3783712	PBA	LCS	Dissolved Lead (Pb)	2014/10/16		96	%	80 - 120
3784466	ZZ	LCS	o-Terphenyl	2014/10/15		97	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2014/10/15		100	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2014/10/15		107	%	60 - 130
			F4 (C34-C50 Hydrocarbons)	2014/10/15		112	%	60 - 130
3785161	SHK	LCS	1,4-Difluorobenzene	2014/10/15		99	%	70 - 130
			4-Bromofluorobenzene	2014/10/15		108	%	70 - 130
			D10-Ethylbenzene	2014/10/15		101	%	70 - 130
			D4-1,2-Dichloroethane	2014/10/15		89	%	70 - 130
			Benzene	2014/10/15		105	%	70 - 130
			Toluene	2014/10/15		107	%	70 - 130
			Ethylbenzene	2014/10/15		118	%	70 - 130
			o-Xylene	2014/10/15		111	%	70 - 130
			p+m-Xylene	2014/10/15		107	%	70 - 130
			Hexane	2014/10/15		98	%	70 - 130
			F1 (C6-C10)	2014/10/15		97	%	70 - 130

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

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Maxxam Job #: B4I8266
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exp Energy Services Ltd.
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Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam

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Toll Free: 800-563-6266

EXXONMOBIL/IMPERIAL OIL - MAXXAM CHAIN-OF-CUSTODY RECORD

ANALYSIS REQUESTED

C of C # 487951-04-01

487951

INVOICE INFORMATION	REPORT INFORMATION
Company Name: Imperial Oil, a partnership of Imperial Oil Limited and McColl Frontenac Petrole	Company Name: exp Energy Services Ltd.
Contact Name: Jessica Snelgrove	Contact Name: Tanya Fernandes-Peters
Address: 1 Duncan Mill Road North York ON M3B 1Z2	Address: 220 Commerce Valley Dr. W Suite 500 Markham ON L3T 0A8
Email: Jessica.j.snelgrove@esso.ca	Email: tanya.fernandes@exp.com;
Phone: (416) 442-5140 x	Phone: (905) 695-3217 x3611
Sampler Name (Print): DAN CLARKE, DARREN DOHERTY	Consultant Project #: 11010

	FIELD SAMPLE ID	MATRIX: GROUNDWATER	MATRIX: SURFACE WATER	MATRIX: SOIL	MATRIX: OTHER	# CONTAINERS	SAMPLING: DATE (YYYY/MM/DD)	SAMPLING: TIME (24 HR)	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	F1 / BTEX + Hexane	F2 - F4	LEAD	MTBE
1	F. Blank				X	12	2014/10/07	0030			X	X	X	X
2	Trip Blank				X	6	2014/10/07	0100			X	X	X	X
3							YYYY/MM/DD	HH:MM						
4							YYYY/MM/DD	HH:MM						
5							YYYY/MM/DD	HH:MM						
6							YYYY/MM/DD	HH:MM						
7							YYYY/MM/DD	HH:MM						
8							YYYY/MM/DD	HH:MM						
9							YYYY/MM/DD	HH:MM						
10							YYYY/MM/DD	HH:MM						

IOL SITE LOCATION:
1660 MERIVALE ROAD, OTTAWA, ON

IOL SITE # (if applicable):
N/A

IOL PROJECT # (if applicable):
MZ 60277

MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM:
4410180847-10

REGULATORY CRITERIA / DETECTION LIMITS

☒ REG 153 Table 3 ☐ 2004 ☒ 2011 ☐ RSC
(Please indicate which Reg. version and if RSC required)

☐ CCME ☐ PWQO

☐ Other

SPECIAL INSTRUCTIONS:

ICE-YES

JARS USED AND NOT SUBMITTED
Enter N/A for Water
NA

TURNAROUND TIME

Standard	(5 days)	☒
Rush	(3 days)	☐
	(2 days)	☐
	(1 day)	☐
	(same day)	☐

Date Required

COOLER ID: 1	1010-1																							
CUSTODY SEAL	YES	NO	TEMP	6	6	7	COOLER ID: 2	1010-2																
PRESENT	✓			1	2	3	CUSTODY SEAL	YES	NO	TEMP	6	7	8	COOLER ID: 3	1010-3									
INTACT	✓						PRESENT	✓			1	2	3	CUSTODY SEAL	YES	NO	TEMP	5	5	6
							INTACT	✓						PRESENT	✓			1	2	3				
														INTACT	✓									

RELINQUISHED BY:		DATE:	TIME (24 HR)	RECEIVED BY:		DATE:	TIME (24 HR)
1.	DARREN DOHERTY	2014/10/07	0100	1.	Grant Pettypiece	2014/10/08	0900
2.	Grant Pettypiece	2014/10/08	1100	2.	FANA	2014/10/08	1500
3.	printed name	YYYY/MM/DD	HH:MM	3.	printed name	YYYY/MM/DD	HH:MM

LAB USE ONLY	
MAXXAM JOB #	B418266
SAMPLES	
LABELED BY:	VERIFIED BY:
FW	ASR

COC – 10-2 (2013) IOL – ON

White Maxxam

Yellow Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: **exp** Energy Services Ltd.

Sampling Date: October 7, 2014

Location: Adjacent to 1660 Merivale Road, Ottawa, Ontario

Laboratory : Maxxam Analytics

Consultant Project Number: 11010

Sample Submission Number: B4I8266

Are All Laboratory QC Samples Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC met acceptance criteria
Extraction Surrogate Recovery	X			
Method Blank Concentration	X			
Matrix Duplicate RPD			X	
Matrix Spike Recovery			X	
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration	X			All field QC samples are within alert limits
Trip Blank Concentration	X			
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	No
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 48 hours (Yes/No)?:	Not Required
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Was a Data Quality Waiver (DQW) issued (Yes/No)?: No

Date Issued: NA

Date of Response: NA

Is data considered to be reliable (Yes/No)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Melanie Thomson

Data Reviewed by (Signature): M. Thomson

Date: October 28, 2014

BARENCO

These documents and the information contained therein are confidential, property of Imperial Oil and any disclosure of same is governed by the provisions of each of the applicable provincial and territorial freedom of information legislation, the Privacy Act (Canada) 1980-81-82-83, c.111, Sch. II"1", and the Access to Information Act (Canada) 1980-81-82-83, c.111, Sch .I"1", as such legislation may be amended from time to time.

October 8, 2014

Imperial Oil
1 Duncan Mill Road,
North York, ON
M3B 1Z2

2014 Ground Water Monitoring and Sampling Program Report
Site Address: 1660 Merivale Road, Ottawa, Ontario
IOL Site Number: 302620
Project Number: 11010
Limitation of liability, scope of report and third party reliance: Appendix A

Sampling Event: August 2014

SCOPE OF WORK

- Monitor all accessible monitors (TH1 to TH7) for subsurface vapour concentrations, water levels and the presence or absence of phase-separated liquid petroleum
- Collect ground water samples from all accessible monitors and submit to the laboratory for analysis of benzene, toluene, ethylbenzene, and xylenes (BTEX), hexane, petroleum hydrocarbon fractions (PHC) F1 to F4, and lead
- Compare the ground water analytical results to the applicable Ontario Regulation 153/04 standards. For this site, Ontario Regulation 153/04 Table 3 standards for an industrial/commercial/community property use and medium and fine textured soils and non-potable ground water use were selected per the CMP prepared by **exp** Energy Services Ltd. on June 27, 2011

RESULTS

- *Ground Water Monitoring* (**Date** - Depth to Ground Water Range; Ground Water Direction)
  - **August 26, 2014** – 3.03 to 4.05 mbgs; southeasterly (Figure 1 and Table 1)
- *Monitoring Well Headspace Vapour* (**Date -** Range)
  - **August 26, 2014** - non-detectable to 30% LEL (Table 1)
- *Liquid Petroleum Occurrence* (**Date** - Observations)
  - **August 26, 2014** - no measurable liquid petroleum (Figure 2 and Table 1)
- *Ground Water Analytical Exceedances* (**Date** - Wells)
  - **August 26 & 27, 2014** - TH3, TH4/DUP1, TH5, and TH7 (Figure 2 and Table 2)

Professional Engineers Ontario

APGO

THIS REPORT CONTAINS PROVISIONS LIMITING LIABILITY, THE SCOPE OF THE REPORT AND THIRD PARTY RELIANCE

220 Commerce Valley Drive West, Suite 500, Markham, ON L3T 0A8, Canada
T: +1.905.695.3217 • www.exp.com

METHODOLOGY

Subsurface Vapour Concentrations

All measurements of petroleum vapours in the monitor riser were made with a Gastechtor 1238 ME in methane elimination mode. Immediately after removing the well cap, the collection tube of the Gastechtor was inserted into the riser and the peak instrument reading wa s recorded.

Combustible Gas Detector Calibrations

Gastechtor 1238 ME calibration is checked on a daily basis in the field in both the parts per million by volume (ppmv) and percentage lower explosive limit (% LEL) range using standard gases comprised of a known concentration of hexane (400 ppmv, 40% LEL) in air. If the instrument readings are within +/- 10% of the standard gas value, then the instrument is deemed to be calibrated. However, if the readings are greater than +/- 10% of the standard gas value then the instrument is re-calibrated in the field prior to use.

Depth to Ground Water and Free Product Thickness

All measurements of depth to ground water and presence or absence of phase-separated liquid petroleum are made with a Solinst Model 122 oil/water interface probe. Both the probe and the measuring tape that come into contact with liquids within a monitor are cleaned with phosphate-free soap and tap water, rinsed with distilled water and then finally rinsed with methanol after each measurement. For all monitors in which phase-separated liquid petroleum is detected with the interface probe, the presence of liquid petroleum is verified with a bailer. For all monitors in which phase-separated liquid petroleum is not detected with the interface probe but that have a petroleum vapour reading of 5% LEL or higher, a bailer is used to check the monitor for the presence of phase-separated liquid petroleum. If there is measurable or observable phase-separated liquid petroleum in the bailer, then a ground water sample is not submitted for laboratory analysis from this location.

Ground Water Sampling Methodology

Ground water samples were collected from all the accessible monitors on August 26 & 27, 2014. All ground water samples were collected using a low-flow sampling technique. This technique involves pumping ground water at low rates, typically less than 500 mL per minute, to minimize drawdown. Purge water collected from the monitors during sampling activities was disposed of at the Scott's Environmental Group facility in Kingston, Ontario, an MOE approved waste receiver.

Prior to collecting the ground water samples, the monitors were purged with the low flow sampling equipment and field parameters (pH, conductivity, turbidity, dissolved oxygen, temperature, and oxidation reduction potential) were monitored until stable readings were achieved. These parameters are considered to be stable when three consecutive readings are within 10% of one another. When stabilization occurs, equilibrium between ground water within a monitor and the surrounding formation water is attained. As such, samples collected when stabilization occurs are considered to be representative of formation water.

Laboratory Analysis of Samples

Samples were collected in the appropriate sample containers, using the appropriate preservatives. All sample bottles were supplied by the laboratory. The ground water samples were placed into a cooler with ice at less than 10°C immediately after they were collected. The samples were submitted to the Mississauga facility of Maxxam Analytics (Maxxam), a Standards Council of Canada (SCC) accredited laboratory. Analytical methods used are referenced in the certificates of analysis presented in Appendix B.

Quality Assurance and Quality Control Program

A quality assurance and quality control (QA/QC) program was implemented to reduce and quantify potential issues introduced during sample collection. All work was carried out following the quality management, control and assurance procedures outlined in Appendix C. A discussion of the laboratory and field QA/QC program is also

provided in Appendix C. In summary, no QA/QC issues were identified that would materially affect the overall conclusions of the ground water monitoring and sampling assessment described in this report.

CLOSURE

We trust this report meets your current needs. If you require further information pertaining to this investigation, please do not hesitate to contact the undersigned.

Sincerely,

exp Energy Services Ltd.

for Melanie Thomson, B.Sc. (Hons.)
Environmental Scientist

Tanya Fernandes-Peters, M.Sc (Env.P)
Intermediate Project Manager

Patricia Stelmack, M.Sc., P. Eng.
Team Lead/Senior Project Manager

LICENSED PROFESSIONAL ENGINEER
P.L. STELMACK
PROVINCE OF ONTARIO

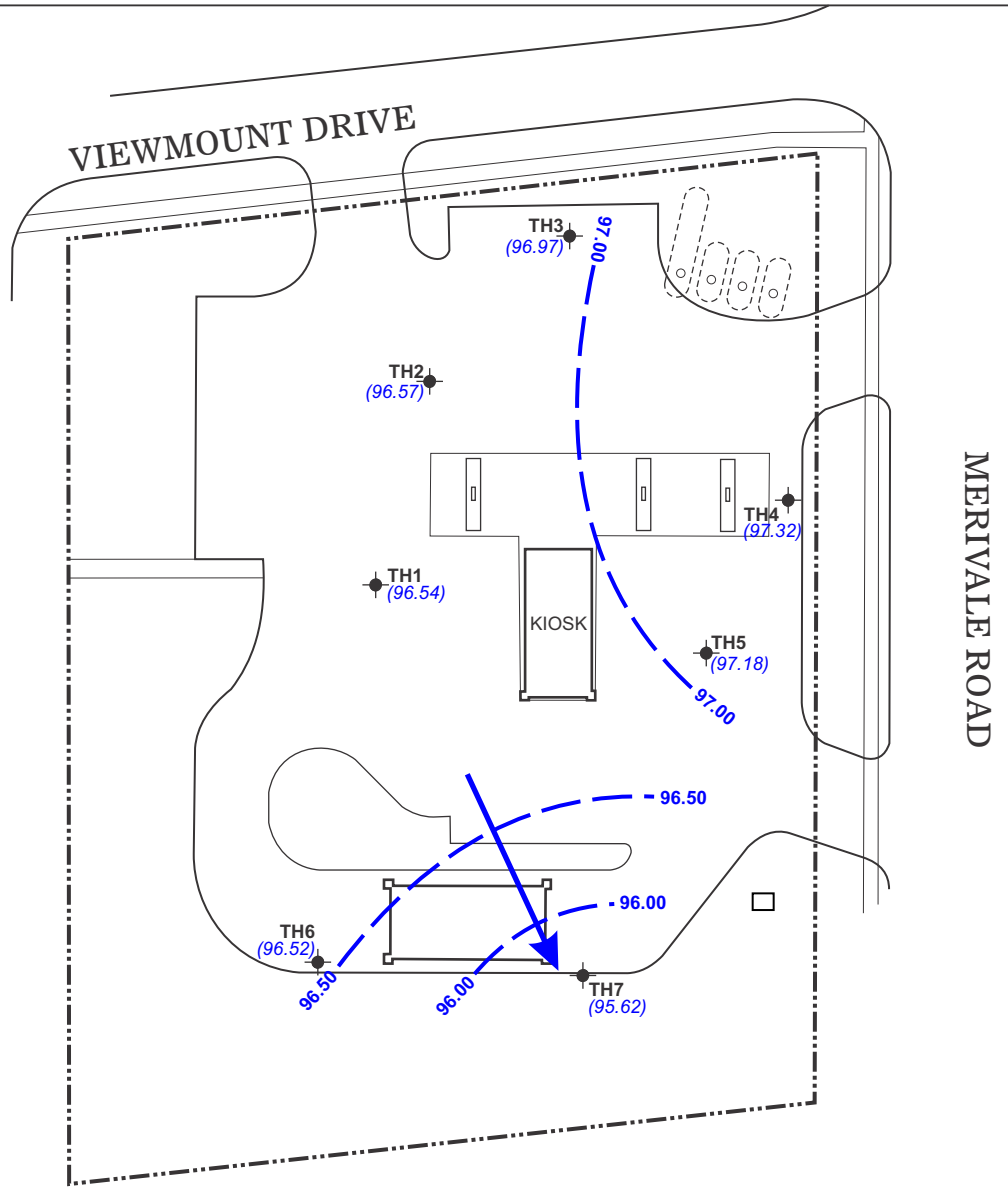
Attachments:

Figure 1 - Ground Water Contour Plan (August 26, 2014)
Figure 2 - Current and Historical Ground Water Analytical Results – Petroleum Related Parameters

Table 1 - Ground Water Monitoring Data
Table 2 - Ground Water Chemical Analysis - Petroleum Related Parameters

Appendix A - Limitation of Liability, Scope of Report and Third Party Reliance
Appendix B - Laboratory Certificates of Analysis
Appendix C - Quality Management, Control and Assurance

Figures



SCALE:

0 10 20m

(APPROXIMATE)

DRAWN BY	CHECKED BY
J.DH.	T.F.P.

SOURCE:

BASED ON 'SITE PLAN' BY IMPERIAL OIL A0765 DATED JAN. 16, 1984, AND FIELD OBSERVATIONS BY **exp** STAFF

NOTE:

BENCHMARK NORTH SIDE OF MANHOLE COVER ON THE WEST SIDE OF THE KIOSK WITH AN ASSUMED ELEVATION OF 100.00M

LEGEND:

PROPERTY BOUNDARY	(100.00) GROUND WATER ELEVATION (m)
TEST HOLE WITH MONITOR (BARENCO, 2011)	(100.00)* GROUND WATER ELEVATION NOT USED IN CONTOURING (m)
	100.00 GROUND WATER ELEVATION CONTOUR (m)
	GROUND WATER FLOW DIRECTION
	(NM) NOT MONITORED
	(NA) NOT ACCESSIBLE

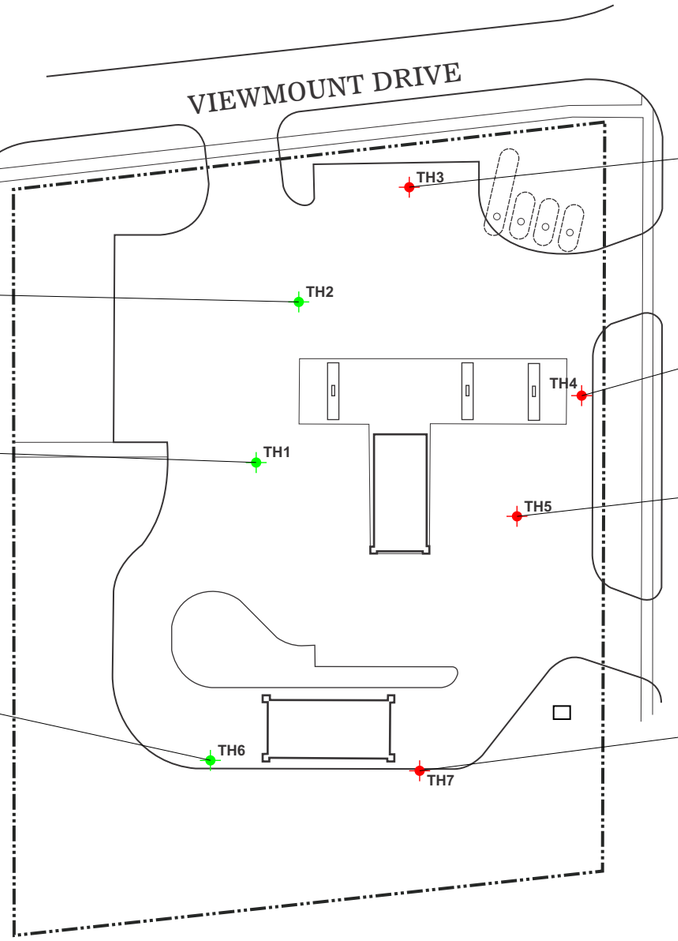
GROUND WATER CONTOUR PLAN (AUGUST 26, 2014)

FIGURE 1

IMPERIAL OIL
1660 MERIVALE ROAD
OTTAWA, ONTARIO

PROJECT NUMBER: 11010 | DATE: SEPTEMBER 2014

11010-GWC PLAN ONSITE-AUG14-SEP14



TH2 — SCREEN INTERVAL = 3.2 to 4.7mbgs

DATE	B	T	E	X	H	F1	F2	F3	F4	Pb
AUG31/11	0.77	<0.20	1.3	0.48	<5.0	<25	<100	<100	<100	<0.5
JUN13/13	0.62	<0.20	2.2	<0.40	<5.0	<25	<100	<200	<200	<0.5
AUG27/14	<0.20	<0.20	<0.20	<0.40	<5.0	<25	<100	<200	<200	<0.50

TH1 — SCREEN INTERVAL = 2.6 to 5.6mbgs

DATE	B	T	E	X	H	F1	F2	F3	F4	Pb
AUG31/11	<0.20	<0.20	<0.20	<0.40	<5.0	<25	<100	<100	<100	<0.5
JUN13/13	<0.20	<0.20	<0.20	<0.40	<5.0	<25	<100	<200	<200	0.53
AUG26/14	<0.20	0.75	<0.20	1.2	<5.0	<25	<100	<200	<200	<0.50

TH6 — SCREEN INTERVAL = 3.6 to 5.1mbgs

DATE	B	T	E	X	H	F1	F2	F3	F4	Pb
OCT20/11	<0.20	<0.20	<0.20	<0.40	<5.0	<25	<100	<100	<100	<0.5
OCT20/11(DUP)	<0.20	<0.20	<0.20	<0.40	<5.0	<25	<100	<100	<100	<0.5
JUN13/13	<0.20	<0.20	<0.20	<0.40	<5.0	<25	<100	<200	<200	0.60
AUG27/14	<0.20	<0.20	<0.20	<0.40	<5.0	<25	<100	<200	<200	<0.50

TH3 — SCREEN INTERVAL = 3.2 to 4.7mbgs

DATE	B	T	E	X	H	F1	F2	F3	F4	Pb
AUG31/11	27	2.4	79	150	20	**1100**	**430**	<100	130	3.8
AUG31/11(DUP)	23	2.1	69	130	17	**1100**	**380**	<100	110	3.9
JUN13/13	11	0.61	66	85	<5.0	**900**	**350**	<200	<200	3.1
AUG26/14	14	0.28	19	5.2	<5.0	520	**180**	<200	<200	2.2

TH4 — SCREEN INTERVAL = 3.4 to 4.9mbgs

DATE	B	T	E	X	H	F1	F2	F3	F4	Pb
AUG31/11	**610**	610	**3400**	**19000**	**540**	**26000**	**17000**	360	170	2.6
JUN13/13	200	35	1200	**4300**	<100	**6200**	**19000**	**580**	430	5.8
AUG26/14	**500**	37	1400	2600	58	**4700**	**1400**	<200	<200	3.0
AUG26/14(DUP)	**540**	40	1600	2700	62	**4000**	**1400**	<200	<200	1.9

TH5 — SCREEN INTERVAL = 3.5 to 5.0mbgs

DATE	B	T	E	X	H	F1	F2	F3	F4	Pb
AUG31/11	**750**	140	**3000**	**13000**	**1400**	**85000**	**20000**	**690**	**620**	5.5
JUN13/13	**530**	44	1600	3800	<100	**9900**	**160000**	**12000**	**6800**	8.3
JUN13/13(DUP)	**550**	44	1600	3800	<100	**9200**	**110000**	**7000**	**4300**	8.0
AUG27/14	**450**	46	1500	3100	210	**11000**	**2800**	<200	<200	4.1

TH7 — SCREEN INTERVAL = 4.4 to 5.8mbgs

DATE	B	T	E	X	H	F1	F2	F3	F4	Pb
NOV14/11	31	5.4	160	340	<30	430	<100	<100	<100	<0.5
JUN13/13	37	2.8	140	130	<5.0	550	**460**	<200	<200	3.2
AUG27/14	150	18	610	730	22	**1900**	**540**	<200	<200	2.1

PARAMETER	ABBREVIATION	REG 153/04 TABLE 3 STANDARDS*
BENZENE	**B**	430
TOLUENE	**T**	18000
ETHYLBENZENE	**E**	2300
XYLENES	**X**	4200
HEXANE	**H**	520
F1 (C_6-C_{10}) - BTEX	**F1**	750
F2 (C_{10}-C_{16})	**F2**	150
F3 (C_{16}-C_{34})	**F3**	500
F4 (C_{34}-C_{50})	**F4**	500
LEAD	**Pb**	25

SCALE:

0 15 30m

(APPROXIMATE)

SOURCE:

BASED ON 'SITE PLAN' BY IMPERIAL OIL A0765 DATED JAN. 16, 1984, AND FIELD OBSERVATIONS BY **exp** STAFF

LEGEND:

PROPERTY BOUNDARY

TEST HOLE WITH MONITOR TH1-TH7 (BARENCO, 2011)

MONITOR LOCATION WHERE MOST RECENT GROUND WATER SAMPLE MEETS **REG 153/04 TABLE 3** STANDARDS FOR ALL PARAMETERS THAT WERE ANALYSED

MONITOR LOCATION WHERE MOST RECENT GROUND WATER SAMPLE EXCEEDS **REG 153/04 TABLE 3** STANDARDS FOR AT LEAST ONE PARAMETER ANALYSED

MONITOR LOCATION WITH MEASURABLE OR OBSERVABLE LIQUID PETROLEUM DURING THE MOST RECENT GROUND WATER SAMPLING EVENT

MONITOR LOCATION WHERE NO GROUND WATER SAMPLE SUBMITTED FOR ANALYSIS DURING THE MOST RECENT GROUND WATER SAMPLING EVENT

TEXT EXCEEDANCES OF **REG 153/04 TABLE 3** STANDARDS

TEXT LIQUID PETROLEUM THICKNESS [IN METRES(m)]

ALL ANALYTICAL RESULTS ARE IN MICROGRAMS PER LITRE (µg/L)
'mbgs ' MEANS METRES BELOW GROUND SURFACE
'-' MEANS NOT ANALYSED OR NOT APPLICABLE
'NM' MEANS NOT MEASURED
'<RDL' MEANS NOT DETECTED AT REPORTING DETECTION LIMIT (RDL)
'RDL' ARE SHOWN FOR NON-DETECTED RESULTS; FOR RDL OF REPORTABLE RESULTS, SEE APPLICABLE DATA TABLE
(DUP) REPRESENTS FIELD DUPLICATE OF PRECEDING SAMPLE

*STANDARDS SHOWN ARE FOR ALL TYPES OF PROPERTY USE AND MEDIUM AND FINE TEXTURED SOILS IN A NON-POTABLE GROUND WATER CONDITION

DRAWN BY	CHECKED BY
J.D.H.	T.F.P.

CURRENT & HISTORICAL GROUND WATER ANALYTICAL RESULTS – PETROLEUM RELATED PARAMETERS

FIGURE 2

IMPERIAL OIL
1660 MERIVALE ROAD
OTTAWA, ONTARIO

PROJECT NUMBER: 11010 | DATE: SEPTEMBER 2014

Tables

Table 1

GROUND WATER MONITORING DATA

1660 Merivale Road, Ottawa, Ontario

Monitor	Top of Pipe Elevation (m)	Ground Surface Elevation (m)	Screen Interval (mbgs)	Date	Petroleum Vapour Concentrations	Liquid Petroleum Thickness (m)*	Water Depth (mbgs)	Water Table Elevation (m)
TH1	99.99	100.08	2.6 to 5.6	30-Aug-11	nd	nd	4.18	95.83
				20-Oct-11	nm	nm	nm	n/a
				15-Nov-11	nm	nm	nm	n/a
				12-Jun-13	10	nd	3.48	96.60
				26-Aug-14	75	nd	3.55	96.54
TH2	100.04	100.14	3.2 to 4.7	30-Aug-11	130	nd	4.19	95.88
				20-Oct-11	nm	nm	nm	n/a
				15-Nov-11	nm	nm	nm	n/a
				12-Jun-13	75	nd	3.46	96.68
				26-Aug-14	nd	nd	3.57	96.57
TH3	100.28	100.41	3.2 to 4.7	30-Aug-11	8%	nd	3.27	97.03
				20-Oct-11	nm	nm	nm	n/a
				15-Nov-11	nm	nm	nm	n/a
				12-Jun-13	35	nd	3.06	97.35
				26-Aug-14	nd	nd	3.44	96.97
TH4	100.27	100.35	3.4 to 4.9	30-Aug-11	45	nd	3.23	97.04
				20-Oct-11	nm	nm	nm	n/a
				15-Nov-11	nm	nm	nm	n/a
				12-Jun-13	150	nd	3.07	97.28
				26-Aug-14	30%	nd	3.03	97.32
TH5	100.12	100.23	3.5 to 5.0	30-Aug-11	450	nd	3.34	96.79
				20-Oct-11	nm	nm	nm	n/a
				15-Nov-11	nm	nm	nm	n/a
				12-Jun-13	290	nd	3.47	96.76
				26-Aug-14	50	nd	3.05	97.18
TH6**	100.08	99.99	3.6 to 5.1	20-Oct-11	nd	nd	5.06	n/a
				15-Nov-11	nm	nm	nm	n/a
				12-Jun-13	25	nd	3.22	96.78
				26-Aug-14	25	nd	3.48	96.52
TH7**	100.50	99.66	4.4 to 5.8	20-Oct-11	nd	nd	dry	dry
				15-Nov-11	nd	nd	2.93	n/a
				12-Jun-13	nd	nd	3.48	96.18
				26-Aug-14	nd	nd	4.05	95.62

Note:

All measurements shown in metres (m)

Elevations are relative to local benchmark (centre of storm sewer catch basin located approximately 5 metres west of kiosk)

assigned elevation = 100.00 m (exp, 2013)

nd means "not detected"; nm means "not monitored"; na means "not accessible"; n/a means "not applicable"; mbgs means "metres below ground surface"

Vapour concentrations measured using Gastechtor 1238 ME operated in methane elimination mode

Petroleum vapour concentrations <500 ppmv shown in parts per million volume (ppmv), >500 ppmv shown in percent of lower explosive limit (% LEL)

* If liquid petroleum was measured, the water table elevations were corrected assuming a liquid petroleum specific gravity of 0.75

** Monitoring well installed in October 2011

Table 2

GROUND WATER CHEMICAL ANALYSIS - Petroleum Related Parameters

1660 Merivale Road, Ottawa, Ontario

Sample	Monitor TH1	Monitor TH2	Monitor TH3	Monitor TH4	Monitor DUP1 (TH4)	Monitor TH5	Ontario Regulation 153/04 Table 3 Ground Water Standards*
Screen Interval (mbgs)	2.6 to 5.6	3.2 to 4.7	3.2 to 4.7	3.4 to 4.9	3.4 to 4.9	3.5 to 5.0	
Sample Date	26-Aug-14	27-Aug-14	26-Aug-14	26-Aug-14	26-Aug-14	27-Aug-14	
Maxxam I.D.	XI5725	XI5729	XI5726	XI5727	XI5728	XI5730	
Maxxam Job #	B4F7840	B4F7840	B4F7840	B4F7840	B4F7840	B4F7840	
PARAMETERS							
Volatile Organic Compounds							
Benzene	<0.20	<0.20	14	**500**	**540**	**450**	430
Toluene	0.75	<0.20	0.28	37	40	46	18000
Ethylbenzene	<0.20	<0.20	19	1400	1600	1500	2300
Xylenes	1.2	<0.40	5.2	2600	2700	3100	4200
Hexane	<5.0	<5.0	<5.0	58	62	210	520
Petroleum Hydrocarbons							
F1 (C6 to C10 - BTEX)	<25	<25	520	**4700**	**4000**	**11000**	750
F2 (C10 to C16)	<100	<100	**180**	**1400**	**1400**	**2800**	150
F3 (C16 to C34)	<200	<200	<200	<200	<200	<200	500
F4 (C34 to C50)	<200	<200	<200	<200	<200	<200	500
Inorganic Parameters							
Lead	<0.50	<0.50	2.2	3.0	1.9	4.1	25

Analysis by Maxxam Analytics

All results in ppb (ug/L); mbgs means "metres below ground surface"; <RDL means not detected at reporting detection limit (RDL); na means "not analysed"

RDL are shown for non-detected results; for RDL of reportable results, see the respective laboratory certificate of analysis (refer to Maxxam Job #)

* Standards shown are for all types of property use and medium and fine textured soils in a non-potable ground water condition

Exceedances of Table 3 standards are shown in **bold**

GROUND WATER CHEMICAL ANALYSIS - Petroleum Related Parameters

1660 Merivale Road, Ottawa, Ontario

Sample	Monitor TH6	Monitor TH7					Ontario Regulation 153/04 Table 3 Ground Water Standards*
Screen Interval (mbgs)	3.6 to 5.1	4.4 to 5.8					
Sample Date	27-Aug-14	27-Aug-14					
Maxxam I.D.	XI5731	XI5732					
Maxxam Job #	B4F7840	B4F7840					
PARAMETERS							
Volatile Organic Compounds							
Benzene	<0.20	150					430
Toluene	<0.20	18					18000
Ethylbenzene	<0.20	610					2300
Xylenes	<0.40	730					4200
Hexane	<5.0	22					520
Petroleum Hydrocarbons							
F1 (C6 to C10 - BTEX)	<25	**1900**					750
F2 (C10 to C16)	<100	**540**					150
F3 (C16 to C34)	<200	<200					500
F4 (C34 to C50)	<200	<200					500
Inorganic Parameters							
Lead	<0.50	2.1					25

Analysis by Maxxam Analytics

All results in ppb (ug/L); mbgs means "metres below ground surface"; <RDL means not detected at reporting detection limit (RDL); na means "not analysed"

RDL are shown for non-detected results; for RDL of reportable results, see the respective laboratory certificate of analysis (refer to Maxxam Job #)

* Standards shown are for all types of property use and medium and fine textured soils in a non-potable ground water condition

Exceedances of Table 3 standards are shown in **bold**

Appendix A –
Limitation of Liability, Scope of Report and Third Party Reliance

LIMITATION OF LIABILITY, SCOPE OF REPORT AND THIRD PARTY RELIANCE

This report has been prepared and the work referred to in this report has been undertaken by **exp** Energy Services Ltd. (**exp**) for Imperial Oil. It is intended for the sole and exclusive use of Imperial Oil, its affiliated companies and partners and the respective insurers, agents, employees and advisors (collectively, "Imperial Oil"). Any use, reliance on or decision made by any person other than Imperial Oil based on this report is the sole responsibility of such other person. Imperial Oil and **exp** make no representation or warranty to any other person with regard to this report and the work referred to in this report and they accept no duty of care to any other person or any liability or responsibility whatsoever for any losses, expenses, damages, fines, penalties, or other harm that may be suffered or incurred by any other person as a result of the use of, reliance on, any decision made or any action taken based on this report or the work referred to in this report.

The investigation undertaken by **exp** with respect to this report and any conclusions or recommendations made in this report reflect **exp's** judgement based on the site conditions observed at the time of the site inspection on the date(s) set out in this report and on information available at the time of preparation of this report. This report has been prepared for specific application to this site and it is based, in part, upon visual observation of the site, subsurface investigation at discrete locations and depths, and specific analysis of specific chemical parameters and materials during a specific time interval, all as described in this report. Unless otherwise stated, the findings cannot be extended to previous or future site conditions, portions of the site which were unavailable for direct investigation, subsurface locations which were not investigated directly, or chemical parameters, materials or analysis which were not addressed. Substances other than those addressed by the investigation described in this report may exist within the site, substances addressed by the investigation may exist in areas of the site not investigated and concentrations of substances addressed which are different than those reported may exist in areas other than the locations from which the samples were taken.

If site conditions or applicable standards change or if any additional information becomes available at a future date, modifications to the findings, conclusions and recommendations in this report may be necessary.

Other than by Imperial Oil, copying or distribution of this report or the use of or reliance on the information contained herein, in whole or in part, is not permitted without the express written permission of **exp.** Nothing in this report is intended to constitute or provide a legal opinion.

Appendix B –
Laboratory Certificates of Analysis

Attached are copies of the original Certificates of Analysis provided by the laboratory. The data contained in these analyses is to be read only in conjunction with the report to which it is attached. For interpretation of the chemical data, see the attached text.

Since the laboratory data contains scientific terms and references, only trained persons familiar with sampling and laboratory methods should attempt to interpret the data contained in the Certificates of Analysis.

Maxxam
A Bureau Veritas Group Company

Success Through Science®

Task Order#: 4410180847
Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010
Your C.O.C. #: 482475-05-01

Attention:Tanya Fernandes-Peters

exp Energy Services Ltd.
220 Commerce Valley Dr. W
Suite 500
Markham, ON
L3T 0A8

Report Date: 2014/09/08
Report #: R3148152
Version: 1

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B4F7840
Received: 2014/08/28, 18:35

Sample Matrix: Water
Samples Received: 8

Analyses	Quantity	Laboratory Method	Primary Reference
Petroleum Hydro. CCME F1 & BTEX in Water	8	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water	8	CAM SOP-00316	CCME PHC-CWS m
Dissolved Metals by ICPMS	8	CAM SOP-00447	EPA 6020 m

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act.

The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following the 'Alberta Environment Draft Addenda to the CWS-PHC, Appendix 6, Validation of Alternate Methods'. Documentation is available upon request. Maxxam has made the following improvements to the CWS-PHC reference benchmark method: (i) Headspace for F1; and, (ii) Mechanical extraction for F2-F4. Note: F4G cannot be added to the C6 to C50 hydrocarbons.

Maxxam Analytics is accredited by SCC (Lab ID 97) for all specific parameters as required by GUCSO and O.Reg 153/04. Maxxam Analytics is limited in liability to the actual cost of analysis unless otherwise agreed in writing. There is no other warranty expressed or implied. Samples will be retained at Maxxam Analytics for three weeks from receipt of data or as per contract.

All data is in statistical control and has met all QC and method performance criteria unless otherwise flagged. All samples were analysed within hold time unless otherwise flagged. All soil samples for BTEX analysis were methanol extracted within 24 hours unless otherwise flagged.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key Kudrat Bajwa
08 Sep 2014 15:33:10 -04:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Patricia Legette, Project Manager
Email: PLegette@maxxam.ca
Phone# (905)817-5799

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B4F7840
Report Date: 2014/09/08

exp Energy Services Ltd.
Task Order#: 4410180847, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

LEAD (DISSOLVED) IN WATER

Maxxam ID		XI5725	XI5725	XI5726	XI5727	XI5728	XI5729		
Sampling Date		2014/08/26 12:00	2014/08/26 12:00	2014/08/26 13:00	2014/08/26 14:00	2014/08/26 14:00	2014/08/27 08:00		
COC Number		482475-05-01	482475-05-01	482475-05-01	482475-05-01	482475-05-01	482475-05-01		
	Units	**TH1**	**TH1 Lab-Dup**	**TH3**	**TH4**	**DUP1**	**TH2**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	<0.50	<0.50	2.2	3.0	1.9	<0.50	0.50	3737314

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

Maxxam ID		XI5730	XI5731	XI5732		
Sampling Date		2014/08/27 10:00	2014/08/27 12:00	2014/08/27 14:00		
COC Number		482475-05-01	482475-05-01	482475-05-01		
	Units	**TH5**	**TH6**	**TH7**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	4.1	<0.50	2.1	0.50	3737314

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B4F7840
Report Date: 2014/09/08

exp Energy Services Ltd.
Task Order#: 4410180847, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

HBTEX/F1-F4 PET. HYDROCARBONS IN WATER (WATER)

Maxxam ID		XI5725	XI5726		XI5727	XI5728		XI5729		
Sampling Date		2014/08/26 12:00	2014/08/26 13:00		2014/08/26 14:00	2014/08/26 14:00		2014/08/27 08:00		
COC Number		482475-05-01	482475-05-01		482475-05-01	482475-05-01		482475-05-01		
	Units	**TH1**	**TH3**	**RDL**	**TH4**	**DUP1**	**RDL**	**TH2**	**RDL**	**QC Batch**
Benzene	ug/L	<0.20	14	0.20	500	540	1.0	<0.20	0.20	3734723
Toluene	ug/L	0.75	0.28	0.20	37	40	1.0	<0.20	0.20	3734723
Ethylbenzene	ug/L	<0.20	19	0.20	1400	1600	1.0	<0.20	0.20	3734723
o-Xylene	ug/L	0.40	0.30	0.20	25	28	1.0	<0.20	0.20	3734723
p+m-Xylene	ug/L	0.76	4.9	0.40	2500	2700	2.0	<0.40	0.40	3734723
Total Xylenes	ug/L	1.2	5.2	0.40	2600	2700	2.0	<0.40	0.40	3734723
Hexane	ug/L	<5.0	<5.0	5.0	58	62	25	<5.0	5.0	3734723
F1 (C6-C10)	ug/L	<25	550	25	9200	8800	130	<25	25	3734723
F1 (C6-C10) - BTEX	ug/L	<25	520	25	4700	4000	130	<25	25	3734723
F2 (C10-C16 Hydrocarbons)	ug/L	<100	180	100	1400	1400	100	<100	100	3735333
F3 (C16-C34 Hydrocarbons)	ug/L	<200	<200	200	<200	<200	200	<200	200	3735333
F4 (C34-C50 Hydrocarbons)	ug/L	<200	<200	200	<200	<200	200	<200	200	3735333
Reached Baseline at C50	ug/L	Yes	Yes		Yes	Yes		Yes		3735333
Extraction Surrogate Recovery (%)										
o-Terphenyl	%	107	102		104	102		100		3735333
Instrument Surrogate Recovery (%)										
1,4-Difluorobenzene	%	99	100		96	99		98		3734723
4-Bromofluorobenzene	%	97	98		105	104		96		3734723
D10-Ethylbenzene	%	97	96		96	106		98		3734723
D4-1,2-Dichloroethane	%	102	103		94	97		99		3734723

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B4F7840
Report Date: 2014/09/08

exp Energy Services Ltd.
Task Order#: 4410180847, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

HBTEX/F1-F4 PET. HYDROCARBONS IN WATER (WATER)

Maxxam ID		XI5729		XI5730		XI5731		XI5732		
Sampling Date		2014/08/27 08:00		2014/08/27 10:00		2014/08/27 12:00		2014/08/27 14:00		
COC Number		482475-05-01		482475-05-01		482475-05-01		482475-05-01		
	Units	**TH2 Lab-Dup**	**RDL**	**TH5**	**RDL**	**TH6**	**RDL**	**TH7**	**RDL**	**QC Batch**
Benzene	ug/L	<0.20	0.20	450	1.0	<0.20	0.20	150	0.40	3734723
Toluene	ug/L	<0.20	0.20	46	1.0	<0.20	0.20	18	0.40	3734723
Ethylbenzene	ug/L	<0.20	0.20	1500	1.0	<0.20	0.20	610	0.40	3734723
o-Xylene	ug/L	<0.20	0.20	120	1.0	<0.20	0.20	23	0.40	3734723
p+m-Xylene	ug/L	<0.40	0.40	3000	2.0	<0.40	0.40	710	0.80	3734723
Total Xylenes	ug/L	<0.40	0.40	3100	2.0	<0.40	0.40	730	0.80	3734723
Hexane	ug/L	<5.0	5.0	210	25	<5.0	5.0	22	10	3734723
F1 (C6-C10)	ug/L	<25	25	16000	130	<25	25	3500	50	3734723
F1 (C6-C10) - BTEX	ug/L	<25	25	11000	130	<25	25	1900	50	3734723
F2 (C10-C16 Hydrocarbons)	ug/L		100	2800	100	<100	100	540	100	3735333
F3 (C16-C34 Hydrocarbons)	ug/L		200	<200	200	<200	200	<200	200	3735333
F4 (C34-C50 Hydrocarbons)	ug/L		200	<200	200	<200	200	<200	200	3735333
Reached Baseline at C50	ug/L			Yes		Yes		Yes		3735333
Extraction Surrogate Recovery (%)										
o-Terphenyl	%			104		102		101		3735333
Instrument Surrogate Recovery (%)										
1,4-Difluorobenzene	%	99		99		100		101		3734723
4-Bromofluorobenzene	%	98		103		101		104		3734723
D10-Ethylbenzene	%	98		116		99		102		3734723
D4-1,2-Dichloroethane	%	101		98		103		98		3734723

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B4F7840
Report Date: 2014/09/08

exp Energy Services Ltd.
Task Order#: 4410180847, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

TEST SUMMARY

Maxxam ID: XI5725
Sample ID: TH1
Matrix: Water

Collected: 2014/08/26
Relinquished: 2014/08/28
Received: 2014/08/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	3734723	N/A	2014/09/05	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	3735333	2014/09/04	2014/09/05	(Kent) Maolin Li
Dissolved Metals by ICPMS	ICP/MS	3737314	N/A	2014/09/06	Prempal Bhatti

Maxxam ID: XI5725 Dup
Sample ID: TH1
Matrix: Water

Collected: 2014/08/26
Relinquished: 2014/08/28
Received: 2014/08/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Metals by ICPMS	ICP/MS	3737314	N/A	2014/09/06	Prempal Bhatti

Maxxam ID: XI5726
Sample ID: TH3
Matrix: Water

Collected: 2014/08/26
Relinquished: 2014/08/28
Received: 2014/08/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	3734723	N/A	2014/09/05	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	3735333	2014/09/04	2014/09/05	(Kent) Maolin Li
Dissolved Metals by ICPMS	ICP/MS	3737314	N/A	2014/09/06	Prempal Bhatti

Maxxam ID: XI5727
Sample ID: TH4
Matrix: Water

Collected: 2014/08/26
Relinquished: 2014/08/28
Received: 2014/08/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	3734723	N/A	2014/09/05	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	3735333	2014/09/04	2014/09/05	(Kent) Maolin Li
Dissolved Metals by ICPMS	ICP/MS	3737314	N/A	2014/09/06	Prempal Bhatti

Maxxam ID: XI5728
Sample ID: DUP1
Matrix: Water

Collected: 2014/08/26
Relinquished: 2014/08/28
Received: 2014/08/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	3734723	N/A	2014/09/05	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	3735333	2014/09/04	2014/09/05	(Kent) Maolin Li
Dissolved Metals by ICPMS	ICP/MS	3737314	N/A	2014/09/06	Prempal Bhatti

Maxxam ID: XI5729
Sample ID: TH2
Matrix: Water

Collected: 2014/08/27
Relinquished: 2014/08/28
Received: 2014/08/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	3734723	N/A	2014/09/05	Abdikarim Ali

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B4F7840
Report Date: 2014/09/08

exp Energy Services Ltd.
Task Order#: 4410180847, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

TEST SUMMARY

Maxxam ID: XI5729
Sample ID: TH2
Matrix: Water

Collected: 2014/08/27
Relinquished: 2014/08/28
Received: 2014/08/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	3735333	2014/09/04	2014/09/05	(Kent) Maolin Li
Dissolved Metals by ICPMS	ICP/MS	3737314	N/A	2014/09/06	Prempal Bhatti

Maxxam ID: XI5729 Dup
Sample ID: TH2
Matrix: Water

Collected: 2014/08/27
Relinquished: 2014/08/28
Received: 2014/08/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	3734723	N/A	2014/09/05	Abdikarim Ali

Maxxam ID: XI5730
Sample ID: TH5
Matrix: Water

Collected: 2014/08/27
Relinquished: 2014/08/28
Received: 2014/08/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	3734723	N/A	2014/09/05	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	3735333	2014/09/04	2014/09/05	(Kent) Maolin Li
Dissolved Metals by ICPMS	ICP/MS	3737314	N/A	2014/09/06	Prempal Bhatti

Maxxam ID: XI5731
Sample ID: TH6
Matrix: Water

Collected: 2014/08/27
Relinquished: 2014/08/28
Received: 2014/08/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	3734723	N/A	2014/09/05	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	3735333	2014/09/04	2014/09/05	(Kent) Maolin Li
Dissolved Metals by ICPMS	ICP/MS	3737314	N/A	2014/09/06	Prempal Bhatti

Maxxam ID: XI5732
Sample ID: TH7
Matrix: Water

Collected: 2014/08/27
Relinquished: 2014/08/28
Received: 2014/08/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	3734723	N/A	2014/09/05	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	3735333	2014/09/04	2014/09/05	(Kent) Maolin Li
Dissolved Metals by ICPMS	ICP/MS	3737314	N/A	2014/09/06	Prempal Bhatti

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Maxxam Job #: B4F7840
Report Date: 2014/09/08

exp Energy Services Ltd.
Task Order#: 4410180847, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	3.0°C
Package 2	1.7°C
Package 3	1.7°C
Package 4	1.0°C

The following bottles contained visual sediment, which was included in the analysis as per the Protocol for Analytical Methods Use in the Assessment of Properties under part XV.1 of the Environmental Protection Act.
ment.

For sample TH1:
1 of 1 x 500mL amber glass bottle for F2-F4 contains 3.8cm of sediment.
1st of 4x 40mL clear glass vial for F1/BTEX contains 4.6cm of sediment.
2nd of 4 x 40mL clear glass vial for F1/BTEX contains 2.5cm of sediment.
3rd of 4 x 40mL clear glass vial for F1/BTEX contains 1.8cm of sediment.
4th of 4 x 40mL clear glass vial for F1/BTEX contains 5.6cm of sediment.

Results relate only to the items tested.

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Maxxam Job #: B4F7840
Report Date: 2014/09/08

exp Energy Services Ltd.
Task Order#: 4410180847, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
3734723	AAI	Method Blank	1,4-Difluorobenzene	2014/09/05		99	%	70 - 130
			4-Bromofluorobenzene	2014/09/05		96	%	70 - 130
			D10-Ethylbenzene	2014/09/05		95	%	70 - 130
			D4-1,2-Dichloroethane	2014/09/05		103	%	70 - 130
			Benzene	2014/09/05	<0.20		ug/L	
			Toluene	2014/09/05	<0.20		ug/L	
			Ethylbenzene	2014/09/05	<0.20		ug/L	
			o-Xylene	2014/09/05	<0.20		ug/L	
			p+m-Xylene	2014/09/05	<0.40		ug/L	
			Total Xylenes	2014/09/05	<0.40		ug/L	
			Hexane	2014/09/05	<5.0		ug/L	
			F1 (C6-C10)	2014/09/05	<25		ug/L	
			F1 (C6-C10) - BTEX	2014/09/05	<25		ug/L	
3735333	KLI	Method Blank	o-Terphenyl	2014/09/05		105	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2014/09/05	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2014/09/05	<200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2014/09/05	<200		ug/L	
3737314	PBA	Method Blank	Dissolved Lead (Pb)	2014/09/06	<0.50		ug/L	
3737314	PBA	RPD [XI5725-02]	Dissolved Lead (Pb)	2014/09/06	NC		%	20
3734723	AAI	RPD [XI5729-04]	Benzene	2014/09/05	NC		%	30
			Toluene	2014/09/05	NC		%	30
			Ethylbenzene	2014/09/05	NC		%	30
			o-Xylene	2014/09/05	NC		%	30
			p+m-Xylene	2014/09/05	NC		%	30
			Total Xylenes	2014/09/05	NC		%	30
			Hexane	2014/09/05	NC		%	30
			F1 (C6-C10)	2014/09/05	NC		%	30
			F1 (C6-C10) - BTEX	2014/09/05	NC		%	30
3734723	AAI	Matrix Spike [XI5729-04]	1,4-Difluorobenzene	2014/09/05		101	%	70 - 130
			4-Bromofluorobenzene	2014/09/05		98	%	70 - 130
			D10-Ethylbenzene	2014/09/05		102	%	70 - 130
			D4-1,2-Dichloroethane	2014/09/05		103	%	70 - 130
			Benzene	2014/09/05		115	%	70 - 130
			Toluene	2014/09/05		111	%	70 - 130
			Ethylbenzene	2014/09/05		121	%	70 - 130
			o-Xylene	2014/09/05		122	%	70 - 130
			p+m-Xylene	2014/09/05		110	%	70 - 130
			Hexane	2014/09/05		85	%	70 - 130
			F1 (C6-C10)	2014/09/05		95	%	70 - 130
3737314	PBA	Matrix Spike [XI5725-02]	Dissolved Lead (Pb)	2014/09/06		95	%	80 - 120
3734723	AAI	LCS	1,4-Difluorobenzene	2014/09/05		101	%	70 - 130
			4-Bromofluorobenzene	2014/09/05		98	%	70 - 130
			D10-Ethylbenzene	2014/09/05		105	%	70 - 130
			D4-1,2-Dichloroethane	2014/09/05		104	%	70 - 130
			Benzene	2014/09/05		121	%	70 - 130
			Toluene	2014/09/05		115	%	70 - 130
			Ethylbenzene	2014/09/05		128	%	70 - 130
			o-Xylene	2014/09/05		128	%	70 - 130
			p+m-Xylene	2014/09/05		118	%	70 - 130
			Hexane	2014/09/05		92	%	70 - 130
			F1 (C6-C10)	2014/09/05		85	%	70 - 130

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Maxxam Job #: B4F7840
Report Date: 2014/09/08

exp Energy Services Ltd.
Task Order#: 4410180847, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
3735333	KLI	LCS	o-Terphenyl	2014/09/05		104	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2014/09/05		102	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2014/09/05		107	%	60 - 130
			F4 (C34-C50 Hydrocarbons)	2014/09/05		108	%	60 - 130
3737314	PBA	LCS	Dissolved Lead (Pb)	2014/09/06		104	%	80 - 120

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

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Report Date: 2014/09/08

exp Energy Services Ltd.
Task Order#: 4410180847, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Brad Newman, Scientific Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam

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Toll Free: 800-563-6266

EXXONMOBIL/IMPERIAL OIL - MAXXAM
CHAIN-OF-CUSTODY RECORD
ANALYSIS REQUESTED

C of C # 482475-05-01

482475

INVOICE INFORMATION	REPORT INFORMATION
Company Name:Imperial Oil, a partnership of Imperial Oil Limited and McColl Frontenac Petrole	Company Name:exp Energy Services Ltd.
Contact Name: ~~Nadia Sullivan~~ JESSICA SNEAGROVE	Contact Name: Tanya Fernandes-Peters
Address: 1 Duncan Mill Road North York ON M3B 1Z2	Address: 220 Commerce Valley Dr. W Suite 500 Markham ON L3T 0A8
Email: ~~nadia.sullivan@esso.ca~~	Email: tanya.fernandes@exp.com;
Phone: ~~(416) 442-8129~~	Phone: (905) 695-3217 x3611
Sampler Name (Print): DAN CLARKE, DARREN DOHERTY	Consultant Project #: 11010

	FIELD SAMPLE ID	MATRIX: GROUNDWATER	MATRIX: SURFACE WATER	MATRIX: SOIL	MATRIX: OTHER	# CONTAINERS	SAMPLING: DATE (YYYY/MM/DD)	SAMPLING: TIME (24 HR)	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	F1 / BTEX + Hexane	F2 - F4	LEAD	*Limited Sample
1	TH1	X				6	2014/08/26	1200	X		X	X	X	X
2	TH3	X				8		1300	X		X	X	X	
3	TH4	X				8		1400	X		X	X	X	
4	DUP1	X				8		1400	X		X	X	X	
5	TH2	X				8	2014/08/27	0800	X		X	X	X	
6	TH5	X				8		1000	X		X	X	X	
7	TH6	X				8		1200	X		X	X	X	
8	TH7	X				8		1400	X		X	X	X	
9														
10														

IOL SITE LOCATION:
1660 MERIVALE ROAD, OTTAWA, ON

IOL SITE # (if applicable):
N/A

IOL PROJECT # (if applicable):
MZ.00277

MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM:
4410180847-10

REGULATORY CRITERIA / DETECTION LIMITS:
☒ REG 153 Table 3 ☐ 2004 ☒ 2011 ☐ RSC
(Please indicate which Reg. version and if RSC required)
☐ ODWS ☐ PWQO
☐ Other

SPECIAL INSTRUCTIONS:
- Tiny bubbles may occur due to degassing
- Particulate may be present
ICE-YES

JARS USED AND NOT SUBMITTED
Enter N/A for Water
NA

TURNAROUND TIME
Standard (5 days) ☒
Rush (3 days) ☐
(2 days) ☐
(1 day) ☐
(same day) ☐
Date Required

COOLER ID: REFER TO ACTR	YES	NO	TEMP	1	2	3
CUSTODY SEAL PRESENT						
CUSTODY SEAL INTACT						

COOLER ID:	YES	NO	TEMP	1	2	3
CUSTODY SEAL PRESENT						
CUSTODY SEAL INTACT						

COOLER ID:	YES	NO	TEMP	1	2	3
CUSTODY SEAL PRESENT						
CUSTODY SEAL INTACT						

	RELINQUISHED BY:	DATE:	TIME (24 HR)	RECEIVED BY:	DATE:	TIME (24 HR)
1.	D DOHERTY	2014/08/27	1700	1.	2014/08/28	0900
2.	Dorothy YU	2014/08/28	1100	2. FANG WANG	2014/08/28	18:35
3.				3.		

LAB USE ONLY
MAXXAM JOB #
B4F7840
SAMPLES
LABELED BY: NVA
VERIFIED BY: FW

COC – 1012 (2013) IOL – ON

White: Maxxam

Yellow: Client

Maxxam

ADDITIONAL COOLER TEMPERATURE RECORD

CHAIN-OF-CUSTODY RECORD

CHAIN OF CUSTODY #	
Page 1 of 1	482475-05-01
Page ___ of ___	
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Page ___ of ___	
Page ___ of ___	

COOLER OBSERVATIONS:

MAXXAM JOB#: B4F7840 NNA/FW

CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT	✓					
INTACT	✓		TEMP	1	4	4
ICE PRESENT	✓			1	2	3

CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT	✓					
INTACT	✓		TEMP	1	2	2
ICE PRESENT	✓			1	2	3

CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT	✓					
INTACT	✓		TEMP	2	2	1
ICE PRESENT	✓			1	2	3

CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT	✓					
INTACT	✓		TEMP	1	1	1
ICE PRESENT	✓			1	2	3

CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT						
INTACT			TEMP			
ICE PRESENT				1	2	3

CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT						
INTACT			TEMP			
ICE PRESENT				1	2	3

CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT						
INTACT			TEMP			
ICE PRESENT				1	2	3

CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT						
INTACT			TEMP			
ICE PRESENT				1	2	3

CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT						
INTACT			TEMP			
ICE PRESENT				1	2	3

CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT						
INTACT			TEMP			
ICE PRESENT				1	2	3

CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT						
INTACT			TEMP			
ICE PRESENT				1	2	3

CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT						
INTACT			TEMP			
ICE PRESENT				1	2	3

CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT						
INTACT			TEMP			
ICE PRESENT				1	2	3

CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT						
INTACT			TEMP			
ICE PRESENT				1	2	3

CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT						
INTACT			TEMP			
ICE PRESENT				1	2	3

CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT						
INTACT			TEMP			
ICE PRESENT				1	2	3

RECEIVED BY (SIGN & PRINT)		DATE (YYYY/MM/DD)	TIME (HH:MM)
	FANG WANG	2014/08/28	18:35

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: **exp** Energy Services Ltd.

Sampling Date: August 26 & 27, 2014

Location: 1660 Merivale Road, Ottawa

Laboratory : Maxxam Analytics

Consultant Project Number: 11010

Sample Submission Number: B4F7840

Are All Laboratory QC Samples Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC met acceptance criteria
Extraction Surrogate Recovery	X			
Method Blank Concentration	X			
Matrix Duplicate RPD	X			
Matrix Spike Recovery	X			
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	All field QC samples are within alert limits
Trip Blank Concentration			X	
Field Duplicate RPD	X			

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 48 hours (Yes/No)?:	Not required
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Was a Data Quality Waiver (DQW) issued (Yes/No)?: No

Date Issued: NA

Date of Response: NA

Is data considered to be reliable (Yes/No)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Melanie Thomson

Data Reviewed by (Signature): M. Thomson

Date: September 9, 2014

Maxxam
A Bureau Veritas Group Company

Success Through Science®

Task Order#: 4410180847
Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010
Your C.O.C. #: 482475-04-01

Attention:Tanya Fernandes-Peters

exp Energy Services Ltd.
220 Commerce Valley Dr. W
Suite 500
Markham, ON
L3T 0A8

Report Date: 2014/09/08
Report #: R3148166
Version: 1

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B4F7892
Received: 2014/08/28, 18:35

Sample Matrix: Water
Samples Received: 2

Analyses	Quantity	Laboratory Method	Primary Reference
Petroleum Hydro. CCME F1 & BTEX in Water	2	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water	2	CAM SOP-00316	CCME PHC-CWS m
Dissolved Metals by ICPMS	2	CAM SOP-00447	EPA 6020 m

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act.

The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following the 'Alberta Environment Draft Addenda to the CWS-PHC, Appendix 6, Validation of Alternate Methods'. Documentation is available upon request. Maxxam has made the following improvements to the CWS-PHC reference benchmark method: (i) Headspace for F1; and, (ii) Mechanical extraction for F2-F4. Note: F4G cannot be added to the C6 to C50 hydrocarbons.

Maxxam Analytics is accredited by SCC (Lab ID 97) for all specific parameters as required by GUCSO and O.Reg 153/04. Maxxam Analytics is limited in liability to the actual cost of analysis unless otherwise agreed in writing. There is no other warranty expressed or implied. Samples will be retained at Maxxam Analytics for three weeks from receipt of data or as per contract.

All data is in statistical control and has met all QC and method performance criteria unless otherwise flagged. All samples were analysed within hold time unless otherwise flagged. All soil samples for BTEX analysis were methanol extracted within 24 hours unless otherwise flagged.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key Kudrat Bajwa
Kudrat Bajwa
08 Sep 2014 15:30:00 -04:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Patricia Legette, Project Manager
Email: PLegette@maxxam.ca
Phone# (905)817-5799

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B4F7892
Report Date: 2014/09/08

exp Energy Services Ltd.
Task Order#: 4410180847, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

LEAD (DISSOLVED) IN WATER

Maxxam ID		XI6061	XI6062		
Sampling Date		2014/08/27 16:30	2014/08/27 17:00		
COC Number		482475-04-01	482475-04-01		
	Units	**F. BLANK**	**TRIP BLANK**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	<0.50	<0.50	0.50	3737314

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B4F7892
Report Date: 2014/09/08

exp Energy Services Ltd.
Task Order#: 4410180847, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

HBTEX/F1-F4 PET. HYDROCARBONS IN WATER (WATER)

Maxxam ID		XI6061	XI6062		
Sampling Date		2014/08/27 16:30	2014/08/27 17:00		
COC Number		482475-04-01	482475-04-01		
	Units	**F. BLANK**	**TRIP BLANK**	**RDL**	**QC Batch**
Benzene	ug/L	<0.20	<0.20	0.20	3734408
Toluene	ug/L	<0.20	<0.20	0.20	3734408
Ethylbenzene	ug/L	<0.20	<0.20	0.20	3734408
o-Xylene	ug/L	<0.20	<0.20	0.20	3734408
p+m-Xylene	ug/L	<0.40	<0.40	0.40	3734408
Total Xylenes	ug/L	<0.40	<0.40	0.40	3734408
Hexane	ug/L	<5.0	<5.0	5.0	3734408
F1 (C6-C10)	ug/L	<25	<25	25	3734408
F1 (C6-C10) - BTEX	ug/L	<25	<25	25	3734408
F2 (C10-C16 Hydrocarbons)	ug/L	<100	<100	100	3735333
F3 (C16-C34 Hydrocarbons)	ug/L	<200	<200	200	3735333
F4 (C34-C50 Hydrocarbons)	ug/L	<200	<200	200	3735333
Reached Baseline at C50	ug/L	Yes	Yes		3735333
Extraction Surrogate Recovery (%)					
o-Terphenyl	%	102	102		3735333
Instrument Surrogate Recovery (%)					
1,4-Difluorobenzene	%	104	100		3734408
4-Bromofluorobenzene	%	98	92		3734408
D10-Ethylbenzene	%	102	100		3734408
D4-1,2-Dichloroethane	%	93	91		3734408

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Task Order#: 4410180847, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

TEST SUMMARY

Maxxam ID: XI6061
Sample ID: F. BLANK
Matrix: Water

Collected: 2014/08/27
Relinquished: 2014/08/28
Received: 2014/08/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	3734408	N/A	2014/09/04	Sung Ho Kim
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	3735333	2014/09/04	2014/09/05	(Kent) Maolin Li
Dissolved Metals by ICPMS	ICP/MS	3737314	N/A	2014/09/06	Prempal Bhatti

Maxxam ID: XI6062
Sample ID: TRIP BLANK
Matrix: Water

Collected: 2014/08/27
Relinquished: 2014/08/28
Received: 2014/08/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	3734408	N/A	2014/09/04	Sung Ho Kim
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	3735333	2014/09/04	2014/09/05	(Kent) Maolin Li
Dissolved Metals by ICPMS	ICP/MS	3737314	N/A	2014/09/06	Prempal Bhatti

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Maxxam Job #: B4F7892
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Project #: 11010

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	3.0°C
Package 2	1.7°C
Package 3	1.7°C
Package 4	1.0°C

Results relate only to the items tested.

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Maxxam Job #: B4F7892
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Task Order#: 4410180847, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
3734408	SHK	Method Blank	1,4-Difluorobenzene	2014/09/04		103	%	70 - 130
			4-Bromofluorobenzene	2014/09/04		98	%	70 - 130
			D10-Ethylbenzene	2014/09/04		106	%	70 - 130
			D4-1,2-Dichloroethane	2014/09/04		93	%	70 - 130
			Benzene	2014/09/04	<0.20		ug/L	
			Toluene	2014/09/04	<0.20		ug/L	
			Ethylbenzene	2014/09/04	<0.20		ug/L	
			o-Xylene	2014/09/04	<0.20		ug/L	
			p+m-Xylene	2014/09/04	<0.40		ug/L	
			Total Xylenes	2014/09/04	<0.40		ug/L	
			Hexane	2014/09/04	<5.0		ug/L	
			F1 (C6-C10)	2014/09/04	<25		ug/L	
			F1 (C6-C10) - BTEX	2014/09/04	<25		ug/L	
3735333	KLI	Method Blank	o-Terphenyl	2014/09/05		105	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2014/09/05	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2014/09/05	<200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2014/09/05	<200		ug/L	
3737314	PBA	Method Blank	Dissolved Lead (Pb)	2014/09/06	<0.50		ug/L	
3734408	SHK	LCS	1,4-Difluorobenzene	2014/09/05		102	%	70 - 130
			4-Bromofluorobenzene	2014/09/05		104	%	70 - 130
			D10-Ethylbenzene	2014/09/05		108	%	70 - 130
			D4-1,2-Dichloroethane	2014/09/05		92	%	70 - 130
			Benzene	2014/09/05		104	%	70 - 130
			Toluene	2014/09/05		105	%	70 - 130
			Ethylbenzene	2014/09/05		114	%	70 - 130
			o-Xylene	2014/09/05		110	%	70 - 130
			p+m-Xylene	2014/09/05		107	%	70 - 130
			Hexane	2014/09/05		102	%	70 - 130
			F1 (C6-C10)	2014/09/05		95	%	70 - 130
3735333	KLI	LCS	o-Terphenyl	2014/09/05		104	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2014/09/05		102	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2014/09/05		107	%	60 - 130
			F4 (C34-C50 Hydrocarbons)	2014/09/05		108	%	60 - 130
3737314	PBA	LCS	Dissolved Lead (Pb)	2014/09/06		104	%	80 - 120

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

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Maxxam Job #: B4F7892
Report Date: 2014/09/08

exp Energy Services Ltd.
Task Order#: 4410180847, Line Item: 10
Site#: MZ.00277
Site Location: N/A;1660 MERIVALE ROAD, OTTAWA, ON
Project #: 11010

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Toll Free: 800-563-6266

EXXONMOBIL/IMPERIAL OIL - MAXXAM
CHAIN-OF-CUSTODY RECORD
ANALYSIS REQUESTED

C of C # 482475-04-01

482475

INVOICE INFORMATION	REPORT INFORMATION
Company Name: Imperial Oil, a partnership of Imperial Oil Limited and McColl Frontenac Petrole	Company Name: exp Energy Services Ltd.
Contact Name: ~~Nadia Sullivan~~ JESSICA SNEDDON	Contact Name: Tanya Fernandes-Peters
Address: 1 Duncan Mill Road North York ON M3B 1Z2	Address: 220 Commerce Valley Dr. W Suite 500 Markham ON L3T 0A8
Email: ~~nadia.sullivan@esso.ca~~	Email: tanya.fernandes@exp.com;
Phone: ~~(416) [illegible]~~	Phone: (905) 695-3217 x3611
Sampler Name (Print): DAN CLARKE, DARREN DOHERTY	Consultant Project #: 11010

	FIELD SAMPLE ID	MATRIX: GROUNDWATER	MATRIX: SURFACE WATER	MATRIX: SOIL	MATRIX: OTHER	# CONTAINERS	SAMPLING: DATE (YYYY/MM/DD)	SAMPLING: TIME (24 HR)	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	F1 / BTEX + Hexane	F2 - F4	LEAD
1	FiBlank				X	8	2014/08/27	1630			X	X	X
2	Trip Blank				X	5	2014/08/27	1700			X	X	X
3													
4													
5													
6													
7													
8													
9													
10													

IOL SITE LOCATION:
1660 MERIVALE ROAD, OTTAWA, ON

IOL SITE # (if applicable):
N/A

IOL PROJECT # (if applicable):
MZ.00277

MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM:
4410180847-10

REGULATORY CRITERIA / DETECTION LIMITS:
☒ REG 153 Table 3 ☐ 2004 ☒ 2011 ☐ RSC
(Please indicate which Reg. version and if RSC required)
☐ ODWS ☐ PWQO
☐ Other

SPECIAL INSTRUCTIONS:
ICE - YES

JARS USED AND NOT SUBMITTED Enter N/A for Water
NA

TURNAROUND TIME
Standard (5 days) ☒
Rush (3 days) ☐
(2 days) ☐
(1 day) ☐
(same day) ☐
Date Required

COOLER ID: REFER TO ACTR						COOLER ID:						COOLER ID:					
CUSTODY SEAL	YES	NO	TEMP	1	2	3	CUSTODY SEAL	YES	NO	TEMP	1	2	3	CUSTODY SEAL	YES	NO	TEMP	1	2	3
PRESENT							PRESENT							PRESENT						
INTACT							INTACT							INTACT						

RELINQUISHED BY:		DATE:	TIME (24 HR)	RECEIVED BY:		DATE:	TIME (24 HR)
1.	D. DOHERTY	2014/08/27	1700	1.	Dorothy Yu	2014/08/28	0900
2.	Dorothy Yu	2014/08/28	1100	2.	FANG WANG	2014/08/28	18:35
3.				3.			

LAB USE ONLY
MAXXAM JOB # B4F7892
SAMPLES
LABELED BY: HG1
VERIFIED BY: FW

COC - 1012 (2013) IOL - ON

White: Maxxam

Yellow: Client

Maxxam

ADDITIONAL COOLER TEMPERATURE RECORD

CHAIN-OF-CUSTODY RECORD

CHAIN OF CUSTODY #	
Page 1 of 1	482475-04-01
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COOLER OBSERVATIONS:

MAXXAM JOB#: B4F7892 HG1/

CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT	✓					
INTACT	✓		TEMP	1	4	4
ICE PRESENT	✓			1	2	3

CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT	✓					
INTACT	✓		TEMP	1	2	2
ICE PRESENT	✓			1	2	3

CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT	✓					
INTACT	✓		TEMP	2	2	1
ICE PRESENT	✓			1	2	3

CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT	✓					
INTACT	✓		TEMP	1	1	1
ICE PRESENT	✓			1	2	3

CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT						
INTACT			TEMP			
ICE PRESENT				1	2	3

CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT						
INTACT			TEMP			
ICE PRESENT				1	2	3

CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT						
INTACT			TEMP			
ICE PRESENT				1	2	3

CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT						
INTACT			TEMP			
ICE PRESENT				1	2	3

CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT						
INTACT			TEMP			
ICE PRESENT				1	2	3

CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT						
INTACT			TEMP			
ICE PRESENT				1	2	3

CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT						
INTACT			TEMP			
ICE PRESENT				1	2	3

CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT						
INTACT			TEMP			
ICE PRESENT				1	2	3

CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT						
INTACT			TEMP			
ICE PRESENT				1	2	3

CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT						
INTACT			TEMP			
ICE PRESENT				1	2	3

CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT						
INTACT			TEMP			
ICE PRESENT				1	2	3

CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT						
INTACT			TEMP			
ICE PRESENT				1	2	3

CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT						
INTACT			TEMP			
ICE PRESENT				1	2	3

CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT						
INTACT			TEMP			
ICE PRESENT				1	2	3

RECEIVED BY (SIGN & PRINT)		DATE (YYYY/MM/DD)	TIME (HH:MM)
[signature]	FANG WANG	2014/08/28	18:35

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: **exp** Energy Services Ltd.

Sampling Date: August 27, 2014

Location: 1660 Merivale Road, Ottawa

Laboratory : Maxxam Analytics

Consultant Project Number: 11010

Sample Submission Number: B4F7892

Are All Laboratory QC Samples Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC met acceptance criteria
Extraction Surrogate Recovery	X			
Method Blank Concentration	X			
Matrix Duplicate RPD			X	
Matrix Spike Recovery			X	
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration	X			All field QC samples are within alert limits
Trip Blank Concentration	X			
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 48 hours (Yes/No)?:	Not required
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Was a Data Quality Waiver (DQW) issued (Yes/No)?: No

Date Issued: NA

Date of Response: NA

Is data considered to be reliable (Yes/No)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Melanie Thomson

Data Reviewed by (Signature): M. Thomson

Date: September 9, 2014

Appendix C –
Quality Management, Control and Assurance

QUALITY MANAGEMENT, CONTROL AND ASSURANCE

Project Quality Management

The field work documented in this report and the preparation of this report were overseen by a Qualified Person, as defined in Ontario Regulation 153/04, as amended (Regulation 153/04).

Sampling analysis was performed using generally accepted principles and with appropriate sampling equipment. Written field and laboratory sampling procedures for ground water developed by **exp** Energy Services Ltd. (**exp**) were used to ensure consistency in sample collection and preparation of samples for submission to the laboratory.

The staff involved in the field sampling have participated in regular, ongoing training programs and were qualified and experienced in collecting, describing, and preparing environmental samples for laboratory analysis.

Laboratory analysis was performed using generally accepted principles in accordance with the *Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the* Environmental Protection Act, March 9, 2004 amended as of July 1, 2011 (Protocol).

Data quality objectives for the parameters of concern were set to meet acceptable RDLs to achieve the goal of defining areas where such parameters are present at levels in excess of applicable generic standards, as defined in Regulation 153/04. Sampling programs included providing written instruction to the analytical laboratory describing the required analyses on the Chain of Custody prepared and delivered with the samples.

The laboratory has a standing contract with Imperial Oil which sets out specific data quality requirements. Any non-compliance with this contract is documented using a data quality waiver issued by the laboratory. When a data quality waiver is issued by the laboratory, it must be reviewed, signed by **exp**, and returned to the laboratory. Data quality waivers are included with all reports, along with the complete Certificate of Analysis.

Field Quality Assurance/ Quality Control

The ground water sampling plan was prepared and executed based on previous assessment work conducted for the site and on professional judgment at the time of the investigation.

Field observations were made and documented in a field book in accordance with generally accepted practices and with the procedures developed and utilized by **exp**.

Exp field sampling Quality Assurance and Quality Control (QA/QC) protocols are tailored to the investigation and include:

- The collection of at least one field duplicate sample for every ten samples or less (where three or more such samples are collected)
- For ground water samples, the collection of samples directly into vials with Teflon-lined lids or bottles containing an appropriate preservative, where required
- For ground water samples analysed for dissolved metals, including mercury and hexavalent chromium, filtration of the sample in the field using a 45 micron disposable filter prior to collection in a bottle containing preservative
- For ground water samples analysed for benzo(a)pyrene, where deemed necessary by the Qualified Person overseeing this work, the collection of an additional bottle for laboratory filtration prior to analysis
- The immediate placement, upon collection, of ground water samples into a cooler with free ice to lower the temperature to less than 10° C
- For ground water sampling, the use of dedicated sampling equipment at different monitors (including the use of dedicated tubing when low flow ground water sampling techniques are used)
- Ensuring that neither the bare hand nor latex glove comes into contact with the ground water as it is being placed into the sample container
- The inclusion of one ground water field blank and trip blank per submission for all parameters in ground water except pH and electrical conductivity. The field blanks are prepared in the field during the sample collection process using laboratory-supplied water and returned to the laboratory for analysis as part of the submission. The trip blanks are prepared by the laboratory, kept in the cooler on ice for the duration of the sampling event and returned to the laboratory unopened for analysis as part of the submission
- All samples were shipped to the laboratory in custody sealed coolers, filled with ice at less than 10° C
- All sample shipments are accompanied by standard chain of custody forms

The results of the field duplicate samples are presented along with the tabulated data in this appendix. Tabulated data are presented to a maximum of two significant digits.

Laboratory Quality Assurance/Quality Control

All laboratory analyses were completed by the Mississauga facility of Maxxam Analytics (Maxxam). This Maxxam laboratory has been accredited by the Standards Council of Canada (SCC) for all of the parameters that were analysed in accordance with the latest version of the International Standard ISO/IEC 17025 – "*General Requirement for the Competence of Testing and Calibration Laboratories*". Maxxam performed the work following formal written methods and procedures. These methods include all the minimum requirements as specified in the Protocol.

Exp has accepted the data provided by Maxxam based on the assurance from Maxxam that, as a minimum, the following requirements have been met and documentation to demonstrate compliance can be produced on request:

- The method performance criteria identified in the Protocol were met
- Sample storage requirements, pre-analysis processing techniques, and holding times for all sample types as identified in the Protocol were met following receipt and sign-off of the samples from **exp** staff
- The results of all laboratory QC samples were within statistically determined control limits and if not, reasons were provided
- Surrogate recoveries for organic analyses were monitored and recorded
- Details on the precision and accuracy of the data have been recorded and retained and are available from the laboratory should they be required as a result of a Ministry of the Environment (MOE) audit
- The analytical data were reported without blank correction (unless the correction was clearly identified on the Certificate of Analysis)
- All laboratory QA/QC sample data, including method blanks, matrix spikes, matrix duplicates, laboratory control samples, and surrogate recoveries, were included in the Certificate of Analysis

All Certificates of Analysis were reviewed by the Qualified Person to ensure that data quality objectives have been met and that any anomalies have been identified. A data quality review checklist has been prepared by an **exp** staff member under the supervision of the Qualified Person for each laboratory submission. The checklist is appended with each Certificate of Analysis. All Certificates of Analysis meet the requirements under Section 47(3) of Regulation 153/04.

Quality Assurance/Quality Control Program

The laboratory QA/QC program consisted of one or more of the following analysis: a) instrument and extraction surrogate recoveries for soil and/or ground water samples that were analysed and b) the analysis of a method blank, laboratory duplicate, matrix spike and/or laboratory control samples for the analytical batches that were analysed. The laboratory QA/QC results are included in the certificates of analysis. As indicated, no laboratory QA/QC issues were identified that would have a material effect on the interpretation of results presented in this report.

The ground water field QA/QC program consisted of the following submission for laboratory analysis: one field duplicate sample for BTEX, hexane, PHC fractions F1 to F4, and lead; one field blank for BTEX, hexane, PHC fractions F1 to F4, and lead; and one trip blank for BTEX, hexane, PHC fractions F1 to F4, and lead.

For the field duplicate samples, evaluation of the QA/QC results were determined by calculating the relative percent difference (RPD) between the field duplicate and original sample results, and comparison of the RPD to designated alert limits. Consistent with laboratory practices and to permit reliable calculations, an RPD is only calculated when the original and duplicate sample concentrations are at least five times the reportable detections limits.

$$RPD = \left| \frac{(x_1 - x_2)}{\left(\frac{(x_1 + x_2)}{2}\right)} \right| \times 100\%$$

The RPD for the ground water field duplicate sample are provided in Table C-1, along with the designated field duplicate alert limits. All of the RPD were either within the alert limits or not calculable.

The ground water trip blank and field blank data were compared to the alert limits and are provided in Table C-2. All of the results were within the alert limits.

No field or laboratory QA/QC issues were identified that would affect the overall conclusions presented in this report. Overall, the results reported are considered to be reliable.

Table C-1

GROUND WATER FIELD DUPLICATE

Relative Percent Differences - Petroleum Related Parameters

1660 Merivale Road, Ottawa, Ontario

August 26, 2014

Location Maxxam I.D.		TH4 XI5727	DUP1 (TH4) XI5728	RPD (%)	Alert Limit (%)
PARAMETERS	**RDL***				
Volatile Organic Compounds					
Benzene	1.0	500	540	8	80
Toluene	1.0	37	40	8	80
Ethylbenzene	1.0	1400	1600	13	80
Xylenes	2.0	2600	2700	4	80
Hexane	25	58	62	nc	80
Petroleum Hydrocarbons					
F1 (C6 to C10 - BTEX)	130	4700	4000	16	80
F2 (C10 to C16)	100	1400	1400	0	80
F3 (C16 to C34)	200	<200	<200	nc	80
F4 (C34 to C50)	200	<200	<200	nc	80
Inorganic Parameters					
Lead	0.50	3.0	1.9	nc	50

Analysis by Maxxam Analytics

All results in ppb (ug/L) unless otherwise indicated; <RDL means not detected at reporting detection limit (RDL)

na means "not analysed"

nc means "not calculable" - one (or both) of the results are <5x RDL

* Analytical RDL are shown for comparison with detectable results; if RDL differ for each sample, both are shown (sample RDL/duplicate RDL)

Exceedances of alert limits are shown in **bold**

Table C-2

GROUND WATER CHEMICAL ANALYSIS - Petroleum Related Parameters

Field Blank and Trip Blank

1660 Merivale Road, Ottawa, Ontario

Sample	F.BLANK	TRIP BLANK					Alert Limit
Sample Date	27-Aug-14	27-Aug-14					
Maxxam I.D.	XI6061	XI6062					
Maxxam Job #	B4F7892	B4F7892					
PARAMETERS							
Volatile Organic Compounds							
Benzene	<0.20	<0.20					1X RDL
Toluene	<0.20	<0.20					1X RDL
Ethylbenzene	<0.20	<0.20					1X RDL
Xylenes	<0.40	<0.40					1X RDL
Hexane	<5.0	<5.0					1X RDL
Petroleum Hydrocarbons							
F1 (C6 to C10 - BTEX)	<25	<25					2X RDL
F2 (C10 to C16)	<100	<100					2X RDL
F3 (C16 to C34)	<200	<200					2X RDL
F4 (C34 to C50)	<200	<200					2X RDL
Inorganic Parameters							
Lead	<0.50	<0.50					5X RDL

Analysis by Maxxam Analytics

All results in ppb (ug/L) unless otherwise indicated; <RDL means not detected at reporting detection limit (RDL); na means "not analysed"

RDL are shown for non-detected results; for RDL of reportable results, see the respective laboratory certificate of analysis (refer to Maxxam Job #)

Exceedances of alert limits are shown in **bold**

BARENCO

Phase II Environmental Site Assessment

Project Name
Adjacent to 1660 Merivale Road
Ottawa, ON

IOL Site Number
302620

Project Number
11010

Prepared For: **Imperial Oil**
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Toronto, ON M3C 1K5

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Date
December 5, 2013

THIS REPORT CONTAINS PROVISIONS LIMITING LIABILITY, THE SCOPE OF THE REPORT AND THIRD PARTY RELIANCE
"These documents and the information contained therein are confidential, property of Imperial Oil and any disclosure of same is governed by the provisions of each of the applicable provincial and territorial freedom of information legislation, the Privacy Act (Canada) 1980-81-82-83, c.111, Sch. II"1", and the Access to Information Act (Canada) 1980-81-82-83, c.111, Sch. I "1", as such legislation may be amended from time to time."

Summary Sheet

1. Site and Adjacent Land Conditions

Land Use	Operating retail petroleum facility
Date of Soil Sampling	August 28 to 30, 2012
Date of Ground Water Sampling	June 10 and 11, 2013
Number of Test Holes Drilled	5 (TH8 to TH12)
Number of Monitoring Wells Installed	5 (TH8 to TH12)
Type of OVM Meter	RKI Eagle II
Adjacent Land Use (current)	North – Commercial South – Commercial East – Community (High School) West – Commercial
Aquifer Usage in 250 metre Radius	No

2. Site Soil Conditions

Soil Type	Maximum Depths (mbgs)	Comments
Sand & Gravel	1.1	Fill
Silt Till	2.4	Limestone bedrock encountered at 2.4 mbgs

3. Ground Water

Depth (mbgs)	Approximately 3.0
Inferred Ground Water Flow Direction	Southerly
Liquid Petroleum Detected	No

4. Selected Soil and Ground Water Standards

Regulation 153/04, as amended, Table 3 (industrial/commercial/community property use and medium and fine textured soils in a non-potable ground water condition)

5. Analytical Results (Samples exceeding applicable Regulation 153/04 standards)

Location	Medium	Depth (mbgs)	Parameters
TH10	Water	n/a	PHC F1 and F2
TH11	Water	n/a	PHC F1 and F2
TH12/DUP1	Water	n/a	PHC F1 and F2

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1 Introduction

Exp Energy Services Ltd. (**exp**) was retained by Imperial Oil to conduct a Phase II Environmental Site Assessment (ESA) along Merivale Road and Viewmount Drive adjacent to the Imperial Oil site located at 1660 Merivale Road, Ottawa, Ontario. This area of Merivale Road and Viewmount Drive will henceforth be referred to as the subject property. A locality plan is provided as Figure 1.

The objective of the Phase II ESA was to gain an understanding of subsurface conditions at the subject property. The Phase II ESA involved a soil and ground water sampling program. Parameters chosen for analysis during the Phase II ESA were based upon use of the adjacent Imperial Oil site as an operating gas station.

The environmental assessment standards for the subject property were determined using Ontario Regulation 153/04, as amended (Regulation 153/04), under Part XV.1 of the *Environmental Protection Act*. Soil and ground water samples were collected, preserved, and submitted to the Mississauga facility of Maxxam Analytics (Maxxam), a Standards Council of Canada (SCC) accredited laboratory.

Exp performed the environmental site assessment work in accordance with generally accepted professional practices. Subject to this standard of care, **exp** makes no express or implied warranties regarding its services and no third party beneficiaries are intended. Limitation of liability, scope of report and third party reliance are outlined in Appendix A.

2 Site Background

2.1 Site Description

The Imperial Oil site is located on the southwest corner of Merivale Road and Viewmount Drive in Ottawa, Ontario. The subject property includes the portions of Merivale Road and Viewmount Drive that are immediately adjacent to the Imperial Oil site. A locality plan is provided as Figure 1 and a site plan is provided as Figure 2.

Surrounding properties are used for residential, commercial and institutional purposes. The Imperial Oil site is located south and west of the subject property. Shopping Malls are located to the north and northeast and Merivale High School is located to the east.

2.2 Native Soils and Topography

The subject property is located in the physiographic region known as the Russell and Prescott Sand Plains. The surface soils are composed of sand and sandy loams (*Physiography of Southern Ontario*, Chapman and Putnam, 1984). Although sand is

predominant in the area, a silt till was encountered at the subject property. Merivale Road slopes slightly downwards towards the southeast and Viewmount Drive slopes slightly downward toward the southwest.

Based on field observations, the water table is located in the limestone bedrock. The hydraulic conductivity of the limestone bedrock at the Imperial Oil site was measured to be approximately 1.79 x 10^{-6} cm/s (Barenco, 2011). This value is consistent with typical values for this type of bedrock (Groundwater, Freeze and Cherry, 1979).

The soil at the subject property has been classified as a medium and fine-grained material based on grain size analysis performed on the Imperial Oil site.

2.3 Ground Water and Municipal Services

The subject and surrounding properties are serviced with municipal water, storm sewers and sanitary sewers by the City of Ottawa. According to the City of Ottawa, its municipal water supply comes from the Ottawa River.

The nearest surface water body is Nepean Creek (a tributary of the Rideau River), located approximately 250 metres southeast of the subject property. Table 1 summarizes the environmental setting and site characteristics.

3 Assessment Standards

Ontario Regulation 153/04, as amended, under Part XV.1 of the *Environmental Protection Act* provides generic remediation standards based on land use (agricultural, residential/ parkland/institutional, or industrial/commercial/community), ground water use (potable or non-potable), soil type (coarse or medium and fine textured), and restoration depth (full or stratified).

Regulation 153/04 also provides alternate methods for assessment and remediation based on either restoring soil and/or ground water to background conditions or the use of a risk assessment. Generic standards for both soil and ground water are outlined in a document entitled *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act*, April 15, 2011.

According to Regulation 153/04, a property is considered to be an environmentally sensitive area if one or more of the following applies:

a) The property is
   i) within an area of natural significance,
   ii) includes or is adjacent to an area of natural significance or part of such an area, or,

iii) includes land that is within 30 metres of an area of natural significance or part of such an area.

b) The soil at the property has a pH value as follows:
   i) for surface soil, less than 5 or greater than 9
   ii) for sub-surface soil, less than 5 or greater than 11

c) A qualified person is of the opinion that, given the characteristics of the property and the certification the qualified person would be required to make in a record of site condition in relation to the property as specified in Schedule A, it is appropriate to apply to this section of the property

An "area of natural significance" means any of the following:

1. An area reserved or set apart as a provincial park or conservation reserve under the *Provincial Parks and Conservation Reserves Act, 2006*
2. An area of natural and scientific interest (life science or earth science) identified by the Ministry of Natural Resources as having provincial significance
3. A wetland identified by the Ministry of Natural Resources as having provincial significance
4. An area designated by a municipality in its official plan as environmentally significant, however expressed, including designations of areas as environmentally sensitive, as being of environmental concern and as being ecologically significant
5. An area designated as an escarpment natural area or an escarpment protection area by the Niagara Escarpment Plan under the *Niagara Escarpment Planning and Development Act*
6. An area identified by the Ministry of Natural Resources as significant habitat of a threatened or endangered species
7. An area which is habitat of a species that is classified under section 7 of the *Endangered Species Act, 2007* as a threatened or endangered species
8. Property within an area designated as a natural core area or natural linkage area within the area to which the Oak Ridges Moraine Conservation Plan under the *Oak Ridges Moraine Conservation Act, 2001* applies
9. An area set apart as a wilderness area under the *Wilderness Areas Act*

The subject property would not be considered environmentally sensitive as none of the conditions above apply, and based on measurements made on the adjacent Imperial Oil site, the pH of soil on the subject property is likely to be within the applicable ranges for surface and subsurface soils.

In addition, the site condition standards for a shallow soil property or a surface water body in or near the property are not applicable to the subject property. A least 2/3 of the area of the subject property has soil to depths greater than 2 metres. It does not include all or part of a water body, nor is it adjacent to a water body, nor does it include land within 30 metres of a water body.

Based on the land use of the subject property as discussed in Section 2.1, the soil texture as discussed in Section 2.2, as well as the environmental setting data shown in Table 1, the subject property would be classified as having industrial/commercial/community property use in a non-potable ground water condition. Regulation 153/04 Table 3 standards for industrial/commercial/community property use and medium and fine textured soils are appropriate for evaluating conditions at the subject property.

4 Site Investigation

The objective of the site investigation was to evaluate subsurface conditions at the subject property. The investigation included the following activities:

- Inspecting soil conditions by drilling three test holes along Merivale Road and two test holes along Viewmount Drive and installing ground water monitors in all five test holes
- Field screening of all recovered soil samples for the presence of environmental impact (i.e. soil headspace petroleum vapour measurements, physical observations)
- Submitting selected soil samples for laboratory analysis of the potential contaminants of concern (PCOC) based upon use of the adjacent Imperial Oil site as an operating gas station
- Monitoring ground water levels in the five monitors to determine ground water elevations and ground water flow direction
- Submitting ground water samples from each of the monitors for laboratory analysis of the PCOC based upon use of the adjacent Imperial Oil site as an operating gas station
- Conducting soil and ground water sampling in accordance with the Ministry of the Environment (MOE) *Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario*, dated December 1996, in accordance with the MOE *Protocol for Analytical Methods used in the Assessment of Properties* under *Part XV.1 of the Environmental Protection Act*, March 2004, as amended, and per **exp** Standard Operating Procedures (SOP), and generally accepted professional practices

- Determining the appropriate Site Condition Standards in accordance with Regulation 153/04
- Comparing the results of the soil and ground water analyses to the applicable Standards

All work was carried out following the Quality Management, Control and Assurance procedures outlined in Appendix B.

4.1 Potential Contaminants of Concern

The PCOC for this assessment were benzene, toluene, ethylbenzene, xylenes (BTEX), petroleum hydrocarbon (PHC) fractions F1 to F4, select polycyclic aromatic hydrocarbons (PAH), and lead. The PCOC were chosen based upon use of the adjacent Imperial Oil site as an operating gas station.

4.2 Drilling Investigation

The drilling investigation was conducted from August 28 to 30, 2012. George Downing Estate Drilling Ltd. was contracted by **exp** to drill three test holes (TH10 to TH12) along Merivale Road and two test holes (TH8 and TH9) along Viewmount Drive. The test holes were drilled to the bedrock (a maximum depth of 2.4 metres below ground surface (mbgs)) using a CME 75 truck-mounted auger rig equipped with a split spoon sampler. All test holes were then cored to a maximum of 5.0 mbgs. The test holes were daylighted to a maximum depth of 2.1 mbgs using a hydrovacuum truck. Daylighting activities were performed to reduce the possibility that an unknown subsurface structure would be struck as drilling activities progressed. **Exp** retained Lacombe Waste Services (Lacombe) to provide the daylighting services. Soil cuttings from daylighting were disposed of at the Lacombe facility at 5555 Power Road, Ottawa, a MOE approved waste receiver.

Soil samples were collected as the drilling progressed at approximately 0.5 metre intervals using a hand auger in the daylighted portion of the test holes and from a 0.6 metre long split spoon from the daylighted portion to the bedrock. These samples were examined for geologic information and for physical evidence of chemical impact. No samples were collected from the bedrock portion of the test holes.

Soil samples were submitted to the laboratory from the "worst case" depth above the bedrock. Contaminant indicators such as physical observations and measured soil headspace vapour concentrations were used to direct sampling of "worst case" samples.

After each sample collection, the split spoon sampler and/or hand auger was thoroughly cleaned with phosphate-free soap and tap water and rinsed with distilled water, then methanol, to prevent cross-contamination of subsequent soil samples. Hollow stem auger

flights were cleaned with a brush between borehole locations. Following the conclusion of the drilling investigation, the drill rig was steam cleaned to decontaminate the equipment.

During the drilling investigation the following ground conditions were generally encountered:

0.0 to 1.1 mbgs	Brown SAND and GRAVEL (fill)
1.1 to 2.4 mbgs	Grey to brown SILT (till), some sand, trace gravel and clay
2.4 to 5.0 mbgs	Grey LIMESTONE

In conjunction with the bedrock coring activities, water was used to cool the bits. The coring water was obtained from CSM Water Services. The source of the coring water was the municipal water supply.

Readings of petroleum vapour concentrations in the soil samples collected during the drilling investigation were recorded using a RKI Eagle II, where there was sufficient recovery. It is equipped with three ranges of measurement, reading concentrations in parts per million by volume (ppmv), percentage lower explosive limit (%LEL) or in percent by volume (%vol).

The instrument was configured to eliminate any response from methane for all sampling conducted at the site. Instrument calibration is checked on a daily basis using a standard gas comprised of a known concentration of hexane (15% LEL) in air. If the instrument readings are within ±10% of the standard gas value, then the instrument is deemed to be calibrated, however if the readings are greater than ±10% of the standard gas value then the instrument is re-calibrated prior to use.

Soil samples are collected from the hand auger and split spoon using a stainless-steel spoon and placed into plastic bags. The samples are left to equilibrate within the bag at a temperature above 15° C for 30 minutes before measurement of the peak headspace concentration is taken. Petroleum vapours ranged from non-detectable to 180 ppmv in samples where there was sufficient recovery to perform vapour measurements.

The test hole logs are provided in Appendix C along with the MOE well record.

All test holes were completed as subsurface monitors. The monitors were constructed of 50 millimetre diameter threaded polyvinylchloride (PVC) pipe. The lower section of pipe was slotted (0.254 millimetre slot) above and below the water table, as observed during drilling. The upper section of the pipe is a solid riser. The lower part of the annulus of the hole was backfilled with clean sand (fine graded silica sand with an uniformity coefficient of 1.1-1.7 and an effective size of 1.5-3.0 mm, usually K&E Well Pack #3 Silica Sand) up to approximately 0.3 metres above the top of the slotted section. A bentonite seal (dry chipped sodium montmorillonite in 3/8-inch diameter chips) was placed above the sand to just below grade. Concrete was used to seal the monitor at grade. The monitors were equipped with

protective casings and locking lids. A diagram showing a typical monitor installation is provided in Appendix C.

Following the conclusion of the drilling investigation and installation of the monitors, all new monitors were developed by purging and surging a minimum of three well volumes of water.

4.3 Soil Chemical Analysis

Six soil samples, including one field duplicate sample, were collected during this investigation and submitted to Maxxam for analysis of BTEX, hexane, PHC fractions F1 to F4, select PAH, and lead. All work was carried out following the Quality Management, Control and Assurance procedures outlined in Appendix B.

The results of the soil chemical analysis for petroleum related parameters are provided in Table 2 and Figure 3, along with the applicable Regulation 153/04 Table 3 standards. All soil samples were within the applicable Table 3 standards for all parameters analysed.

The results of the soil chemical analysis for PAH are provided in Table 3 and Figure 4, along with the applicable Regulation 153/04 Table 3 standards. All soil samples were within the applicable Table 3 standards for all parameters analysed.

Copies of the laboratory Certificates of Analysis are provided in Appendix D.

4.4 Coring Water Chemical Analysis

One coring water sample was submitted for analysis for BTEX, hexane, and PHC fractions F1 to F4. All work was carried out following the Quality Management, Control and Assurance procedures outlined in Appendix B.

The results of the coring water chemical analysis are provided in Table 4, along with the applicable Ontario Regulation 153/04 Table 3 standards. The sample was within the applicable Table 3 standards for all parameters analysed.

A copy of the laboratory Certificates of Analysis is provided in Appendix D.

4.5 Ground Water Monitoring

The newly installed monitors (TH8 to TH12) were inspected for general physical condition, ground water depth, the presence of liquid petroleum and petroleum vapour concentrations on June 10, 2013. At this time, TH9 was buried under asphalt.

All measurements of ground water and phase-separated liquid petroleum depth are made with a Solinst Model 122 oil/water interface probe. Both the probe and the measuring tape

that come into contact with liquids within a monitor are cleaned with phosphate-free soap and water, rinsed with distilled water and then methanol after each measurement.

For all monitors in which phase-separated liquid petroleum is detected with the interface probe, the presence of liquid petroleum is verified with a bailer. For all monitors in which phase-separated liquid petroleum is not detected with the interface probe but that have a petroleum vapour reading of 5% LEL or higher, a bailer is used to check the monitor for the presence of phase-separated liquid petroleum. If there is measurable or observable phase-separated liquid petroleum in the bailer, then a ground water sample is not submitted for laboratory analysis from this location.

Following calibration of the RKI Eagle II, as described in Section 4.2, the ground water vapour concentrations were measured by placing the nozzle inside the monitoring well casing no less than six inches and no more than twelve inches below the top of pipe, immediately after the water well cap is removed. The peak reading is recorded.

Petroleum vapours ranged from 50 ppmv to 18% LEL. Liquid petroleum was not detected in any of the accessible monitors. The depth to the ground water table ranged from 2.75 mbgs (TH12) to 3.03 mbgs (TH10).

Based on the ground water depths measured during the June monitoring event and ground water elevation data shown in Table 5, ground water contours were plotted, as shown on Figure 5. The benchmark used for the monitor survey was the north side of the manhole cover on the west side of the kiosk with an assumed elevation of 100.00 metres. The location of this benchmark is shown on Figure 5. Based on the data, the ground water flow direction is interpreted to be southerly.

The horizontal gradient was calculated based on the ground water contour plan provided in Figure 5. The hydraulic gradient is approximately 0.01 m/m (change in hydraulic head per unit distance) towards the south.

Table 6 shows the Darcy's Law calculation of the estimated ground water flow velocity at the subject property. Based on measured hydraulic conductivity determined during a previous investigation on the Imperial Oil site and the hydraulic gradient, on the subject property, determined during the current investigation, the ground water flow velocity was estimated to be approximately 0.06 metres per year.

4.6 Ground Water Chemical Analysis

On June 10 and 11, 2013, ground water samples were collected from TH8 and TH10 to TH12. All ground water samples were collected using a low-flow sampling technique. This technique involves pumping ground water at low rates, typically less than 500 mL per minute, to minimize drawdown.

Prior to collecting the ground water samples, the monitors were purged with the low flow sampling equipment and field parameters (pH, conductivity, turbidity, dissolved oxygen, temperature and oxidation reduction potential) were monitored until stable readings were achieved. These parameters are considered to be stable when three consecutive readings are within 10% of one another. When stabilization occurs, equilibrium between ground water within a monitor and the surrounding formation water is attained. As such, samples collected when stabilization occurs are considered to be representative of formation water.

Five ground water samples, including one field duplicate sample, were collected and submitted to the Mississauga facility of Maxxam for chemical analysis of petroleum related parameters. All work was carried out following the Quality Management, Control and Assurance procedures outlined in Appendix B.

The results of the ground water chemical analysis for petroleum related parameters are provided in Table 7 and Figure 6, along with the applicable Regulation 153/04 Table 3 standards. All ground water samples exceeded the applicable Table 3 standards for PHC fractions F1 and F2, except the TH8 sample.

Copies of the laboratory Certificates of Analysis are provided in Appendix D.

5 Quality Management, Control and Assurance

The quality assurance and quality control measures are discussed in the Quality Management, Control and Assurance procedures outlined in Appendix B.

No field or laboratory QA/QC issues were identified that would affect the overall conclusions presented in this report. Overall, the results reported are considered to be reliable.

6 Current Site Status

During the drilling investigation, soil and ground water quality at the subject property were assessed. The results of soil and ground water sampling were compared to the Regulation 153/04 Table 3 standards for industrial/commercial/community property use and medium and fine textured soils. Soil and ground water samples were analysed for BTEX, PHC fractions F1 to F4, select PAH, and/or lead.

All soil samples were within the applicable Table 3 standards for all parameters that were analysed. Ground water samples collected from TH10, TH11, and TH12 exceeded the Table 3 standards for one or more petroleum parameters. The remaining ground water sample was within the applicable Table 3 standards for all parameters that were analysed.

We trust this report meets your current needs. If you require further information pertaining to this investigation, please do not hesitate to contact the undersigned.

Sincerely,
exp Energy Services Ltd.



Daina Marie Schreiber, B.Sc. (Geol)
Environmental Scientist

Patricia Stelmack, M.Sc. P.Eng.
Team Lead/Senior Project Manager

7 References

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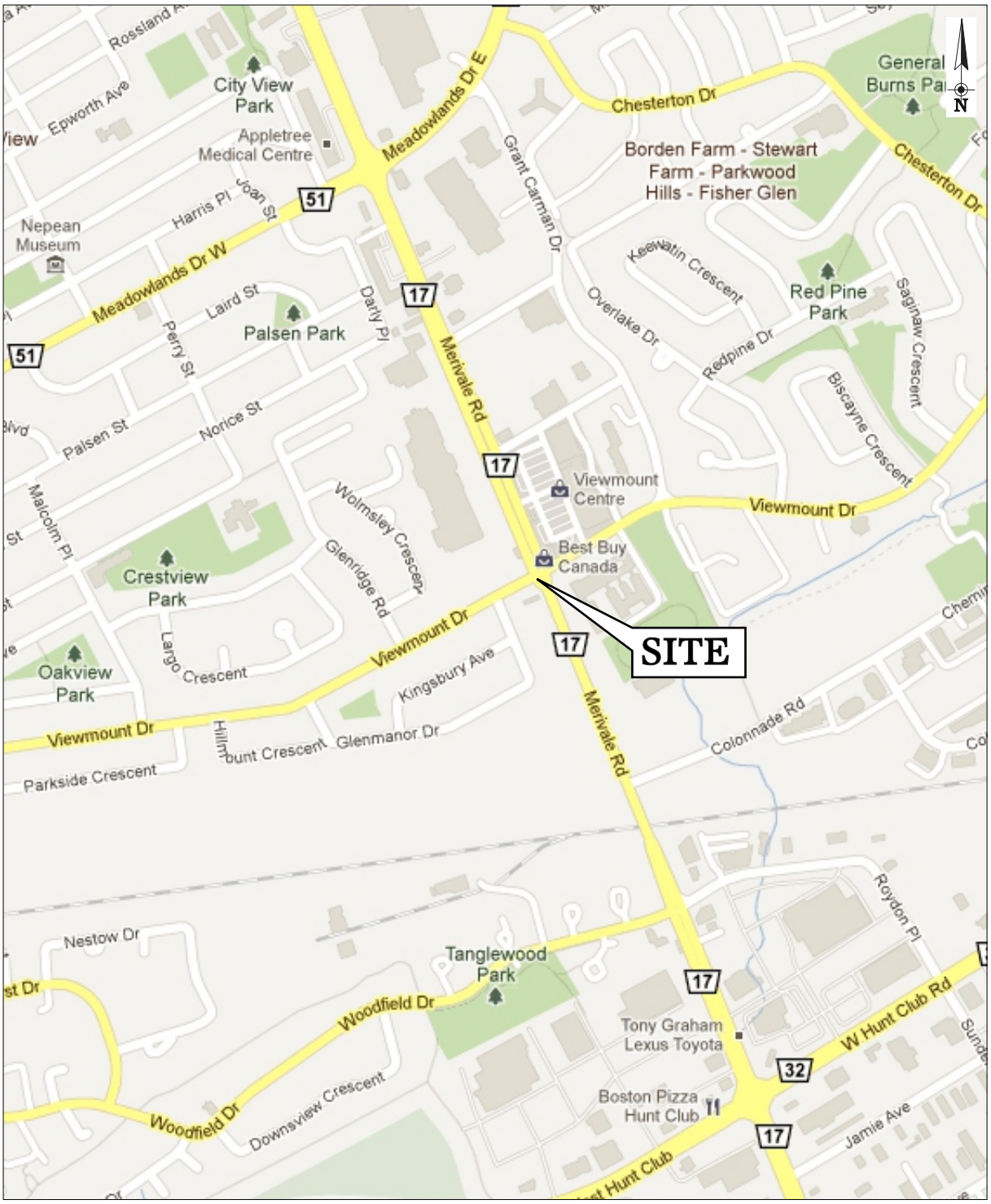
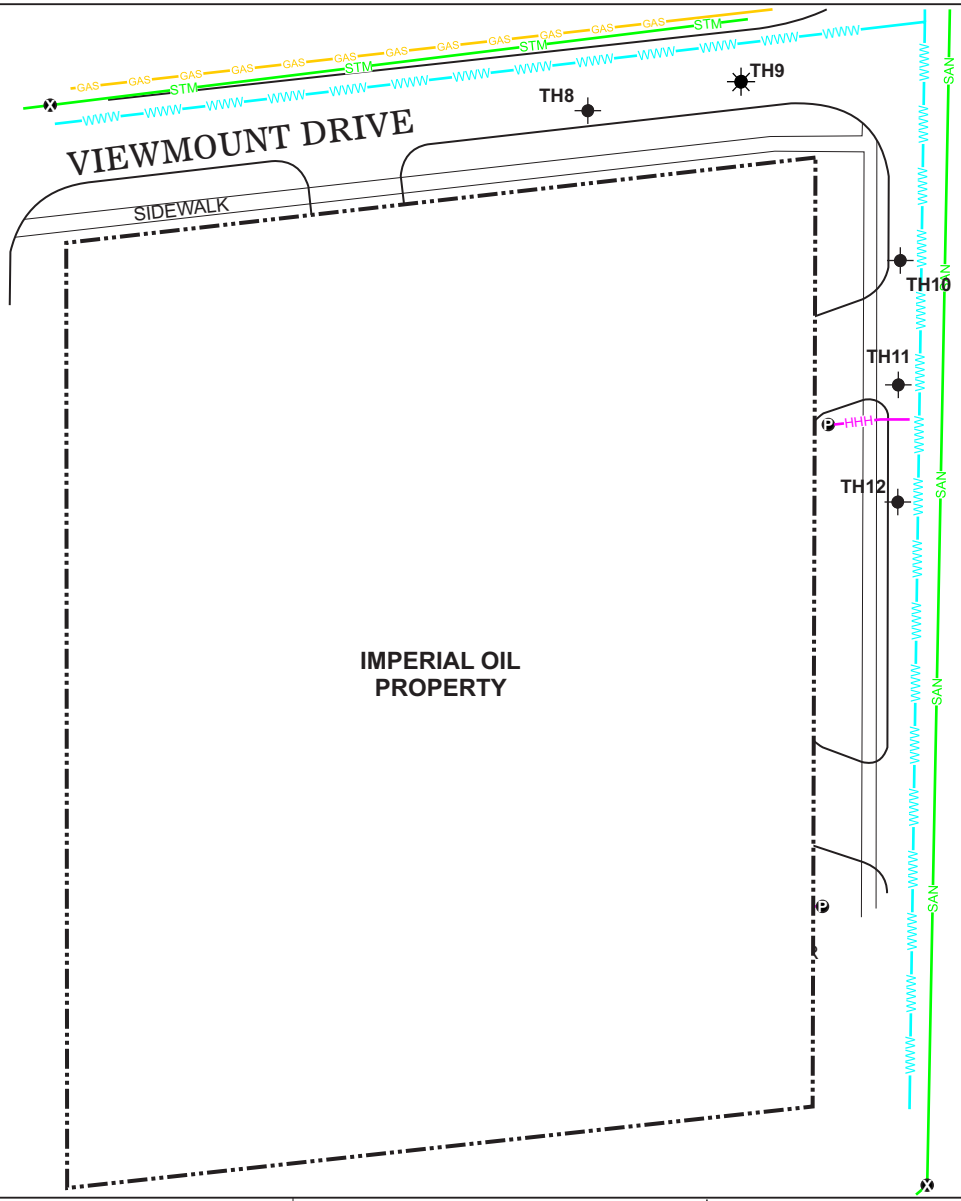
Figures



SCALE: 0 200 400m (APPROXIMATE)	**SOURCE:** GOOGLE MAPS		LOCALITY PLAN	FIGURE 1
exp.	DRAWN BY: J.D.H.	CHECKED BY: D.K.S.	**IMPERIAL OIL** ADJACENT TO 1660 MERIVALE ROAD OTTAWA, ONTARIO	
			PROJECT NUMBER: 11010	DATE: NOVEMBER 2013



SCALE:

0 15 30m

(APPROXIMATE)

DRAWN BY	CHECKED BY
J.D.H.	D.K.S.

SOURCE:

BASED ON 'SITE PLAN' BY IMPERIAL OIL A0765 DATED JAN. 16, 1984, LOCATES BY PROMARK TELECON ON OCT. 13, 2011, AND FIELD OBSERVATIONS BY **exp** STAFF

NOTES:

UTILITIES ARE UNDERGROUND UNLESS OTHERWISE NOTED, LOCATIONS OF UTILITIES ARE APPROXIMATE

LEGEND:

- PROPERTY BOUNDARY
- MANHOLE
- UTILITY POLE
- TEST HOLE WITH MONITOR TH8-TH12 (**exp**, 2012)
- TEST HOLE WITH MONITOR (DESTROYED)
- STM — STORM SEWER
- SAN — SANITARY SEWER
- WWW — WATER
- HHH — HYDRO
- GAS — GAS

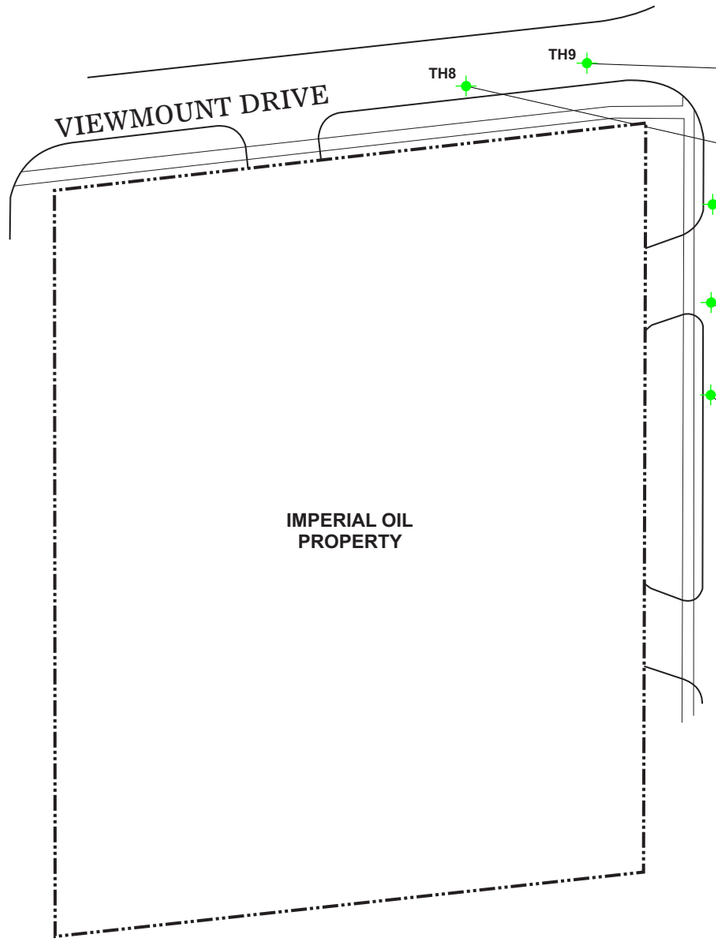
SITE PLAN

FIGURE 2

IMPERIAL OIL
ADJACENT TO 1660 MERIVALE ROAD
OTTAWA, ONTARIO

PROJECT NUMBER: 11010 | DATE: NOVEMBER 2013

11010-SITE PLAN OFFSITE-NOV13



TH9 AUG29/12

DEPTH(mbgs)	B	T	E	X	H	F1	F2	F3	F4	Pb
1.7-1.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	9.6

TH8 AUG28/12

DEPTH(mbgs)	B	T	E	X	H	F1	F2	F3	F4	Pb
1.7-1.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	10

TH10 AUG29/12

DEPTH(mbgs)	B	T	E	X	H	F1	F2	F3	F4	Pb
1.7-1.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	9.1
1.7-1.8(DUP)	ND	ND	ND	ND	ND	ND	ND	ND	ND	8.2

TH11 AUG30/12

DEPTH(mbgs)	B	T	E	X	H	F1	F2	F3	F4	Pb
1.7-1.8	ND	ND	ND	ND	ND	ND	ND	ND	120	1700	7.8

TH12 AUG30/12

DEPTH(mbgs)	B	T	E	X	H	F1	F2	F3	F4	Pb
1.1-1.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	14

PARAMETER	ABBREVIATION	**REG 153/04 TABLE 3** STANDARDS*	RDL (+)
BENZENE	**B**	0.4	0.020
TOLUENE	**T**	78	0.020
ETHYLBENZENE	**E**	19	0.020
XYLENES	**X**	30	0.040
HEXANE	**H**	88	0.050
F1 (C_6-C_{10}) - BTEX	**F1**	65	10
F2 (C_{10}-C_{16})	**F2**	250	10
F3 (C_{16}-C_{34})	**F3**	2500	10
F4 (C_{34}-C_{50})	**F4**	6600	10

SCALE:

0 15 30m

(APPROXIMATE)

DRAWN BY	CHECKED BY
J.D.H.	D.K.S.

SOURCE:

BASED ON 'SITE PLAN' BY IMPERIAL OIL A0765 DATED JAN. 16, 1984, AND FIELD OBSERVATIONS BY **exp** STAFF

LEGEND:

PROPERTY BOUNDARY

TEST HOLE WITH MONITOR TH8-TH12 (**exp**, 2012)

LOCATION WHERE ALL SOIL SAMPLES MEET **REG 153/04 TABLE 3** STANDARDS FOR ALL PARAMETERS THAT WERE ANALYSED

LOCATION WHERE AT LEAST ONE SOIL SAMPLE EXCEEDS **REG 153/04 TABLE 3** STANDARDS FOR AT LEAST ONE PARAMETER ANALYSED

LOCATION WHERE NO SOIL SAMPLE WAS ANALYSED

TEXT EXCEEDANCES OF **REG 153/04 TABLE 3** STANDARDS

ALL ANALYTICAL RESULTS ARE IN MICROGRAMS PER GRAM (µg/g), DRY WEIGHT BASIS
'DEPTH(mbgs)' MEANS DEPTH IN METRES BELOW GROUND SURFACE
'ND' MEANS NOT DETECTED '-' MEANS NOT ANALYSED OR NOT APPLICABLE 'NM' MEANS NOT MEASURED
'RDL' MEANS LABORATORY REPORTING DETECTION LIMIT (+) RDL ARE FOR MOST RECENT RESULTS; ELEVATED RDL SHOWN IN BRACKETS
(DUP) REPRESENTS FIELD DUPLICATE OF PRECEDING SAMPLE

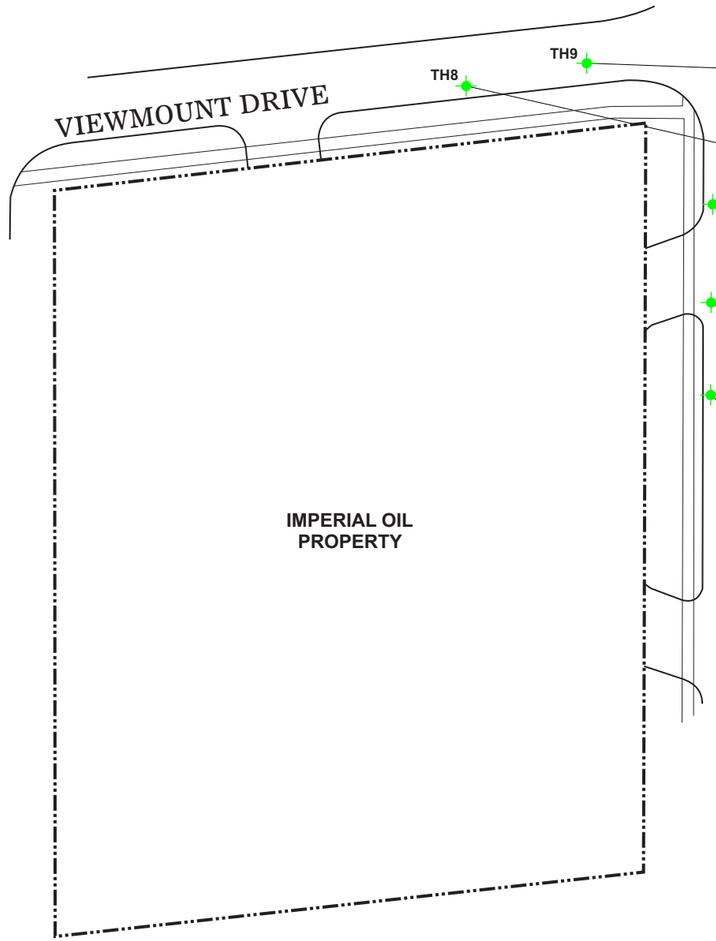
*STANDARDS SHOWN ARE FOR AN INDUSTRIAL/COMMERCIAL/COMMUNITY PROPERTY USE AND MEDIUM AND FINE TEXTURED SOILS IN A NON-POTABLE GROUND WATER CONDITION

SOIL ANALYTICAL RESULTS - PETROLEUM RELATED PARAMETERS

FIGURE 3

IMPERIAL OIL
ADJACENT TO 1660 MERIVALE ROAD
OTTAWA, ONTARIO

PROJECT NUMBER: 11010 DATE: NOVEMBER 2013



TH9										AUG29/12
DEPTH(mbgs)	Ace	Acl	An	Fl	F	1-MN	2-MN	T-MN	N	P
1.7-1.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

TH8										AUG28/12
DEPTH(mbgs)	Ace	Acl	An	Fl	F	1-MN	2-MN	T-MN	N	P
1.7-1.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

TH10										AUG29/12
DEPTH(mbgs)	Ace	Acl	An	Fl	F	1-MN	2-MN	T-MN	N	P
1.7-1.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1.7-1.8(DUP)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

TH11										AUG30/12
DEPTH(mbgs)	Ace	Acl	An	Fl	F	1-MN	2-MN	T-MN	N	P
1.7-1.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

TH12										AUG30/12
DEPTH(mbgs)	Ace	Acl	An	Fl	F	1-MN	2-MN	T-MN	N	P
1.1-1.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

PARAMETER	ABBREVIATION	REG 153/04 TABLE 3 STANDARDS*	RDL (+)
ACENAPHTHENE	**Ace**	96	0.0050
ACENAPHTHYLENE	**Acl**	0.17	0.0050
ANTHRACENE	**An**	0.74	0.0050
FLUORANTHENE	**Fl**	9.6	0.0050
FLUORENE	**F**	69	0.0050
1-METHYLNAPHTHALENE	**1-MN**	85	0.0050
2-METHYLNAPHTHALENE	**2-MN**	85	0.0050
TOTAL-METHYLNAPHTHALENE	**T-MN**	85	0.0071
NAPHTHALENE	**N**	28	0.0050
PHENANTHRENE	**P**	16	0.0050

SCALE:

0 15 30m

(APPROXIMATE)

DRAWN BY	CHECKED BY
J.D.H.	D.K.S.

SOURCE:

BASED ON 'SITE PLAN' BY IMPERIAL OIL A0765 DATED JAN. 16, 1984, AND FIELD OBSERVATIONS BY **exp** STAFF

LEGEND:

PROPERTY BOUNDARY

TEST HOLE WITH MONITOR TH8-TH12 (**exp**, 2012)

LOCATION WHERE ALL SOIL SAMPLES MEET **REG 153/04 TABLE 3** STANDARDS FOR ALL PARAMETERS THAT WERE ANALYSED

LOCATION WHERE AT LEAST ONE SOIL SAMPLE EXCEEDS **REG 153/04 TABLE 3** STANDARDS FOR AT LEAST ONE PARAMETER ANALYSED

LOCATION WHERE NO SOIL SAMPLE WAS ANALYSED

TEXT EXCEEDANCES OF **REG 153/04 TABLE 3** STANDARDS

ALL ANALYTICAL RESULTS ARE IN MICROGRAMS PER GRAM (µg/g), DRY WEIGHT BASIS
'DEPTH(mbgs)' MEANS DEPTH IN METRES BELOW GROUND SURFACE
'ND' MEANS NOT DETECTED '-' MEANS NOT ANALYSED OR NOT APPLICABLE 'NM' MEANS NOT MEASURED
'RDL' MEANS LABORATORY REPORTING DETECTION LIMIT (+) RDL ARE FOR MOST RECENT RESULTS; ELEVATED RDL SHOWN IN BRACKETS (DUP) REPRESENTS FIELD DUPLICATE OF PRECEDING SAMPLE

*STANDARDS SHOWN ARE FOR AN INDUSTRIAL/COMMERCIAL/COMMUNITY PROPERTY USE AND MEDIUM AND FINE TEXTURED SOILS IN A NON-POTABLE GROUND WATER CONDITION

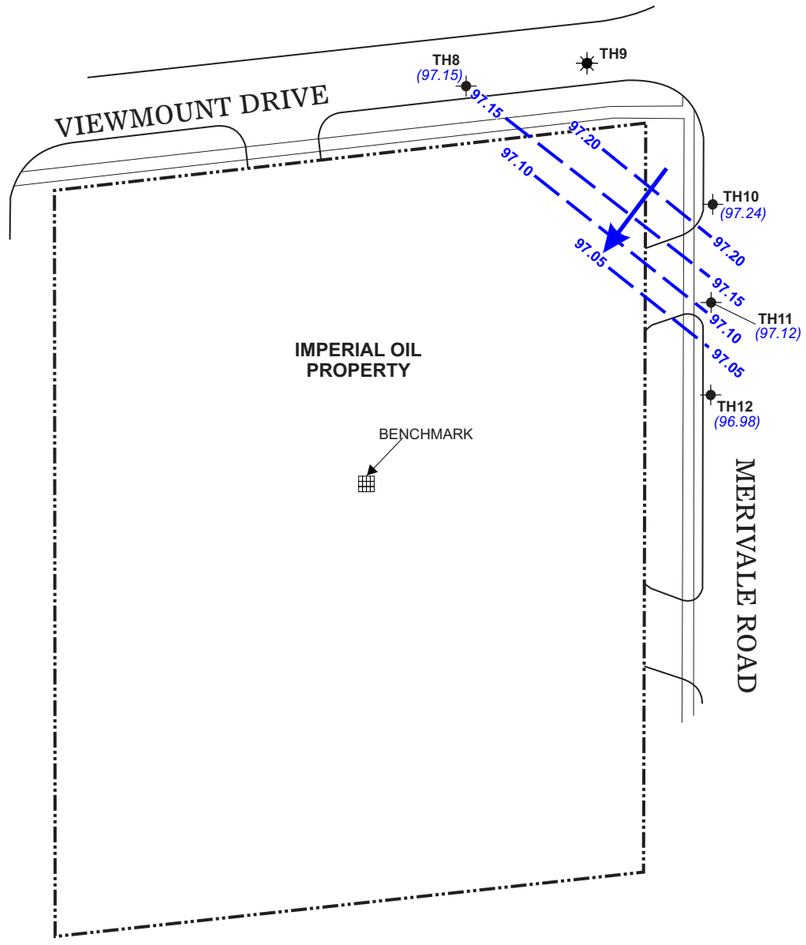
SOIL ANALYTICAL RESULTS - SELECTED POLYCYCLIC AROMATIC HYDROCARBONS

FIGURE 4

IMPERIAL OIL
ADJACENT TO 1660 MERIVALE ROAD
OTTAWA, ONTARIO

PROJECT NUMBER: 11010

DATE: NOVEMBER 2013



SCALE:

0 15 30m

(APPROXIMATE)

SOURCE:

BASED ON 'SITE PLAN' BY IMPERIAL OIL A0765 DATED JAN. 16, 1984, LOCATES BY PROMARK TELECON ON OCT. 13, 2011, AND FIELD OBSERVATIONS BY **exp** STAFF

NOTES:

BENCHMARK NORTH SIDE OF MANHOLE COVER ON THE WEST SIDE OF THE KIOSK WITH AN ASSUMED ELEVATION OF 100.00M

LEGEND:

- PROPERTY BOUNDARY
- CATCH BASIN
- TEST HOLE WITH MONITOR TH8-TH12 (**exp**, 2012)
- TEST HOLE WITH MONITOR (DESTROYED)
- *(100.00)* GROUND WATER ELEVATION (m)
- *(100.00)** GROUND WATER ELEVATION NOT USED IN CONTOURING (m)
- **100.00** GROUND WATER ELEVATION CONTOUR (m)
- GROUND WATER FLOW DIRECTION
- *(NM)* NOT MONITORED
- *(NA)* NOT ACCESSIBLE

DRAWN BY	CHECKED BY
J.D.H.	D.K.S.

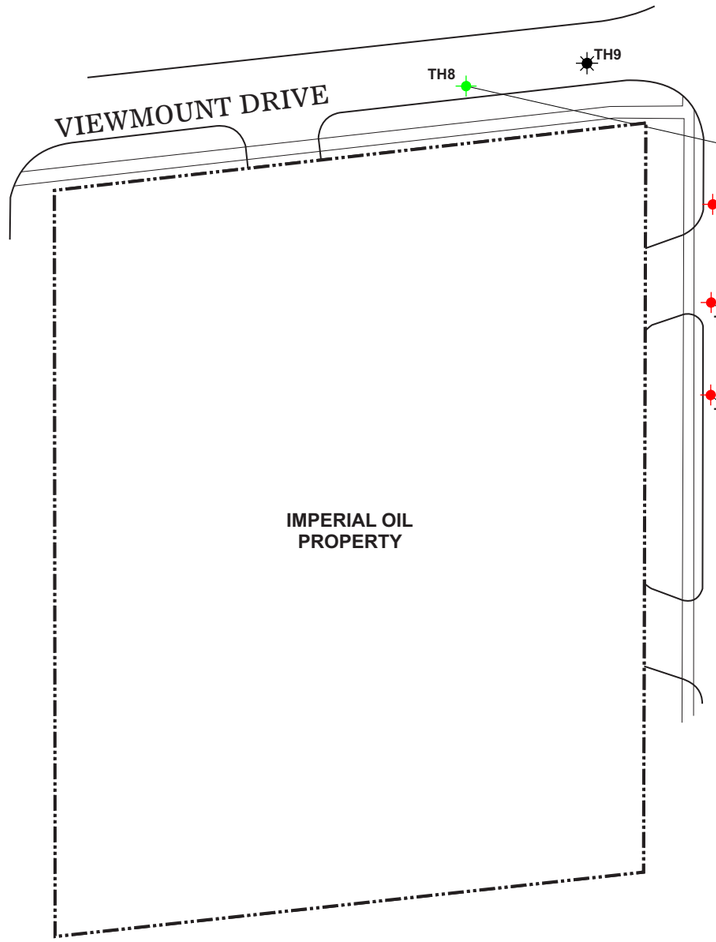
GROUND WATER CONTOUR PLAN (JUNE 10, 2013)

FIGURE 5

IMPERIAL OIL
ADJACENT TO 1660 MERIVALE ROAD
OTTAWA, ONTARIO

PROJECT NUMBER: 11010 | DATE: NOVEMBER 2013

11010-GWC PLAN ADJ JUN13-NOV13



TH8										SCREEN INTERVAL = 3.3-4.9mbgs
DATE	B	T	E	X	H	F1	F2	F3	F4	Pb
JUN10/13	3.9	ND	4.1	0.61	ND	48	ND	ND	ND	1.1

TH10										SCREEN INTERVAL = 3.3-4.9mbgs
DATE	B	T	E	X	H	F1	F2	F3	F4	Pb
JUN11/13	73	58	52	200	35	**1400**	**560**	ND	ND	1.2

TH11										SCREEN INTERVAL = 3.3-4.9mbgs
DATE	B	T	E	X	H	F1	F2	F3	F4	Pb
JUN11/13	370	34	2200	3400	130	**11000**	**1400**	ND	ND	2.6

TH12										SCREEN INTERVAL = 3.3-4.9mbgs
DATE	B	T	E	X	H	F1	F2	F3	F4	Pb
JUN11/13	380	35	2300	3500	ND(100)	**11000**	**3100**	ND	ND	6.8
JUN11/13(DUP)	360	34	2100	3300	ND(100)	**11000**	**2800**	ND	ND	6.9

PARAMETER	ABBREVIATION	**REG 153/04 TABLE 3** STANDARDS*	RDL (+)
BENZENE	**B**	430	0.20
TOLUENE	**T**	18000	0.20
ETHYLBENZENE	**E**	2300	0.20
XYLENES	**X**	4200	0.40
HEXANE	**H**	520	0.50
F1 (C_6-C_{10}) - BTEX	**F1**	750	100
F2 (C_{10}-C_{16})	**F2**	150	100
F3 (C_{16}-C_{34})	**F3**	500	200
F4 (C_{34}-C_{50})	**F4**	500	200
LEAD	**Pb**	25	0.50

SCALE:

0 15 30m

(APPROXIMATE)

DRAWN BY	CHECKED BY
J.D.H.	D.K.S.

SOURCE:

BASED ON 'SITE PLAN' BY IMPERIAL OIL A0765 DATED JAN. 16, 1984, AND FIELD OBSERVATIONS BY **exp** STAFF

LEGEND:

- PROPERTY BOUNDARY
- TEST HOLE WITH MONITOR TH8-TH12 (**exp**, 2012)
- TEST HOLE WITH MONITOR (DESTROYED)
- MONITOR LOCATION WHERE MOST RECENT GROUND WATER SAMPLE MEETS **REG 153/04 TABLE 3** STANDARDS FOR ALL PARAMETERS THAT WERE ANALYSED
- MONITOR LOCATION WHERE MOST RECENT GROUND WATER SAMPLE EXCEEDS **REG 153/04 TABLE 3** STANDARDS FOR AT LEAST ONE PARAMETER ANALYSED
- MONITOR LOCATION WITH MEASURABLE OR OBSERVABLE LIQUID PETROLEUM DURING THE MOST RECENT GROUND WATER SAMPLING EVENT
- MONITOR LOCATION WHERE NO GROUND WATER SAMPLE SUBMITTED FOR ANALYSIS DURING THE MOST RECENT GROUND WATER SAMPLING EVENT
- **TEXT** EXCEEDANCES OF **REG 153/04 TABLE 3** STANDARDS
- **TEXT** LIQUID PETROLEUM THICKNESS [IN METRES(m)]

ALL ANALYTICAL RESULTS ARE IN MICROGRAMS PER LITRE (µg/L)
'DEPTH(mbgs)' MEANS DEPTH IN METRES BELOW GROUND SURFACE 'ND' MEANS NOT DETECTED '-' MEANS NOT ANALYSED OR NOT APPLICABLE
'NM' MEANS NOT MEASURED 'RDL' MEANS LABORATORY REPORTING DETECTION LIMIT (+) RDL ARE FOR MOST RECENT RESULTS;
ELEVATED RDL SHOWN IN BRACKETS (DUP) REPRESENTS FIELD DUPLICATE OF PRECEDING SAMPLE

*STANDARDS SHOWN ARE FOR AN INDUSTRIAL/COMMERCIAL/COMMUNITY PROPERTY USE AND MEDIUM AND FINE TEXTURED SOILS IN A NON-POTABLE GROUND WATER CONDITION

GROUND WATER ANALYTICAL RESULTS - PETROLEUM RELATED PARAMETERS

FIGURE 6

IMPERIAL OIL
ADJACENT TO 1660 MERIVALE ROAD
OTTAWA, ONTARIO

PROJECT NUMBER: 11010

DATE:NOVEMBER 2013

Tables

Table 1

SITE ENVIRONMENTAL SETTING DATA

Site Location: Adjacent to 1660 Merivale Road, Ottawa, Ontario
Date: June 2013

NATIVE SOIL

Type:	Silt Till
Hydraulic Conductivity:	1.79×10^{-6} cm/s (measured on adjacent property)
Texture:	Medium and fine
Depth to Bedrock:	Approximately 2.4 mbgs
Bedrock Type:	Limestone

GROUND WATER

Depth to Water Table:	Approximately 3 mbgs
Estimated or Measured:	Measured during current investigation
Direction of Flow:	Southerly
Estimated or Measured:	Measured during current investigation

POTABLE WATER AND SEWERS

Potable Water Source:	Municipal
Municipal Water Source:	Surface Water (Ottawa River)
Distance to Nearest Municipal Water Well:	n/a
Distance to Nearest Private Water Well:	n/a
Sanitary Sewer System:	Municipal
Storm Sewer System:	Municipal

OTHER UTILITIES

Power:	Hydro Ottawa
Natural Gas:	Enbridge
Telephone:	Bell Canada

SURFACE WATER

Name of Nearest Water Body:	Nepean Creek (tributary of the Rideau River)
Distance from Site:	Approximately 250 metres southeast
Elevation Drop from Site:	Unknown
Direct Drainage from Site:	No

Table 2

SOIL CHEMICAL ANALYSIS - Petroleum Related Parameters

Adjacent to 1660 Merivale Road, Ottawa, Ontario

Sample		Test Hole TH8-3	Test Hole TH9-3	Test Hole TH10-3	Test Hole DUP1 (TH10-3)	Test Hole TH11-3	Test Hole TH12-2	
Depth (mbgs)		1.7 to 1.8	1.7 to 1.8	1.7 to 1.8	1.7 to 1.8	1.7 to 1.8	1.1 to 1.2	Ontario Regulation 153/04
Soil Type		Silt	Silt	Silt	Silt	Silt	Silt	Table 3
Sample Date		28-Aug-12	29-Aug-12	29-Aug-12	29-Aug-12	30-Aug-12	30-Aug-12	Soil Standards **
Maxxam I.D.		OR8420	OR8395	OR8396	OR8397	OS2617	OS2618	
Field Vapour Reading		180 ppmv	nd	100 ppmv	100 ppmv	nd	25 ppmv	
PARAMETERS	**RDL***							
Volatile Organic Compounds								
Benzene	0.020	nd	nd	nd	nd	nd	nd	0.4
Toluene	0.020	nd	nd	nd	nd	nd	nd	78
Ethylbenzene	0.020	nd	nd	nd	nd	nd	nd	19
Xylenes	0.040	nd	nd	nd	nd	nd	nd	30
Hexane	0.50	nd	nd	nd	nd	nd	nd	88
Petroleum Hydrocarbons								
F1 (C6 to C10 - BTEX)	10	nd	nd	nd	nd	nd	nd	65
F2 (C10 to C16)	10	nd	nd	nd	nd	nd	nd	250
F3 (C16 to C34)	10	nd	nd	nd	nd	120	nd	2500
F4 (C34 to C50)	10	nd	nd	nd	nd	1700***	nd	6600
Inorganic Parameters								
Lead	5.0	10	9.6	9.1	8.2	7.8	14	120

Analysis by Maxxam Analytics

All results in ppm (ug/g) on dry weight basis; mbgs means "metres below ground surface"; nd means "not detected" at reporting detection limit (RDL); na means "not analysed"; nm means "not monitored"

* Analytical RDL are shown except as indicated in brackets

** Standards shown are for an industrial/commercial/community property use and medium and fine textured soils in a potable ground water condition

*** F4G (gravimetric determination) result shown because chromatograph did not return to baseline and F4G result is larger than F4 (GC determination) result

Exceedances of Table 3 standards are shown in **bold**

Table 3

SOIL CHEMICAL ANALYSIS - Selected Polycyclic Aromatic Hydrocarbons

Adjacent to 1660 Merivale Road, Ottawa, Ontario

Sample		Test Hole TH8-3	Test Hole TH9-3	Test Hole TH10-3	Test Hole DUP1 (TH10-3)	Test Hole TH11-3	Test Hole TH12-2	Ontario Regulation 153/04 Table 3 Soil Standards**
Depth (mbgs)		1.7 to 1.8	1.7 to 1.8	1.7 to 1.8	1.7 to 1.8	1.7 to 1.8	1.1 to 1.2	
Soil Type		Silt	Silt	Silt	Silt	Silt	Silt	
Sample Date		28-Aug-12	29-Aug-12	29-Aug-12	29-Aug-12	30-Aug-12	30-Aug-12	
Maxxam I.D.		OR8420	OR8395	OR8396	OR8397	OS2617	OS2618	
PARAMETERS	**RDL***							
Acenaphthene	0.0050	nd	nd	nd	nd	nd	nd	96
Acenaphthylene	0.0050	nd	nd	nd	nd	nd	nd	0.17
Anthracene	0.0050	nd	nd	nd	nd	nd	nd	0.74
Fluoranthene	0.0050	nd	nd	nd	nd	nd	nd	9.6
Fluorene	0.0050	nd	nd	nd	nd	nd	nd	69
1-Methylnaphthalene	0.0050	nd	nd	nd	nd	nd	nd	85***
2-Methylnaphthalene	0.0050	nd	nd	nd	nd	nd	nd	85***
Total Methylnapthalene	0.0071	nd	nd	nd	nd	nd	nd	85
Naphthalene	0.0050	nd	nd	nd	nd	nd	nd	28
Phenanthrene	0.0050	nd	nd	nd	nd	nd	nd	16

Analysis by Maxxam Analytics

All results in ppm (ug/g) on dry weight basis; mbgs means "metres below ground surface"; nd means "not detected" at reporting detection limit (RDL); na means "not analysed"; nm means "not monitored"

* Analytical RDL are shown except as indicated in brackets

** Standards shown are for an industrial/commercial/community property use and medium and fine textured soils in a potable ground water condition

*** The sum of 1- and 2-Methylnaphthalene concentrations must not exceed the standard if both are detected

Exceedances of Table 3 standards are shown in **bold**

Table 4

CORING WATER CHEMICAL ANALYSIS - Petroleum Related Parameters

Adjacent to 1660 Merivale Road, Ottawa, Ontario

Sample		Coring Water					Ontario Regulation 153/04
		W1					Table 3
Sample Date		28-Aug-12					Ground Water
Maxxam I.D.		OR9430					Standards**
PARAMETERS	**RDL***						
Volatile Organic Compounds							
Benzene	0.20	nd					430
Toluene	0.20	nd					18000
Ethylbenzene	0.20	nd					2300
Xylenes	0.40	nd					4200
Hexane	5.0	nd					520
Petroleum Hydrocarbons							
F1 (C6 to C10 - BTEX)	25	nd					750
F2 (C10 to C16)	100	nd					150
F3 (C16 to C34)	100	nd					500
F4 (C34 to C50)	100	nd					500

Analysis by Maxxam Analytics

All results in ppb (ug/L); mbgs means "metres below ground surface"; nd means "not detected" at reporting detection limit (RDL); na means "not analysed"

* Analytical RDL are shown except as indicated in brackets

** Standards shown are for an industrial/commercial/community property use and medium and fine textured soils in a non-potable ground water condition

Exceedances of Table 3 standards are shown in **bold**

Table 5

GROUND WATER MONITORING AND ELEVATION DATA

Adjacent to 1660 Merivale Road, Ottawa, Ontario

Monitor	Top of Pipe Elevation (m)	Ground Surface Elevation (m)	Screen Interval (mbgs)	Date	Petroleum Vapour Concentrations	Liquid Petroleum Thickness (m)*	Water Depth (mbgs)	Water Table Elevation (m)
TH8	100.03	100.16	3.4 to 4.9	10-Jun-13	100 ppmv	nd	3.01	97.15
TH9	nm	100.35	3.4 to 4.9	10-Jun-13	D	D	D	D
TH10	100.17	100.26	3.4 to 4.9	10-Jun-13	170 ppmv	nd	3.03	97.24
TH11	99.90	100.04	3.4 to 4.9	10-Jun-13	50 ppmv	nd	2.92	97.12
TH12	99.60	99.74	3.4 to 4.9	10-Jun-13	18% LEL	nd	2.75	96.98

Note:

All measurements shown in metres (m)

Relative elevations shown above are related to the north side of a manhole cover located approximately 5 metres west of kiosk on Imperial Oil property), elevation = 100.00 metres (**exp**, 2013)

nd means "not detected"; nm means "not monitored"; na means "not accessible"; n/a means "not applicable"; mbgs means "metres below ground surface"; D means "destoryed or decommissioned"

Vapour concentrations measured using RKI Eagle II operated in methane elimination mode

Petroleum vapour concentrations <500 ppmv shown in parts per million volume (ppmv), >500 ppmv shown in percent of lower explosive limit (% LEL)

* If liquid petroleum was measured, the water table elevations were corrected assuming a liquid petroleum specific gravity of 0.75

Table 6

DARCY'S LAW CALCULATIONS

Adjacent to 1660 Merivale Road, Ottawa, Ontario

June 10, 2013

v=ki/n

Overburden

Permeability k (m/sec) =	1.79E-08
(cm/sec) =	1.79E-06
Gradient i (m/m) =	0.010
Porosity* n =	0.1

Velocity v (m/sec) =	1.79E-09
(feet/sec) =	5.87E-09
(feet/day) =	5.07E-04
(feet/year) =	1.85E-01
(metres/year) =	5.64E-02

* (from Freeze & Cherry, 1979)

Permeability for LIMESTONE bedrock
Gradient measured across site using monitors installed in the bedrock

GROUND WATER CHEMICAL ANALYSIS - Petroleum Related Parameters

Adjacent to 1660 Merivale Road, Ottawa, Ontario

June 2013 Sampling Event

Sample		Monitor TH8	Monitor TH10	Monitor TH11	Monitor TH12	Monitor DUP1 (TH12)		Ontario Regulation 153/04 Table 3 Ground Water Standards**
Screen Interval (mbgs)		3.3 to 4.9	3.3 to 4.9	3.3 to 4.9	3.3 to 4.9	3.3 to 4.9		
Sample Date		10-Jun-13	11-Jun-13	11-Jun-13	11-Jun-13	11-Jun-13		
Maxxam I.D.		RW8212	RW8213	RW8214	RW8215	RW8216		
PARAMETERS	**RDL***							
Volatile Organic Compounds								
Benzene	0.20	3.9	73	370	380	360		430
Toluene	0.20	nd	58	34	35	34		18000
Ethylbenzene	0.20	4.1	52	2200	2300	2100		2300
Xylenes	0.40	0.61	200	3400	3500	3300		4200
Hexane	5.0	nd	35	130	nd (100)	nd (100)		520
Petroleum Hydrocarbons								
F1 (C6 to C10 - BTEX)	25	48	**1400**	**11000**	**11000**	**11000**		750
F2 (C10 to C16)	100	nd	**560**	**1400**	**3100**	**2800**		150
F3 (C16 to C34)	200	nd	nd	nd	nd	nd		500
F4 (C34 to C50)	200	nd	nd	nd	nd	nd		500
Inorganic Parameters								
Lead	0.50	1.1	1.2	2.6	6.8	6.9		25

Analysis by Maxxam Analytics

All results in ppb (ug/L); mbgs means "metres below ground surface"; nd means "not detected" at reporting detection limit (RDL); na means "not analysed"

* Analytical RDL are shown except as indicated in brackets

** Standards shown are for an industrial/commercial/community property use and medium and fine textured soils in a non-potable ground water condition

Exceedances of Table 3 standards are shown in **bold**

Appendix A –
Limitation of Liability, Scope of Report and Third Party Reliance

LIMITATION OF LIABILITY, SCOPE OF REPORT AND THIRD PARTY RELIANCE

This report has been prepared and the work referred to in this report has been undertaken by **exp** Energy Services Ltd. (**exp**) for Imperial Oil. It is intended for the sole and exclusive use of Imperial Oil, its affiliated companies and partners and the respective insurers, agents, employees and advisors (collectively, "Imperial Oil"). Any use, reliance on or decision made by any person other than Imperial Oil based on this report is the sole responsibility of such other person. Imperial Oil and **exp** make no representation or warranty to any other person with regard to this report and the work referred to in this report and they accept no duty of care to any other person or any liability or responsibility whatsoever for any losses, expenses, damages, fines, penalties, or other harm that may be suffered or incurred by any other person as a result of the use of, reliance on, any decision made or any action taken based on this report or the work referred to in this report.

The investigation undertaken by **exp** with respect to this report and any conclusions or recommendations made in this report reflect **exp's** judgement based on the site conditions observed at the time of the site inspection on the date(s) set out in this report and on information available at the time of preparation of this report. This report has been prepared for specific application to this site and it is based, in part, upon visual observation of the site, subsurface investigation at discrete locations and depths, and specific analysis of specific chemical parameters and materials during a specific time interval, all as described in this report. Unless otherwise stated, the findings cannot be extended to previous or future site conditions, portions of the site which were unavailable for direct investigation, subsurface locations which were not investigated directly, or chemical parameters, materials or analysis which were not addressed. Substances other than those addressed by the investigation described in this report may exist within the site, substances addressed by the investigation may exist in areas of the site not investigated and concentrations of substances addressed which are different than those reported may exist in areas other than the locations from which the samples were taken.

If site conditions or applicable standards change or if any additional information becomes available at a future date, modifications to the findings, conclusions and recommendations in this report may be necessary.

Other than by Imperial Oil, copying or distribution of this report or the use of or reliance on the information contained herein, in whole or in part, is not permitted without the express written permission of **exp.** Nothing in this report is intended to constitute or provide a legal opinion.

Appendix B –
Quality Management, Control and Assurance

QUALITY MANAGEMENT, CONTROL AND ASSURANCE

Project Quality Management

The field work documented in this report and the preparation of this report were overseen by a Qualified Person, as defined in Ontario Regulation 153/04, as amended (Regulation 153/04).

Sampling analysis was performed using generally accepted principles and with appropriate sampling equipment. Written field and laboratory sampling procedures for soil and ground water developed by **exp** Energy Services Ltd. (**exp**) were used to ensure consistency in sample collection and preparation of samples for submission to the laboratory.

The staff involved in the field sampling have participated in regular, ongoing training programs and were qualified and experienced in collecting, describing, and preparing environmental samples for laboratory analysis.

Laboratory analysis was performed using generally accepted principles in accordance with the *Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the* Environmental Protection Act, March 9, 2004 amended as of July 1, 2011 (Protocol).

Data quality objectives for the parameters of concern were set to meet acceptable RDLs to achieve the goal of defining areas where such parameters are present at levels in excess of applicable generic standards, as defined in Regulation 153/04. Sampling programs included providing written instruction to the analytical laboratory describing the required analyses on the Chain of Custody prepared and delivered with the samples.

The laboratory has a standing contract with Imperial Oil which sets out specific data quality requirements. Any non-compliance with this contract is documented using a data quality waiver issued by the laboratory. When a data quality waiver is issued by the laboratory, it must be reviewed, signed by **exp**, and returned to the laboratory. Data quality waivers are included with all reports, along with the complete Certificate of Analysis.

Field Quality Assurance/ Quality Control

The soil and ground water sampling plan was prepared and executed based on professional judgment at the time of the investigation.

Field observations were made and documented in a field book in accordance with generally accepted practices and with the procedures developed and utilized by **exp**.

Exp field sampling Quality Assurance and Quality Control (QA/QC) protocols are tailored to the investigation and include:

- The collection of at least one field duplicate sample for both soil and ground water for every ten samples or less (where three or more such samples are collected)

- For soil samples analysed for volatile organic compounds, including BTEX, the collection of discrete samples directly into vials containing methanol

- For soil samples analysed for all other parameters, the collection of discrete samples directly into jars

- For ground water samples, the collection of samples directly into vials with Teflon-lined lids or bottles containing an appropriate preservative, where required

- For ground water samples analysed for dissolved metals, including mercury and hexavalent chromium, filtration of the sample in the field using a 45 micron disposable filter prior to collection in a bottle containing preservative

- For ground water samples analysed for benzo(a)pyrene, where deemed necessary by the Qualified Person overseeing this work, the collection of an additional bottle for laboratory filtration prior to analysis

- The immediate placement, upon collection, of both soil and ground water samples into a cooler with free ice to lower the temperature to less than 10° C

- For soil sampling, the thorough cleaning of soil sampling equipment using soap and water, followed by a distilled water rinse and a methanol rinse between sample locations

- For ground water sampling, the use of dedicated sampling equipment at different monitors (including the use of dedicated tubing when low flow ground water sampling techniques are used)

- Ensuring that neither the bare hand nor latex glove comes into contact with the soil or ground water as it is being placed into the sample container

- The inclusion of one soil trip blank, at a frequency determined by the Qualified Person, when samples are being analysed for volatile organic compounds, including BTEX. The methanol-charged vials containing the trip blank are prepared by the laboratory: placed in a cooler with ice no later than the morning of the day of sampling (trip blank vials are not placed on ice by the laboratory); and returned to the laboratory unopened for analysis as part of the submission

- The inclusion of one soil field blank for PAH analysis at a frequency determined by the Qualified Person. The field blanks are prepared in the field with laboratory-

supplied silica during the sample collection process and returned to the laboratory for analysis as part of the submission

- The inclusion of one ground water field blank and trip blank per submission for all parameters in ground water except pH and electrical conductivity. The field blanks are prepared in the field during the sample collection process using laboratory-supplied water and returned to the laboratory for analysis as part of the submission. The trip blanks are prepared by the laboratory, kept in the cooler on ice for the duration of the sampling event and returned to the laboratory unopened for analysis as part of the submission

- All samples were shipped to the laboratory in custody sealed coolers, filled with ice at less than 10° C

- All sample shipments are accompanied by standard chain of custody forms

- For each analysis and matrix, Table B-1 describes the type of sample container and preservation technique used

The results of the field duplicate samples are presented along with the tabulated data in this appendix. Tabulated data are presented to a maximum of two significant digits.

Laboratory Quality Assurance/Quality Control

All laboratory analyses were completed by the Mississauga facility of Maxxam Analytics (Maxxam). This Maxxam laboratory has been accredited by the Standards Council of Canada (SCC) for all of the parameters that were analysed in accordance with the latest version of the International Standard ISO/IEC 17025 – "*General Requirement for the Competence of Testing and Calibration Laboratories*". Maxxam performed the work following formal written methods and procedures. These methods include all the minimum requirements as specified in the Protocol.

Exp has accepted the data provided by Maxxam based on the assurance from Maxxam that, as a minimum, the following requirements have been met and documentation to demonstrate compliance can be produced on request:

- The method performance criteria identified in the Protocol were met

- Sample storage requirements, pre-analysis processing techniques, and holding times for all sample types as identified in the Protocol were met following receipt and sign-off of the samples from **exp** staff

- The results of all laboratory QC samples were within statistically determined control limits and if not, reasons were provided

- Surrogate recoveries for organic analyses were monitored and recorded

- Details on the precision and accuracy of the data have been recorded and retained and are available from the laboratory should they be required as a result of a Ministry of the Environment (MOE) audit

- The analytical data were reported without blank correction (unless the correction was clearly identified on the Certificate of Analysis)

- All soil sampling results were reported on a dry weight basis

- All laboratory QA/QC sample data, including method blanks, matrix spikes, matrix duplicates, laboratory control samples, and surrogate recoveries, were included in the Certificate of Analysis

All Certificates of Analysis were reviewed by the Qualified Person to ensure that data quality objectives have been met and that any anomalies have been identified. A data quality review checklist has been prepared by an **exp** staff member under the supervision of the Qualified Person for each laboratory submission. The checklist is appended with each Certificate of Analysis. All Certificates of Analysis meet the requirements under Section 47(3) of Regulation 153/04.

Quality Assurance/Quality Control Program

A summary of laboratory data quality waivers and other laboratory and field data quality issues is provided in Table B-2. No issues were identified that would have a material effect on the interpretation of results presented in this report.

The soil field QA/QC program consisted of the following submission for laboratory analysis: one field duplicate sample for benzene, toluene, ethylbenzene, xylenes (BTEX), hexane, petroleum hydrocarbon (PHC) fractions F1 to F4, selected polycyclic aromatic hydrocarbons (PAH), and lead; one trip blank for BTEX, hexane, and PHC fraction F1; and one field blank for selected PAH.

The ground water field QA/QC program consisted of the following submission for laboratory analysis: one field duplicate sample for BTEX, hexane, PHC fractions F1 to F4, and lead; one field blank for BTEX, hexane, PHC fractions F1 to F4, and lead; and one trip blank for BTEX, hexane, PHC fractions F1 to F4, and lead.

For the field duplicate samples, evaluation of the QA/QC results were determined by calculating the relative percent difference (RPD) between the field duplicate and original sample results, and comparison of the RPD to designated alert limits. Consistent with laboratory practices and to permit reliable calculations, an RPD is only calculated when the original and duplicate sample concentrations are at least five times the reportable detections limits.

$$RPD = \left| \frac{(x_1 - x_2)}{\left(\frac{(x_1 + x_2)}{2}\right)} \right| \times 100\%$$

The RPD for the soil field duplicate samples are provided in Tables B-3 and B-4, along with the designated field duplicate limits. All of the RPD were not calculable.

The soil trip blank and field blank data were compared to the alert limits and are provided in Tables B-5 and B-6. All of the results were within the alert limits.

The RPD for the ground water field duplicate sample are provided in Table B-7. All of the RPD were either within the alert limits or not calculable.

The ground water trip blank and field blank data were compared to the alert limits and are provided in Table B-8. All of the results were within the alert limits.

No field or laboratory QA/QC issues were identified that would affect the overall conclusions presented in this report. Overall, the results reported are considered to be reliable.

Table B-1

SAMPLE CONTAINERS AND PRESERVATIVES

Adjacent to 1660 Merivale Road, Ottawa, Ontario

Parameter Group	Matrix	Container	Preservative
BTEX/F1 hexane	Soil	2 x 40 mL C/G TL septum cap vial	Less than 10°C Methanol
F2-F4	Soil	60 or 120 mL C/G TL	Less than 10°C
PAH	Soil	120 mL C/G TL	Less than 10°C
Metals	Soil	120 or 250 mL C/G	Less than 10°C
PAH	Soil	120 mL C/G TL	Less than 10°C
BTEX/F1 hexane	Ground Water	4 x 40 mL C/G TL septum cap vial	Less than 10°C 18% $NaHSO_4$
F2-F4	Ground Water	2 x 500mL A/G TL	Less than 10°C 15% $NaHSO_4$
F4 Gravimetric	Ground Water	1 x 1L A/G TL	Less than 10°C 15% HCl
Metals (Lead Only)	Ground Water	120 mL HDPE	Less than 10°C 18% HNO_3

A/G means "amber glass"; C/G means "clear glass"; HDPE means "High Density Polyethylene"; TL means "Teflon-lined lid"

Table B-2

DATA QUALITY WAIVERS AND OTHER DATA ISSUES

Adjacent to 1660 Merivale Road, Ottawa, Ontario

Maxxam Job #	DQW #	Matrix	Sample ID	Test Affected	Deviation	Interpretation
B2D4498	NA	Water	W1	PHC F1-F4	D10-ethylbenzene instrument surrogate recovery (34%) is below the acceptance criteria (60-140%)	Possible low bias in reported PHC F1-F4 results for this sample. Since all PHC F1-F4 results were below the detection limits and the detection limits are well below the Table 3 standards, the possible low bias should have no material effect on the interpretation of the data

Table B-3

SOIL FIELD DUPLICATES

Relative Percent Differences - Petroleum Related Parameters

Adjacent to 1660 Merivale Road, Ottawa, Ontario

August 29, 2012

Location Depth (mbgs) Maxxam I.D.		TH10-3 1.7 to 1.8 OR8396	DUP1 (TH10-3) 1.7 to 1.8 OR8397	RPD (%)	Alert Limit (%)
PARAMETERS	**RDL***				
Volatile Organic Compounds					
Benzene	0.020	nd	nd	nc	100
Toluene	0.020	nd	nd	nc	100
Ethylbenzene	0.020	nd	nd	nc	100
Xylenes	0.040	nd	nd	nc	100
Hexane	0.50	nd	nd	nc	100
Petroleum Hydrocarbons					
F1 (C6 to C10 - BTEX)	10	nd	nd	nc	100
F2 (C10 to C16)	10	nd	nd	nc	100
F3 (C16 to C34)	10	nd	nd	nc	100
F4 (C34 to C50)	10	nd	nd	nc	100
Inorganic Parameters					
Lead	5.0	9.1	8.2	nc	100

Analysis by Maxxam Analytics

All results in ppm (ug/g) on dry weight basis; nd means "not detected" at reporting detection limit (RDL)

na means "not analysed"

nc means "not calculable" - one (or both) of the results are <5x RDL

mbgs means "metres below ground surface"

* Analytical RDL are shown except as indicated in brackets

Exceedances of alert limits are shown in **bold**

Table B-4

SOIL FIELD DUPLICATES

Relative Percent Differences - Polycyclic Aromatic Hydrocarbons

Adjacent to 1660 Merivale Road, Ottawa, Ontario

August 29, 2012

Location Depth (mbgs) Maxxam I.D.		TH10-3 1.7 to 1.8 OR8396	DUP1 (TH10-3) 1.7 to 1.8 OR8397	RPD (%)	Alert Limit (%)
PARAMETERS	**RDL***				
Acenaphthene	0.0050	nd	nd	nc	100
Acenaphthylene	0.0050	nd	nd	nc	100
Anthracene	0.0050	nd	nd	nc	100
Fluoranthene	0.0050	nd	nd	nc	100
Fluorene	0.0050	nd	nd	nc	100
1-Methylnaphthalene	0.0050	nd	nd	nc	100
2-Methylnaphthalene	0.0050	nd	nd	nc	100
Total Methylnapthalene	0.0071	nd	nd	nc	100
Naphthalene	0.0050	nd	nd	nc	100
Phenanthrene	0.0050	nd	nd	nc	100

Analysis by Maxxam Analytics

All results in ppm (ug/g) on dry weight basis; nd means "not detected" at reporting detection limit (RDL)

na means "not analysed"

nc means "not calculable" - one (or both) of the results are <5x RDL

mbgs means "metres below ground surface"

* Analytical RDL are shown except as indicated in brackets

Exceedances of alert limits are shown in **bold**

Table B-5

SOIL CHEMICAL ANALYSIS - Petroleum Related Parameters

Trip Blank

Adjacent to 1660 Merivale Road, Ottawa, Ontario

Sample		Trip Blank					Alert Limit
Sample Date		31-Aug-12					
Maxxam I.D.		OS2643					
PARAMETERS	**RDL***						
Volatile Organic Compounds							
Benzene	0.020	nd					5X RDL
Toluene	0.020	nd					5X RDL
Ethylbenzene	0.020	nd					5X RDL
Xylenes	0.040	nd					5X RDL
Hexane	0.50	nd					5X RDL
Petroleum Hydrocarbons							
F1 (C6 to C10 - BTEX)	10	nd					2X RDL

Analysis by Maxxam Analytics

All results in ppm (ug/g) on dry weight basis; nd means "not detected" at reporting detection limit (RDL); na means "not analysed"

* Analytical RDL are shown except as indicated in brackets

Exceedances of alert limits are shown in **bold**

SOIL CHEMICAL ANALYSIS - Polycyclic Aromatic Hydrocarbons

Field Blank

Adjacent to 1660 Merivale Road, Ottawa, Ontario

Sample		Field Blank					Alert Limit
Sample Date		30-Aug-12					
Maxxam I.D.		OS2642					
PARAMETERS	**RDL***						
Acenaphthene	0.0050	nd					5X RDL
Acenaphthylene	0.0050	nd					5X RDL
Anthracene	0.0050	nd					5X RDL
Fluoranthene	0.0050	nd					5X RDL
Fluorene	0.0050	nd					5X RDL
1-Methylnaphthalene	0.0050	nd					5X RDL
2-Methylnaphthalene	0.0050	nd					5X RDL
Total Methylnapthalene	0.0071	nd					5X RDL
Naphthalene	0.0050	nd					5X RDL
Phenanthrene	0.0050	nd					5X RDL

Analysis by Maxxam Analytics

All results in ppm (ug/g) on dry weight basis; nd means "not detected" at reporting detection limit (RDL); na means "not analysed"

* Analytical RDL are shown except as indicated in brackets

Exceedances of alert limits are shown in **bold**

Table B-7

GROUND WATER FIELD DUPLICATES

Relative Percent Differences - Petroleum Related Parameters

Adjacent to 1660 Merivale Road, Ottawa, Ontario

June 11, 2013

Location Maxxam I.D.		TH12 RW8215	DUP1 (TH12) RW8216	RPD (%)	Alert Limit (%)
PARAMETERS	**RDL***				
Volatile Organic Compounds					
Benzene	4.0	380	360	5	80
Toluene	4.0	35	34	3	80
Ethylbenzene	4.0	2300	2100	9	80
Xylenes	8.0	3500	3300	6	80
Hexane	100	nd	nd	nc	80
Petroleum Hydrocarbons					
F1 (C6 to C10 - BTEX)	500	11000	11000	0	80
F2 (C10 to C16)	100	3100	2800	10	80
F3 (C16 to C34)	200	nd	nd	nc	80
F4 (C34 to C50)	200	nd	nd	nc	80
Inorganic Parameters					
Lead	0.50	6.8	6.9	1	50

Analysis by Maxxam Analytics

All results in ppb (ug/L) unless otherwise indicated; nd means "not detected" at reporting detection limit (RDL)

na means "not analysed"

nc means "not calculable" - one (or both) of the results are <5x RDL

* Analytical RDL are shown except as indicated in brackets

Exceedances of alert limits are shown in **bold**

GROUND WATER CHEMICAL ANALYSIS - Petroleum Related Parameters

Field Blank and Trip Blank

Adjacent to 1660 Merivale Road, Ottawa, Ontario

Sample		Trip Blank	Field Blank					Alert Limit
Sample Date		11-Jun-13	11-Jun-13					
Maxxam I.D.		RW8512	RW8513					
PARAMETERS	**RDL***							
Volatile Organic Compounds								
Benzene	0.20	nd	nd					5X RDL
Toluene	0.20	nd	nd					5X RDL
Ethylbenzene	0.20	nd	nd					5X RDL
Xylenes	0.40	nd	nd					5X RDL
Hexane	5.0	nd	nd					5X RDL
Petroleum Hydrocarbons								
F1 (C6 to C10 - BTEX)	25	nd	nd					2X RDL
F2 (C10 to C16)	100	nd	nd					2X RDL
F3 (C16 to C34)	200	nd	nd					2X RDL
F4 (C34 to C50)	200	nd	nd					2X RDL
Inorganic Parameters								
Lead	0.50	nd	nd					5X RDL

Analysis by Maxxam Analytics

All results in ppb (ug/L) unless otherwise indicated; nd means "not detected" at reporting detection limit (RDL); na means "not analysed"

* Analytical RDL are shown except as indicated in brackets

Exceedances of alert limits are shown in **bold**

Appendix C –
Test Hole Logs and MOE Well Record

LEGEND
exp TEST HOLE LOGS

STANDARD INFORMATION (applies to all test holes on this project, unless otherwise noted in the legend or log)

Project Site & Number:	Adjacent to 1660 Merivale Road, Ottawa, Ontario Job #11010
Drilling Contractor:	George Downing Estate Drilling Ltd.
Test Hole Diameter:	216 mm
Monitor Details:	Casing Type = Steel Flush Mounted Casing Screen Type = PVC 50 mm diameter with a 0.010" slot Riser Type = PVC 50 mm diameter (see typical monitor legend for further details)
Dedicated Sampling Equipment:	None
Site Benchmark:	Elevations are related to the north side of the manhole cover on the west side of the kiosk, assumed elevation = 100.00 metres (**exp**, 2013)
Other Notes:	The attached test hole logs are part of the complete report and are to be used only in conjunction with the report. The test holes were drilled using a Mobil B-60 rotary hollow stem auger rig to the maximum depth of the investigation
Attached Graphical Legends:	Refer to Soil Symbol Identification Detail Refer to Typical Monitor Construction Detail

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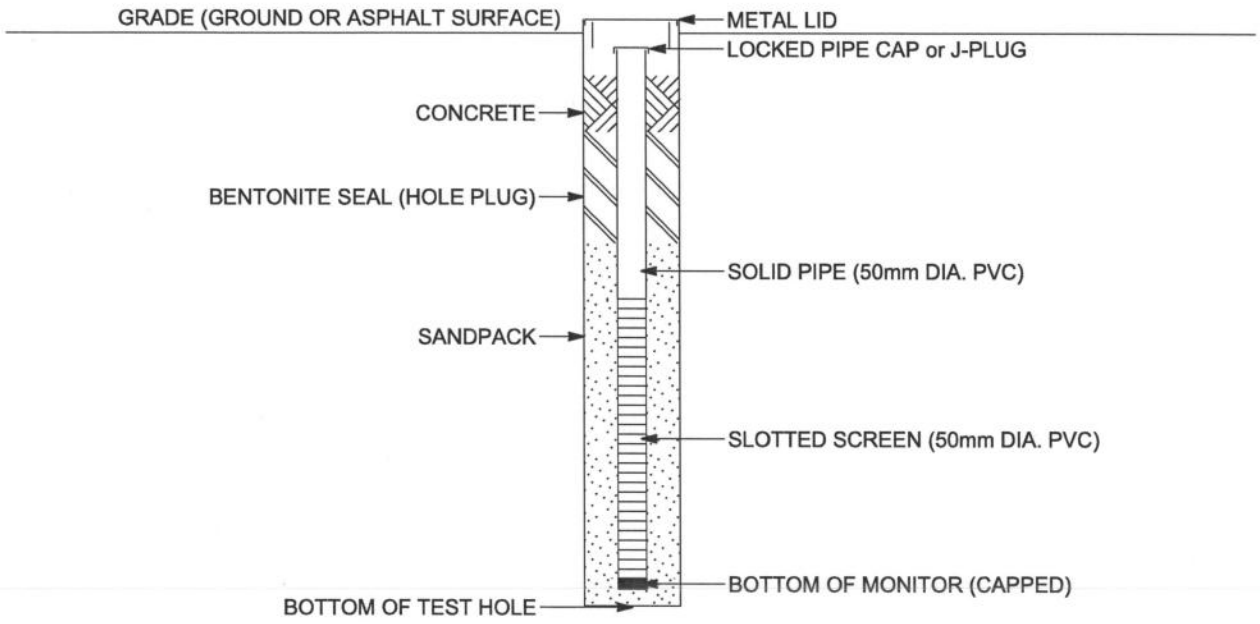
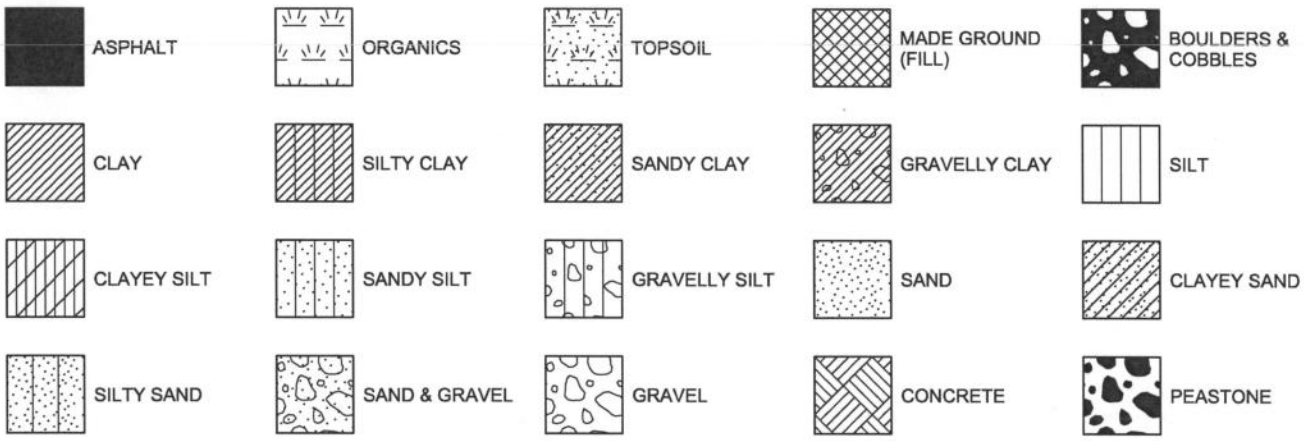
CONVENTIONS USED IN TEST HOLE LOGS

MONITOR INFORMATION



GEOLOGIC SYMBOLS

SOILS



ROCK



SAMPLE SYMBOLS



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CONVENTIONS USED IN PARAMETER ANALYSIS

ABBREVIATIONS	PARAMETERS INCLUDED
F1-F4	Petroleum Hydrocarbon Fractions F1 to F4
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
BTEXH	Benzene, Toluene, Ethylbenzene, Xylenes, Hexane
VOC	Full Suite of Volatile Organic Compounds
CVOC	Chlorinated Volatile Organic Compounds (1,1-Dichloroethane, 1,2-Dichloroethane, 1,1-Dichloroethylene, cis-1,2-Dichloroethylene, trans-1,2-Dichloroethylene, Ethylene Dibromide, Methyl t-Butyl Ether, Tetrachloroethylene, 1,1,1-Trichloroethane, 1,1,2-Trichloroethane, Trichloroethylene, Vinyl Chloride)
CFC	Chlorofluorocarbons (Dichlorodifluoromethane (FREON 12), Trichlorofluoromethane (FREON 11))
1,2-DCA, EDB, MTBE	1,2-Dichloroethane, Ethylene Dibromide, Methyl t-Butyl Ether only
Selected VOC	Any variation of Volatile Organic Parameters not listed above
SVOC	Semivolatile Organic Compounds (Includes PAH, CP, ABN)
PAH	Full Suite of Polycyclic Aromatic Hydrocarbons
2 & 3 Ring PAH	2- & 3- Ring Polycyclic Aromatic Hydrocarbons (Acenaphthene, Acenaphthylene, Anthracene, Fluoranthane, Fluorene, 1-Methylnaphthalene, 2-Methylnaphthalene, Total Methylnaphthalene, Naphthalene, Phenanthrene)
Selected PAH	Any variation of Polycyclic Aromatic Hydrocarbons not listed above
CP	Chlorophenols
ABN	Acid-Base Neutral Compounds
Metals	Full Suite of Metals (may or may not include Hot Water Boron and Mercury)
Pb	Lead only
6 Metals	Arsenic, Barium, Chromium, Copper, Lead, Zinc
Selected Metals	Any variation of Metal parameters not listed above
pH	Hydrogen Ion Concentration
OCP	Organochlorine Pesticides
PCB	Total Polychlorinated Biphenyls (includes Aroclor 1242, 1248, 1252, 1262)
1,4 - Dioxane	1,4 - Dioxane
D/F	Dioxins/Furans
SAR	Sodium Adsorption Ratio
FOC	Fraction of Organic Carbon

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TEST HOLE # TH8

CLIENT Imperial Oil

PROJECT LOCATION 1660 Merivale Road, Ottawa, Ontario **PROJECT NUMBER** 11010

DATE STARTED 28-Aug-12 **COMPLETED** 28-Aug-12 **WEATHER** Partly Cloudy 25°C **GAS METER TYPE** RKI Eagle II

DRILLING CONTRACTOR George Downing Estate Drilling Ltd **GROUND ELEV.** 100.16 m **TOP OF PIPE ELEV.** 100.03 m

DRILLING EQUIPMENT CME 75 Truckmount **DAYLIGHTING TO** 1.98 mbgs **MONITOR DIA** 0.05 m **TH DIA** 0.20 m

DRILLING METHOD Hollow Stem Auger **WATER LEVEL** 3.01 mbgs / Elev 97.15 m 10-Jun-13

FIELD STAFF MCM/JW **LOGGED BY** MCM **CHECKED BY** DKS **NORTHING** 502 13 85 **EASTING** 44 28 28

BENCHMARK North side of the manhole cover located approx. 5 m west of the kiosk on the Imperial Oil Property, Elev. = 100.00 m

DEPTH (mbgs)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	ANALYSIS	GRAPHIC LOG	MATERIAL DESCRIPTION	◆ SOIL VAPOUR CONCENTRATION (ppmv) ○ (nm) ⊗ (is)	◓ SOIL VAPOUR CONCENTRATION (%LEL)	WELL CONSTRUCTION Casing Type: Flushmount	ELEVATION (m)
						mbgs	100 200 300 400	20 40 60 80		
						0.06 ASPHALT				100
						Brown SAND & GRAVEL (fill), damp, no staining, no odour				
	GB TH8-1						◆ nd			
1						1.07				
	GB TH8-2					Grey to brown SILT, some sand, trace clay & gravel, moist, no staining, no odour	◆ 150			99
	GB TH8-3			BTEXH, F1-F4, 2 & 3 Ring PAH, Pb			◆ 180			
2	SS TH8-4	67	8 25 30 50/0"				○ nm			98
	RC					2.44 LIMESTONE				
3										97
4										96
5						5.03				

ppmv = parts per million by volume; %LEL = % lower explosive limit; nd = not detected; is = insufficient sample for screening; nm = not measured; n/a = not applicable; mbgs = metres below ground surface; masl = metres above sea level; saturated = saturated with water

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TEST HOLE # TH9

CLIENT Imperial Oil

PROJECT LOCATION 1660 Merivale Road, Ottawa, Ontario **PROJECT NUMBER** 11010

DATE STARTED 29-Aug-12 **COMPLETED** 29-Aug-12 **WEATHER** Clear 27°C **GAS METER TYPE** RKI Eagle II

DRILLING CONTRACTOR George Downing Estate Drilling Ltd **GROUND ELEV.** 100.35 m **TOP OF PIPE ELEV.** n/a

DRILLING EQUIPMENT CME 75 Truckmount **DAYLIGHTING TO** 1.98 mbgs **MONITOR DIA** 0.05 m **TH DIA** 0.20 m

DRILLING METHOD Hollow Stem Auger **WATER LEVEL** n/a 10-Jun-13

FIELD STAFF MCM/JW **LOGGED BY** MCM **CHECKED BY** DKS **NORTHING** 502 13 95 **EASTING** 44 28 37

BENCHMARK North side of the manhole cover located approx. 5 m west of the kiosk on the Imperial Oil Property, Elev. = 100.00 m

DEPTH (mbgs)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	ANALYSIS	GRAPHIC LOG	MATERIAL DESCRIPTION	◆ SOIL VAPOUR CONCENTRATION (ppmv) ○ (nm) ⊗ (is) 100 200 300 400	❸ SOIL VAPOUR CONCENTRATION (%LEL) 20 40 60 80	WELL CONSTRUCTION Casing Type: Flushmount	ELEVATION (m)
mbgs						0.06 ASPHALT Brown SAND & GRAVEL (fill), damp, no staining, no odour				
1	GB TH9-1						◆ nd			1
						1.07 Brown to grey SILT, some sand, trace gravel, trace organics from 1.1 to 1.7 mbgs, moist, no staining, no odour				
	GB TH9-2						◆ nd			
2	GB TH9-3			BTEXH, F1-F4, 2 & 3 Ring PAH, Pb			◆ nd			2
	SS TH9-4 RC	0	50/2				⊗ is			
						2.44 LIMESTONE				
3										3
4										4
5						5.03				5

ppmv = parts per million by volume; %LEL = % lower explosive limit; nd = not detected; is = insufficient sample for screening; nm = not measured; n/a = not applicable; mbgs = metres below ground surface; masl = metres above sea level; saturated = saturated with water

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TEST HOLE # TH10

CLIENT Imperial Oil

PROJECT LOCATION 1660 Merivale Road, Ottawa, Ontario **PROJECT NUMBER** 11010

DATE STARTED 29-Aug-12 **COMPLETED** 29-Aug-12 **WEATHER** Clear 27°C **GAS METER TYPE** RKI Eagle II

DRILLING CONTRACTOR George Downing Estate Drilling Ltd **GROUND ELEV.** 100.26 m **TOP OF PIPE ELEV.** 100.17 m

DRILLING EQUIPMENT CME 75 Truckmount **DAYLIGHTING TO** 2.13 mbgs **MONITOR DIA** 0.05 m **TH DIA** 0.20 m

DRILLING METHOD Hollow Stem Auger **WATER LEVEL** 3.03 mbgs / Elev 97.24 m 10-Jun-13

FIELD STAFF MCM/JW **LOGGED BY** MCM **CHECKED BY** DKS **NORTHING** 502 13 85 **EASTING** 44 28 65

BENCHMARK North side of the manhole cover located approx. 5 m west of the kiosk on the Imperial Oil Property, Elev. = 100.00 m

DEPTH (mbgs)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	ANALYSIS	GRAPHIC LOG	MATERIAL DESCRIPTION	◆ SOIL VAPOUR CONCENTRATION (ppmv) ○ (nm) ⊗ (is) 100 200 300 400	❸ SOIL VAPOUR CONCENTRATION (%LEL) 20 40 60 80	WELL CONSTRUCTION Casing Type: Flushmount	ELEVATION (m)
mbgs						0.06 ASPHALT				
						Brown SAND & GRAVEL (fill), damp, no staining, no odour				
	GB TH10-1						◆nd			100
1						1.07				
	GB TH10-2					Brown to grey SILT, some sand, trace gravel, damp to moist, no staining, no odour	◆25			99
	GB TH10-3			BTEXH, F1-F4, 2 & 3 Ring PAH, Pb			◆100			
2										98
	SS TH10-4 RC	0	2 50/0"				⊗is			
						2.44 LIMESTONE				
3										97
4										96
5						5.03				

ppmv = parts per million by volume; %LEL = % lower explosive limit; nd = not detected; is = insufficient sample for screening; nm = not measured; n/a = not applicable; mbgs = metres below ground surface; masl = metres above sea level; saturated = saturated with water

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TEST HOLE # TH11

CLIENT Imperial Oil

PROJECT LOCATION 1660 Merivale Road, Ottawa, Ontario **PROJECT NUMBER** 11010

DATE STARTED 30-Aug-12 **COMPLETED** 30-Aug-12 **WEATHER** A few Clouds 26°C **GAS METER TYPE** RKI Eagle II

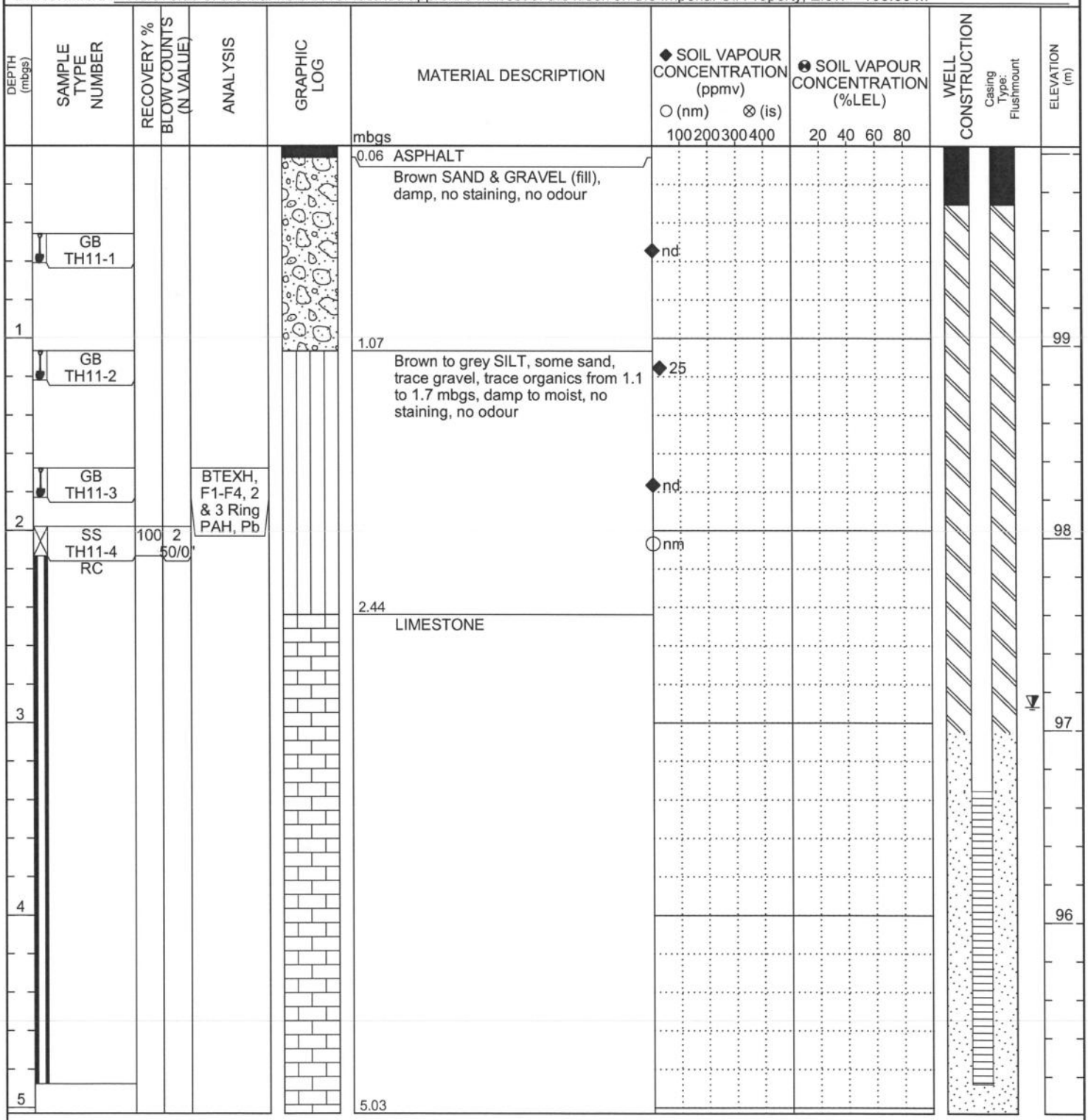
DRILLING CONTRACTOR George Downing Estate Drilling Ltd **GROUND ELEV.** 100.04 m **TOP OF PIPE ELEV.** 99.90 m

DRILLING EQUIPMENT CME 75 Truckmount **DAYLIGHTING TO** 1.98 mbgs **MONITOR DIA** 0.05 m **TH DIA** 0.20 m

DRILLING METHOD Hollow Stem Auger **WATER LEVEL** 2.92 mbgs / Elev 97.12 m 10-Jun-13

FIELD STAFF MCM/JW **LOGGED BY** MCM **CHECKED BY** DKS **NORTHING** 502 13 74 **EASTING** 44 28 67

BENCHMARK North side of the manhole cover located approx. 5 m west of the kiosk on the Imperial Oil Property, Elev. = 100.00 m



ppmv = parts per million by volume; %LEL = % lower explosive limit; nd = not detected; is = insufficient sample for screening; nm = not measured; n/a = not applicable; mbgs = metres below ground surface; masl = metres above sea level; saturated = saturated with water

exp Energy Services Ltd.
220 Commerce Valley Drive West
Markham, Ontario, L3T 0A8
Telephone: (905) 695-3217
Fax: (289) 695-2411

TEST HOLE # TH12

CLIENT Imperial Oil

PROJECT LOCATION 1660 Merivale Road, Ottawa, Ontario **PROJECT NUMBER** 11010

DATE STARTED 30-Aug-12 **COMPLETED** 30-Aug-12 **WEATHER** A few Clouds 26°C **GAS METER TYPE** RKI Eagle II

DRILLING CONTRACTOR George Downing Estate Drilling Ltd **GROUND ELEV.** 99.74 m **TOP OF PIPE ELEV.** 99.60 m

DRILLING EQUIPMENT CME 75 Truckmount **DAYLIGHTING TO** 1.98 mbgs **MONITOR DIA** 0.05 m **TH DIA** 0.20 m

DRILLING METHOD Hollow Stem Auger **WATER LEVEL** 2.75 mbgs / Elev 96.98 m 10-Jun-13

FIELD STAFF MCM/JW **LOGGED BY** MCM **CHECKED BY** DKS **NORTHING** 502 13 68 **EASTING** 44 28 72

BENCHMARK North side of the manhole cover located approx. 5 m west of the kiosk on the Imperial Oil Property, Elev. = 100.00 m

DEPTH (mbgs)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	ANALYSIS	GRAPHIC LOG	MATERIAL DESCRIPTION	◆ SOIL VAPOUR CONCENTRATION (ppmv) ○ (nm) ⊗ (is) 100 200 300 400	⊗ SOIL VAPOUR CONCENTRATION (%LEL) 20 40 60 80	WELL CONSTRUCTION Casing Type: Flushmount	ELEVATION (m)
						mbgs				
						0.06 ASPHALT				
						Brown SAND & GRAVEL (fill), damp, no staining, no odour				
	GB TH12-1						◆nd			
1										99
	GB TH12-2			BTEXH, F1-F4, 2 & 3 Ring PAH, Pb		1.07 Brown to grey SILT, some sand, trace to some gravel, moist, no staining, no odour	◆25			
	GB TH12-3						◆25			98
2										
	SS TH12-4	100	8 13 50/0"				◆25			
	RC					2.44 LIMESTONE				
3										97
4										96
5						5.03				95

ppmv = parts per million by volume; %LEL = % lower explosive limit; nd = not detected; is = insufficient sample for screening; nm = not measured; n/a = not applicable; mbgs = metres below ground surface; masl = metres above sea level; saturated = saturated with water

Ontario Ministry of the Environment

Well Record for Well Cluster - Part 1 of 3

(Only for Multiple Test Holes or Dewatering Wells)

Regulation 903 Ontario Water Resources Act

Page 1 of 1

All measurements recorded in: ☒ Metric ☐ Imperial

Follow instructions on the front and back of this form. Print or Type

Well Tag No. of Deepest Well: *(Print Well Tag No.)* A122861

Well # on Drawing of Deepest Well: TH10

Well Cluster Location Information

Address of Well Location (Street Number(s)/Name(s), RR, if available)	Lot(s)	Concession(s)	Geographic Township	County/District/Upper Tier Municipality
1600 Merivale Road				

City, Town, Village or Hamlet	Province	GPS Unit Make	Model	Unit Mode of Operation
Ottawa	Ontario	Garmin	ETREX	☐ Undifferentiated ☒ Averaged ☐ Differentiated, specify:

Mandatory Attachments/Additional Information

☒ Land Owner Consent Form must be attached.

☒ Detailed Drawing of All Well Locations must be attached.

I, the person constructing the well, will promptly submit to the Director, on request, any additional information in my custody or control related to any well in the well cluster that I have constructed.

Signature of Technician/Contractor — Date (yyyy/mm/dd): 2013/01/16

Well Details

Well # on Drawing	UTM Coordinates Zone	Easting	Northing	Hole Depth (m/ft)	Hole Diameter (cm/in)	Method of Construction	Casing Material; Diameter (cm/in)	Casing (m/ft) From	Casing (m/ft) To	Screen Interval (m/ft) From	Screen Interval (m/ft) To	Annular Space Material (m/ft) From	Annular Space Material (m/ft) To	Annular Space Material: Material:	Overburden/Bedrock or Abandonment Filing Material Intervals (m/ft)	Static Water Level (m/ft)	Date of Completion (yyyy/mm/dd)
TH10	18	441285	5021315	5.03	20	H.S.A./diamond	5.1	0	3.4	3.4	4.9	0.3	3.1	bentonite	asphalt, sand & gravel (fill), sandy silt, limestone bedrock	N/A	2012/05/27
TH11	18	441317	5021314	5.03	20	H.S.A./diamond	5.1	0	3.4	3.4	4.9	0.3	3.0	bentonite	asphalt, sand & gravel (fill), sandy silt, & limestone bedrock	N/A	2012/05/30
TH12	18	441285	5021311	5.03	20	H.S.A./diamond	5.1	0	3.4	3.4	4.9	0.3	3.1	bentonite	asphalt, sand & gravel (fill), sandy silt, limestone bedrock,	N/A	2012/05/30
TH8	18	441285	5021315	5.03	20	H.S.A./diamond	5.1	0	3.4	3.4	4.9	0.3	3.0	bentonite	asphalt, sand & gravel (fill), sandy silt, limestone bedrock	N/A	2012/05/23
TH9	18	441283	5021319	5.03	20	H.S.A./diamond	5.1	0	3.4	3.4	4.9	0.3	3.0	bentonite	asphalt, sand & gravel (fill) silt, limestone bedrock	N/A	2012/05/29

Well Contractor and Well Technician Information

Business Name of Well Contractor	Business Address (Street Number/Name, RR)	Municipality	Province
George Downing Estate Drilling LTD	410 Rue Principale	Grenville-sur-la-Rouge	Qc

Postal Code	Bus. Telephone No.	Well Contractor's Licence No.	Business E-mail Address
J0V 1B0	819-242-6469	1844	downing@hawk.igs.net

Name of Well Technician (First Name, Last Name)	Well Technician's Licence No.	Signature of Well Technician	Date Submitted (yyyy/mm/dd)
Shawn Downing	3326		2013/01/16

Date First Well in Cluster Constructed or Abandoned (yyyy/mm/dd)	Date Last Well in Cluster Completed (yyyy/mm/dd)
2012/08/28	2012/08/30

Well Abandonment

Person Abandoning the Wells:

Name Imperial Oil LTD
(Print or Type) - See instruction 11 on the back of this form

Ministry Use Only

Date Received (yyyy/mm/dd):

Audit No.: C 20604

Comments:

1991E (2011/04) © Queen's Printer for Ontario, 2011

Well Owner's Copy

Ontario Ministry of the Environment

Well Record for Well Cluster - Part 2 of 3
Land Owner Consent

This form is to be completed by the person who constructs or abandons test holes or dewatering wells that form all or part of a well cluster. If this form is being used to report any well abandonment, these wells must have been previously reported as part of a single well cluster.

Note: For well cluster records, only the owners of the land on which the wells are situated are to give written consent. If the well purchaser (e.g. a consultant who hires the driller) is not the owner of the land, then the well purchaser cannot sign the consent form.

By signing this form, land owners are providing consent to use one well record to report a well cluster of test holes or dewatering wells in accordance with section 16.4 of Regulation 903 made under the *Ontario Water Resources Act.*

This completed **Well Record for Well Cluster Part 2 - Land Owner Consent** must be attached to Parts 1 and 3.

* Please PRINT if completing by hand.

Well Tag Number: # A122861

"Well Record for Well Cluster" Audit Number: # C 20604

Well # on Detailed Drawing	Property Location Description	Land Owner's Name	Signature of Land Owner	Date Signed *(yyyy/mm/dd)*
TH 10 TH 11	1660 Merivale Rd Ottawa, ON	Imperial Oil LTD	for Imperial Oil	2013/02/15
TH 12 TH 8	"	"	↓	↓
TH 9	"	"	↓	↓

Well Owner's Copy

 © Queen's Printer for Ontario, 2011 Disponible en français

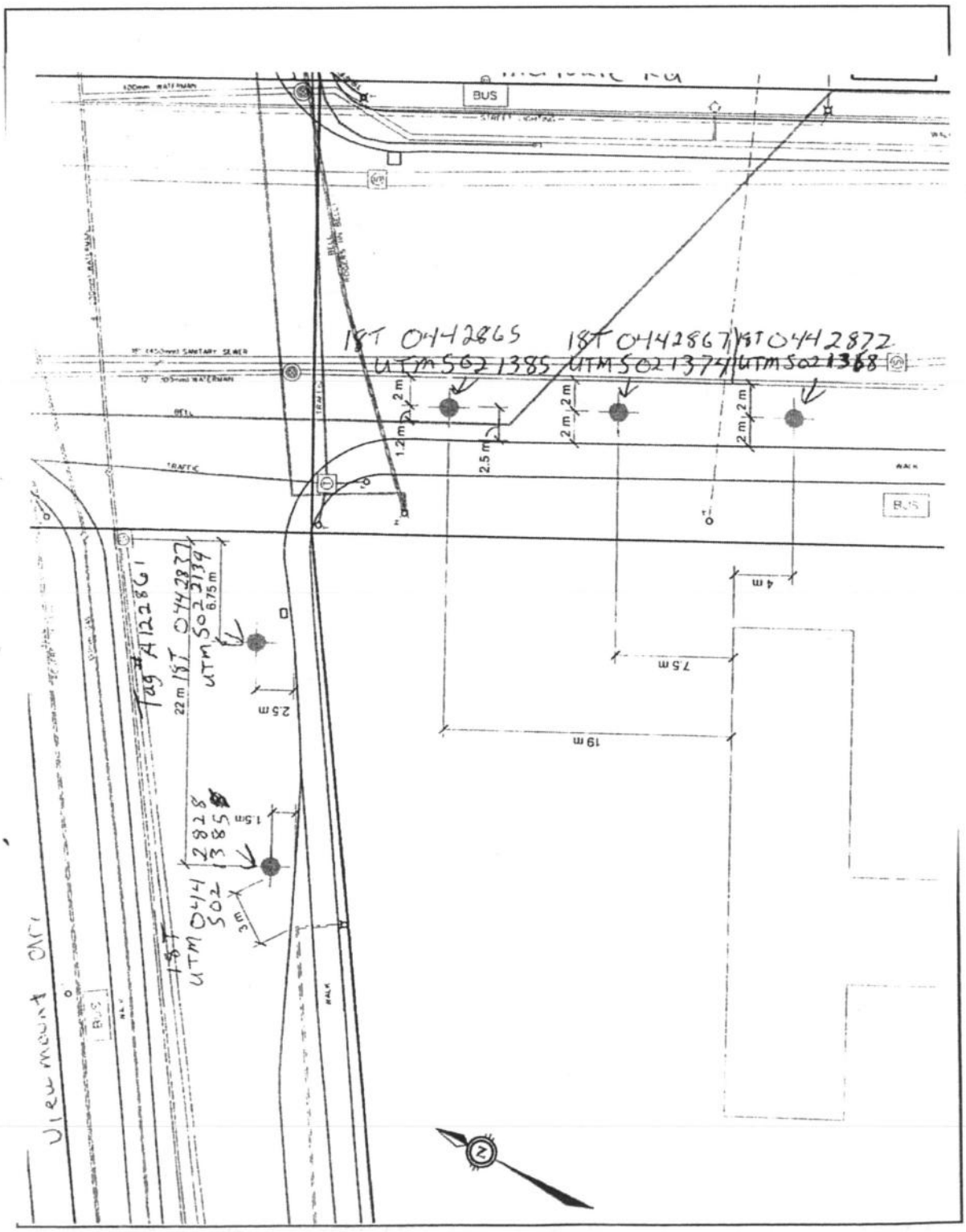
Ontario Ministry of the Environment

Well Record for Well Cluster - Part 3 of 3
Detailed Drawing of All Well Locations

Note: This **Well Record for Well Cluster Part 3 - Detailed Drawing of all Well Locations,** must be attached to Parts 1 and 2. The drawing must include all property boundaries, an arrow indicating the North direction, all named roads and sufficient measurements to locate all wells in the cluster in relation to fixed points. The drawing must show the location of each well and each well must be numbered on the drawing to match number used for that well on the **Well Record for Well Cluster Parts 1 and 2.** The well with the well tag must be clearly identified on the Drawing.
UTM coordinates should appear beside each well, if space permits. Additional comments on wells can be included on the drawing

Well Tag Number: # A122361

"Well Record for Well Cluster" Form Audit Number: # C 20604



Appendix D –
Laboratory Certificates of Analysis

Attached are copies of the original Certificates of Analysis provided by the laboratory. The data contained in these analyses is to be read only in conjunction with the report to which it is attached. For interpretation of the chemical data, see the attached text.

Since the laboratory data contains scientific terms and references, only trained persons familiar with sampling and laboratory methods should attempt to interpret the data contained in the Certificates of Analysis.

Task Order#: 11070983
Site#: P12960
Site Location: 88001627;1660 MERIVALE ROAD, OTTAWA
Project #: 11010
Your C.O.C. #: 58436

Attention: Carl Hentschel
exp Energy Services Ltd.
220 Commerce Valley Dr. W
Suite 500
Markham, ON
L3T 0A8

Report Date: 2012/09/11

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B2D4309
Received: 2012/08/31, 13:35

Sample Matrix: Soil
Samples Received: 3

Analyses	Quantity	Laboratory Method	Method Primary reference
Methylnaphthalene Sum	3	CAM SOP - 00301	EPA 8270
Petroleum Hydro. CCME F1 & BTEX in Soil	3	CAM SOP-00315	CCME CWS
Petroleum Hydrocarbons F2-F4 in Soil	3	CAM SOP-00316	CCME CWS
Total Metals Analysis by ICP	3	CAM SOP-00408	SW-846 6010C
Moisture	3	CAM SOP-00445	R.Carter,1993
PAH Compounds in Soil by GC/MS (SIM)	3	CAM SOP - 00318	EPA 8270

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. Reporting results to two significant figures at the RDL is to permit statistical evaluation and is not intended to be an indication of analytical precision.

The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following the 'Alberta Environment Draft Addenda to the CWS-PHC, Appendix 6, Validation of Alternate Methods'. Documentation is available upon request. Maxxam has made the following improvements to the CWS-PHC reference benchmark method: (i) Headspace for F1; and, (ii) Mechanical extraction for F2-F4. Note: F4G cannot be added to the C6 to C50 hydrocarbons.

Maxxam Analytics is accredited by SCC (Lab ID 97) for all specific parameters as required by GUCSO and O.Reg 153/04. Maxxam Analytics is limited in liability to the actual cost of analysis unless otherwise agreed in writing. There is no other warranty expressed or implied. Samples will be retained at Maxxam Analytics for three weeks from receipt of data or as per contract.

All data is in statistical control and has met all QC and method performance criteria unless otherwise flagged. All samples

Task Order#: 11070983
Site#: P12960
Site Location: 88001627;1660 MERIVALE ROAD, OTTAWA
Project #: 11010
Your C.O.C. #: 58436

Attention: Carl Hentschel
exp Energy Services Ltd.
220 Commerce Valley Dr. W
Suite 500
Markham, ON
L3T 0A8

Report Date: 2012/09/11

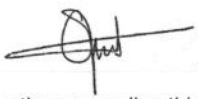
CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B2D4309
Received: 2012/08/31, 13:35

were analysed within hold time unless otherwise flagged. All soil samples for BTEX analysis were methanol extracted within 24 hours unless otherwise flagged.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key



Patricia Opoku
11 Sep 2012 12:29:15 -04:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Patricia Opoku, Project Manager
Email: POpoku@maxxam.ca
Phone# (905) 817-5700

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B2D4309
Report Date: 2012/09/11

exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 88001627;1660 MERIVALE ROAD, OTTAWA
Project #: 11010

LEAD IN SOIL (SOIL)

Maxxam ID		OR8395	OR8396	OR8397	OR8397		
Sampling Date		2012/08/29 22:00	2012/08/29 23:30	2012/08/29 23:30	2012/08/29 23:30		
COC Number		58436	58436	58436	58436		
	Units	**TH9-3**	**TH10-3**	**DUP1**	**DUP1 Lab-Dup**	**RDL**	**QC Batch**
Acid Extractable Lead (Pb)	ug/g	9.6	9.1	8.2	9.2	5.0	2963064

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B2D4309
Report Date: 2012/09/11

exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 88001627;1660 MERIVALE ROAD, OTTAWA
Project #: 11010

O.REG 153 PHCS IN SOIL (SOIL)

Maxxam ID		OR8395	OR8396	OR8397	OR8397		
Sampling Date		2012/08/29 22:00	2012/08/29 23:30	2012/08/29 23:30	2012/08/29 23:30		
COC Number		58436	58436	58436	58436		
	Units	**TH9-3**	**TH10-3**	**DUP1**	**DUP1 Lab-Dup**	**RDL**	**QC Batch**
Moisture	%	19	21	19	20	1.0	2959046
Benzene	ug/g	<0.020	<0.020	<0.020		0.020	2960544
Toluene	ug/g	<0.020	<0.020	<0.020		0.020	2960544
Ethylbenzene	ug/g	<0.020	<0.020	<0.020		0.020	2960544
o-Xylene	ug/g	<0.020	<0.020	<0.020		0.020	2960544
p+m-Xylene	ug/g	<0.040	<0.040	<0.040		0.040	2960544
Total Xylenes	ug/g	<0.040	<0.040	<0.040		0.040	2960544
Hexane	ug/g	<0.50	<0.50	<0.50		0.50	2960544
F1 (C6-C10)	ug/g	<10	<10	<10		10	2960544
F1 (C6-C10) - BTEX	ug/g	<10	<10	<10		10	2960544
F2 (C10-C16 Hydrocarbons)	ug/g	<10	<10	<10		10	2961690
F3 (C16-C34 Hydrocarbons)	ug/g	<10	<10	<10		10	2961690
F4 (C34-C50 Hydrocarbons)	ug/g	<10	<10	<10		10	2961690
Reached Baseline at C50	ug/g	Yes	Yes	Yes			2961690
Extraction Surrogate Recovery (%)							
D10-Ethylbenzene	%	77	77	74			2960544
o-Terphenyl	%	95	94	92			2961690
Instrument Surrogate Recovery (%)							
1,4-Difluorobenzene	%	97	95	96			2960544
4-Bromofluorobenzene	%	100	98	95			2960544
D4-1,2-Dichloroethane	%	103	102	101			2960544

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B2D4309
Report Date: 2012/09/11

exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 88001627;1660 MERIVALE ROAD, OTTAWA
Project #: 11010

SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		OR8395	OR8396	OR8396	OR8397		
Sampling Date		2012/08/29 22:00	2012/08/29 23:30	2012/08/29 23:30	2012/08/29 23:30		
COC Number		58436	58436	58436	58436		
	Units	**TH9-3**	**TH10-3**	**TH10-3 Lab-Dup**	**DUP1**	**RDL**	**QC Batch**
Methylnaphthalene, 2-(1-)	ug/g	<0.0071	<0.0071	<0.0071	<0.0071	0.0071	2957348
Acenaphthene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	2961872
Acenaphthylene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	2961872
Anthracene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	2961872
Fluoranthene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	2961872
Fluorene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	2961872
1-Methylnaphthalene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	2961872
2-Methylnaphthalene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	2961872
Naphthalene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	2961872
Phenanthrene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	2961872
Extraction Surrogate Recovery (%)							
D10-Anthracene	%	85	78	77	85		2961872
D14-Terphenyl (FS)	%	92	90	87	93		2961872
D8-Acenaphthylene	%	83	75	76	82		2961872

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
QC Batch = Quality Control Batch

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Maxxam Job #: B2D4309
Report Date: 2012/09/11

exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 88001627;1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Test Summary

Maxxam ID OR8395
Sample ID TH9-3
Matrix Soil

Collected 2012/08/29
Relinquished 2012/08/31
Received 2012/08/31

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Methylnaphthalene Sum	CALC	2957348	N/A	2012/09/10	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	2960544	2012/08/31	2012/09/06	Mamdouh Salib
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	2961690	2012/09/06	2012/09/07	Jolanta Kawzowicz
Total Metals Analysis by ICP	ICP	2963064	2012/09/07	2012/09/08	Suban Kanapathippllai
Moisture	BAL	2959046	N/A	2012/09/04	Valentina Kaftani
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	2961872	2012/09/06	2012/09/07	Darryl Tiller

Maxxam ID OR8396
Sample ID TH10-3
Matrix Soil

Collected 2012/08/29
Relinquished 2012/08/31
Received 2012/08/31

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Methylnaphthalene Sum	CALC	2957348	N/A	2012/09/07	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	2960544	2012/08/31	2012/09/06	Mamdouh Salib
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	2961690	2012/09/06	2012/09/07	Jolanta Kawzowicz
Total Metals Analysis by ICP	ICP	2963064	2012/09/07	2012/09/08	Suban Kanapathippllai
Moisture	BAL	2959046	N/A	2012/09/04	Valentina Kaftani
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	2961872	2012/09/06	2012/09/06	Darryl Tiller

Maxxam ID OR8396 Dup
Sample ID TH10-3
Matrix Soil

Collected 2012/08/29
Relinquished 2012/08/31
Received 2012/08/31

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Methylnaphthalene Sum	CALC	2957348	N/A	2012/09/10	Automated Statchk
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	2961872	2012/09/06	2012/09/06	Darryl Tiller

Maxxam ID OR8397
Sample ID DUP1
Matrix Soil

Collected 2012/08/29
Relinquished 2012/08/31
Received 2012/08/31

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Methylnaphthalene Sum	CALC	2957348	N/A	2012/09/10	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	2960544	2012/08/31	2012/09/06	Mamdouh Salib
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	2961690	2012/09/06	2012/09/07	Jolanta Kawzowicz
Total Metals Analysis by ICP	ICP	2963064	2012/09/07	2012/09/08	Suban Kanapathippllai
Moisture	BAL	2959046	N/A	2012/09/04	Valentina Kaftani
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	2961872	2012/09/06	2012/09/07	Darryl Tiller

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B2D4309
Report Date: 2012/09/11

exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 88001627;1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Test Summary

Maxxam ID OR8397 Dup
Sample ID DUP1
Matrix Soil

Collected 2012/08/29
Relinquished 2012/08/31
Received 2012/08/31

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Total Metals Analysis by ICP	ICP	2963064	2012/09/07	2012/09/08	Suban Kanapathippllai
Moisture	BAL	2959046	N/A	2012/09/04	Valentina Kaftani

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Maxxam Job #: B2D4309
Report Date: 2012/09/11

exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 88001627;1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Package 1	2.3°C

Each temperature is the average of up to three cooler temperatures taken at receipt

GENERAL COMMENTS

Results relate only to the items tested.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 88001627;1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Quality Assurance Report

Maxxam Job Number: B2D4309

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2960544	MSB	Method Blank	1,4-Difluorobenzene	2012/09/06		98	%	60 - 140
			4-Bromofluorobenzene	2012/09/06		99	%	60 - 140
			D10-Ethylbenzene	2012/09/06		77	%	60 - 140
			D4-1,2-Dichloroethane	2012/09/06		102	%	60 - 140
			Benzene	2012/09/06	<0.020		ug/g	
			Toluene	2012/09/06	<0.020		ug/g	
			Ethylbenzene	2012/09/06	<0.020		ug/g	
			o-Xylene	2012/09/06	<0.020		ug/g	
			p+m-Xylene	2012/09/06	<0.040		ug/g	
			Total Xylenes	2012/09/06	<0.040		ug/g	
			Hexane	2012/09/06	<0.50		ug/g	
			F1 (C6-C10)	2012/09/06	<10		ug/g	
			F1 (C6-C10) - BTEX	2012/09/06	<10		ug/g	
2961690	JKA	Method Blank	o-Terphenyl	2012/09/06		95	%	50 - 130
			F2 (C10-C16 Hydrocarbons)	2012/09/06	<10		ug/g	
			F3 (C16-C34 Hydrocarbons)	2012/09/06	<10		ug/g	
			F4 (C34-C50 Hydrocarbons)	2012/09/06	<10		ug/g	
2961872	DTI	Method Blank	D10-Anthracene	2012/09/06		77	%	50 - 130
			D14-Terphenyl (FS)	2012/09/06		87	%	50 - 130
			D8-Acenaphthylene	2012/09/06		75	%	50 - 130
			Acenaphthene	2012/09/06	<0.0050		ug/g	
			Acenaphthylene	2012/09/06	<0.0050		ug/g	
			Anthracene	2012/09/06	<0.0050		ug/g	
			Fluoranthene	2012/09/06	<0.0050		ug/g	
			Fluorene	2012/09/06	<0.0050		ug/g	
			1-Methylnaphthalene	2012/09/06	<0.0050		ug/g	
			2-Methylnaphthalene	2012/09/06	<0.0050		ug/g	
			Naphthalene	2012/09/06	<0.0050		ug/g	
			Phenanthrene	2012/09/06	<0.0050		ug/g	
2963064	SUK	Method Blank	Acid Extractable Lead (Pb)	2012/09/08	<5.0		ug/g	
2957348	ASC	RPD [OR8396-01]	Methylnaphthalene, 2-(1-)	2012/09/10	NC		%	N/A
2961872	DTI	RPD [OR8396-01]	Acenaphthene	2012/09/06	NC		%	40
			Acenaphthylene	2012/09/06	NC		%	40
			Anthracene	2012/09/06	NC		%	40
			Fluoranthene	2012/09/06	NC		%	40
			Fluorene	2012/09/06	NC		%	40
			1-Methylnaphthalene	2012/09/06	NC		%	40
			2-Methylnaphthalene	2012/09/06	NC		%	40
			Naphthalene	2012/09/06	NC		%	40
			Phenanthrene	2012/09/06	NC		%	40
2959046	THT	RPD [OR8397-02]	Moisture	2012/09/04	0.5		%	20
2963064	SUK	RPD [OR8397-01]	Acid Extractable Lead (Pb)	2012/09/08	NC		%	30
2961872	DTI	Matrix Spike [OR8396-01]	D10-Anthracene	2012/09/06		80	%	50 - 130
			D14-Terphenyl (FS)	2012/09/06		89	%	50 - 130
			D8-Acenaphthylene	2012/09/06		78	%	50 - 130
			Acenaphthene	2012/09/06		82	%	50 - 130
			Acenaphthylene	2012/09/06		77	%	50 - 130
			Anthracene	2012/09/06		77	%	50 - 130
			Fluoranthene	2012/09/06		84	%	50 - 130
			Fluorene	2012/09/06		84	%	50 - 130
			1-Methylnaphthalene	2012/09/06		82	%	50 - 130
			2-Methylnaphthalene	2012/09/06		81	%	50 - 130
			Naphthalene	2012/09/06		76	%	50 - 130
			Phenanthrene	2012/09/06		83	%	50 - 130

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exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 88001627;1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Quality Assurance Report (Continued)

Maxxam Job Number: B2D4309

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2963064	SUK	Matrix Spike [OR8397-01]	Acid Extractable Lead (Pb)	2012/09/08		98	%	75 - 125
2960544	MSB	LCS	1,4-Difluorobenzene	2012/09/06		96	%	60 - 140
			4-Bromofluorobenzene	2012/09/06		99	%	60 - 140
			D10-Ethylbenzene	2012/09/06		103	%	60 - 140
			D4-1,2-Dichloroethane	2012/09/06		96	%	60 - 140
			Benzene	2012/09/06		90	%	60 - 140
			Toluene	2012/09/06		95	%	60 - 140
			Ethylbenzene	2012/09/06		93	%	60 - 140
			o-Xylene	2012/09/06		89	%	60 - 140
			p+m-Xylene	2012/09/06		88	%	60 - 140
			Hexane	2012/09/06		61	%	60 - 140
			F1 (C6-C10)	2012/09/06		92	%	60 - 140
2961690	JKA	LCS	o-Terphenyl	2012/09/06		88	%	50 - 130
			F2 (C10-C16 Hydrocarbons)	2012/09/06		89	%	70 - 130
			F3 (C16-C34 Hydrocarbons)	2012/09/06		94	%	70 - 130
			F4 (C34-C50 Hydrocarbons)	2012/09/06		91	%	70 - 130
2961872	DTI	LCS	D10-Anthracene	2012/09/06		81	%	50 - 130
			D14-Terphenyl (FS)	2012/09/06		90	%	50 - 130
			D8-Acenaphthylene	2012/09/06		78	%	50 - 130
			Acenaphthene	2012/09/06		86	%	50 - 130
			Acenaphthylene	2012/09/06		78	%	50 - 130
			Anthracene	2012/09/06		77	%	50 - 130
			Fluoranthene	2012/09/06		84	%	50 - 130
			Fluorene	2012/09/06		86	%	50 - 130
			1-Methylnaphthalene	2012/09/06		86	%	50 - 130
			2-Methylnaphthalene	2012/09/06		84	%	50 - 130
			Naphthalene	2012/09/06		90	%	50 - 130
			Phenanthrene	2012/09/06		87	%	50 - 130
2963064	SUK	LCS	Acid Extractable Lead (Pb)	2012/09/08		103	%	80 - 120

N/A = Not Applicable
Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
LCS: A blank matrix sample to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.

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Validation Signature Page

Maxxam Job #: B2D4309

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Brad Newman, Scientific Specialist

Cristina Carriere, Scientific Services

Medhat Riskallah, Manager, Hydrocarbon Department

Yuan Zhou, gc\ms Technician

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam
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Toll Free: 1-800-563-6266

EXXONMOBIL/IMPERIAL OIL - MAXXAM CHAIN-OF-CUSTODY RECORD

C of C # 58436

ANALYSIS REQUESTED

INVOICE INFORMATION	REPORT INFORMATION
Company Name: ☒ Imperial Oil ☐ ExxonMobil	Company Name: exp
Contact Name: Tiffany Wong	Contact Name: Carl Hentschel
Address:	Address: 220 Commerce Valley Drive West, Suite 500 Markham Ont. L3T0A8
Email:	Email: carl.hentschel@exp.com
Ph:	Ph: [redacted] (613) 688-1899
Sampler Name (Print): Mark McLean, Jessica Whitton	Consultant Project #: 11010

	FIELD SAMPLE ID	MATRIX: GROUND WATER	MATRIX: SURFACE WATER	MATRIX: SOIL	MATRIX: OTHER	# CONTAINERS	SAMPLING: DATE (YYYY/MM/DD)	SAMPLING: TIME	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	BTEX (plus n-hexane)	F1	F2-F4	OIL & GREASE – TOTAL / MINERAL (SPECIFY)	VOC	PCB	PAH (2+3 Ring)	LEAD	ICP METALS	ICPMS METALS (REG 153)	MERCURY	SAR / CRVI (SPECIFY)	BORON HOT WATER SOLUBLE	IGNITABILITY	REG 558 - INORGANICS	REG 558 - PCB LEACHATE	REG 558 - BENZENE / VOLATILES (SPECIFY)	REG 558 - B(a)P / SEMI-VOLATILES (SPECIFY)
1	~~TH9-3~~ TH9-3			X		4	12/08/31	2200			X	X	X				X	X										
2	TH10-3			X		4	↓	2330			X	X	X				X	X										
3	DUP1			X		4	↓	2330			X	X	X				X	X										
4																												
5																												
6																												
7																												
8																												
9																												

IOL SITE LOCATION: 1660 Merivale Road, Ottawa
IOL SITE # (if applicable): 88001627
IOL PROJECT # (if applicable): P12960
MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM: 11070983

REGULATORY CRITERIA / DETECTION LIMITS:
☒ Reg 153 Table 3 ☐ 2004 ☒ 2011 ☐ RSC
(please indicate which Reg. version and if RSC required)
☐ PWQO ☐ ODWS
☐ Other _____

SPECIAL INSTRUCTIONS: Rocks and voids may be present due to the nature of the material. ICC-YES

JARS USED AND NOT SUBMITTED: 0

TURNAROUND TIME
Standard (5 days) ☒
Rush (3 days) ☐ (2 days) ☐ (1 day) ☐ (same day) ☐
Date Required

COOLER ID	CUSTODY SEAL	YES	NO	COOLER ID	CUSTODY SEAL	YES	NO	COOLER ID	CUSTODY SEAL	YES	NO
11010-1	PRESENT	✓			PRESENT				PRESENT		
TEMP 1/2/4 °C (1 2 3)	INTACT	✓		TEMP (1 2 3)	INTACT			TEMP (1 2 3)	INTACT		

LAB USE ONLY
MAXXAM JOB # B204309
SAMPLES

RELINQUISHED BY (SIGN & PRINT)	DATE (YYYY/MM/DD)	TIME	RECEIVED BY (SIGN & PRINT)	DATE (YYYY/MM/DD)	TIME
1. JESSICA WHITTON	2012/08/30	0200	1. Grant Pettypiece	2012/08/31	0920
2. Grant Pettypiece	2012/08/31	1120	2. CRRIG PROVENCAL	2012/08/31	13:35
3.			3.		

LABELED BY: J-L
VERIFIED BY: DES

COC - 1012 (01/10) IOL - ON White: Maxxam Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: **exp** Energy Services Ltd. Sampling Date: August 29, 2012

Location: 1660 Merivale Road, Ottawa Laboratory : Maxxam Analytics

Consultant Project Number: 11010 Sample Submission Number: B2D4309

Are All Laboratory QC Samples Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC met acceptance criteria
Extraction Surrogate Recovery	X			
Method Blank Concentration	X			
Matrix Duplicate RPD	X			
Matrix Spike Recovery	X			
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	All field QC samples are within alert limits.
Trip Blank Concentration			X	
Field Duplicate RPD	X			

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 48 hours (Yes/No)?:	Yes
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Was a Data Quality Waiver (DQW) issued (Yes/No)?: No

Date Issued: NA Date of Response: NA

Is data considered to be reliable (Yes/No)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Emma Reid Data Reviewed by (Signature): EReid

Date: September 12, 2012

Maxxam

Success Through Science®

Task Order#: 11070983
Site#: P12960
Site Location: 88001627;1660 MERIVALE ROAD, OTTAWA
Project #: 11010
Your C.O.C. #: 58435

Attention: Carl Hentschel
exp Energy Services Ltd.
220 Commerce Valley Dr. W
Suite 500
Markham, ON
L3T 0A8

Report Date: 2012/09/10

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B2D4324
Received: 2012/08/31, 13:35

Sample Matrix: Soil
Samples Received: 1

Analyses	Quantity	Laboratory Method	Method Primary reference
Methylnaphthalene Sum	1	CAM SOP - 00301	EPA 8270
Petroleum Hydro. CCME F1 & BTEX in Soil	1	CAM SOP-00315	CCME CWS
Petroleum Hydrocarbons F2-F4 in Soil	1	CAM SOP-00316	CCME CWS
Total Metals Analysis by ICP	1	CAM SOP-00408	SW-846 6010C
Moisture	1	CAM SOP-00445	R.Carter,1993
PAH Compounds in Soil by GC/MS (SIM)	1	CAM SOP - 00318	EPA 8270

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. Reporting results to two significant figures at the RDL is to permit statistical evaluation and is not intended to be an indication of analytical precision.

The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following the 'Alberta Environment Draft Addenda to the CWS-PHC, Appendix 6, Validation of Alternate Methods'. Documentation is available upon request. Maxxam has made the following improvements to the CWS-PHC reference benchmark method: (i) Headspace for F1; and, (ii) Mechanical extraction for F2-F4. Note: F4G cannot be added to the C6 to C50 hydrocarbons.

Maxxam Analytics is accredited by SCC (Lab ID 97) for all specific parameters as required by GUCSO and O.Reg 153/04. Maxxam Analytics is limited in liability to the actual cost of analysis unless otherwise agreed in writing. There is no other warranty expressed or implied. Samples will be retained at Maxxam Analytics for three weeks from receipt of data or as per contract.

All data is in statistical control and has met all QC and method performance criteria unless otherwise flagged. All samples

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Task Order#: 11070983
Site#: P12960
Site Location: 88001627;1660 MERIVALE ROAD, OTTAWA
Project #: 11010
Your C.O.C. #: 58435

Attention: Carl Hentschel
exp Energy Services Ltd.
220 Commerce Valley Dr. W
Suite 500
Markham, ON
L3T 0A8

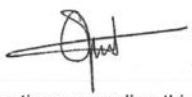
Report Date: 2012/09/10

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B2D4324
Received: 2012/08/31, 13:35
were analysed within hold time unless otherwise flagged. All soil samples for BTEX analysis were methanol extracted within 24 hours unless otherwise flagged.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key



Patricia Opoku
10 Sep 2012 10:46:05 -04:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Patricia Opoku, Project Manager
Email: POpoku@maxxam.ca
Phone# (905) 817-5700

==========

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Maxxam Job #: B2D4324
Report Date: 2012/09/10

exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 88001627;1660 MERIVALE ROAD, OTTAWA
Project #: 11010

LEAD IN SOIL (SOIL)

Maxxam ID		OR8420		
Sampling Date		2012/08/28 22:30		
COC Number		58435		
	Units	**TH8-3**	**RDL**	**QC Batch**
Acid Extractable Lead (Pb)	ug/g	10	5.0	2961102

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B2D4324
Report Date: 2012/09/10

exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 88001627;1660 MERIVALE ROAD, OTTAWA
Project #: 11010

O.REG 153 PHCS IN SOIL (SOIL)

Maxxam ID		OR8420		
Sampling Date		2012/08/28 22:30		
COC Number		58435		
	Units	**TH8-3**	**RDL**	**QC Batch**
Moisture	%	26	1.0	2959046
Benzene	ug/g	<0.020	0.020	2960544
Toluene	ug/g	<0.020	0.020	2960544
Ethylbenzene	ug/g	<0.020	0.020	2960544
o-Xylene	ug/g	<0.020	0.020	2960544
p+m-Xylene	ug/g	<0.040	0.040	2960544
Total Xylenes	ug/g	<0.040	0.040	2960544
Hexane	ug/g	<0.50	0.50	2960544
F1 (C6-C10)	ug/g	<10	10	2960544
F1 (C6-C10) - BTEX	ug/g	<10	10	2960544
F2 (C10-C16 Hydrocarbons)	ug/g	<10	10	2961690
F3 (C16-C34 Hydrocarbons)	ug/g	<10	10	2961690
F4 (C34-C50 Hydrocarbons)	ug/g	<10	10	2961690
Reached Baseline at C50	ug/g	Yes		2961690
Extraction Surrogate Recovery (%)				
D10-Ethylbenzene	%	78		2960544
o-Terphenyl	%	96		2961690
Instrument Surrogate Recovery (%)				
1,4-Difluorobenzene	%	99		2960544
4-Bromofluorobenzene	%	95		2960544
D4-1,2-Dichloroethane	%	105		2960544

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B2D4324
Report Date: 2012/09/10

exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 88001627;1660 MERIVALE ROAD, OTTAWA
Project #: 11010

SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		OR8420		
Sampling Date		2012/08/28 22:30		
COC Number		58435		
	Units	**TH8-3**	**RDL**	**QC Batch**
Methylnaphthalene, 2-(1-)	ug/g	<0.0071	0.0071	2957348
Acenaphthene	ug/g	<0.0050	0.0050	2958425
Acenaphthylene	ug/g	<0.0050	0.0050	2958425
Anthracene	ug/g	<0.0050	0.0050	2958425
Fluoranthene	ug/g	<0.0050	0.0050	2958425
Fluorene	ug/g	<0.0050	0.0050	2958425
1-Methylnaphthalene	ug/g	<0.0050	0.0050	2958425
2-Methylnaphthalene	ug/g	<0.0050	0.0050	2958425
Naphthalene	ug/g	<0.0050	0.0050	2958425
Phenanthrene	ug/g	<0.0050	0.0050	2958425
Extraction Surrogate Recovery (%)				
D10-Anthracene	%	99		2958425
D14-Terphenyl (FS)	%	104		2958425
D8-Acenaphthylene	%	115		2958425

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B2D4324
Report Date: 2012/09/10

exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 88001627;1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Test Summary

Maxxam ID OR8420
Sample ID TH8-3
Matrix Soil

Collected 2012/08/28
Relinquished 2012/08/31
Received 2012/08/31

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Methylnaphthalene Sum	CALC	2957348	N/A	2012/09/06	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	2960544	2012/08/31	2012/09/06	Mamdouh Salib
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	2961690	2012/09/06	2012/09/07	Jolanta Kawzowicz
Total Metals Analysis by ICP	ICP	2961102	2012/09/06	2012/09/06	Suban Kanapathippllai
Moisture	BAL	2959046	N/A	2012/09/04	Valentina Kaftani
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	2958425	2012/09/04	2012/09/05	Darryl Tiller

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Maxxam Job #: B2D4324
Report Date: 2012/09/10

exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 88001627;1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Package 1	2.3°C

Each temperature is the average of up to three cooler temperatures taken at receipt

GENERAL COMMENTS

Results relate only to the items tested.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 88001627;1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Quality Assurance Report

Maxxam Job Number: B2D4324

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2958425 DTI	Method Blank	D10-Anthracene	2012/09/05		97	%	50 - 130
		D14-Terphenyl (FS)	2012/09/05		104	%	50 - 130
		D8-Acenaphthylene	2012/09/05		113	%	50 - 130
		Acenaphthene	2012/09/05	<0.0050		ug/g	
		Acenaphthylene	2012/09/05	<0.0050		ug/g	
		Anthracene	2012/09/05	<0.0050		ug/g	
		Fluoranthene	2012/09/05	<0.0050		ug/g	
		Fluorene	2012/09/05	<0.0050		ug/g	
		1-Methylnaphthalene	2012/09/05	<0.0050		ug/g	
		2-Methylnaphthalene	2012/09/05	<0.0050		ug/g	
		Naphthalene	2012/09/05	<0.0050		ug/g	
		Phenanthrene	2012/09/05	<0.0050		ug/g	
2960544 MSB	Method Blank	1,4-Difluorobenzene	2012/09/06		98	%	60 - 140
		4-Bromofluorobenzene	2012/09/06		99	%	60 - 140
		D10-Ethylbenzene	2012/09/06		77	%	60 - 140
		D4-1,2-Dichloroethane	2012/09/06		102	%	60 - 140
		Benzene	2012/09/06	<0.020		ug/g	
		Toluene	2012/09/06	<0.020		ug/g	
		Ethylbenzene	2012/09/06	<0.020		ug/g	
		o-Xylene	2012/09/06	<0.020		ug/g	
		p+m-Xylene	2012/09/06	<0.040		ug/g	
		Total Xylenes	2012/09/06	<0.040		ug/g	
		Hexane	2012/09/06	<0.50		ug/g	
		F1 (C6-C10)	2012/09/06	<10		ug/g	
		F1 (C6-C10) - BTEX	2012/09/06	<10		ug/g	
2961102 SUK	Method Blank	Acid Extractable Lead (Pb)	2012/09/06	<5.0		ug/g	
2961690 JKA	Method Blank	o-Terphenyl	2012/09/06		95	%	50 - 130
		F2 (C10-C16 Hydrocarbons)	2012/09/06	<10		ug/g	
		F3 (C16-C34 Hydrocarbons)	2012/09/06	<10		ug/g	
		F4 (C34-C50 Hydrocarbons)	2012/09/06	<10		ug/g	
2958425 DTI	LCS	D10-Anthracene	2012/09/05		92	%	50 - 130
		D14-Terphenyl (FS)	2012/09/05		98	%	50 - 130
		D8-Acenaphthylene	2012/09/05		108	%	50 - 130
		Acenaphthene	2012/09/05		93	%	50 - 130
		Acenaphthylene	2012/09/05		98	%	50 - 130
		Anthracene	2012/09/05		97	%	50 - 130
		Fluoranthene	2012/09/05		103	%	50 - 130
		Fluorene	2012/09/05		105	%	50 - 130
		1-Methylnaphthalene	2012/09/05		88	%	50 - 130
		2-Methylnaphthalene	2012/09/05		86	%	50 - 130
		Naphthalene	2012/09/05		85	%	50 - 130
		Phenanthrene	2012/09/05		98	%	50 - 130
2960544 MSB	LCS	1,4-Difluorobenzene	2012/09/06		96	%	60 - 140
		4-Bromofluorobenzene	2012/09/06		99	%	60 - 140
		D10-Ethylbenzene	2012/09/06		103	%	60 - 140
		D4-1,2-Dichloroethane	2012/09/06		96	%	60 - 140
		Benzene	2012/09/06		90	%	60 - 140
		Toluene	2012/09/06		95	%	60 - 140
		Ethylbenzene	2012/09/06		93	%	60 - 140
		o-Xylene	2012/09/06		89	%	60 - 140
		p+m-Xylene	2012/09/06		88	%	60 - 140
		Hexane	2012/09/06		61	%	60 - 140
		F1 (C6-C10)	2012/09/06		92	%	60 - 140
2961102 SUK	LCS	Acid Extractable Lead (Pb)	2012/09/06		110	%	80 - 120
2961690 JKA	LCS	o-Terphenyl	2012/09/06		88	%	50 - 130

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exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 88001627;1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Quality Assurance Report (Continued)

Maxxam Job Number: B2D4324

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2961690 JKA	LCS	F2 (C10-C16 Hydrocarbons)	2012/09/06		89	%	70 - 130
		F3 (C16-C34 Hydrocarbons)	2012/09/06		94	%	70 - 130
		F4 (C34-C50 Hydrocarbons)	2012/09/06		91	%	70 - 130

LCS: A blank matrix sample to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

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Validation Signature Page

Maxxam Job #: B2D4324

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Brad Newman, Scientific Specialist

Cristina Carriere, Scientific Services

Floyd Mayede, Senior Analyst

Medhat Riskallah, Manager, Hydrocarbon Department

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EXXONMOBIL/IMPERIAL OIL - MAXXAM CHAIN-OF-CUSTODY RECORD

C of C # 58435

INVOICE INFORMATION

Company Name: [X] Imperial Oil [ ] ExxonMobil
Contact Name: Tiffany Wong
Address:
Email:
Ph:
Sampler Name (Print): Mark McLean, Jessica Whitton

REPORT INFORMATION

Company Name: exp.
Contact Name: Carl Hentschel
Address: 220 Commerce Valley Drive West, Suite 500 Markham Ont. L3T 0A8
Email: carl.hentschel@exp.com
Ph: [redacted] (613) 688-1899
Consultant Project #: 11010

ANALYSIS REQUESTED

FIELD SAMPLE ID	MATRIX: GROUND WATER	SURFACE WATER	SOIL	OTHER	# CONTAINERS	SAMPLING: DATE (YY/MM/DD)	TIME	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	BTEX + (n-hexane)	F1	F2-F4	OIL & GREASE - TOTAL / MINERAL (SPECIFY)	VOC	PCB	PAH (2+3 Ring)	LEAD	ICP METALS	ICPMS METALS (REG 153)	MERCURY	SAR / CRVI (SPECIFY)	BORON HOT WATER SOLUBLE	IGNITABILITY	REG 558 - INORGANICS	REG 558 - PCB LEACHATE	REG 558 - BENZENE / VOLATILES (SPECIFY)	REG 558 - BaP / SEMI-VOLATILES (SPECIFY)	REG 558 - BaP / SEMI-VOLATILES (SPECIFY)
1 TH8-3			X		4	12/08/28	2230			X	X	X				X	X												
2																													
3																													
4																													
5																													
6																													
7																													
8																													
9																													

IOL SITE LOCATION: 1660 Mesivale Road, Ottawa
IOL SITE # (if applicable): 88001627
IOL PROJECT # (if applicable): P12960
MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM: 11070983

REGULATORY CRITERIA / DETECTION LIMITS:
[X] Reg 153 Table 3 [ ] 2004 [X] 2011 [ ] RSC (please indicate which Reg. version and if RSC required)
[ ] PWQO [ ] ODWS
[ ] Other

SPECIAL INSTRUCTIONS: Rocks and voids may be present due to the nature of the material
1 cooler Submitted
11010-1 Ice-Yes

JARS USED AND NOT SUBMITTED: Ø

TURNAROUND TIME
Standard (5 days) [X]
Rush (3 days) [ ]
(2 days) [ ]
(1 day) [ ]
(same day) [ ]
Date Required

COOLER ID	CUSTODY SEAL	YES	NO	COOLER ID	CUSTODY SEAL	YES	NO	COOLER ID	CUSTODY SEAL	YES	NO
TEMP 1/2/4 °C (1 2 3)	PRESENT	✓		TEMP (1 2 3)	PRESENT			TEMP (1 2 3)	PRESENT		
	INTACT	✓			INTACT				INTACT		

LAB USE ONLY
MAXXAM JOB # B2D4324
SAMPLES
LABELED BY: J-L
VERIFIED BY: DES

RELINQUISHED BY (SIGN & PRINT)	DATE (YYYY/MM/DD)	TIME	RECEIVED BY (SIGN & PRINT)	DATE (YYYY/MM/DD)	TIME
1. Jessica Whitton	2012/08/29	0200	1. Grant Pettypiece	2012/08/31	0920
2. Grant Pettypiece	2012/08/31	1120	2. CRAIG PROVENCHAL	2012/08/31	13:35
3.			3.		

CoC -1012 (01/10) IOL ON — White: Maxxam — Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: **exp** Energy Services Ltd. Sampling Date: August 28, 2012

Location: 1660 Merivale Road, Ottawa Laboratory : Maxxam Analytics

Consultant Project Number: 11010 Sample Submission Number: B2D4324

Are All Laboratory QC Samples Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC met acceptance criteria
Extraction Surrogate Recovery	X			
Method Blank Concentration	X			
Matrix Duplicate RPD			X	
Matrix Spike Recovery			X	
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	No field QC samples submitted.
Trip Blank Concentration			X	
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 48 hours (Yes/No)?:	Yes
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Was a Data Quality Waiver (DQW) issued (Yes/No)?: No

Date Issued: NA Date of Response: NA

Is data considered to be reliable (Yes/No)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Emma Reid Data Reviewed by (Signature): 

Date: September 12, 2012

Maxxam

Success Through Science®

Task Order#: 11070983
Site#: P12960
Site Location: 88001627;1660 MERIVALE ROAD, OTTAWA
Project #: 11010
Your C.O.C. #: 58437

Attention: Carl Hentschel
exp Energy Services Ltd.
220 Commerce Valley Dr. W
Suite 500
Markham, ON
L3T 0A8

Report Date: 2013/11/27
This report supersedes all previous reports with the same Maxxam job number

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B2D4498
Received: 2012/08/31, 13:35

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Laboratory Method	Method Primary Reference
Petroleum Hydro. CCME F1 & BTEX in Water	1	CAM SOP-00315	CCME CWS
Petroleum Hydrocarbons F2-F4 in Water	1	CAM SOP-00316	CCME Hydrocarbons

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. Reporting results to two significant figures at the RDL is to permit statistical evaluation and is not intended to be an indication of analytical precision.

The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following the 'Alberta Environment Draft Addenda to the CWS-PHC, Appendix 6, Validation of Alternate Methods'. Documentation is available upon request. Maxxam has made the following improvements to the CWS-PHC reference benchmark method: (i) Headspace for F1; and, (ii) Mechanical extraction for F2-F4. Note: F4G cannot be added to the C6 to C50 hydrocarbons.

Maxxam Analytics is accredited by SCC (Lab ID 97) for all specific parameters as required by GUCSO and O.Reg 153/04. Maxxam Analytics is limited in liability to the actual cost of analysis unless otherwise agreed in writing. There is no other warranty expressed or implied. Samples will be retained at Maxxam Analytics for three weeks from receipt of data or as per contract.

All data is in statistical control and has met all QC and method performance criteria unless otherwise flagged. All samples were analysed within hold time unless otherwise flagged. All soil samples for BTEX analysis were methanol extracted within 24 hours unless otherwise flagged.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Task Order#: 11070983
Site#: P12960
Site Location: 88001627;1660 MERIVALE ROAD, OTTAWA
Project #: 11010
Your C.O.C. #: 58437

Attention: Carl Hentschel
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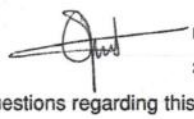
Report Date: 2013/11/27
This report supersedes all previous reports with the same Maxxam job number

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B2D4498
Received: 2012/08/31, 13:35

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key



Patricia Legette
27 Nov 2013 17:49:32 -05:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Patricia Legette, Project Manager
Email: PLegette@maxxam.ca
Phone# (905) 817-5799

==========

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Maxxam Job #: B2D4498
Report Date: 2013/11/27

exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 88001627;1660 MERIVALE ROAD, OTTAWA
Project #: 11010

O.REG 153 PHCS IN WATER (WATER)

Maxxam ID		OR9430		
Sampling Date		2012/08/28 23:30		
COC Number		58437		
	Units	**W1**	**RDL**	**QC Batch**
Benzene	ug/L	<0.20	0.20	2961099
Toluene	ug/L	<0.20	0.20	2961099
Ethylbenzene	ug/L	<0.20	0.20	2961099
o-Xylene	ug/L	<0.20	0.20	2961099
p+m-Xylene	ug/L	<0.40	0.40	2961099
Total Xylenes	ug/L	<0.40	0.40	2961099
Hexane	ug/L	<5.0	5.0	2961099
F1 (C6-C10)	ug/L	<25	25	2961099
F1 (C6-C10) - BTEX	ug/L	<25	25	2961099
F2 (C10-C16 Hydrocarbons)	ug/L	<100	100	2962580
F3 (C16-C34 Hydrocarbons)	ug/L	<100	100	2962580
F4 (C34-C50 Hydrocarbons)	ug/L	<100	100	2962580
Reached Baseline at C50	ug/L	Yes		2962580
Extraction Surrogate Recovery (%)				
o-Terphenyl	%	97		2962580
Instrument Surrogate Recovery (%)				
1,4-Difluorobenzene	%	103		2961099
4-Bromofluorobenzene	%	103		2961099
D10-Ethylbenzene	%	34 (1)		2961099
D4-1,2-Dichloroethane	%	90		2961099

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) The surrogate recovery for the sample was below the acceptance criteria. The sample was reanalyzed with the same results. It was concluded that the sample matrix is reacting with the surrogate resulting in low recovery.

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Maxxam Job #: B2D4498
Report Date: 2013/11/27

exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 88001627;1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Test Summary

Maxxam ID OR9430
Sample ID W1
Matrix Water

Collected 2012/08/28
Relinquished 2012/08/31
Received 2012/08/31

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Wat	HSGC/MSFD	2961099	N/A	2012/09/07	Sung Ho Kim
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	2962580	2012/09/07	2012/09/10	Biljana Lazovic

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Maxxam Job #: B2D4498
Report Date: 2013/11/27

exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 88001627;1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Package 1	5.0°C

Each temperature is the average of up to three cooler temperatures taken at receipt

GENERAL COMMENTS

Revised Report: Report re-issued with BTEX and n-hexane reported under F1/BTEX scan per Daina Marie Schreiber's request.

Results relate only to the items tested.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 88001627;1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Quality Assurance Report

Maxxam Job Number: B2D4498

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2961099 SHK	Method Blank	1,4-Difluorobenzene	2012/09/06		103	%	70 - 130
		4-Bromofluorobenzene	2012/09/06		103	%	70 - 130
		D10-Ethylbenzene	2012/09/06		97	%	70 - 130
		D4-1,2-Dichloroethane	2012/09/06		91	%	70 - 130
		Benzene	2012/09/06	<0.20		ug/L	
		Toluene	2012/09/06	<0.20		ug/L	
		Ethylbenzene	2012/09/06	<0.20		ug/L	
		o-Xylene	2012/09/06	<0.20		ug/L	
		p+m-Xylene	2012/09/06	<0.40		ug/L	
		Total Xylenes	2012/09/06	<0.40		ug/L	
		Hexane	2012/09/06	<5.0		ug/L	
		F1 (C6-C10)	2012/09/06	<25		ug/L	
		F1 (C6-C10) - BTEX	2012/09/06	<25		ug/L	
2962580 BLZ	Method Blank	o-Terphenyl	2012/09/10		105	%	60 - 130
		F2 (C10-C16 Hydrocarbons)	2012/09/10	<100		ug/L	
		F3 (C16-C34 Hydrocarbons)	2012/09/10	<200		ug/L	
		F4 (C34-C50 Hydrocarbons)	2012/09/10	<100		ug/L	
2961099 SHK	LCS	1,4-Difluorobenzene	2012/09/07		98	%	70 - 130
		4-Bromofluorobenzene	2012/09/07		102	%	70 - 130
		D10-Ethylbenzene	2012/09/07		90	%	70 - 130
		D4-1,2-Dichloroethane	2012/09/07		103	%	70 - 130
		Benzene	2012/09/07		121	%	70 - 130
		Toluene	2012/09/07		103	%	70 - 130
		Ethylbenzene	2012/09/07		112	%	70 - 130
		o-Xylene	2012/09/07		105	%	70 - 130
		p+m-Xylene	2012/09/07		89	%	70 - 130
		Hexane	2012/09/07		92	%	70 - 130
		F1 (C6-C10)	2012/09/07		108	%	70 - 130
2962580 BLZ	LCS	o-Terphenyl	2012/09/10		105	%	60 - 130
		F2 (C10-C16 Hydrocarbons)	2012/09/10		98	%	60 - 130
		F3 (C16-C34 Hydrocarbons)	2012/09/10		104	%	60 - 130
		F4 (C34-C50 Hydrocarbons)	2012/09/10		100	%	60 - 130

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

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Validation Signature Page

Maxxam Job #: B2D4498

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

M. Riskallah

Medhat Riskallah, Manager, Hydrocarbon Department

Suzana Popovic

Suzana Popovic, Supervisor, Hydrocarbons

==========

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Maxxam

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Fax: (905) 817-5779
Toll Free: 1-800-563-6266

EXXONMOBIL/IMPERIAL OIL - MAXXAM CHAIN-OF-CUSTODY RECORD

ANALYSIS REQUESTED

Page 1 of 1

C of C # 58437

INVOICE INFORMATION	REPORT INFORMATION
Company Name: ☒ Imperial Oil ☐ ExxonMobil	Company Name: exp
Contact Name: Tiffany Wong	Contact Name: Carl Hentschel
Address:	Address: 220 Commerce Valley Drive West, Suite 500 Markham Ont. L3T0A8
Email:	Email: carl.hentschel@exp.com
Ph:	Ph: [redacted] (613) 688-1899
Sampler Name (Print): Mark McLean, Jessica Whitton	Consultant Project #: 11010

FIELD SAMPLE ID	MATRIX: GROUND WATER	MATRIX: SURFACE WATER	MATRIX: SOIL	MATRIX: OTHER	# CONTAINERS	SAMPLING: DATE (YY/MM/DD)	SAMPLING: TIME	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	BTEX	F1	F2-F4	OIL & GREASE – TOTAL / MINERAL (SPECIFY)	VOC	PCB	PAH	LEAD	ICP METALS	ICPMS METALS (REG 153)	MERCURY	SAR / CRVI (SPECIFY)	BORON HOT WATER SOLUBLE	IGNITABILITY	REG 558 - INORGANICS	REG 558 - PCB LEACHATE	REG 558 - BENZENE / VOLATILES (SPECIFY)	REG 558 - B(a)P / SEMI-VOLATILES (SPECIFY)
1 W1				X	11	12/08/28	2330			X	X	X		X													
2																											
3																											
4																											
5																											
6																											
7																											
8																											
9																											

IOL SITE LOCATION: 1660 Merivale Road, Ottawa

IOL SITE # (if applicable): ~~88~~ 88001627

IOL PROJECT # (if applicable): P12960

MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM: 1070983

REGULATORY CRITERIA / DETECTION LIMITS:
☒ Reg 153 Table 3 ☐ 2004 ☒ 2011 ☐ RSC
(please indicate which Reg. version and if RSC required)
☐ PWQO ☐ ODWS
☐ Other _____

SPECIAL INSTRUCTIONS: ICE - Yes
Tiny bubbles may form due to degassing
Particulate may be present
1 cooler submitted 11010-A

JARS USED AND NOT SUBMITTED: N/A

TURNAROUND TIME
Standard (5 days) ☒
Rush (3 days) ☐ (2 days) ☐ (1 day) ☐ (same day) ☐
Date Required

COOLER ID	CUSTODY SEAL	YES	NO	COOLER ID	CUSTODY SEAL	YES	NO	COOLER ID	CUSTODY SEAL	YES	NO
11010-A	PRESENT	✓			PRESENT				PRESENT		
TEMP 1: 5/5/5°C	INTACT	✓		TEMP 1 2 3	INTACT			TEMP 1 2 3	INTACT		

LAB USE ONLY
MAXXAM JOB #: B2D4498
SAMPLES
LABELED BY: DKN
VERIFIED BY: RSO

RELINQUISHED BY (SIGN & PRINT)	DATE (YYYY/MM/DD)	TIME	RECEIVED BY (SIGN & PRINT)	DATE (YYYY/MM/DD)	TIME
1. JESSICA WHITTON	2012/08/29	0200	1. Grant Pettypiece	2012/08/31	0920
2. Grant Pettypiece	2012/08/31	1120	2. CRAIG PROVENCAL	2012/08/31	13:35
3.			3.		

COC -1012 (01/10) IOL - ON

White: Maxxam Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: **exp** Energy Services Ltd. | Sampling Date: August 28, 2012

Location: 1660 Merivale Road, Ottawa | Laboratory : Maxxam Analytics

Consultant Project Number: 11010 | Sample Submission Number: B2D4498

Are All Laboratory QC Samples Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery		X		D10-ethylbenzene Instrument surrogate recovery (34%) is below the acceptance criteria (60-140%). All other laboratory QC met acceptance criteria.
Extraction Surrogate Recovery	X			
Method Blank Concentration	X			
Matrix Duplicate RPD			X	
Matrix Spike Recovery			X	
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	No field QC samples submitted.
Trip Blank Concentration			X	
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 48 hours (Yes/No)?:	Not Required
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Was a Data Quality Waiver (DQW) issued (Yes/No)?: No

Date Issued: NA | Date of Response: NA

Is data considered to be reliable (Yes/No)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Emma Reid | Data Reviewed by (Signature): E Reid

Date: September 12, 2012

Maxxam

Success Through Science®

Task Order#: 11070983
Site#: P12960
Site Location: 88001627;1660 MERIVALE ROAD, OTTAWA
Project #: 11010
Your C.O.C. #: 58624

Attention: Carl Hentschel
exp Energy Services Ltd.
220 Commerce Valley Dr. W
Suite 500
Markham, ON
L3T 0A8

Report Date: 2012/09/12

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B2D4994
Received: 2012/09/04, 12:55

Sample Matrix: Soil
Samples Received: 2

Analyses	Quantity	Laboratory Method	Method Primary reference
Methylnaphthalene Sum	2	CAM SOP - 00301	EPA 8270
Petroleum Hydro. CCME F1 & BTEX in Soil	2	CAM SOP-00315	CCME CWS
Petroleum Hydrocarbons F2-F4 in Soil	2	CAM SOP-00316	CCME CWS
F4G (CCME Hydrocarbons Gravimetric)	1	CAM SOP-00316	CCME CWS
Total Metals Analysis by ICP	2	CAM SOP-00408	SW-846 6010C
Moisture	2	CAM SOP-00445	R.Carter,1993
PAH Compounds in Soil by GC/MS (SIM)	2	CAM SOP - 00318	EPA 8270

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. Reporting results to two significant figures at the RDL is to permit statistical evaluation and is not intended to be an indication of analytical precision.

The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following the 'Alberta Environment Draft Addenda to the CWS-PHC, Appendix 6, Validation of Alternate Methods'. Documentation is available upon request. Maxxam has made the following improvements to the CWS-PHC reference benchmark method: (i) Headspace for F1; and, (ii) Mechanical extraction for F2-F4. Note: F4G cannot be added to the C6 to C50 hydrocarbons.

Maxxam Analytics is accredited by SCC (Lab ID 97) for all specific parameters as required by GUCSO and O.Reg 153/04. Maxxam Analytics is limited in liability to the actual cost of analysis unless otherwise agreed in writing. There is no other warranty expressed or implied. Samples will be retained at Maxxam Analytics for three weeks from receipt of data or as per contract.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Task Order#: 11070983
Site#: P12960
Site Location: 88001627;1660 MERIVALE ROAD, OTTAWA
Project #: 11010
Your C.O.C. #: 58624

Attention: Carl Hentschel
exp Energy Services Ltd.
220 Commerce Valley Dr. W
Suite 500
Markham, ON
L3T 0A8

Report Date: 2012/09/12

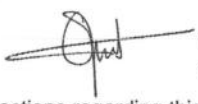
CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B2D4994
Received: 2012/09/04, 12:55

All data is in statistical control and has met all QC and method performance criteria unless otherwise flagged. All samples were analysed within hold time unless otherwise flagged. All soil samples for BTEX analysis were methanol extracted within 24 hours unless otherwise flagged.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key



Patricia Opoku
12 Sep 2012 16:21:54 -04:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Patricia Opoku, Project Manager
Email: POpoku@maxxam.ca
Phone# (905) 817-5700

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B2D4994
Report Date: 2012/09/12

exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 88001627;1660 MERIVALE ROAD, OTTAWA
Project #: 11010

LEAD IN SOIL (SOIL)

Maxxam ID		OS2617	OS2618		
Sampling Date		2012/08/30 21:30	2012/08/30 23:30		
COC Number		58624	58624		
	Units	**TH11-3**	**TH12-2**	**RDL**	**QC Batch**
Acid Extractable Lead (Pb)	ug/g	7.8	14	5.0	2963064

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B2D4994
Report Date: 2012/09/12

exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 88001627;1660 MERIVALE ROAD, OTTAWA
Project #: 11010

O.REG 153 PHCS IN SOIL (SOIL)

Maxxam ID		OS2617	OS2618	OS2618		
Sampling Date		2012/08/30 21:30	2012/08/30 23:30	2012/08/30 23:30		
COC Number		58624	58624	58624		
	Units	**TH11-3**	**TH12-2**	**TH12-2 Lab-Dup**	**RDL**	**QC Batch**
Moisture	%	16	17	19	1.0	2962016
Benzene	ug/g	<0.020	<0.020	<0.020	0.020	2961202
Toluene	ug/g	<0.020	<0.020	<0.020	0.020	2961202
Ethylbenzene	ug/g	<0.020	<0.020	<0.020	0.020	2961202
o-Xylene	ug/g	<0.020	<0.020	<0.020	0.020	2961202
p+m-Xylene	ug/g	<0.040	<0.040	<0.040	0.040	2961202
Total Xylenes	ug/g	<0.040	<0.040	<0.040	0.040	2961202
Hexane	ug/g	<0.50	<0.50	<0.50	0.50	2961202
F1 (C6-C10)	ug/g	<10	<10	<10	10	2961202
F1 (C6-C10) - BTEX	ug/g	<10	<10	<10	10	2961202
F2 (C10-C16 Hydrocarbons)	ug/g	<10	<10		10	2963232
F3 (C16-C34 Hydrocarbons)	ug/g	120	<10		10	2963232
F4 (C34-C50 Hydrocarbons)	ug/g	470	<10		10	2963232
Reached Baseline at C50	ug/g	No	Yes			2963232
Extraction Surrogate Recovery (%)						
D10-Ethylbenzene	%	83	91	85		2961202
o-Terphenyl	%	105	105			2963232
Instrument Surrogate Recovery (%)						
1,4-Difluorobenzene	%	96	103	113		2961202
4-Bromofluorobenzene	%	103	102	102		2961202
D4-1,2-Dichloroethane	%	90	84	92		2961202

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
QC Batch = Quality Control Batch

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Maxxam Job #: B2D4994
Report Date: 2012/09/12

exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 88001627;1660 MERIVALE ROAD, OTTAWA
Project #: 11010

SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		OS2617	OS2618		
Sampling Date		2012/08/30 21:30	2012/08/30 23:30		
COC Number		58624	58624		
	Units	**TH11-3**	**TH12-2**	**RDL**	**QC Batch**
Methylnaphthalene, 2-(1-)	ug/g	<0.0071	<0.0071	0.0071	2959289
Acenaphthene	ug/g	<0.0050	<0.0050	0.0050	2962270
Acenaphthylene	ug/g	<0.0050	<0.0050	0.0050	2962270
Anthracene	ug/g	<0.0050	<0.0050	0.0050	2962270
Fluoranthene	ug/g	<0.0050	<0.0050	0.0050	2962270
Fluorene	ug/g	<0.0050	<0.0050	0.0050	2962270
1-Methylnaphthalene	ug/g	<0.0050	<0.0050	0.0050	2962270
2-Methylnaphthalene	ug/g	<0.0050	<0.0050	0.0050	2962270
Naphthalene	ug/g	<0.0050	<0.0050	0.0050	2962270
Phenanthrene	ug/g	<0.0050	<0.0050	0.0050	2962270
Extraction Surrogate Recovery (%)					
D10-Anthracene	%	96	96		2962270
D14-Terphenyl (FS)	%	89	88		2962270
D8-Acenaphthylene	%	72	81		2962270

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B2D4994
Report Date: 2012/09/12

exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 88001627;1660 MERIVALE ROAD, OTTAWA
Project #: 11010

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		OS2617	OS2617		
Sampling Date		2012/08/30 21:30	2012/08/30 21:30		
COC Number		58624	58624		
	Units	**TH11-3**	**TH11-3 Lab-Dup**	**RDL**	**QC Batch**
F4G-sg (Grav. Heavy Hydrocarbons)	ug/g	1700	1300	200	2966520

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
QC Batch = Quality Control Batch

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Maxxam Job #: B2D4994
Report Date: 2012/09/12

exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 88001627;1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Test Summary

Maxxam ID OS2617
Sample ID TH11-3
Matrix Soil

Collected 2012/08/30
Relinquished 2012/09/04
Received 2012/09/04

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Methylnaphthalene Sum	CALC	2959289	N/A	2012/09/12	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	2961202	2012/09/05	2012/09/06	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	2963232	2012/09/07	2012/09/10	Biljana Lazovic
F4G (CCME Hydrocarbons Gravimetric)	BAL	2966520	2012/09/11	2012/09/11	Raheela Usmani
Total Metals Analysis by ICP	ICP	2963064	2012/09/07	2012/09/08	Suban Kanapathippllai
Moisture	BAL	2962016	N/A	2012/09/06	Gaurav Kalia
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	2962270	2012/09/06	2012/09/07	Darryl Tiller

Maxxam ID OS2617 Dup
Sample ID TH11-3
Matrix Soil

Collected 2012/08/30
Relinquished 2012/09/04
Received 2012/09/04

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
F4G (CCME Hydrocarbons Gravimetric)	BAL	2966520	2012/09/11	2012/09/11	Raheela Usmani

Maxxam ID OS2618
Sample ID TH12-2
Matrix Soil

Collected 2012/08/30
Relinquished 2012/09/04
Received 2012/09/04

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Methylnaphthalene Sum	CALC	2959289	N/A	2012/09/12	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	2961202	2012/09/05	2012/09/06	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	2963232	2012/09/07	2012/09/10	Biljana Lazovic
Total Metals Analysis by ICP	ICP	2963064	2012/09/07	2012/09/08	Suban Kanapathippllai
Moisture	BAL	2962016	N/A	2012/09/06	Gaurav Kalia
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	2962270	2012/09/06	2012/09/07	Darryl Tiller

Maxxam ID OS2618 Dup
Sample ID TH12-2
Matrix Soil

Collected 2012/08/30
Relinquished 2012/09/04
Received 2012/09/04

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	2961202	2012/09/05	2012/09/06	Abdikarim Ali
Moisture	BAL	2962016	N/A	2012/09/06	Gaurav Kalia

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Maxxam Job #: B2D4994
Report Date: 2012/09/12

exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 88001627;1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Package 1	2.7°C

Each temperature is the average of up to three cooler temperatures taken at receipt

GENERAL COMMENTS

Results relate only to the items tested.

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exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 88001627;1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Quality Assurance Report

Maxxam Job Number: B2D4994

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2961202 AAI	Method Blank	1,4-Difluorobenzene	2012/09/06		100	%	60 - 140
		4-Bromofluorobenzene	2012/09/06		103	%	60 - 140
		D10-Ethylbenzene	2012/09/06		95	%	60 - 140
		D4-1,2-Dichloroethane	2012/09/06		86	%	60 - 140
		Benzene	2012/09/06	<0.020		ug/g	
		Toluene	2012/09/06	<0.020		ug/g	
		Ethylbenzene	2012/09/06	<0.020		ug/g	
		o-Xylene	2012/09/06	<0.020		ug/g	
		p+m-Xylene	2012/09/06	<0.040		ug/g	
		Total Xylenes	2012/09/06	<0.040		ug/g	
		Hexane	2012/09/06	<0.50		ug/g	
		F1 (C6-C10)	2012/09/06	<10		ug/g	
		F1 (C6-C10) - BTEX	2012/09/06	<10		ug/g	
2962270 DTI	Method Blank	D10-Anthracene	2012/09/07		94	%	50 - 130
		D14-Terphenyl (FS)	2012/09/07		86	%	50 - 130
		D8-Acenaphthylene	2012/09/07		84	%	50 - 130
		Acenaphthene	2012/09/07	<0.0050		ug/g	
		Acenaphthylene	2012/09/07	<0.0050		ug/g	
		Anthracene	2012/09/07	<0.0050		ug/g	
		Fluoranthene	2012/09/07	<0.0050		ug/g	
		Fluorene	2012/09/07	<0.0050		ug/g	
		1-Methylnaphthalene	2012/09/07	<0.0050		ug/g	
		2-Methylnaphthalene	2012/09/07	<0.0050		ug/g	
		Naphthalene	2012/09/07	<0.0050		ug/g	
		Phenanthrene	2012/09/07	<0.0050		ug/g	
2963064 SUK	Method Blank	Acid Extractable Lead (Pb)	2012/09/08	<5.0		ug/g	
2963232 BLZ	Method Blank	o-Terphenyl	2012/09/10		103	%	50 - 130
		F2 (C10-C16 Hydrocarbons)	2012/09/10	<10		ug/g	
		F3 (C16-C34 Hydrocarbons)	2012/09/10	<10		ug/g	
		F4 (C34-C50 Hydrocarbons)	2012/09/10	<10		ug/g	
2966520 RUS	Method Blank	F4G-sg (Grav. Heavy Hydrocarbons)	2012/09/11	<100		ug/g	
	RPD [OS2617-02]	F4G-sg (Grav. Heavy Hydrocarbons)	2012/09/11	22.2		%	50
2961202 AAI	RPD [OS2618-03]	Benzene	2012/09/06	NC		%	50
		Toluene	2012/09/06	NC		%	50
		Ethylbenzene	2012/09/06	NC		%	50
		o-Xylene	2012/09/06	NC		%	50
		p+m-Xylene	2012/09/06	NC		%	50
		Total Xylenes	2012/09/06	NC		%	50
		Hexane	2012/09/06	NC		%	50
		F1 (C6-C10)	2012/09/06	NC		%	50
		F1 (C6-C10) - BTEX	2012/09/06	NC		%	50
2962016 DIP	RPD [OS2618-02]	Moisture	2012/09/06	10.7		%	20
2961202 AAI	Matrix Spike [OS2617-03]	1,4-Difluorobenzene	2012/09/06		112	%	60 - 140
		4-Bromofluorobenzene	2012/09/06		104	%	60 - 140
		D10-Ethylbenzene	2012/09/06		83	%	60 - 140
		D4-1,2-Dichloroethane	2012/09/06		91	%	60 - 140
		Benzene	2012/09/06		98	%	60 - 140
		Toluene	2012/09/06		86	%	60 - 140
		Ethylbenzene	2012/09/06		93	%	60 - 140
		o-Xylene	2012/09/06		92	%	60 - 140
		p+m-Xylene	2012/09/06		84	%	60 - 140
		Hexane	2012/09/06		84	%	60 - 140
		F1 (C6-C10)	2012/09/06		70	%	60 - 140
2966520 RUS	Matrix Spike [OS2617-02]	F4G-sg (Grav. Heavy Hydrocarbons)	2012/09/11		83	%	65 - 135

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exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 88001627;1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Quality Assurance Report (Continued)

Maxxam Job Number: B2D4994

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2961202	AAI	LCS	1,4-Difluorobenzene	2012/09/06		108	%	60 - 140
			4-Bromofluorobenzene	2012/09/06		106	%	60 - 140
			D10-Ethylbenzene	2012/09/06		94	%	60 - 140
			D4-1,2-Dichloroethane	2012/09/06		92	%	60 - 140
			Benzene	2012/09/06		108	%	60 - 140
			Toluene	2012/09/06		92	%	60 - 140
			Ethylbenzene	2012/09/06		98	%	60 - 140
			o-Xylene	2012/09/06		95	%	60 - 140
			p+m-Xylene	2012/09/06		88	%	60 - 140
			Hexane	2012/09/06		87	%	60 - 140
			F1 (C6-C10)	2012/09/06		96	%	60 - 140
2962270	DTI	LCS	D10-Anthracene	2012/09/07		93	%	50 - 130
			D14-Terphenyl (FS)	2012/09/07		87	%	50 - 130
			D8-Acenaphthylene	2012/09/07		84	%	50 - 130
			Acenaphthene	2012/09/07		84	%	50 - 130
			Acenaphthylene	2012/09/07		81	%	50 - 130
			Anthracene	2012/09/07		88	%	50 - 130
			Fluoranthene	2012/09/07		87	%	50 - 130
			Fluorene	2012/09/07		83	%	50 - 130
			1-Methylnaphthalene	2012/09/07		84	%	50 - 130
			2-Methylnaphthalene	2012/09/07		81	%	50 - 130
			Naphthalene	2012/09/07		82	%	50 - 130
			Phenanthrene	2012/09/07		85	%	50 - 130
2963064	SUK	LCS	Acid Extractable Lead (Pb)	2012/09/08		103	%	80 - 120
2963232	BLZ	LCS	o-Terphenyl	2012/09/10		105	%	50 - 130
			F2 (C10-C16 Hydrocarbons)	2012/09/10		102	%	70 - 130
			F3 (C16-C34 Hydrocarbons)	2012/09/10		106	%	70 - 130
			F4 (C34-C50 Hydrocarbons)	2012/09/10		98	%	70 - 130
2966520	RUS	LCS	F4G-sg (Grav. Heavy Hydrocarbons)	2012/09/11		90	%	65 - 135

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
LCS: A blank matrix sample to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel (905) 817-5700 Toll-Free 800-563-6266 Fax (905) 817-5777 www.maxxam.ca

Validation Signature Page

Maxxam Job #: B2D4994

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Brad Newman, Scientific Specialist

Medhat Riskallah, Manager, Hydrocarbon Department

Mamdouh Salib, Analyst, Hydrocarbons

Yuan Zhou, gc\ms Technician

==========

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Toll Free: 1-800-563-6266

EXXONMOBIL/IMPERIAL OIL - MAXXAM CHAIN-OF-CUSTODY RECORD

ANALYSIS REQUESTED

C of C # 58624

INVOICE INFORMATION	REPORT INFORMATION
Company Name: ☒ Imperial Oil ☐ ExxonMobil	Company Name: exp
Contact Name: Tiffany Wong	Contact Name: Carl Ittentschel
Address:	Address: 220 Commerce Valley West Drive, Suite 500, Markham Ontario L3T 0A8
Email:	Email: carl.ittentschel@exp.com
Ph:	Ph: (613) 688-1899
Sampler Name (Print): Mark McLean, Jessica Whitton	Consultant Project #: 11010

FIELD SAMPLE ID	MATRIX: GROUND WATER	SURFACE WATER	SOIL	OTHER	# CONTAINERS	SAMPLING: DATE (YY/MM/DD)	TIME	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	BTEX	F1	F2-F4	OIL & GREASE - TOTAL / MINERAL (SPECIFY)	VOC	PCB	PAH (2+3 Ring)	LEAD	ICP METALS	ICP/MS METALS (REG 153)	MERCURY	SAR / CRVI (SPECIFY)	BORON HOT WATER SOLUBLE	IGNITABILITY	REG 558 - INORGANICS	REG 558 - PCB LEACHATE	REG 558 - BENZENE / VOLATILES (SPECIFY)	REG 558 - B(a)P / SEMI-VOLATILES (SPECIFY)
1 TH11-3			X		4	12/08/30	2130			X	X	X				X	X										
2 TH12-2			X		4	↓	2330			X	X	X				X	X										
3																											
4																											
5																											
6																											
7																											
8																											
9																											

(plus n-hexane)

IOL SITE LOCATION: 1660 Merivale Road, Ottawa
IOL SITE # (if applicable): 88001627
IOL PROJECT # (if applicable): P12960
MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM: 11070983

REGULATORY CRITERIA / DETECTION LIMITS:
☒ Reg 153 Table 3 ☐ 2004 ☒ 2011 ☐ RSC
(please indicate which Reg. version and if RSC required)
☐ PWQO ☐ ODWS
☐ Other

SPECIAL INSTRUCTIONS: Rocks and voids may be present due to the nature of the material
ICE - YES

JARS USED AND NOT SUBMITTED: 0

TURNAROUND TIME
Standard (5 days) ☒
Rush (3 days) ☐
(2 days) ☐
(1 day) ☐
(same day) ☐
Date Required

COOLER ID	CUSTODY SEAL	YES	NO	COOLER ID	CUSTODY SEAL	YES	NO	COOLER ID	CUSTODY SEAL	YES	NO
11010	PRESENT	✓			PRESENT				PRESENT		
TEMP 12/3/3 °C	INTACT	✓		TEMP 1 2 3	INTACT			TEMP 1 2 3	INTACT		

LAB USE ONLY
MAXXAM JOB # B2D4994
SAMPLES

RELINQUISHED BY (SIGN & PRINT)	DATE (YYYY/MM/DD)	TIME	RECEIVED BY (SIGN & PRINT)	DATE (YYYY/MM/DD)	TIME
1. JESSICA WHITTON	2012/08/31	0200	1. Stéphanie Nolet	2012/09/04	0840
2. Stéphanie Nolet	2012/09/04	1135	2. RACHEL DEVLIN	2012/09/04	12:55
3.			3.		

LABELED BY: J-L
VERIFIED BY: RSO

COC - 1012 (01/10) IOL - ON White: Maxxam Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: **exp** Energy Services Ltd.

Sampling Date: August 30, 2012

Location: 1660 Merivale Road, Ottawa

Laboratory : Maxxam Analytics

Consultant Project Number: 11010

Sample Submission Number: B2D4994

Are All Laboratory QC Samples Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC met acceptance criteria
Extraction Surrogate Recovery	X			
Method Blank Concentration	X			
Matrix Duplicate RPD	X			
Matrix Spike Recovery	X			
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	No field QC samples submitted.
Trip Blank Concentration			X	
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 48 hours (Yes/No)?:	Yes
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Was a Data Quality Waiver (DQW) issued (Yes/No)?: No

Date Issued: NA

Date of Response: NA

Is data considered to be reliable (Yes/No)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Emma Reid

Data Reviewed by (Signature): E Reid

Date: September 12, 2012

Maxxam

Success Through Science®

Task Order#: 11070983
Site#: P12960
Site Location: 88001627;1660 MERIVALE ROAD, OTTAWA
Project #: 11010
Your C.O.C. #: 58623

Attention: Carl Hentschel
exp Energy Services Ltd.
220 Commerce Valley Dr. W
Suite 500
Markham, ON
L3T 0A8

Report Date: 2012/09/12

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B2D4997
Received: 2012/09/04, 12:55

Sample Matrix: Soil
Samples Received: 2

Analyses	Quantity	Laboratory Method	Method Primary reference
Methylnaphthalene Sum	1	CAM SOP - 00301	EPA 8270
Petroleum Hydro. CCME F1 & BTEX in Soil	1	CAM SOP-00315	CCME CWS
Moisture	1	CAM SOP-00445	R.Carter,1993
PAH Compounds in Soil by GC/MS (SIM)	1	CAM SOP - 00318	EPA 8270

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. Reporting results to two significant figures at the RDL is to permit statistical evaluation and is not intended to be an indication of analytical precision.

The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following the 'Alberta Environment Draft Addenda to the CWS-PHC, Appendix 6, Validation of Alternate Methods'. Documentation is available upon request. Maxxam has made the following improvements to the CWS-PHC reference benchmark method: (i) Headspace for F1; and, (ii) Mechanical extraction for F2-F4. Note: F4G cannot be added to the C6 to C50 hydrocarbons.

Maxxam Analytics is accredited by SCC (Lab ID 97) for all specific parameters as required by GUCSO and O.Reg 153/04. Maxxam Analytics is limited in liability to the actual cost of analysis unless otherwise agreed in writing. There is no other warranty expressed or implied. Samples will be retained at Maxxam Analytics for three weeks from receipt of data or as per contract.

All data is in statistical control and has met all QC and method performance criteria unless otherwise flagged. All samples were analysed within hold time unless otherwise flagged. All soil samples for BTEX analysis were methanol extracted within 24 hours unless otherwise flagged.

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Task Order#: 11070983
Site#: P12960
Site Location: 88001627;1660 MERIVALE ROAD, OTTAWA
Project #: 11010
Your C.O.C. #: 58623

Attention: Carl Hentschel
exp Energy Services Ltd.
220 Commerce Valley Dr. W
Suite 500
Markham, ON
L3T 0A8

Report Date: 2012/09/12

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B2D4997
Received: 2012/09/04, 12:55

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Patricia Opoku
12 Sep 2012 16:15:39 -04:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Patricia Opoku, Project Manager
Email: POpoku@maxxam.ca
Phone# (905) 817-5700

==========

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Maxxam Job #: B2D4997
Report Date: 2012/09/12

exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 88001627;1660 MERIVALE ROAD, OTTAWA
Project #: 11010

RESULTS OF ANALYSES OF SOIL

Maxxam ID		OS2642		
Sampling Date		2012/08/30 23:00		
COC Number		58623		
	Units	**FB1**	**RDL**	**QC Batch**
Moisture	%	<1.0	1.0	2964085

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B2D4997
Report Date: 2012/09/12

exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 88001627;1660 MERIVALE ROAD, OTTAWA
Project #: 11010

SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		OS2642		
Sampling Date		2012/08/30 23:00		
COC Number		58623		
	Units	**FB1**	**RDL**	**QC Batch**
Methylnaphthalene, 2-(1-)	ug/g	<0.0071	0.0071	2959289
Acenaphthene	ug/g	<0.0050	0.0050	2962270
Acenaphthylene	ug/g	<0.0050	0.0050	2962270
Anthracene	ug/g	<0.0050	0.0050	2962270
Fluoranthene	ug/g	<0.0050	0.0050	2962270
Fluorene	ug/g	<0.0050	0.0050	2962270
1-Methylnaphthalene	ug/g	<0.0050	0.0050	2962270
2-Methylnaphthalene	ug/g	<0.0050	0.0050	2962270
Naphthalene	ug/g	<0.0050	0.0050	2962270
Phenanthrene	ug/g	<0.0050	0.0050	2962270
Extraction Surrogate Recovery (%)				
D10-Anthracene	%	103		2962270
D14-Terphenyl (FS)	%	91		2962270
D8-Acenaphthylene	%	90		2962270

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B2D4997
Report Date: 2012/09/12

exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 88001627;1660 MERIVALE ROAD, OTTAWA
Project #: 11010

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		OS2643		
Sampling Date		2012/08/31 02:00		
COC Number		58623		
	Units	**TRIP BLANK**	**RDL**	**QC Batch**
Benzene	ug/g	<0.020	0.020	2961202
Toluene	ug/g	<0.020	0.020	2961202
Ethylbenzene	ug/g	<0.020	0.020	2961202
o-Xylene	ug/g	<0.020	0.020	2961202
p+m-Xylene	ug/g	<0.040	0.040	2961202
Total Xylenes	ug/g	<0.040	0.040	2961202
Hexane	ug/g	<0.50	0.50	2961202
F1 (C6-C10)	ug/g	<10	10	2961202
F1 (C6-C10) - BTEX	ug/g	<10	10	2961202
Extraction Surrogate Recovery (%)				
D10-Ethylbenzene	%	80		2961202
Instrument Surrogate Recovery (%)				
1,4-Difluorobenzene	%	117		2961202
4-Bromofluorobenzene	%	100		2961202
D4-1,2-Dichloroethane	%	95		2961202

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B2D4997
Report Date: 2012/09/12

exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 88001627;1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Test Summary

Maxxam ID OS2642
Sample ID FB1
Matrix Soil

Collected 2012/08/30
Relinquished 2012/09/04
Received 2012/09/04

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Methylnaphthalene Sum	CALC	2959289	N/A	2012/09/12	Automated Statchk
Moisture	BAL	2964085	N/A	2012/09/08	Gaurav Kalia
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	2962270	2012/09/06	2012/09/07	Darryl Tiller

Maxxam ID OS2643
Sample ID TRIP BLANK
Matrix Soil

Collected 2012/08/31
Relinquished 2012/09/04
Received 2012/09/04

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	2961202	2012/09/05	2012/09/06	Abdikarim Ali

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Maxxam Job #: B2D4997
Report Date: 2012/09/12

exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 88001627;1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Package 1	2.7°C

Each temperature is the average of up to three cooler temperatures taken at receipt

GENERAL COMMENTS

Results relate only to the items tested.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 88001627;1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Quality Assurance Report

Maxxam Job Number: B2D4997

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2961202 AAI	Method Blank	1,4-Difluorobenzene	2012/09/06		100	%	60 - 140
		4-Bromofluorobenzene	2012/09/06		103	%	60 - 140
		D10-Ethylbenzene	2012/09/06		95	%	60 - 140
		D4-1,2-Dichloroethane	2012/09/06		86	%	60 - 140
		Benzene	2012/09/06	<0.020		ug/g	
		Toluene	2012/09/06	<0.020		ug/g	
		Ethylbenzene	2012/09/06	<0.020		ug/g	
		o-Xylene	2012/09/06	<0.020		ug/g	
		p+m-Xylene	2012/09/06	<0.040		ug/g	
		Total Xylenes	2012/09/06	<0.040		ug/g	
		Hexane	2012/09/06	<0.50		ug/g	
		F1 (C6-C10)	2012/09/06	<10		ug/g	
		F1 (C6-C10) - BTEX	2012/09/06	<10		ug/g	
2962270 DTI	Method Blank	D10-Anthracene	2012/09/07		94	%	50 - 130
		D14-Terphenyl (FS)	2012/09/07		86	%	50 - 130
		D8-Acenaphthylene	2012/09/07		84	%	50 - 130
		Acenaphthene	2012/09/07	<0.0050		ug/g	
		Acenaphthylene	2012/09/07	<0.0050		ug/g	
		Anthracene	2012/09/07	<0.0050		ug/g	
		Fluoranthene	2012/09/07	<0.0050		ug/g	
		Fluorene	2012/09/07	<0.0050		ug/g	
		1-Methylnaphthalene	2012/09/07	<0.0050		ug/g	
		2-Methylnaphthalene	2012/09/07	<0.0050		ug/g	
		Naphthalene	2012/09/07	<0.0050		ug/g	
		Phenanthrene	2012/09/07	<0.0050		ug/g	
2961202 AAI	LCS	1,4-Difluorobenzene	2012/09/06		108	%	60 - 140
		4-Bromofluorobenzene	2012/09/06		106	%	60 - 140
		D10-Ethylbenzene	2012/09/06		94	%	60 - 140
		D4-1,2-Dichloroethane	2012/09/06		92	%	60 - 140
		Benzene	2012/09/06		108	%	60 - 140
		Toluene	2012/09/06		92	%	60 - 140
		Ethylbenzene	2012/09/06		98	%	60 - 140
		o-Xylene	2012/09/06		95	%	60 - 140
		p+m-Xylene	2012/09/06		88	%	60 - 140
		Hexane	2012/09/06		87	%	60 - 140
		F1 (C6-C10)	2012/09/06		96	%	60 - 140
2962270 DTI	LCS	D10-Anthracene	2012/09/07		93	%	50 - 130
		D14-Terphenyl (FS)	2012/09/07		87	%	50 - 130
		D8-Acenaphthylene	2012/09/07		84	%	50 - 130
		Acenaphthene	2012/09/07		84	%	50 - 130
		Acenaphthylene	2012/09/07		81	%	50 - 130
		Anthracene	2012/09/07		88	%	50 - 130
		Fluoranthene	2012/09/07		87	%	50 - 130
		Fluorene	2012/09/07		83	%	50 - 130
		1-Methylnaphthalene	2012/09/07		84	%	50 - 130
		2-Methylnaphthalene	2012/09/07		81	%	50 - 130
		Naphthalene	2012/09/07		82	%	50 - 130
		Phenanthrene	2012/09/07		85	%	50 - 130

LCS: A blank matrix sample to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

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Validation Signature Page

Maxxam Job #: B2D4997

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Brad Newman, Scientific Specialist

Mamdouh Salib, Analyst, Hydrocarbons

Yuan Zhou, gc\ms Technician

==========

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Maxxam

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Mississauga, ON L5N 2L8
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Phone: (905) 817-5700
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Toll Free: 1-800-563-6266

EXXONMOBIL/IMPERIAL OIL - MAXXAM CHAIN-OF-CUSTODY RECORD

ANALYSIS REQUESTED

C of C # 58623

INVOICE INFORMATION	REPORT INFORMATION
Company Name: ☒ Imperial Oil ☐ ExxonMobil	Company Name: exp
Contact Name: Tiffany Wong	Contact Name: Carl Hentschel
Address:	Address: 220 Commerce Valley Drive West, Suite 500, Markham Ontario L3T 0A8
Email:	Email: carl.hentschel@exp.com
Ph:	Ph: (613) 688-1899
Sampler Name (Print): Mark McLean, Jessica Whitton	Consultant Project #: 11010

FIELD SAMPLE ID	MATRIX: GROUND WATER	SURFACE WATER	SOIL	OTHER	# CONTAINERS	SAMPLING: DATE (YY/MM/DD)	TIME	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	BTEX + (n-hexane)	F1	F2-F4	OIL & GREASE - TOTAL / MINERAL (SPECIFY)	VOC	PCB	PAH (2+3 Ring)	LEAD	ICP METALS	ICPMS METALS (REG 153)	MERCURY	SAR / CRVI (SPECIFY)	BORON HOT WATER SOLUBLE	IGNITABILITY	REG 558 - INORGANICS	REG 558 - PCB LEACHATE	REG 558 - BENZENE / VOLATILES (SPECIFY)	REG 558 - BaP / SEMI-VOLATILES (SPECIFY)
1 FB1				X	1	12/08/30	2300									X											
2 Trip Blank				X	2	12/08/31	0200			X	X																
3																											
4																											
5																											
6																											
7																											
8																											
9																											

IOL SITE LOCATION: 1660 Merivale Road, Ottawa

IOL SITE # (if applicable): 88001627

IOL PROJECT # (if applicable): P12960

MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM: 11070983

REGULATORY CRITERIA / DETECTION LIMITS:
☒ Reg 153 Table 3 ☐ 2004 ☒ 2011 ☐ RSC
(please indicate which Reg. version and if RSC required)
☐ PWQO ☐ ODWS
☐ Other

SPECIAL INSTRUCTIONS: 1 cooler submitted
ICE - YES

JARS USED AND NOT SUBMITTED: 0

TURNAROUND TIME
Standard (5 days) ☒
Rush (3 days) ☐
(2 days) ☐
(1 day) ☐
(same day) ☐
Date Required

COOLER ID	CUSTODY SEAL	YES	NO	COOLER ID	CUSTODY SEAL	YES	NO	COOLER ID	CUSTODY SEAL	YES	NO
TEMP 1: 2/2 3/3 °C	PRESENT	✓		TEMP 1 2 3	PRESENT			TEMP 1 2 3	PRESENT		
	INTACT	✓			INTACT				INTACT		

LAB USE ONLY
MAXXAM JOB # B204997
SAMPLES
LABELED BY: J-L
VERIFIED BY: RBO

RELINQUISHED BY (SIGN & PRINT)	DATE (YYYY/MM/DD)	TIME	RECEIVED BY (SIGN & PRINT)	DATE (YYYY/MM/DD)	TIME
1. JESSICA WHITTON	2012/08/31	0200	1. Stéphanie Nolet Stephanie Nolet	2012/09/04	0840
2. Stéphanie Nolet Stephanie Nolet	2012/09/04	1135	2. RACHEL DEVLIN	2012/09/04	12:55
3.			3.		

COC - 1012 (01/10) IOL - ON

White: Maxxam Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: **exp** Energy Services Ltd. Sampling Date: August 31, 2012

Location: 1660 Merivale Road, Ottawa Laboratory : Maxxam Analytics

Consultant Project Number: 11010 Sample Submission Number: B2D4997

Are All Laboratory QC Samples Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC met acceptance criteria
Extraction Surrogate Recovery	X			
Method Blank Concentration	X			
Matrix Duplicate RPD			X	
Matrix Spike Recovery			X	
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration	X			All field QC samples are within alert limits.
Trip Blank Concentration	X			
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 48 hours (Yes/No)?:	Yes
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Was a Data Quality Waiver (DQW) issued (Yes/No)?: No

Date Issued: NA Date of Response: NA

Is data considered to be reliable (Yes/No)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Emma Reid Data Reviewed by (Signature): E Reid

Date: September 12, 2012

Maxxam

Success Through Science®

Task Order#: 11070983
Site#: P12960
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010
Your C.O.C. #: 416710-01-01

Attention: Daina Marie Schreiber
exp Energy Services Ltd.
220 Commerce Valley Dr. W
Suite 500
Markham, ON
L3T 0A8

Report Date: 2013/06/21

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B393127
Received: 2013/06/13, 15:50

Sample Matrix: Water
Samples Received: 5

Analyses	Quantity	Laboratory Method	Method Primary reference
Petroleum Hydro. CCME F1 & BTEX in Water	5	CAM SOP-00315	CCME CWS
Petroleum Hydrocarbons F2-F4 in Water	5	CAM SOP-00316	CCME Hydrocarbons
Dissolved Metals by ICPMS	5	CAM SOP-00447	EPA 6020

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. Reporting results to two significant figures at the RDL is to permit statistical evaluation and is not intended to be an indication of analytical precision.

The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following the 'Alberta Environment Draft Addenda to the CWS-PHC, Appendix 6, Validation of Alternate Methods'. Documentation is available upon request. Maxxam has made the following improvements to the CWS-PHC reference benchmark method: (i) Headspace for F1; and, (ii) Mechanical extraction for F2-F4. Note: F4G cannot be added to the C6 to C50 hydrocarbons.

Maxxam Analytics is accredited by SCC (Lab ID 97) for all specific parameters as required by GUCSO and O.Reg 153/04. Maxxam Analytics is limited in liability to the actual cost of analysis unless otherwise agreed in writing. There is no other warranty expressed or implied. Samples will be retained at Maxxam Analytics for three weeks from receipt of data or as per contract.

All data is in statistical control and has met all QC and method performance criteria unless otherwise flagged. All samples were analysed within hold time unless otherwise flagged. All soil samples for BTEX analysis were methanol extracted within 24 hours unless otherwise flagged.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Task Order#: 11070983
Site#: P12960
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010
Your C.O.C. #: 416710-01-01

Attention: Daina Marie Schreiber
exp Energy Services Ltd.
220 Commerce Valley Dr. W
Suite 500
Markham, ON
L3T 0A8

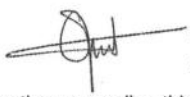
Report Date: 2013/06/21

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B393127
Received: 2013/06/13, 15:50

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key



Patricia Legette
21 Jun 2013 12:10:57 -04:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Patricia Legette, Project Manager
Email: PLegette@maxxam.ca
Phone# (905) 817-5799

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B393127
Report Date: 2013/06/21

exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

LEAD (DISSOLVED) IN WATER

Maxxam ID		RW8212	RW8213	RW8214	RW8215	RW8216		
Sampling Date		2013/06/10 21:30	2013/06/11 20:00	2013/06/11 22:30	2013/06/11 23:00	2013/06/11 23:00		
COC Number		416710-01-01	416710-01-01	416710-01-01	416710-01-01	416710-01-01		
	Units	**TH8**	**TH10**	**TH11**	**TH12**	**DUP1**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	1.1	1.2	2.6	6.8	6.9	0.50	3253587

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B393127
Report Date: 2013/06/21

exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

HBTEX/F1-F4 PETROLEUM HYDROCARBONS (WATER)

Maxxam ID		RW8212	RW8213	RW8213		RW8214		
Sampling Date		2013/06/10 21:30	2013/06/11 20:00	2013/06/11 20:00		2013/06/11 22:30		
COC Number		416710-01-01	416710-01-01	416710-01-01		416710-01-01		
	Units	**TH8**	**TH10**	**TH10 Lab-Dup**	**RDL**	**TH11**	**RDL**	**QC Batch**
Benzene	ug/L	3.9	73		0.20	370	4.0	3251160
Toluene	ug/L	<0.20	58		0.20	34	4.0	3251160
Ethylbenzene	ug/L	4.1	52		0.20	2200	4.0	3251160
o-Xylene	ug/L	<0.20	19		0.20	72	4.0	3251160
p+m-Xylene	ug/L	0.61	180		0.40	3400	8.0	3251160
Total Xylenes	ug/L	0.61	200		0.40	3400	8.0	3251160
Hexane	ug/L	<5.0	35		5.0	130	100	3251160
F1 (C6-C10)	ug/L	56	1700		25	17000	500	3251160
F1 (C6-C10) - BTEX	ug/L	48	1400		25	11000	500	3251160
F2 (C10-C16 Hydrocarbons)	ug/L	<100	560	460	100	1400	100	3251346
F3 (C16-C34 Hydrocarbons)	ug/L	<200	<200	<200	200	<200	200	3251346
F4 (C34-C50 Hydrocarbons)	ug/L	<200	<200	<200	200	<200	200	3251346
Reached Baseline at C50	ug/L	Yes	Yes	Yes		Yes		3251346
Extraction Surrogate Recovery (%)								
o-Terphenyl	%	102	101	100		100		3251346
Instrument Surrogate Recovery (%)								
1,4-Difluorobenzene	%	102	100			98		3251160
4-Bromofluorobenzene	%	99	103			105		3251160
D10-Ethylbenzene	%	111	113			109		3251160
D4-1,2-Dichloroethane	%	103	102			100		3251160

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
QC Batch = Quality Control Batch

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Maxxam Job #: B393127
Report Date: 2013/06/21

exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

HBTEX/F1-F4 PETROLEUM HYDROCARBONS (WATER)

Maxxam ID		RW8215	RW8216		
Sampling Date		2013/06/11 23:00	2013/06/11 23:00		
COC Number		416710-01-01	416710-01-01		
	Units	**TH12**	**DUP1**	**RDL**	**QC Batch**
Benzene	ug/L	380	360	4.0	3251160
Toluene	ug/L	35	34	4.0	3251160
Ethylbenzene	ug/L	2300	2100	4.0	3251160
o-Xylene	ug/L	77	69	4.0	3251160
p+m-Xylene	ug/L	3400	3300	8.0	3251160
Total Xylenes	ug/L	3500	3300	8.0	3251160
Hexane	ug/L	<100	<100	100	3251160
F1 (C6-C10)	ug/L	17000	17000	500	3251160
F1 (C6-C10) - BTEX	ug/L	11000	11000	500	3251160
F2 (C10-C16 Hydrocarbons)	ug/L	3100	2800	100	3251346
F3 (C16-C34 Hydrocarbons)	ug/L	<200	<200	200	3251346
F4 (C34-C50 Hydrocarbons)	ug/L	<200	<200	200	3251346
Reached Baseline at C50	ug/L	Yes	Yes		3251346
Extraction Surrogate Recovery (%)					
o-Terphenyl	%	100	93		3251346
Instrument Surrogate Recovery (%)					
1,4-Difluorobenzene	%	96	98		3251160
4-Bromofluorobenzene	%	104	105		3251160
D10-Ethylbenzene	%	109	106		3251160
D4-1,2-Dichloroethane	%	99	100		3251160

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B393127
Report Date: 2013/06/21

exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Test Summary

Maxxam ID RW8212 **Collected** 2013/06/10
Sample ID TH8 **Relinquished** 2013/06/13
Matrix Water **Received** 2013/06/13

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Wat	HSGC/MSFD	3251160	N/A	2013/06/19	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	3251346	2013/06/18	2013/06/19	Ravinder Gaidhu
Dissolved Metals by ICPMS	ICP/MS	3253587	N/A	2013/06/20	Hua Ren

Maxxam ID RW8213 **Collected** 2013/06/11
Sample ID TH10 **Relinquished** 2013/06/13
Matrix Water **Received** 2013/06/13

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Wat	HSGC/MSFD	3251160	N/A	2013/06/19	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	3251346	2013/06/18	2013/06/19	Ravinder Gaidhu
Dissolved Metals by ICPMS	ICP/MS	3253587	N/A	2013/06/20	Hua Ren

Maxxam ID RW8213 Dup **Collected** 2013/06/11
Sample ID TH10 **Relinquished** 2013/06/13
Matrix Water **Received** 2013/06/13

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	3251346	2013/06/18	2013/06/19	Ravinder Gaidhu

Maxxam ID RW8214 **Collected** 2013/06/11
Sample ID TH11 **Relinquished** 2013/06/13
Matrix Water **Received** 2013/06/13

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Wat	HSGC/MSFD	3251160	N/A	2013/06/18	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	3251346	2013/06/18	2013/06/19	Ravinder Gaidhu
Dissolved Metals by ICPMS	ICP/MS	3253587	N/A	2013/06/20	Hua Ren

Maxxam ID RW8215 **Collected** 2013/06/11
Sample ID TH12 **Relinquished** 2013/06/13
Matrix Water **Received** 2013/06/13

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Wat	HSGC/MSFD	3251160	N/A	2013/06/18	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	3251346	2013/06/18	2013/06/19	Ravinder Gaidhu
Dissolved Metals by ICPMS	ICP/MS	3253587	N/A	2013/06/20	Hua Ren

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Maxxam Job #: B393127
Report Date: 2013/06/21

exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Test Summary

Maxxam ID RW8216
Sample ID DUP1
Matrix Water

Collected 2013/06/11
Relinquished 2013/06/13
Received 2013/06/13

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Wat	HSGC/MSFD	3251160	N/A	2013/06/18	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	3251346	2013/06/18	2013/06/19	Ravinder Gaidhu
Dissolved Metals by ICPMS	ICP/MS	3253587	N/A	2013/06/20	Hua Ren

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Maxxam Job #: B393127
Report Date: 2013/06/21

exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Package 1	2.0°C
Package 2	1.3°C
Package 3	2.0°C

Each temperature is the average of up to three cooler temperatures taken at receipt

GENERAL COMMENTS

Sample RW8215-01: F1/BTEX Analysis:
Due to high concentration of target analytes, sample required dilution. Reporting limits were adjusted accordingly.

Sample RW8216-01: F1/BTEX Analysis:
Due to high concentration of target analytes, sample required dilution. Reporting limits were adjusted accordingly.

Results relate only to the items tested.

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exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Quality Assurance Report

Maxxam Job Number: B393127

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3251160 LRA	Method Blank	1,4-Difluorobenzene	2013/06/18		97	%	70 - 130
		4-Bromofluorobenzene	2013/06/18		98	%	70 - 130
		D10-Ethylbenzene	2013/06/18		106	%	70 - 130
		D4-1,2-Dichloroethane	2013/06/18		101	%	70 - 130
		Benzene	2013/06/18	<0.20		ug/L	
		Toluene	2013/06/18	<0.20		ug/L	
		Ethylbenzene	2013/06/18	<0.20		ug/L	
		o-Xylene	2013/06/18	<0.20		ug/L	
		p+m-Xylene	2013/06/18	<0.40		ug/L	
		Total Xylenes	2013/06/18	<0.40		ug/L	
		Hexane	2013/06/18	<5.0		ug/L	
		F1 (C6-C10)	2013/06/18	<25		ug/L	
		F1 (C6-C10) - BTEX	2013/06/18	<25		ug/L	
3251346 RGA	Method Blank	o-Terphenyl	2013/06/19		101	%	50 - 130
		F2 (C10-C16 Hydrocarbons)	2013/06/19	<100		ug/L	
		F3 (C16-C34 Hydrocarbons)	2013/06/19	<200		ug/L	
		F4 (C34-C50 Hydrocarbons)	2013/06/19	<200		ug/L	
3253587 HRE	Method Blank	Dissolved Lead (Pb)	2013/06/20	<0.50		ug/L	
3251346 RGA	RPD [RW8213-02]	F2 (C10-C16 Hydrocarbons)	2013/06/19	NC		%	30
		F3 (C16-C34 Hydrocarbons)	2013/06/19	NC		%	30
		F4 (C34-C50 Hydrocarbons)	2013/06/19	NC		%	30
	Matrix Spike [RW8212-02]	o-Terphenyl	2013/06/19		103	%	50 - 130
		F2 (C10-C16 Hydrocarbons)	2013/06/19		93	%	50 - 130
		F3 (C16-C34 Hydrocarbons)	2013/06/19		87	%	50 - 130
		F4 (C34-C50 Hydrocarbons)	2013/06/19		90	%	50 - 130
3251160 LRA	LCS	1,4-Difluorobenzene	2013/06/19		100	%	70 - 130
		4-Bromofluorobenzene	2013/06/19		106	%	70 - 130
		D10-Ethylbenzene	2013/06/19		104	%	70 - 130
		D4-1,2-Dichloroethane	2013/06/19		100	%	70 - 130
		Benzene	2013/06/19		104	%	60 - 130
		Toluene	2013/06/19		99	%	60 - 130
		Ethylbenzene	2013/06/19		97	%	60 - 130
		o-Xylene	2013/06/19		102	%	60 - 130
		p+m-Xylene	2013/06/19		89	%	60 - 130
		Hexane	2013/06/19		105	%	70 - 130
		F1 (C6-C10)	2013/06/19		93	%	60 - 140
3251346 RGA	LCS	o-Terphenyl	2013/06/19		104	%	50 - 130
		F2 (C10-C16 Hydrocarbons)	2013/06/19		101	%	70 - 130
		F3 (C16-C34 Hydrocarbons)	2013/06/19		98	%	70 - 130
		F4 (C34-C50 Hydrocarbons)	2013/06/19		102	%	70 - 130
3253587 HRE	LCS	Dissolved Lead (Pb)	2013/06/20		100	%	80 - 120

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.

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Validation Signature Page

Maxxam Job #: B393127

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Brad Newman, Scientific Specialist

Jeevaraj Jeevaratnam, Senior Analyst

Medhat Riskallah, Manager, Hydrocarbon Department

==========

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Maxxam

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Toll Free: 800-563-6266

EXXONMOBIL/IMPERIAL OIL - MAXXAM
CHAIN-OF-CUSTODY RECORD

C of C # 416710-01-01

416710

ANALYSIS REQUESTED

INVOICE INFORMATION	REPORT INFORMATION
Company Name: Imperial Oil, a partnership of Imperial Oil Limited and McColl Frontenac Petrole	Company Name: exp Energy Services Ltd.
Contact Name: Nadia Sullivan	Contact Name: Daina Marie Schreiber
Address: 90 Wynford Dr 5th Floor Don Mills ON M3C 1K5	Address: 220 Commerce Valley Dr. W Suite 500 Markham ON L3T 0A8
Email: nadia.sullivan@esso.ca	Email: dainamarie.schreiber@exp.com,
Phone: (416)441-7788	Phone: (905)695-3217 x3641
Sampler Name (Print): DARRAGH KILROY/DANIEL CLARKE	Consultant Project #: 11010

	FIELD SAMPLE ID	MATRIX: GROUND WATER	MATRIX: SURFACE WATER	MATRIX: SOIL	MATRIX: OTHER	# CONTAINERS	SAMPLING: DATE (YY/MM/DD)	SAMPLING: TIME	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	F1/BTEX (including n-hexane)	F2-F4	Lead
1	TH8	X				8	13/06/10	21:30	X		X	X	X
2	TH10	X				8	13/06/11	20:00	X		X	X	X
3	TH11	X				8	13/06/11	21:30	X		X	X	X
4	TH12	X				8	13/06/11	23:00	X		X	X	X
5	Dup1	X				8	13/06/11	23:00	X		X	X	X
6													
7													
8													
9													
10													

IOL SITE LOCATION: 1660 Merivale Road, Ottawa

IOL SITE # (if applicable): N/A

IOL PROJECT # (if applicable): P12960

MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM: 11070983 -

REGULATORY CRITERIA / DETECTION LIMITS:

☒ REG 153 Table 3 ☐ 2004 ☒ 2011 ☐ RSC
(Please indicate which Reg. version and if RSC required)

☐ ODWS ☐ PWQO

☐ Other ____

SPECIAL INSTRUCTIONS:

Bubbles may be present due to off gassing

Particulate may be present

ICE-YES

JARS USED AND NOT SUBMITTED: N/A

TURNAROUND TIME

Standard (5 days) ☒

Rush (3 days) ☐ (2 days) ☐ (1 day) ☐ (same day) ☐

Date Required

COOLER ID: 11010-1 TEMP: 2/3/1°C	CUSTODY SEAL	YES	NO	COOLER ID: 11010-2 TEMP: 2/1/1°C	CUSTODY SEAL	YES	NO	COOLER ID: 11010-3 TEMP: 2/2/2°C	CUSTODY SEAL	YES	NO
	PRESENT	✓			PRESENT	✓			PRESENT	✓	
	INTACT	✓			INTACT	✓			INTACT	✓	

LAB USE ONLY

MAXXAM JOB #: B393127

RELINQUISHED BY: (SIGN & PRINT)	DATE:(YYYY/MM/DD)	TIME:	RECEIVED BY: (SIGN & PRINT)	DATE:(YYYY/MM/DD)	TIME:
1. DARRAGH KILROY	2013/06/12	13:00	1. MORAYO NINALOWO	2013/06/13	10:15
2. MORAYO NINALOWO	2013/06/13	11:30	2. DAVID CHAN	2013/06/13	15:50
3.			3.		

SAMPLES LABELED BY: J-L VERIFIED BY: ABH

COC 1012 (01/10) IOL - ON White: Maxxam Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: **exp** Energy Services Ltd. Sampling Date: June 11, 2013

Location: 1660 Merivale Road, Ottawa Laboratory : Maxxam Analytics

Consultant Project Number: 11010 Sample Submission Number: B393127

Are All Laboratory QC Samples Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC met acceptance criteria
Extraction Surrogate Recovery	X			
Method Blank Concentration	X			
Matrix Duplicate RPD	X			
Matrix Spike Recovery	X			
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	All field QC samples are within alert limits.
Trip Blank Concentration			X	
Field Duplicate RPD	X			

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 48 hours (Yes/No)?:	Not Required
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Was a Data Quality Waiver (DQW) issued (Yes/No)?: No

Date Issued: NA Date of Response: NA

Is data considered to be reliable (Yes/No)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Emma Reid Data Reviewed by (Signature): ERei

Date: June 24, 2013

Maxxam

Success Through Science®

Task Order#: 11070983
Site#: P12960
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010
Your C.O.C. #: 416710-03-01

Attention: Daina Marie Schreiber
exp Energy Services Ltd.
220 Commerce Valley Dr. W
Suite 500
Markham, ON
L3T 0A8

Report Date: 2013/06/21

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B393184
Received: 2013/06/13, 15:50

Sample Matrix: Water
Samples Received: 2

Analyses	Quantity	Laboratory Method	Method Primary reference
Petroleum Hydro. CCME F1 & BTEX in Water	2	CAM SOP-00315	CCME CWS
Petroleum Hydrocarbons F2-F4 in Water	2	CAM SOP-00316	CCME Hydrocarbons
Dissolved Metals by ICPMS	2	CAM SOP-00447	EPA 6020

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. Reporting results to two significant figures at the RDL is to permit statistical evaluation and is not intended to be an indication of analytical precision.

The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following the 'Alberta Environment Draft Addenda to the CWS-PHC, Appendix 6, Validation of Alternate Methods'. Documentation is available upon request. Maxxam has made the following improvements to the CWS-PHC reference benchmark method: (i) Headspace for F1; and, (ii) Mechanical extraction for F2-F4. Note: F4G cannot be added to the C6 to C50 hydrocarbons.

Maxxam Analytics is accredited by SCC (Lab ID 97) for all specific parameters as required by GUCSO and O.Reg 153/04. Maxxam Analytics is limited in liability to the actual cost of analysis unless otherwise agreed in writing. There is no other warranty expressed or implied. Samples will be retained at Maxxam Analytics for three weeks from receipt of data or as per contract.

All data is in statistical control and has met all QC and method performance criteria unless otherwise flagged. All samples were analysed within hold time unless otherwise flagged. All soil samples for BTEX analysis were methanol extracted within 24 hours unless otherwise flagged.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Task Order#: 11070983
Site#: P12960
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010
Your C.O.C. #: 416710-03-01

Attention: Daina Marie Schreiber
exp Energy Services Ltd.
220 Commerce Valley Dr. W
Suite 500
Markham, ON
L3T 0A8

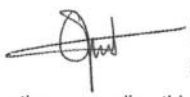
Report Date: 2013/06/21

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B393184
Received: 2013/06/13, 15:50

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key



Patricia Legette
21 Jun 2013 11:51:47 -04:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Patricia Legette, Project Manager
Email: PLegette@maxxam.ca
Phone# (905) 817-5799

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B393184
Report Date: 2013/06/21

exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

LEAD (DISSOLVED) IN WATER

Maxxam ID		RW8512	RW8513		
Sampling Date		2013/06/11 23:30	2013/06/11 23:15		
COC Number		416710-03-01	416710-03-01		
	Units	**TRIP BLANK**	**F. BLANK**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	<0.50	<0.50	0.50	3253587

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B393184
Report Date: 2013/06/21

exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

HBTEX/F1-F4 PETROLEUM HYDROCARBONS (WATER)

Maxxam ID		RW8512	RW8513		
Sampling Date		2013/06/11 23:30	2013/06/11 23:15		
COC Number		416710-03-01	416710-03-01		
	Units	**TRIP BLANK**	**F. BLANK**	**RDL**	**QC Batch**
Benzene	ug/L	<0.20	<0.20	0.20	3250629
Toluene	ug/L	<0.20	<0.20	0.20	3250629
Ethylbenzene	ug/L	<0.20	<0.20	0.20	3250629
o-Xylene	ug/L	<0.20	<0.20	0.20	3250629
p+m-Xylene	ug/L	<0.40	<0.40	0.40	3250629
Total Xylenes	ug/L	<0.40	<0.40	0.40	3250629
Hexane	ug/L	<5.0	<5.0	5.0	3250629
F1 (C6-C10)	ug/L	<25	<25	25	3250629
F1 (C6-C10) - BTEX	ug/L	<25	<25	25	3250629
F2 (C10-C16 Hydrocarbons)	ug/L	<100	<100	100	3251346
F3 (C16-C34 Hydrocarbons)	ug/L	<200	<200	200	3251346
F4 (C34-C50 Hydrocarbons)	ug/L	<200	<200	200	3251346
Reached Baseline at C50	ug/L	Yes	Yes		3251346
Extraction Surrogate Recovery (%)					
o-Terphenyl	%	95	97		3251346
Instrument Surrogate Recovery (%)					
1,4-Difluorobenzene	%	97	96		3250629
4-Bromofluorobenzene	%	106	106		3250629
D10-Ethylbenzene	%	113	114		3250629
D4-1,2-Dichloroethane	%	100	101		3250629

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B393184
Report Date: 2013/06/21

exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Test Summary

Maxxam ID RW8512
Sample ID TRIP BLANK
Matrix Water

Collected 2013/06/11
Relinquished 2013/06/13
Received 2013/06/13

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Wat	HSGC/MSFD	3250629	N/A	2013/06/18	Sung Ho Kim
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	3251346	2013/06/18	2013/06/19	Ravinder Gaidhu
Dissolved Metals by ICPMS	ICP/MS	3253587	N/A	2013/06/20	Hua Ren

Maxxam ID RW8513
Sample ID F. BLANK
Matrix Water

Collected 2013/06/11
Relinquished 2013/06/13
Received 2013/06/13

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Wat	HSGC/MSFD	3250629	N/A	2013/06/18	Sung Ho Kim
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	3251346	2013/06/18	2013/06/19	Ravinder Gaidhu
Dissolved Metals by ICPMS	ICP/MS	3253587	N/A	2013/06/20	Hua Ren

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Maxxam Job #: B393184
Report Date: 2013/06/21

exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Package 1	2.0°C
Package 2	1.3°C
Package 3	2.0°C

Each temperature is the average of up to three cooler temperatures taken at receipt

GENERAL COMMENTS

Results relate only to the items tested.

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exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Quality Assurance Report

Maxxam Job Number: B393184

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3250629 SHK	Method Blank	1,4-Difluorobenzene	2013/06/18		97	%	70 - 130
		4-Bromofluorobenzene	2013/06/18		105	%	70 - 130
		D10-Ethylbenzene	2013/06/18		104	%	70 - 130
		D4-1,2-Dichloroethane	2013/06/18		100	%	70 - 130
		Benzene	2013/06/18	<0.20		ug/L	
		Toluene	2013/06/18	<0.20		ug/L	
		Ethylbenzene	2013/06/18	<0.20		ug/L	
		o-Xylene	2013/06/18	<0.20		ug/L	
		p+m-Xylene	2013/06/18	<0.40		ug/L	
		Total Xylenes	2013/06/18	<0.40		ug/L	
		Hexane	2013/06/18	<5.0		ug/L	
		F1 (C6-C10)	2013/06/18	<25		ug/L	
		F1 (C6-C10) - BTEX	2013/06/18	<25		ug/L	
3251346 RGA	Method Blank	o-Terphenyl	2013/06/19		101	%	50 - 130
		F2 (C10-C16 Hydrocarbons)	2013/06/19	<100		ug/L	
		F3 (C16-C34 Hydrocarbons)	2013/06/19	<200		ug/L	
		F4 (C34-C50 Hydrocarbons)	2013/06/19	<200		ug/L	
3253587 HRE	Method Blank	Dissolved Lead (Pb)	2013/06/20	<0.50		ug/L	
3250629 SHK	LCS	1,4-Difluorobenzene	2013/06/19		97	%	70 - 130
		4-Bromofluorobenzene	2013/06/19		107	%	70 - 130
		D10-Ethylbenzene	2013/06/19		103	%	70 - 130
		D4-1,2-Dichloroethane	2013/06/19		99	%	70 - 130
		Benzene	2013/06/19		89	%	60 - 130
		Toluene	2013/06/19		89	%	60 - 130
		Ethylbenzene	2013/06/19		98	%	60 - 130
		o-Xylene	2013/06/19		100	%	60 - 130
		p+m-Xylene	2013/06/19		95	%	60 - 130
		Hexane	2013/06/19		75	%	70 - 130
		F1 (C6-C10)	2013/06/19		92	%	60 - 140
3251346 RGA	LCS	o-Terphenyl	2013/06/19		104	%	50 - 130
		F2 (C10-C16 Hydrocarbons)	2013/06/19		101	%	70 - 130
		F3 (C16-C34 Hydrocarbons)	2013/06/19		98	%	70 - 130
		F4 (C34-C50 Hydrocarbons)	2013/06/19		102	%	70 - 130
3253587 HRE	LCS	Dissolved Lead (Pb)	2013/06/20		100	%	80 - 120

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Validation Signature Page

Maxxam Job #: B393184

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Brad Newman, Scientific Specialist

Jeevaraj Jeevaratrnam, Senior Analyst

Suzana Popovic, Supervisor, Hydrocarbons

==========

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Toll Free: 800-563-6266

EXXONMOBIL/IMPERIAL OIL - MAXXAM CHAIN-OF-CUSTODY RECORD

C of C # 416710-03-01

416710

ANALYSIS REQUESTED

INVOICE INFORMATION	REPORT INFORMATION
Company Name: Imperial Oil, a partnership of Imperial Oil Limited and McColl Frontenac Petrole	Company Name: exp Energy Services Ltd.
Contact Name: Nadia Sullivan	Contact Name: Daina Marie Schreiber
Address: 90 Wynford Dr 5th Floor, Don Mills ON M3C 1K5	Address: 220 Commerce Valley Dr. W Suite 500, Markham ON L3T 0A8
Email: nadia.sullivan@esso.ca	Email: dainamarie.schreiber@exp.com,
Phone: (416)441-7788	Phone: (905)695-3217 x3641
Sampler Name (Print): DARRAGH KILROY / DANIEL CLARKE	Consultant Project #: 11010

	FIELD SAMPLE ID	MATRIX: GROUND WATER	MATRIX: SURFACE WATER	MATRIX: SOIL	MATRIX: OTHER	# CONTAINERS	SAMPLING: DATE (YY/MM/DD)	SAMPLING: TIME	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	F1/BTEX (including n-hexane)	F2-F4	Lead
1	Trip Blank				X	5	13/06/11	23:30			X	X	X
2	F. Blank				X	8	13/06/11	23:15			X	X	X
3													
4													
5													
6													
7													
8													
9													
10													

IOL SITE LOCATION: 1660 Merivale Road, Ottawa

IOL SITE # (if applicable): N/A

IOL PROJECT # (if applicable): P12960

MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM: 11070983 -

REGULATORY CRITERIA / DETECTION LIMITS:

☒ REG 153 Table 3 ☐ 2004 ☒ 2011 ☐ RSC
(Please indicate which Reg. version and if RSC required)

☐ ODWS ☐ PWQO

☐ Other

SPECIAL INSTRUCTIONS: ICE-YES

JARS USED AND NOT SUBMITTED: N/A

TURNAROUND TIME

Standard (5 days) ☒

Rush (3 days) ☐ (2 days) ☐ (1 day) ☐ (same day) ☐

Date Required

	COOLER ID: 11010-1	TEMP: 2/3/1°C	CUSTODY SEAL	YES	NO
			PRESENT	✓	
			INTACT	✓	
	COOLER ID: 11010-2	TEMP: 2/1/1°C	CUSTODY SEAL	YES	NO
			PRESENT	✓	
			INTACT	✓	
	COOLER ID: 11010-3	TEMP: 2/2/2°C	CUSTODY SEAL	YES	NO
			PRESENT	✓	
			INTACT	✓	

LAB USE ONLY

MAXXAM JOB #: B393184

RELINQUISHED BY: (SIGN & PRINT)	DATE:(YYYY/MM/DD)	TIME:	RECEIVED BY: (SIGN & PRINT)	DATE:(YYYY/MM/DD)	TIME:
1. DARRAGH KILROY	2013/06/12	13:00	1. MORAYO NINALOWO	2013/06/13	10:15
2. MORAYO NINALOWO	2013/06/13	16:30	2. DAVID CHAN	2013/06/13	15:50
3.			3.		

SAMPLES — LABELED BY: ABH — VERIFIED BY: J. L

COC 1012 (01/10) IOL - ON White: Maxxam Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: **exp** Energy Services Ltd. Sampling Date: June 11, 2013

Location: 1660 Merivale Road, Ottawa Laboratory : Maxxam Analytics

Consultant Project Number: 11010 Sample Submission Number: B393184

Are All Laboratory QC Samples Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC met acceptance criteria
Extraction Surrogate Recovery	X			
Method Blank Concentration	X			
Matrix Duplicate RPD			X	
Matrix Spike Recovery			X	
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration	X			All field QC samples are within alert limits.
Trip Blank Concentration	X			
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 48 hours (Yes/No)?:	Not Required
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Was a Data Quality Waiver (DQW) issued (Yes/No)?: No

Date Issued: NA Date of Response: NA

Is data considered to be reliable (Yes/No)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Emma Reid Data Reviewed by (Signature): ERéid

Date: June 24, 2013

July 22, 2013

Imperial Oil
90 Wynford Drive
Toronto, Ontario
M3C 1K5

Re: 1660 Merivale Road, Ottawa, Ontario
IOL Site Number 302620
2013 Ground Water Monitoring and Sampling Program Report

INTRODUCTION

Exp Energy Services Ltd. **(exp)** was retained by Imperial Oil to conduct a ground water monitoring and sampling program at 1660 Merivale Road in Ottawa, Ontario (henceforth referred to as the subject property). Monitoring and ground water sampling activities were conducted on June 12 and 13, 2013. The objective of this work was to evaluate ground water conditions at the subject property.

A locality plan is provided as Figure 1. A site plan showing the monitor locations is provided as Figure 2.

Exp performed the environmental assessment work in accordance with generally accepted professional practices. Subject to this standard of care, **exp** makes no express or implied warranties regarding its services and no third party beneficiaries are intended. Limitation of liability, scope of report and third party reliance are outlined in Appendix A.

THIS REPORT CONTAINS PROVISIONS LIMITING LIABILITY, THE SCOPE OF THE REPORT AND THIRD PARTY RELIANCE

These documents and the information contained therein are confidential, property of Imperial Oil and any disclosure of same is governed by the provisions of each of the applicable provincial and territorial freedom of information legislation, the Privacy Act (Canada) 1980-81-82-83, c.111, Sch. II"1", and the Access to Information Act (Canada) 1980-81-82-83, c.111, Sch .I"1", as such legislation may be amended from time to time.

220 Commerce Valley Drive West, Suite 500, Markham, ON L3T 0A8, Canada
T: +1.905.695.3217 • www.exp.com

SCOPE OF WORK

The scope of work was to perform the following activities:

- Monitor all monitors (TH1 to TH7) for subsurface vapour concentrations, water levels and the presence or absence of phase-separated liquid petroleum
- Collect ground water samples from all monitors and submit to the laboratory for analysis of benzene, toluene, ethylbenzene, and xylenes (BTEX), hexane, petroleum hydrocarbon fractions (PHC) F1 to F4 and lead
- Compare the ground water analytical results to the applicable Ontario Regulation 153/04 standards
- Prepare a report documenting the results of field activities and laboratory analyses

All work was carried out following the Quality Management, Control and Assurance procedures outlined in Appendix B.

FIELD ACTIVITIES

Ground Water Monitoring

The accessible subsurface monitors on the subject property were inspected for general physical condition, ground water depth, the presence of phase-separated liquid petroleum and petroleum vapour concentrations on June 12, 2013. The monitors were generally monitored in order of least impacted to most impacted (based on historical ground water data).

All measurements of petroleum vapours in the monitor riser were made with a RKI Eagle II in methane elimination mode. Immediately after removing the well cap, the collection tube of the RKI Eagle 2 was inserted into the riser and the peak instrument reading was recorded.

Instrument calibration is checked on a daily basis using a standard gas comprised of a known concentration of hexane (15% LEL) in air. If the instrument readings are within ±10% of the standard gas value, then the instrument is deemed to be calibrated, however if the readings are greater than ±10% of the standard gas value then the instrument is re-calibrated prior to use.

All measurements of ground water and phase-separated liquid petroleum depth are made with a Solinst Model 122 oil/water interface probe. Both the probe and the measuring tape

that come into contact with liquids within a monitor are cleaned with phosphate-free soap and tap water, rinsed with distilled water and then finally rinsed with methanol after each measurement.

For all monitors in which phase-separated liquid petroleum is detected with the interface probe, the presence of liquid petroleum is verified with a bailer. For all monitors in which phase-separated liquid petroleum is not detected with the interface probe but that have a petroleum vapour reading of 5% LEL or higher, a bailer is used to check the monitor for the presence of phase-separated liquid petroleum. If there is measurable or observable phase-separated liquid petroleum in the bailer, then a ground water sample is not submitted for laboratory analysis from this location.

Ground Water Sampling and Analysis

Ground water samples were collected from all seven monitors on June 13, 2013. Prior to sampling, the monitors were purged by removing approximately three well volume equivalents of ground water. The water level in the monitor was allowed to recover to at least 90% of its static level prior to sample collection.

All ground water samples were collected using a bailer individually dedicated to each monitor. Samples for BTEX, hexane, and PHC fraction F1 were collected in 40 mL clear glass vials (with zero headspace), pre-charged with sodium bisulphate ($NaHSO_4$) preservative. Samples for analysis of PHC fractions F2 to F4 were collected in two 500 mL amber bottles, pre-charged with $NaHSO_4$ preservative. Samples for F4 Gravimetric analysis were collected in 1L amber bottles pre-charged with hydrochloric acid (HCl) preservative. Samples for analysis of lead were field filtered using 0.45 µm in-line filters and collected in 250 mL high-density polyethylene (HDPE) bottles, pre-charged with nitric acid preservative. All sample bottles were supplied by the laboratory. The ground water samples were placed into a cooler with ice at less than 10°C.

The samples were submitted to the Mississauga facility of Maxxam Analytics (Maxxam). Maxxam is a Standards Council of Canada (SCC) accredited laboratory. Further details are provided in Appendix B.

Quality Assurance and Quality Control Sampling

A quality assurance and quality control program (QA/QC) was implemented to reduce and quantify potential issues introduced during sample collection. Further details are provided in Appendix B.

RESULTS

During the June 12, 2013 monitoring event, all seven monitors were inspected. Liquid petroleum was not measured in any monitor. Petroleum vapours ranged from non-detectable to 290 ppmv. Results are summarised in Table 1.

The depth to ground water within the monitors ranged from 3.06 (TH3) to 3.49 (TH1) metres below ground surface. Based on the ground water depths measured during the monitoring event and ground water elevation data shown in Table 1, ground water contours were plotted, as shown on Figure 3. The benchmark used for the monitor survey was the north side of manhole cover on the west side of the kiosk with an assumed elevation of 100.00 metres (m). The ground water flow direction is interpreted to be southerly.

During the June 13, 2013 sampling event, eight samples, including one field duplicate, were collected and submitted to Maxxam for chemical analysis of BTEX, hexane, PHC fractions F1 to F4 and lead. A field and trip blank were also submitted for analysis of these parameters.

Ontario Regulation 153/04 Table 3 standards for an industrial/commercial/community property use and medium and fine textured soils and non-potable ground water use are appropriate for evaluating conditions at the subject property, based on previous environmental assessment work at the subject property. The results of the ground water chemical analysis, along with the appropriate Table 3 standards, are provided in Table 2.

All of the samples exceeded the applicable Table 3 Standards except samples from TH1, TH2 and TH6. Current and historical ground water analytical data are shown on Figure 4. Copies of the laboratory Certificates of Analysis are provided in Appendix C.

Quality Assurance and Quality Control Results

The results of the laboratory and field quality assurance and quality control program are provided in Appendix B. No laboratory or field QA/QC issues were identified that called into question the reliability of the laboratory data reported.

In summary, no QA/QC issues were identified that would affect the overall conclusions for the ground water monitoring and sampling event described in this report.

CLOSURE

We trust this report meets your current needs. If you require further information pertaining to this investigation, please do not hesitate to contact the undersigned.

Sincerely,

exp Energy Services Ltd.

Daina Marie Schreiber, B.Sc. (Geology)
Environmental Scientist

Patricia Stelmack, M.Sc., P.Eng.
Team Lead/Senior Project Manager

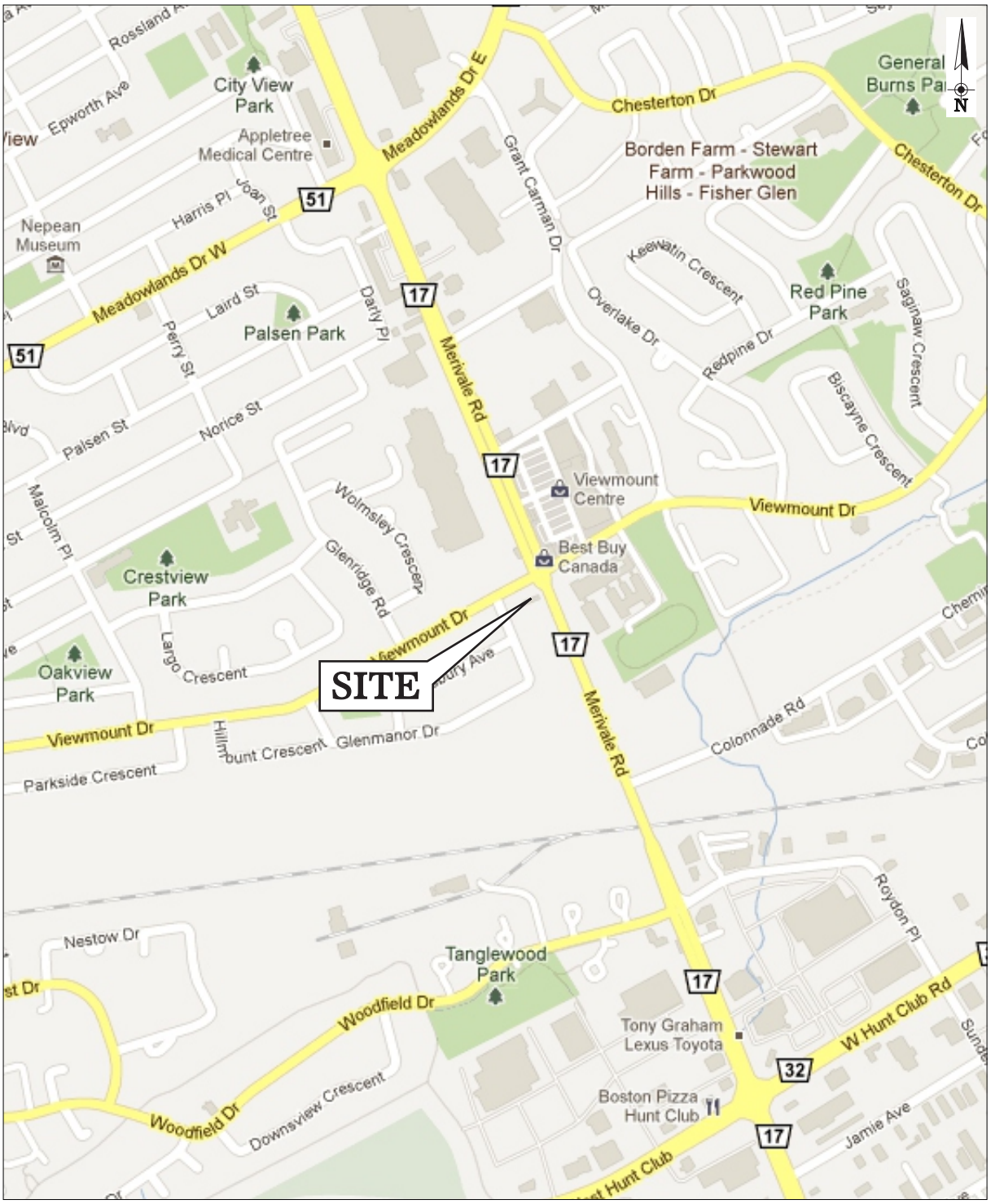
Attachments:

Figure 1 - Locality Plan
Figure 2 - Site Plan
Figure 3 - Ground Water Contour Plan (June 12, 2013)
Figure 4 - Current and Historical Ground Water Analytical Results – Petroleum Related Parameters

Table 1 – Ground Water Monitoring Data
Table 2 - Ground Water Chemical Analysis - Petroleum Related Parameters

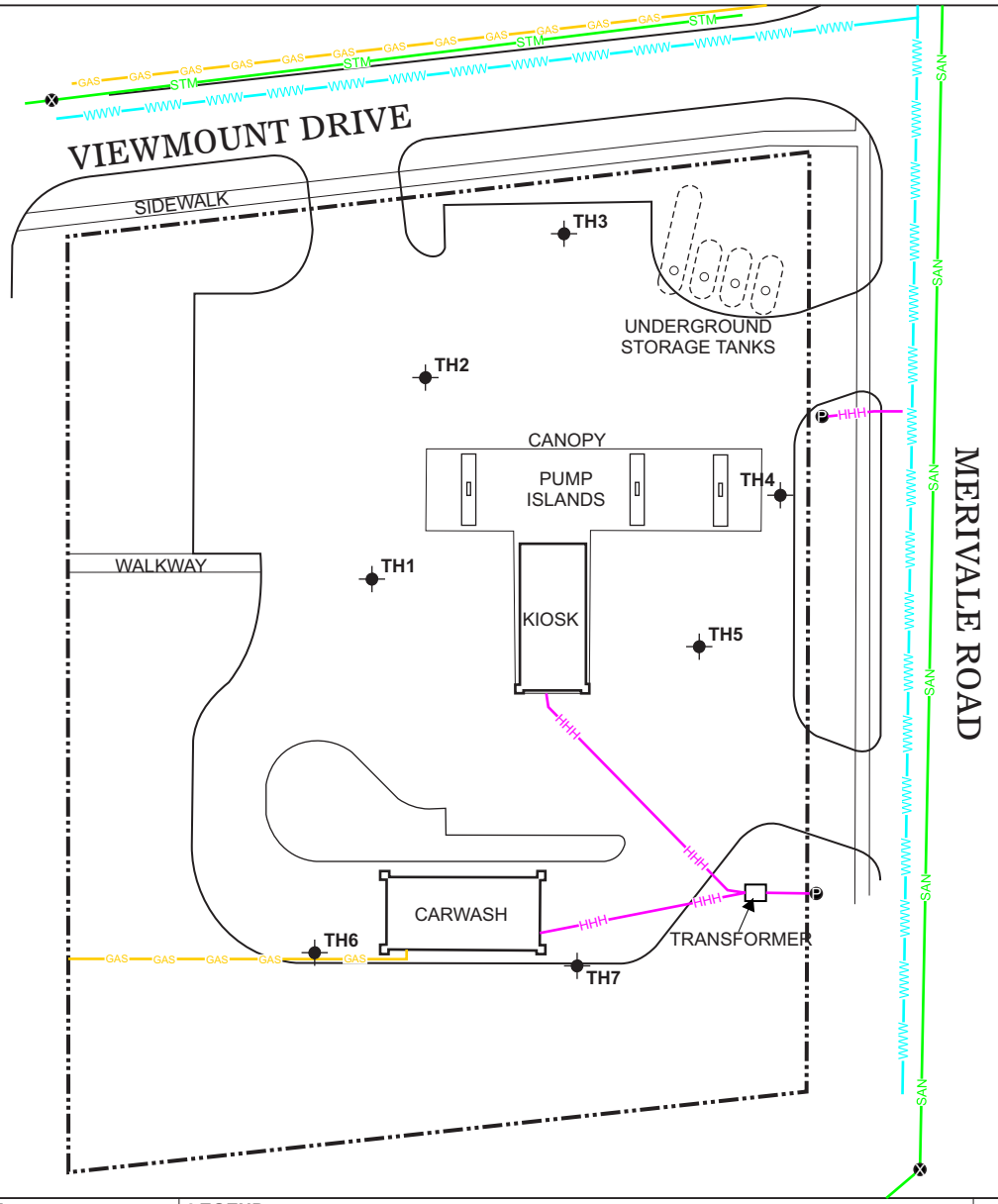
Appendix A - Limitation of Liability, Scope of Report and Third Party Reliance
Appendix B - Quality Management, Control and Assurance
Appendix C - Laboratory Certificates of Analysis

Figures



SCALE: 0 200 400m (APPROXIMATE)	**SOURCE:** GOOGLE MAPS	LOCALITY PLAN		FIGURE 1
exp.	DRAWN BY: J.D.H.	CHECKED BY: D.K.S.	**IMPERIAL OIL** 1660 MERIVALE ROAD OTTAWA, ONTARIO	
			PROJECT NUMBER: 11010	DATE: JULY 2013

11010-LOCALITY



SCALE:

0 15 30m

(APPROXIMATE)

DRAWN BY	CHECKED BY
J.DH.	D.K.S.

SOURCE:
BASED ON 'SITE PLAN' BY IMPERIAL OIL A0765 DATED JAN. 16, 1984, LOCATES BY PROMARK TELECON ON OCT. 13, 2011, AND FIELD OBSERVATIONS BY **exp** STAFF

NOTE:
LOCATIONS OF UTILITIES ARE APPROXIMATE

LEGEND:

- PROPERTY BOUNDARY
- MANHOLE
- UTILITY POLE
- TEST HOLE WITH MONITOR TH1-TH7 (BARENCO, 2011)
- STM — STORM SEWER
- SAN — SANITARY SEWER
- WWW — WATER
- HHH — HYDRO
- GAS — GAS

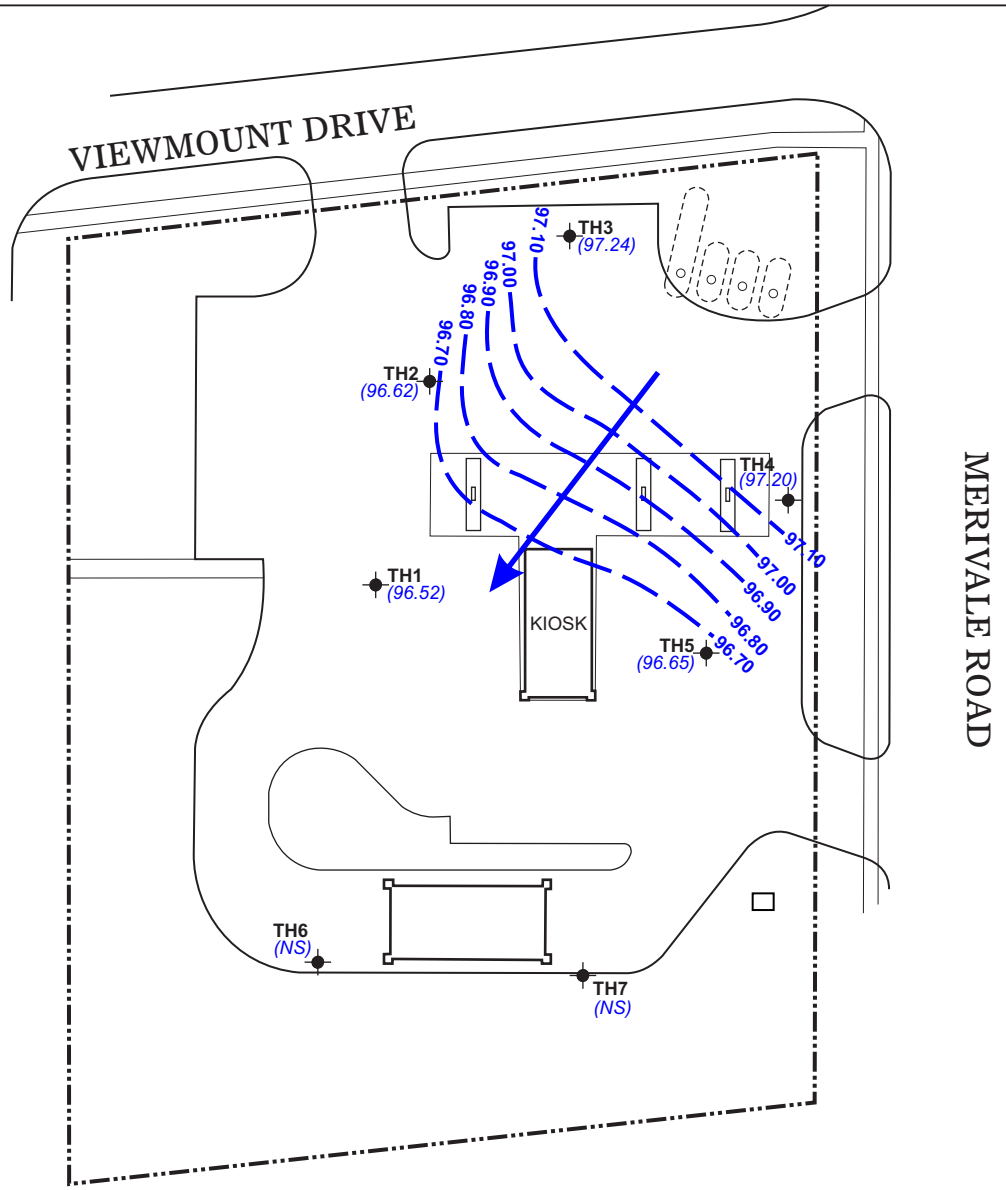
SITE PLAN

FIGURE 2

IMPERIAL OIL
1660 MERIVALE ROAD
OTTAWA, ONTARIO

BARENCO JOB #: 11010 | DATE: JULY 2013

11010-SITE PLAN ONSITE-JUL13



SCALE:

0 15 30m

(APPROXIMATE)

DRAWN BY	CHECKED BY
J.DH.	D.K.S.

SOURCE:

BASED ON 'SITE PLAN' BY IMPERIAL OIL A0765 DATED JAN. 16, 1984, LOCATES BY PROMARK TELECON ON OCT. 13, 2011, AND FIELD OBSERVATIONS BY **exp** STAFF

NOTE:

BENCHMARK NORTH SIDE OF MANHOLE COVER ON THE WEST SIDE OF THE KIOSK WITH AN ASSUMED ELEVATION OF 100.00M

LEGEND:

- PROPERTY BOUNDARY
- TEST HOLE WITH MONITOR TH1-TH7 (BARENCO, 2011)
- (100.00) GROUND WATER ELEVATION (m)
- (100.00)* GROUND WATER ELEVATION NOT USED IN CONTOURING (m)
- 100.00 GROUND WATER ELEVATION CONTOUR (m)
- GROUND WATER FLOW DIRECTION
- (NM) NOT MONITORED
- (NS) NOT SURVEYED

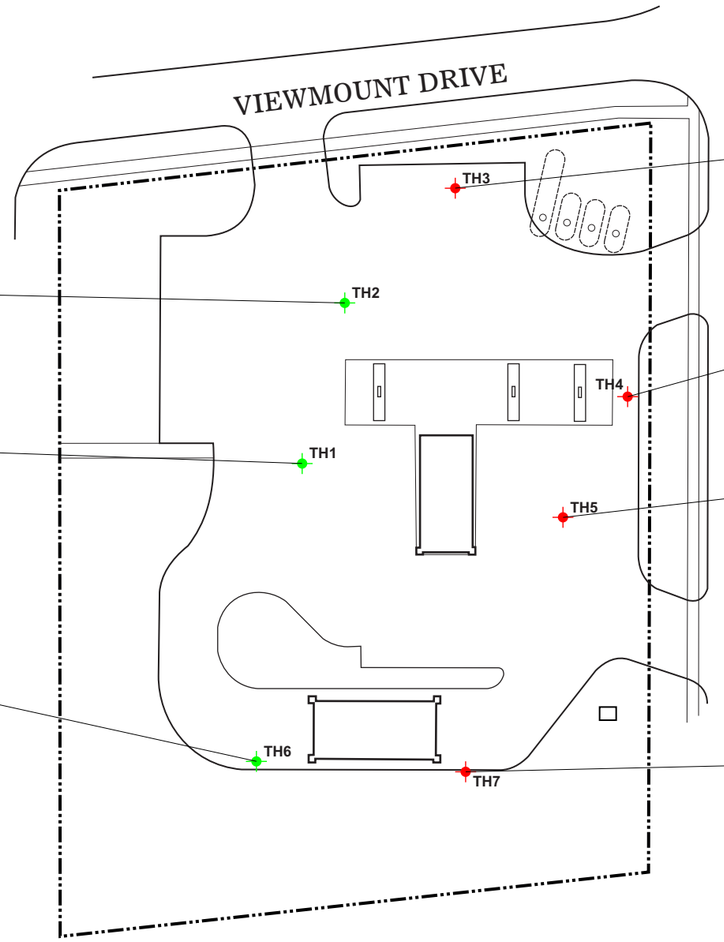
GROUND WATER CONTOUR PLAN (JUNE 12, 2013)

FIGURE 3

IMPERIAL OIL
1660 MERIVALE ROAD
OTTAWA, ONTARIO

BARENCO JOB #: 11010 | DATE: JULY 2013

11010-GWC PLAN-JUN13-JUL13



TH3 SCREEN INTERVAL = 3.2-4.7mbgs

DATE	B	T	E	X	H	F1	F2	F3	F4	Pb
AUG31/11	27	2.4	79	150	20	**1100**	**430**	ND	130	3.8
AUG31/11(DUP)	23	2.1	69	130	17	**1100**	**380**	ND	110	3.9
JUN13/13	11	0.61	66	85	nd	**900**	**350**	ND	ND	3.1

TH2 SCREEN INTERVAL = 3.2-4.7mbgs

DATE	B	T	E	X	H	F1	F2	F3	F4	Pb
AUG31/11	0.77	ND	1.3	0.48	ND	ND	ND	ND	ND	ND
JUN13/13	0.62	ND	2.2	ND	ND	ND	ND	ND	ND	ND

TH4 SCREEN INTERVAL = 3.4-4.9mbgs

DATE	B	T	E	X	H	F1	F2	F3	F4	Pb
AUG31/11	**610**	610	**3400**	**19000**	**540**	**26000**	**17000**	360	170	2.6
JUN13/13	200	35	1200	**4300**	ND(100)	**6200**	**19000**	**580**	430	5.8

TH1 SCREEN INTERVAL = 2.6-5.6mbgs

DATE	B	T	E	X	H	F1	F2	F3	F4	Pb
AUG31/11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
JUN13/13	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.53

TH5 SCREEN INTERVAL = 3.5-5.0mbgs

DATE	B	T	E	X	H	F1	F2	F3	F4	Pb
AUG31/11	**750**	140	**3000**	**13000**	**1400**	**85000**	**20000**	**690**	**620**	5.5
JUN13/13	**530**	44	1600	3800	ND(100)	**9900**	**160000**	**12000**	**6800**	8.3
JUN13/13(DUP)	**550**	44	1600	3800	ND(100)	**9200**	**110000**	**7000**	**4300**	8.0

TH6 SCREEN INTERVAL = 3.6-5.1mbgs

DATE	B	T	E	X	H	F1	F2	F3	F4	Pb
OCT20/11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
OCT20/11(DUP)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
JUN13/13	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.60

TH7 SCREEN INTERVAL = 4.4-5.8mbgs

DATE	B	T	E	X	H	F1	F2	F3	F4	Pb
NOV14/11	31	5.4	160	340	ND(30)	430	ND	ND	ND	ND
JUN13/13	37	2.8	140	130	ND	550	**460**	ND	ND	3.2

SCALE:

0 15 30m

(APPROXIMATE)

SOURCE:

BASED ON 'SITE PLAN' BY IMPERIAL OIL A0765 DATED JAN. 16, 1984, LOCATES BY PROMARK TELECON ON OCT. 13, 2011, AND FIELD OBSERVATIONS BY **exp** STAFF

LEGEND:

PROPERTY BOUNDARY

TEST HOLE WITH MONITOR TH1-TH7 (BARENCO, 2011)

MONITOR LOCATION WHERE MOST RECENT GROUND WATER SAMPLE MEETS **REG 153/04 TABLE 3** STANDARDS FOR ALL PARAMETERS THAT WERE ANALYSED

MONITOR LOCATION WHERE MOST RECENT GROUND WATER SAMPLE EXCEEDS **REG 153/04 TABLE 3** STANDARDS FOR AT LEAST ONE PARAMETER ANALYSED

MONITOR LOCATION WITH MEASURABLE OR OBSERVABLE LIQUID PETROLEUM DURING THE MOST RECENT GROUND WATER SAMPLING EVENT

MONITOR LOCATION WHERE NO GROUND WATER SAMPLE SUBMITTED FOR ANALYSIS DURING THE MOST RECENT GROUND WATER SAMPLING EVENT

TEXT EXCEEDANCES OF **REG 153/04 TABLE 3** STANDARDS

TEXT LIQUID PETROLEUM THICKNESS [IN METRES(m)]

ALL ANALYTICAL RESULTS ARE IN MICROGRAMS PER LITRE (µg/L)
'DEPTH(mbgs)' MEANS DEPTH IN METRES BELOW GROUND SURFACE
'ND' MEANS NOT DETECTED '-' MEANS NOT ANALYSED OR NOT APPLICABLE 'NM' MEANS NOT MEASURED
'RDL' MEANS LABORATORY REPORTING DETECTION LIMIT
(+) RDL ARE FOR MOST RECENT RESULTS; ELEVATED RDL SHOWN IN BRACKETS (DUP) REPRESENTS FIELD DUPLICATE OF PRECEDING SAMPLE

*STANDARDS SHOWN ARE FOR AN INDUSTRIAL/ COMMERCIAL/ COMMUNITY PROPERTY USE AND MEDIUM AND FINE TEXTURED SOILS IN A NON-POTABLE GROUND WATER CONDITION

PARAMETER	ABBREVIATION	REG 153/04 TABLE 3 STANDARDS*	RDL
BENZENE	**B**	430	0.20
TOLUENE	**T**	18000	0.20
ETHYLBENZENE	**E**	2300	0.20
XYLENES	**X**	4200	0.40
HEXANE	**H**	520	5.0
F1 (C_6-C_{10}) - BTEX	**F1**	750	25
F2 (C_{10}-C_{16})	**F2**	150	100
F3 (C_{16}-C_{34})	**F3**	500	200
F4 (C_{34}-C_{50})	**F4**	500	200
LEAD	**Pb**	25	0.50

CURRENT & HISTORICAL GROUND WATER ANALYTICAL RESULTS – PETROLEUM RELATED PARAMETERS

FIGURE 4

IMPERIAL OIL
1660 MERIVALE ROAD
OTTAWA, ONTARIO

exp. | DRAWN BY: J.D.H. | CHECKED BY: D.K.S.

BARENCO JOB #: 11010 | DATE: JULY 2013

11010-GW RESULTS PET-JUL13

Tables

Table 1

GROUND WATER MONITORING DATA

1660 Merivale Road, Ottawa, Ontario

Monitor	Top of Pipe Elevation (m)	Ground Surface Elevation (m)	Screen Interval (mbgs)	Date	Petroleum Vapour Concentrations	Liquid Petroleum Thickness (m)*	Water Depth (mbgs)	Water Table Elevation (m)
TH1	99.91	100.01	2.6 to 5.6	30-Aug-11	nd	nd	4.18	95.83
				20-Oct-11	nm	nm	n/a	n/a
				15-Nov-11	nm	nm	n/a	n/a
				12-Jun-13	10	nd	3.49	96.52
TH2	99.98	100.07	3.2 to 4.7	30-Aug-11	130	nd	4.19	95.88
				20-Oct-11	nm	nm	n/a	n/a
				15-Nov-11	nm	nm	n/a	n/a
				12-Jun-13	75	nd	3.45	96.62
TH3	100.17	100.30	3.2 to 4.7	30-Aug-11	8%	nd	3.27	97.03
				20-Oct-11	nm	nm	n/a	n/a
				15-Nov-11	nm	nm	n/a	n/a
				12-Jun-13	35	nd	3.06	97.24
TH4	100.19	100.27	3.4 to 4.9	30-Aug-11	45	nd	3.23	97.04
				20-Oct-11	nm	nm	n/a	n/a
				15-Nov-11	nm	nm	n/a	n/a
				12-Jun-13	150	nd	3.07	97.20
TH5	100.01	100.13	3.5 to 5.0	30-Aug-11	450	nd	3.34	96.79
				20-Oct-11	nm	nm	n/a	n/a
				15-Nov-11	nm	nm	n/a	n/a
				12-Jun-13	290	nd	3.48	96.65
TH6	nm	nm	3.6 to 5.1	Installed October 2011				
				20-Oct-11	nd	nd	5.17	n/a
				15-Nov-11	nm	nm	n/a	n/a
				12-Jun-13	25	nd	3.41	n/a
TH7	nm	nm	4.4 to 5.8	Installed October 2011				
				20-Oct-11	nd	nd	dry	dry
				15-Nov-11	nd	nd	2.93	n/a
				12-Jun-13	nd	nd	3.48	n/a

Note:

All measurements shown in metres (m)

Elevations are relative to local benchmark (north side of a manhole cover located on the west side of the kiosk) elevation = 100.00 m (Barenco, 2011)

nd means "not detected"; nm means "not monitored"; na means "not accessible"; n/a means "not applicable"; mbgs means "metres below ground surface"

Vapour Concentrations measured using RKI Eagle 2 operated in methane elimination mode

Petroleum vapour concentrations <1000 ppmv shown in parts per million volume (ppmv), >1000 ppmv shown in percent of lower explosive limit (% LEL)

* If liquid petroleum was measured, the water table elevations were corrected assuming a liquid petroleum specific gravity of 0.75

GROUND WATER CHEMICAL ANALYSIS - Petroleum Related Parameters

1660 Merivale Road, Ottawa, Ontario

Sample		Monitor TH1	Monitor TH2	Monitor TH3	Monitor TH4	Monitor TH5	Monitor DUP2 (TH5)	Ontario Regulation 153/04
Screen Interval (mbgs)		2.6 to 5.6	3.2 to 4.7	3.2 to 4.7	3.4 to 4.9	3.5 to 5.0	3.5 to 5.0	Table 3
Sample Date		13-Jun-13	13-Jun-13	13-Jun-13	13-Jun-13	13-Jun-13	13-Jun-13	Ground Water
Maxxam I.D.		RX2638	RX2637	RX2636	RX2635	RX2634	RX2639	Standards**
PARAMETERS	**RDL***							
Volatile Organic Compounds								
Benzene	0.20	nd	0.62	11	200	**530**	**550**	430
Toluene	0.20	nd	nd	0.61	35	44	44	18000
Ethylbenzene	0.20	nd	2.2	66	1200	1600	1600	2300
Xylenes	0.40	nd	nd	85	**4300**	3800	3800	4200
Hexane	5.0	nd	nd	nd	nd (100)	nd (100)	nd (100)	520
Petroleum Hydrocarbons								
F1 (C6 to C10 - BTEX)	25	nd	nd	**900**	**6200**	**9900**	**9200**	750
F2 (C10 to C16)	100	nd	nd	**350**	**19000**	**160000**	**110000**	150
F3 (C16 to C34)	200	nd	nd	nd	**580**	**12000**	**7000**	500
F4 (C34 to C50)	200	nd	nd	nd	430	**6800**	**4300**	500
Inorganic Parameters								
Lead	0.50	0.53	nd	3.1	5.8	8.3	8.0	25

Analysis by Maxxam Analytics

All results in ppb (ug/L); mbgs means "metres below ground surface"; nd means "not detected" at reporting detection limit (RDL); na means "not analysed"

* Analytical RDL are shown except as indicated in brackets

** Standards shown are for an industrial/commercial/community property use and medium and fine textured soils in a non-potable ground water condition

Exceedances of Table 3 standards are shown in **bold**

GROUND WATER CHEMICAL ANALYSIS - Petroleum Related Parameters

1660 Merivale Road, Ottawa, Ontario

Sample Screen Interval (mbgs) Sample Date Maxxam I.D.		Monitor TH6 3.6 to 5.1 13-Jun-13 RX2632	Monitor TH7 4.4 to 5.8 13-Jun-13 RX2633					Ontario Regulation 153/04 Table 3 Ground Water Standards**
PARAMETERS	**RDL***							
Volatile Organic Compounds								
Benzene	0.20	nd	37					430
Toluene	0.20	nd	2.8					18000
Ethylbenzene	0.20	nd	140					2300
Xylenes	0.40	nd	130					4200
Hexane	5.0	nd	nd					520
Petroleum Hydrocarbons								
F1 (C6 to C10 - BTEX)	25	nd	550					750
F2 (C10 to C16)	100	nd	**460**					150
F3 (C16 to C34)	200	nd	nd					500
F4 (C34 to C50)	200	nd	nd					500
Inorganic Parameters								
Lead	0.50	0.60	3.2					25

Analysis by Maxxam Analytics

All results in ppb (ug/L); mbgs means "metres below ground surface"; nd means "not detected" at reporting detection limit (RDL); na means "not analysed"

* Analytical RDL are shown except as indicated in brackets

** Standards shown are for an industrial/commercial/community property use and medium and fine textured soils in a non-potable ground water condition

Exceedances of Table 3 standards are shown in **bold**

Appendix A –
Limitation of Liability, Scope of Report and Third Party Reliance

LIMITATION OF LIABILITY, SCOPE OF REPORT AND THIRD PARTY RELIANCE

This report has been prepared and the work referred to in this report has been undertaken by **exp** Energy Services Ltd. (**exp**) for Imperial Oil. It is intended for the sole and exclusive use of Imperial Oil, its affiliated companies and partners and the respective insurers, agents, employees and advisors (collectively, "Imperial Oil"). Any use, reliance on or decision made by any person other than Imperial Oil based on this report is the sole responsibility of such other person. Imperial Oil and **exp** make no representation or warranty to any other person with regard to this report and the work referred to in this report and they accept no duty of care to any other person or any liability or responsibility whatsoever for any losses, expenses, damages, fines, penalties, or other harm that may be suffered or incurred by any other person as a result of the use of, reliance on, any decision made or any action taken based on this report or the work referred to in this report.

The investigation undertaken by **exp** with respect to this report and any conclusions or recommendations made in this report reflect **exp's** judgement based on the site conditions observed at the time of the site inspection on the date(s) set out in this report and on information available at the time of preparation of this report. This report has been prepared for specific application to this site and it is based, in part, upon visual observation of the site, subsurface investigation at discrete locations and depths, and specific analysis of specific chemical parameters and materials during a specific time interval, all as described in this report. Unless otherwise stated, the findings cannot be extended to previous or future site conditions, portions of the site which were unavailable for direct investigation, subsurface locations which were not investigated directly, or chemical parameters, materials or analysis which were not addressed. Substances other than those addressed by the investigation described in this report may exist within the site, substances addressed by the investigation may exist in areas of the site not investigated and concentrations of substances addressed which are different than those reported may exist in areas other than the locations from which the samples were taken.

If site conditions or applicable standards change or if any additional information becomes available at a future date, modifications to the findings, conclusions and recommendations in this report may be necessary.

Other than by Imperial Oil, copying or distribution of this report or the use of or reliance on the information contained herein, in whole or in part, is not permitted without the express written permission of **exp.** Nothing in this report is intended to constitute or provide a legal opinion.

Appendix B –
Quality Management, Control and Assurance

QUALITY MANAGEMENT, CONTROL AND ASSURANCE

Project Quality Management

The field work documented in this report and the preparation of this report were overseen by a Qualified Person, as defined in Ontario Regulation 153/04, as amended (Regulation 153/04).

Sampling analysis was performed using generally accepted principles and with appropriate sampling equipment. Written field and laboratory sampling procedures for soil and ground water developed by **exp** Energy Services Ltd. (**exp**) were used to ensure consistency in sample collection and preparation of samples for submission to the laboratory.

The staff involved in the field sampling have participated in regular, ongoing training programs and were qualified and experienced in collecting, describing, and preparing environmental samples for laboratory analysis.

Laboratory analysis was performed using generally accepted principles in accordance with the *Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the* Environmental Protection Act, March 9, 2004 amended as of July 1, 2011 (Protocol).

Data quality objectives for the parameters of concern were set to meet acceptable RDLs to achieve the goal of defining areas where such parameters are present at levels in excess of applicable generic standards, as defined in Regulation 153/04. Sampling programs included providing written instruction to the analytical laboratory describing the required analyses on the Chain of Custody prepared and delivered with the samples.

The laboratory has a standing contract with Imperial Oil which sets out specific data quality requirements. Any non-compliance with this contract is documented using a data quality waiver issued by the laboratory. When a data quality waiver is issued by the laboratory, it must be reviewed, signed by **exp**, and returned to the laboratory. Data quality waivers are included with all reports, along with the complete Certificate of Analysis.

Field Quality Assurance/ Quality Control

The ground water sampling plan was prepared and executed based on previous assessment work including the findings of the Phase I assessment conducted for the site, and on professional judgment at the time of the investigation.

Field observations were made and documented in a field book in accordance with generally accepted practices and with the procedures developed and utilized by **exp**.

Exp field sampling Quality Assurance and Quality Control (QA/QC) protocols are tailored to the investigation and include:

- The collection of at least one field duplicate sample for every ten samples or less (where three or more such samples are collected)
- For ground water samples, the collection of samples directly into vials with Teflon-lined lids or bottles containing an appropriate preservative, where required
- For ground water samples analysed for dissolved metals, including mercury and hexavalent chromium, filtration of the sample in the field using a 45 micron disposable filter prior to collection in a bottle containing preservative
- For ground water samples analysed for benzo(a)pyrene, where deemed necessary by the Qualified Person overseeing this work, the collection of an additional bottle for laboratory filtration prior to analysis
- The immediate placement, upon collection, of ground water samples into a cooler with free ice to lower the temperature to less than 10° C
- For ground water sampling, the use of dedicated sampling equipment at different monitors (including the use of dedicated tubing when low flow ground water sampling techniques are used)
- Ensuring that neither the bare hand nor latex glove comes into contact with the ground water as it is being placed into the sample container
- The inclusion of one ground water field blank and trip blank per submission for all parameters in ground water except pH and electrical conductivity. The field blanks are prepared in the field during the sample collection process using laboratory-supplied water and returned to the laboratory for analysis as part of the submission. The trip blanks are prepared by the laboratory, kept in the cooler on ice for the duration of the sampling event and returned to the laboratory unopened for analysis as part of the submission
- All samples were shipped to the laboratory in custody sealed coolers, filled with ice at less than 10° C
- All sample shipments are accompanied by standard chain of custody forms

The results of the field duplicate samples are presented along with the tabulated data in this appendix. Tabulated data are presented to a maximum of two significant digits.

Laboratory Quality Assurance/Quality Control

All laboratory analyses were completed by the Mississauga facility of Maxxam Analytics (Maxxam). This Maxxam laboratory has been accredited by the Standards Council of Canada (SCC) for all of the parameters that were analysed in accordance with the latest version of the International Standard ISO/IEC 17025 – "*General Requirement for the Competence of Testing and Calibration Laboratories*". Maxxam performed the work following formal written methods and procedures. These methods include all the minimum requirements as specified in the Protocol.

Exp has accepted the data provided by Maxxam based on the assurance from Maxxam that, as a minimum, the following requirements have been met and documentation to demonstrate compliance can be produced on request:

- The method performance criteria identified in the Protocol were met
- Sample storage requirements, pre-analysis processing techniques, and holding times for all sample types as identified in the Protocol were met following receipt and sign-off of the samples from **exp** staff
- The results of all laboratory QC samples were within statistically determined control limits and if not, reasons were provided
- Surrogate recoveries for organic analyses were monitored and recorded
- Details on the precision and accuracy of the data have been recorded and retained and are available from the laboratory should they be required as a result of a Ministry of the Environment (MOE) audit
- The analytical data were reported without blank correction (unless the correction was clearly identified on the Certificate of Analysis)
- All laboratory QA/QC sample data, including method blanks, matrix spikes, matrix duplicates, laboratory control samples, and surrogate recoveries, were included in the Certificate of Analysis

All Certificates of Analysis were reviewed by the Qualified Person to ensure that data quality objectives have been met and that any anomalies have been identified. A data quality review checklist has been prepared by an **exp** staff member under the supervision of the Qualified Person for each laboratory submission. The checklist is appended with each Certificate of Analysis. All Certificates of Analysis meet the requirements under Section 47(3) of Regulation 153/04.

Quality Assurance/Quality Control Program

A summary of laboratory data quality waivers and other laboratory and field data quality issues is provided in Table B-1. No issues were identified that would have a material effect on the interpretation of results presented in this report.

The ground water field QA/QC program consisted of the following submission for laboratory analysis: one field duplicate sample for BTEX, hexane, PHC fractions F1 to F4, and lead; one field blank for BTEX, hexane, PHC fractions F1 to F4, and lead; and one trip blank for BTEX, hexane, PHC fractions F1 to F4, and lead.

For the field duplicate samples, evaluation of the QA/QC results were determined by calculating the relative percent difference (RPD) between the field duplicate and original sample results, and comparison of the RPD to designated alert limits. Consistent with laboratory practices and to permit reliable calculations, an RPD is only calculated when the original and duplicate sample concentrations are at least five times the reportable detections limits.

$$RPD = \left| \frac{(x_1 - x_2)}{\left(\frac{(x_1 + x_2)}{2}\right)} \right| \times 100\%$$

The RPD for the ground water field duplicate sample are provided in Table B-2. All of the RPD were either within the alert limits or not calculable.

The ground water field blank and trip blank data were compared to the alert limits and are provided in Table B-3. All of the results were within the alert limits.

No field or laboratory QA/QC issues were identified that would affect the overall conclusions presented in this report. Overall, the results reported are considered to be reliable.

Table B-1

DATA QUALITY WAIVERS AND OTHER DATA ISSUES

1660 Merivale Road, Ottawa, Ontario

Maxxam Job #	DQW #	Matrix	Sample ID	Test Affected	Deviation	Interpretation
B394079	1740	Ground Water	TH4	F2 to F4	Matrix duplicate RPD for F2 (58.3%) is above the acceptance criterion (30%)	Poor reproducibility for F2 in the matrix duplicate of TH4. Since results for both TH4 and its matrix duplicate are well above the Table 3 standard for F2, the deviation should have no material effect on the interpretation of the F2 results for this sample.

Table B-2

GROUND WATER FIELD DUPLICATES

Relative Percent Differences - Petroleum Related Parameters

1660 Merivale Road, Ottawa, Ontario

June 13, 2013

Location Maxxam I.D.		TH5 RX2634	DUP2 (TH5) RX2639	RPD (%)	Alert Limit (%)
PARAMETERS	**RDL***				
Volatile Organic Compounds					
Benzene	4.0	530	550	4	80
Toluene	4.0	44	44	0	80
Ethylbenzene	4.0	1600	1600	48	80
Xylenes	8.0	3800	3800	0	80
Hexane	100	nd	nd	nc	80
Petroleum Hydrocarbons					
F1 (C6 to C10 - BTEX)	500	9900	9200	7	80
F2 (C10 to C16)	100	160000	110000	37	80
F3 (C16 to C34)	200	12000	7000	53	80
F4 (C34 to C50)	200	6800	4300	45	80
Inorganic Parameters					
Lead	0.50	8.3	8.0	4	50

Analysis by Maxxam Analytics

All results in ppb (ug/L) unless otherwise indicated; nd means "not detected" at reporting detection limit (RDL)

na means "not analysed"

nc means "not calculable" - one (or both) of the results are <5x RDL

* Analytical RDL are shown except as indicated in brackets

Exceedances of alert limits are shown in **bold**

GROUND WATER CHEMICAL ANALYSIS - Petroleum Related Parameters

Field Blanks and Trip Blanks

1660 Merivale Road, Ottawa, Ontario

Sample		F. Blank	Trip Blank					Alert Limit
Sample Date		11-Jun-13	11-Jun-13					
Maxxam I.D.		RW8513	RW8512					
PARAMETERS	**RDL***							
Volatile Organic Compounds								
Benzene	0.20	nd	nd					5X RDL
Toluene	0.20	nd	nd					5X RDL
Ethylbenzene	0.20	nd	nd					5X RDL
Xylenes	0.40	nd	nd					5X RDL
Hexane	5.0	nd	nd					5X RDL
Petroleum Hydrocarbons								
F1 (C6 to C10 - BTEX)	25	nd	nd					2X RDL
F2 (C10 to C16)	100	nd	nd					2X RDL
F3 (C16 to C34)	200	nd	nd					2X RDL
F4 (C34 to C50)	200	nd	nd					2X RDL
Inorganic Parameters								
Lead	0.50	nd	nd					5X RDL

Analysis by Maxxam Analytics

All results in ppb (ug/L) unless otherwise indicated; nd means "not detected" at reporting detection limit (RDL); na means "not analysed"

* Analytical RDL are shown except as indicated in brackets

Exceedances of alert limits are shown in **bold**

Appendix C –
Laboratory Certificates of Analysis

Attached are copies of the original Certificates of Analysis provided by the laboratory. The data contained in these analyses is to be read only in conjunction with the report to which it is attached. For interpretation of the chemical data, see the attached text.

Since the laboratory data contains scientific terms and references, only trained persons familiar with sampling and laboratory methods should attempt to interpret the data contained in the Certificates of Analysis.

Task Order#: 11070983
Site#: P12960
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010
Your C.O.C. #: 416710-07-01

Attention: Daina Marie Schreiber
exp Energy Services Ltd.
220 Commerce Valley Dr. W
Suite 500
Markham, ON
L3T 0A8

Report Date: 2013/06/24

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B394079
Received: 2013/06/14, 14:35

Sample Matrix: Water
Samples Received: 8

Analyses	Quantity	Laboratory Method	Method Primary reference
Petroleum Hydro. CCME F1 & BTEX in Water	8	CAM SOP-00315	CCME CWS
Petroleum Hydrocarbons F2-F4 in Water	8	CAM SOP-00316	CCME Hydrocarbons
Dissolved Metals by ICPMS	8	CAM SOP-00447	EPA 6020

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. Reporting results to two significant figures at the RDL is to permit statistical evaluation and is not intended to be an indication of analytical precision.

The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following the 'Alberta Environment Draft Addenda to the CWS-PHC, Appendix 6, Validation of Alternate Methods'. Documentation is available upon request. Maxxam has made the following improvements to the CWS-PHC reference benchmark method: (i) Headspace for F1; and, (ii) Mechanical extraction for F2-F4. Note: F4G cannot be added to the C6 to C50 hydrocarbons.

Maxxam Analytics is accredited by SCC (Lab ID 97) for all specific parameters as required by GUCSO and O.Reg 153/04. Maxxam Analytics is limited in liability to the actual cost of analysis unless otherwise agreed in writing. There is no other warranty expressed or implied. Samples will be retained at Maxxam Analytics for three weeks from receipt of data or as per contract.

All data is in statistical control and has met all QC and method performance criteria unless otherwise flagged. All samples were analysed within hold time unless otherwise flagged. All soil samples for BTEX analysis were methanol extracted within 24 hours unless otherwise flagged.

Task Order#: 11070983
Site#: P12960
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010
Your C.O.C. #: 416710-07-01

Attention: Daina Marie Schreiber
exp Energy Services Ltd.
220 Commerce Valley Dr. W
Suite 500
Markham, ON
L3T 0A8

Report Date: 2013/06/24

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B394079
Received: 2013/06/14, 14:35

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Patricia Legette
24 Jun 2013 16:29:07 -04:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Patricia Legette, Project Manager
Email: PLegette@maxxam.ca
Phone# (905) 817-5799

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B394079
Report Date: 2013/06/24

exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

LEAD (DISSOLVED) IN WATER

Maxxam ID		RX2632		RX2633	RX2634	RX2635		
Sampling Date		2013/06/13 12:30		2013/06/13 13:00	2013/06/13 13:30	2013/06/13 14:00		
COC Number		416710-07-01		416710-07-01	416710-07-01	416710-07-01		
	Units	**TH6**	**RDL**	**TH7**	**TH5**	**TH4**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	0.60	0.50	3.2	8.3	5.8	2.5	3255262

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		RX2636	RX2637	RX2638	RX2638		
Sampling Date		2013/06/13 14:30	2013/06/13 15:00	2013/06/13 15:30	2013/06/13 15:30		
COC Number		416710-07-01	416710-07-01	416710-07-01	416710-07-01		
	Units	**TH3**	**TH2**	**TH1**	**TH1 Lab-Dup**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	3.1	<0.50	0.53	0.50	0.50	3255262

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
QC Batch = Quality Control Batch

Maxxam ID		RX2639		
Sampling Date		2013/06/13 13:30		
COC Number		416710-07-01		
	Units	**DUP2**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	8.0	2.5	3255262

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B394079
Report Date: 2013/06/24

exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

HBTEX/F1-F4 PETROLEUM HYDROCARBONS (WATER)

Maxxam ID		RX2632	RX2633		RX2634	RX2635		
Sampling Date		2013/06/13 12:30	2013/06/13 13:00		2013/06/13 13:30	2013/06/13 14:00		
COC Number		416710-07-01	416710-07-01		416710-07-01	416710-07-01		
	Units	**TH6**	**TH7**	**RDL**	**TH5**	**TH4**	**RDL**	**QC Batch**
Benzene	ug/L	<0.20	37	0.20	530	200	4.0	3252965
Toluene	ug/L	<0.20	2.8	0.20	44	35	4.0	3252965
Ethylbenzene	ug/L	<0.20	140	0.20	1600	1200	4.0	3252965
o-Xylene	ug/L	<0.20	3.1	0.20	100	230	4.0	3252965
p+m-Xylene	ug/L	<0.40	120	0.40	3700	4000	8.0	3252965
Total Xylenes	ug/L	<0.40	130	0.40	3800	4300	8.0	3252965
Hexane	ug/L	<5.0	<5.0	5.0	<100	<100	100	3252965
F1 (C6-C10)	ug/L	<25	850	25	16000	12000	500	3252965
F1 (C6-C10) - BTEX	ug/L	<25	550	25	9900	6200	500	3252965
F2 (C10-C16 Hydrocarbons)	ug/L	<100	460	100	160000	19000	100	3251238
F3 (C16-C34 Hydrocarbons)	ug/L	<200	<200	200	12000	580	200	3251238
F4 (C34-C50 Hydrocarbons)	ug/L	<200	<200	200	6800	430	200	3251238
Reached Baseline at C50	ug/L	Yes	Yes		Yes	Yes		3251238
Extraction Surrogate Recovery (%)								
o-Terphenyl	%	100	100		119	102		3251238
Instrument Surrogate Recovery (%)								
1,4-Difluorobenzene	%	100	102		100	101		3252965
4-Bromofluorobenzene	%	99	106		109	106		3252965
D10-Ethylbenzene	%	106	109		111	107		3252965
D4-1,2-Dichloroethane	%	104	104		105	104		3252965

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B394079
Report Date: 2013/06/24

exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

HBTEX/F1-F4 PETROLEUM HYDROCARBONS (WATER)

Maxxam ID		RX2635		RX2636	RX2637	RX2638		
Sampling Date		2013/06/13 14:00		2013/06/13 14:30	2013/06/13 15:00	2013/06/13 15:30		
COC Number		416710-07-01		416710-07-01	416710-07-01	416710-07-01		
	Units	**TH4 Lab-Dup**	**RDL**	**TH3**	**TH2**	**TH1**	**RDL**	**QC Batch**
Benzene	ug/L		4.0	11	0.62	<0.20	0.20	3252965
Toluene	ug/L		4.0	0.61	<0.20	<0.20	0.20	3252965
Ethylbenzene	ug/L		4.0	66	2.2	<0.20	0.20	3252965
o-Xylene	ug/L		4.0	0.69	0.31	<0.20	0.20	3252965
p+m-Xylene	ug/L		8.0	85	<0.40	<0.40	0.40	3252965
Total Xylenes	ug/L		8.0	85	<0.40	<0.40	0.40	3252965
Hexane	ug/L		100	<5.0	<5.0	<5.0	5.0	3252965
F1 (C6-C10)	ug/L		500	1100	<25	<25	25	3252965
F1 (C6-C10) - BTEX	ug/L		500	900	<25	<25	25	3252965
F2 (C10-C16 Hydrocarbons)	ug/L	34000 (1)	100	350	<100	<100	100	3251238
F3 (C16-C34 Hydrocarbons)	ug/L	1400	200	<200	<200	<200	200	3251238
F4 (C34-C50 Hydrocarbons)	ug/L	900	200	<200	<200	<200	200	3251238
Reached Baseline at C50	ug/L	Yes		Yes	Yes	Yes		3251238
Extraction Surrogate Recovery (%)								
o-Terphenyl	%	104		103	99	103		3251238
Instrument Surrogate Recovery (%)								
1,4-Difluorobenzene	%			101	100	102		3252965
4-Bromofluorobenzene	%			102	99	99		3252965
D10-Ethylbenzene	%			110	107	107		3252965
D4-1,2-Dichloroethane	%			102	104	107		3252965

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
QC Batch = Quality Control Batch
(1) Duplicate results exceeded RPD acceptance criteria for flagged analytes. The sample was reanalysed with the same results.This is likely due to sample heterogeneity.

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Maxxam Job #: B394079
Report Date: 2013/06/24

exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

HBTEX/F1-F4 PETROLEUM HYDROCARBONS (WATER)

Maxxam ID		RX2639		
Sampling Date		2013/06/13 13:30		
COC Number		416710-07-01		
	Units	**DUP2**	**RDL**	**QC Batch**
Benzene	ug/L	550	4.0	3252965
Toluene	ug/L	44	4.0	3252965
Ethylbenzene	ug/L	1600	4.0	3252965
o-Xylene	ug/L	100	4.0	3252965
p+m-Xylene	ug/L	3700	8.0	3252965
Total Xylenes	ug/L	3800	8.0	3252965
Hexane	ug/L	<100	100	3252965
F1 (C6-C10)	ug/L	15000	500	3252965
F1 (C6-C10) - BTEX	ug/L	9200	500	3252965
F2 (C10-C16 Hydrocarbons)	ug/L	110000	100	3251238
F3 (C16-C34 Hydrocarbons)	ug/L	7000	200	3251238
F4 (C34-C50 Hydrocarbons)	ug/L	4300	200	3251238
Reached Baseline at C50	ug/L	Yes		3251238
Extraction Surrogate Recovery (%)				
o-Terphenyl	%	117		3251238
Instrument Surrogate Recovery (%)				
1,4-Difluorobenzene	%	101		3252965
4-Bromofluorobenzene	%	106		3252965
D10-Ethylbenzene	%	112		3252965
D4-1,2-Dichloroethane	%	105		3252965

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B394079
Report Date: 2013/06/24

exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Test Summary

Maxxam ID RX2632
Sample ID TH6
Matrix Water

Collected 2013/06/13
Relinquished 2013/06/14
Received 2013/06/14

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Wat	HSGC/MSFD	3252965	N/A	2013/06/20	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	3251238	2013/06/18	2013/06/18	Nicoleta Ciublea
Dissolved Metals by ICPMS	ICP/MS	3255262	N/A	2013/06/24	Prempal Bhatti

Maxxam ID RX2633
Sample ID TH7
Matrix Water

Collected 2013/06/13
Relinquished 2013/06/14
Received 2013/06/14

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Wat	HSGC/MSFD	3252965	N/A	2013/06/20	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	3251238	2013/06/18	2013/06/18	Nicoleta Ciublea
Dissolved Metals by ICPMS	ICP/MS	3255262	N/A	2013/06/24	Prempal Bhatti

Maxxam ID RX2634
Sample ID TH5
Matrix Water

Collected 2013/06/13
Relinquished 2013/06/14
Received 2013/06/14

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Wat	HSGC/MSFD	3252965	N/A	2013/06/20	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	3251238	2013/06/18	2013/06/19	Nicoleta Ciublea
Dissolved Metals by ICPMS	ICP/MS	3255262	N/A	2013/06/24	Prempal Bhatti

Maxxam ID RX2635
Sample ID TH4
Matrix Water

Collected 2013/06/13
Relinquished 2013/06/14
Received 2013/06/14

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Wat	HSGC/MSFD	3252965	N/A	2013/06/20	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	3251238	2013/06/18	2013/06/19	Nicoleta Ciublea
Dissolved Metals by ICPMS	ICP/MS	3255262	N/A	2013/06/24	Prempal Bhatti

Maxxam ID RX2635 Dup
Sample ID TH4
Matrix Water

Collected 2013/06/13
Relinquished 2013/06/14
Received 2013/06/14

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	3251238	2013/06/18	2013/06/19	Nicoleta Ciublea

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Maxxam Job #: B394079
Report Date: 2013/06/24

exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Test Summary

Maxxam ID RX2636
Sample ID TH3
Matrix Water

Collected 2013/06/13
Relinquished 2013/06/14
Received 2013/06/14

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Wat	HSGC/MSFD	3252965	N/A	2013/06/20	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	3251238	2013/06/18	2013/06/19	Nicoleta Ciublea
Dissolved Metals by ICPMS	ICP/MS	3255262	N/A	2013/06/24	Prempal Bhatti

Maxxam ID RX2637
Sample ID TH2
Matrix Water

Collected 2013/06/13
Relinquished 2013/06/14
Received 2013/06/14

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Wat	HSGC/MSFD	3252965	N/A	2013/06/20	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	3251238	2013/06/18	2013/06/19	Nicoleta Ciublea
Dissolved Metals by ICPMS	ICP/MS	3255262	N/A	2013/06/24	Prempal Bhatti

Maxxam ID RX2638
Sample ID TH1
Matrix Water

Collected 2013/06/13
Relinquished 2013/06/14
Received 2013/06/14

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Wat	HSGC/MSFD	3252965	N/A	2013/06/20	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	3251238	2013/06/18	2013/06/19	Nicoleta Ciublea
Dissolved Metals by ICPMS	ICP/MS	3255262	N/A	2013/06/24	Prempal Bhatti

Maxxam ID RX2638 Dup
Sample ID TH1
Matrix Water

Collected 2013/06/13
Relinquished 2013/06/14
Received 2013/06/14

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Dissolved Metals by ICPMS	ICP/MS	3255262	N/A	2013/06/24	Prempal Bhatti

Maxxam ID RX2639
Sample ID DUP2
Matrix Water

Collected 2013/06/13
Relinquished 2013/06/14
Received 2013/06/14

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Wat	HSGC/MSFD	3252965	N/A	2013/06/20	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	3251238	2013/06/18	2013/06/19	Nicoleta Ciublea
Dissolved Metals by ICPMS	ICP/MS	3255262	N/A	2013/06/24	Prempal Bhatti

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Maxxam Job #: B394079
Report Date: 2013/06/24

exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Package 1	1.7°C
Package 2	1.0°C
Package 3	1.3°C

Each temperature is the average of up to three cooler temperatures taken at receipt

GENERAL COMMENTS

Sample RX2633-01: Metals Analysis: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

Sample RX2634-01: F1/BTEX Analysis:
Due to high concentration of target analytes, sample required dilution. Reporting limits were adjusted accordingly.

Metals Analysis: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

Sample RX2635-01: F1/BTEX Analysis:
Due to high concentration of target analytes, sample required dilution. Reporting limits were adjusted accordingly.

Metals Analysis: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

Sample RX2639-01: F1/BTEX Analysis:
Due to high concentration of target analytes, sample required dilution. Reporting limits were adjusted accordingly.

Metals Analysis: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

Results relate only to the items tested.

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exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Quality Assurance Report

Maxxam Job Number: B394079

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3251238	NCI	Method Blank	o-Terphenyl	2013/06/18		102	%	50 - 130
			F2 (C10-C16 Hydrocarbons)	2013/06/18	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2013/06/18	<200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2013/06/18	<200		ug/L	
3252965	LRA	Method Blank	1,4-Difluorobenzene	2013/06/20		101	%	70 - 130
			4-Bromofluorobenzene	2013/06/20		97	%	70 - 130
			D10-Ethylbenzene	2013/06/20		107	%	70 - 130
			D4-1,2-Dichloroethane	2013/06/20		104	%	70 - 130
			Benzene	2013/06/20	<0.20		ug/L	
			Toluene	2013/06/20	<0.20		ug/L	
			Ethylbenzene	2013/06/20	<0.20		ug/L	
			o-Xylene	2013/06/20	<0.20		ug/L	
			p+m-Xylene	2013/06/20	<0.40		ug/L	
			Total Xylenes	2013/06/20	<0.40		ug/L	
			Hexane	2013/06/20	<5.0		ug/L	
			F1 (C6-C10)	2013/06/20	<25		ug/L	
			F1 (C6-C10) - BTEX	2013/06/20	<25		ug/L	
3255262	PBA	Method Blank	Dissolved Lead (Pb)	2013/06/24	<0.50		ug/L	
3251238	NCI	RPD [RX2635-02]	F2 (C10-C16 Hydrocarbons)	2013/06/19	58.3 (1)		%	30
			F3 (C16-C34 Hydrocarbons)	2013/06/19	NC		%	30
			F4 (C34-C50 Hydrocarbons)	2013/06/19	NC		%	30
3255262	PBA	RPD [RX2638-03]	Dissolved Lead (Pb)	2013/06/24	NC		%	20
3251238	NCI	Matrix Spike [RX2633-02]	o-Terphenyl	2013/06/18		103	%	50 - 130
			F2 (C10-C16 Hydrocarbons)	2013/06/18		97	%	50 - 130
			F3 (C16-C34 Hydrocarbons)	2013/06/18		97	%	50 - 130
			F4 (C34-C50 Hydrocarbons)	2013/06/18		100	%	50 - 130
3255262	PBA	Matrix Spike [RX2638-03]	Dissolved Lead (Pb)	2013/06/24		93	%	80 - 120
3251238	NCI	LCS	o-Terphenyl	2013/06/18		104	%	50 - 130
			F2 (C10-C16 Hydrocarbons)	2013/06/18		100	%	70 - 130
			F3 (C16-C34 Hydrocarbons)	2013/06/18		108	%	70 - 130
			F4 (C34-C50 Hydrocarbons)	2013/06/18		89	%	70 - 130
3252965	LRA	LCS	1,4-Difluorobenzene	2013/06/20		101	%	70 - 130
			4-Bromofluorobenzene	2013/06/20		106	%	70 - 130
			D10-Ethylbenzene	2013/06/20		107	%	70 - 130
			D4-1,2-Dichloroethane	2013/06/20		107	%	70 - 130
			Benzene	2013/06/20		101	%	60 - 130
			Toluene	2013/06/20		98	%	60 - 130
			Ethylbenzene	2013/06/20		98	%	60 - 130
			o-Xylene	2013/06/20		103	%	60 - 130
			p+m-Xylene	2013/06/20		91	%	60 - 130
			Hexane	2013/06/20		95	%	70 - 130
			F1 (C6-C10)	2013/06/20		96	%	60 - 140
3255262	PBA	LCS	Dissolved Lead (Pb)	2013/06/24		100	%	80 - 120

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.
(1) Duplicate results exceeded RPD acceptance criteria for flagged analytes. The sample was reanalysed with the same results.This is likely due to sample heterogeneity.

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Maxxam

DATA QUALITY WAIVER

2013/06/24 4:26 PM

Invoice Client Name: Imperial Oil, a partnership of Imperial Oil Limited and McColl Frontenac Petrole
Invoice Client ID #: 2209
Invoice Project Manager: Nadia Sullivan

Report To Client Name: exp Energy Services Ltd.
Report To Client ID #: 4883
Report To Project Manager: Daina Marie Schreiber

Maxxam Project Manager: Patricia Legette

Site Location: 1660 MERIVALE ROAD, OTTAWA
Client Project #: 11010
Task #: 11070983
Quote: B31742
COC/Submission #:

TAT: 10 Days
Rush: No

Maxxam Job #: B394079

Received By: Jimmy Liu
Received: 2013/06/14 14:35

DQW #: 1740
DQW Created By: Patricia Legette
DQW Created: 2013/06/24 16:05

Lab ID	Client Sample ID	Matrix	Test Code	Analysis Type	Parameters	Deviation	Root Cause	Potential Impact
RX2635	TH4	Water	F24FID-W	F2F4	F2 (C10-C16 Hydrocarbons)	#6 Duplicate RPD Above Control Limit	#6 Non-Homogeneous	This may increase the uncertainty associated with these results.

Waiver Issued By:
Signature: _____ **Date:** 2013/06/24 16:06
Name: Patricia Legette
Title: Project Manager

Data Quality Waiver Reviewed and Accepted By:
Signature: _____ **Date:** 2013/06/26
Name: Daina Schreiber
Title: PM.

Data Quality Waiver Reviewed and Declined By:
Signature: _____ **Date:** _____
Name: _____
Title: _____

Comments / Requested Actions: _____

If this waiver is not returned within 7 calendar days of issuance, the associated data will be deemed acceptable as reported by the issuing laboratory. Closure of the Data Quality Waiver Request requires written acceptance, or declining with comments. Failure to return a signed waiver within 7 calendar days will be reported to Imperial Oil as a failure to close the Data Quality Waiver Request by the recipient of the data.

Validation Signature Page

Maxxam Job #: B394079

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Brad Newman, Scientific Specialist

Medhat Riskallah, Manager, Hydrocarbon Department

Suzana Popovic, Supervisor, Hydrocarbons

==========

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EXXONMOBIL/IMPERIAL OIL - MAXXAM
CHAIN-OF-CUSTODY RECORD

C of C # 416710-07-01

416710

ANALYSIS REQUESTED

INVOICE INFORMATION	REPORT INFORMATION
Company Name: Imperial Oil, a partnership of Imperial Oil Limited and McColl Frontenac Petrole	Company Name: exp Energy Services Ltd.
Contact Name: Nadia Sullivan	Contact Name: Daina Marie Schreiber
Address: 90 Wynford Dr 5th Floor, Don Mills ON M3C 1K5	Address: 220 Commerce Valley Dr. W Suite 500, Markham ON L3T 0A8
Email: nadia.sullivan@esso.ca	Email: dainamarie.schreiber@exp.com
Phone: (416)441-7768	Phone: (905)695-3217 x3641
Sampler Name (Print): Daniel Clarke, Mark Devlin	Consultant Project #: 11010

	FIELD SAMPLE ID	MATRIX: GROUND WATER	SURFACE WATER	SOIL	OTHER	# CONTAINERS	SAMPLING: DATE (YY/MM/DD)	TIME	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	F1-BTEX (including n-hexane)	F2-F4	Lead
1	TH 6	X				8	13/06/13	12:30	X		X	X	X
2	TH 7	X				8	13/06/13	13:00	X		X	X	X
3	TH 5	X				8	13/06/13	13:30	X		X	X	X
4	TH 4	X				8	13/06/13	14:00	X		X	X	X
5	TH 3	X				8	13/06/13	14:30	X		X	X	X
6	TH 2	X				8	13/06/13	15:00	X		X	X	X
7	TH 1	X				8	13/06/13	15:30	X		X	X	X
8	Dup2	X				8	13/06/13	13:30	X		X	X	X
9													
10													

IOL SITE LOCATION: 1060 Merivale Road, Ottawa
IOL SITE # (if applicable): N/A
IOL PROJECT # (if applicable): P12960
MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM: 11070983 -

REGULATORY CRITERIA / DETECTION LIMITS:
☑ REG 153 Table 3 ☐ 2004 ☒ 2011 ☐ RSC
(Please indicate which Reg. version and if RSC required)
☐ ODWS ☐ PWQO
☐ Other

SPECIAL INSTRUCTIONS:
Vials may contain bubbles due to degassing
Particulate may be present
ICE - YES

JARS USED AND NOT SUBMITTED: N/A

TURNAROUND TIME
Standard (5 days) ☒
Rush (3 days) ☐
(2 days) ☐
(1 day) ☐
(same day) ☐
Date Required

COOLER ID:	CUSTODY SEAL	YES	NO	COOLER ID:	CUSTODY SEAL	YES	NO	COOLER ID:	CUSTODY SEAL	YES	NO
TEMP: 0/2/3°C	PRESENT	✓		TEMP: 0/1/2°C	PRESENT	✓		TEMP: 1/1/2°C	PRESENT	✓	
	INTACT	✓			INTACT	✓			INTACT	✓	

LAB USE ONLY
MAXXAM JOB #: B394079
SAMPLES
LABELED BY: J-L
VERIFIED BY: ABM

RELINQUISHED BY: (SIGN & PRINT)	DATE:(YYYY/MM/DD)	TIME:	RECEIVED BY: (SIGN & PRINT)	DATE:(YYYY/MM/DD)	TIME:
1. Daniel Clarke	2013/06/13	16:30	1. AMALIA WALKER	2013/06/14	09:00
2. AMALIA WALKER	2013/06/14	10:30	2. FANG WANG	2013/06/14	14:35
3.			3.		

COC 1012 (01/10) IOL - ON — White: Maxxam — Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: **exp** Energy Services Ltd.

Sampling Date: June 13, 2013

Location: 1660 Merivale Road, Ottawa

Laboratory : Maxxam Analytics

Consultant Project Number: 11010

Sample Submission Number: B394079

Are All Laboratory QC Samples Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			Matrix duplicate RPD for F2 (58.3%) is above the acceptance criteria (30%). All other laboratory QC met acceptance criteria
Extraction Surrogate Recovery	X			
Method Blank Concentration	X			
Matrix Duplicate RPD		X		
Matrix Spike Recovery	X			
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	All field QC samples are within alert limits
Trip Blank Concentration			X	
Field Duplicate RPD	X			

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 48 hours (Yes/No)?:	Not applicable
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Was a Data Quality Waiver (DQW) issued (Yes/No)?: Yes

Date Issued: June 24, 2013

Date of Response: June 26, 2013

Is data considered to be reliable (Yes/No)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Daina Marie Schreiber

Data Reviewed by (Signature):

Date: June 27, 2013

Maxxam

Success Through Science®

Task Order#: 11070983
Site#: P12960
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010
Your C.O.C. #: 416710-03-01

Attention: Daina Marie Schreiber
exp Energy Services Ltd.
220 Commerce Valley Dr. W
Suite 500
Markham, ON
L3T 0A8

Report Date: 2013/06/21

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B393184
Received: 2013/06/13, 15:50

Sample Matrix: Water
Samples Received: 2

Analyses	Quantity	Laboratory Method	Method Primary reference
Petroleum Hydro. CCME F1 & BTEX in Water	2	CAM SOP-00315	CCME CWS
Petroleum Hydrocarbons F2-F4 in Water	2	CAM SOP-00316	CCME Hydrocarbons
Dissolved Metals by ICPMS	2	CAM SOP-00447	EPA 6020

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. Reporting results to two significant figures at the RDL is to permit statistical evaluation and is not intended to be an indication of analytical precision.

The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following the 'Alberta Environment Draft Addenda to the CWS-PHC, Appendix 6, Validation of Alternate Methods'. Documentation is available upon request. Maxxam has made the following improvements to the CWS-PHC reference benchmark method: (i) Headspace for F1; and, (ii) Mechanical extraction for F2-F4. Note: F4G cannot be added to the C6 to C50 hydrocarbons.

Maxxam Analytics is accredited by SCC (Lab ID 97) for all specific parameters as required by GUCSO and O.Reg 153/04. Maxxam Analytics is limited in liability to the actual cost of analysis unless otherwise agreed in writing. There is no other warranty expressed or implied. Samples will be retained at Maxxam Analytics for three weeks from receipt of data or as per contract.

All data is in statistical control and has met all QC and method performance criteria unless otherwise flagged. All samples were analysed within hold time unless otherwise flagged. All soil samples for BTEX analysis were methanol extracted within 24 hours unless otherwise flagged.

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Task Order#: 11070983
Site#: P12960
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010
Your C.O.C. #: 416710-03-01

Attention: Daina Marie Schreiber
exp Energy Services Ltd.
220 Commerce Valley Dr. W
Suite 500
Markham, ON
L3T 0A8

Report Date: 2013/06/21

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B393184
Received: 2013/06/13, 15:50

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Patricia Legette
21 Jun 2013 11:51:47 -04:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Patricia Legette, Project Manager
Email: PLegette@maxxam.ca
Phone# (905) 817-5799

==========

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Maxxam Job #: B393184
Report Date: 2013/06/21

exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

LEAD (DISSOLVED) IN WATER

Maxxam ID		RW8512	RW8513		
Sampling Date		2013/06/11 23:30	2013/06/11 23:15		
COC Number		416710-03-01	416710-03-01		
	Units	**TRIP BLANK**	**F. BLANK**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	<0.50	<0.50	0.50	3253587

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B393184
Report Date: 2013/06/21

exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

HBTEX/F1-F4 PETROLEUM HYDROCARBONS (WATER)

Maxxam ID		RW8512	RW8513		
Sampling Date		2013/06/11 23:30	2013/06/11 23:15		
COC Number		416710-03-01	416710-03-01		
	Units	**TRIP BLANK**	**F. BLANK**	**RDL**	**QC Batch**
Benzene	ug/L	<0.20	<0.20	0.20	3250629
Toluene	ug/L	<0.20	<0.20	0.20	3250629
Ethylbenzene	ug/L	<0.20	<0.20	0.20	3250629
o-Xylene	ug/L	<0.20	<0.20	0.20	3250629
p+m-Xylene	ug/L	<0.40	<0.40	0.40	3250629
Total Xylenes	ug/L	<0.40	<0.40	0.40	3250629
Hexane	ug/L	<5.0	<5.0	5.0	3250629
F1 (C6-C10)	ug/L	<25	<25	25	3250629
F1 (C6-C10) - BTEX	ug/L	<25	<25	25	3250629
F2 (C10-C16 Hydrocarbons)	ug/L	<100	<100	100	3251346
F3 (C16-C34 Hydrocarbons)	ug/L	<200	<200	200	3251346
F4 (C34-C50 Hydrocarbons)	ug/L	<200	<200	200	3251346
Reached Baseline at C50	ug/L	Yes	Yes		3251346
Extraction Surrogate Recovery (%)					
o-Terphenyl	%	95	97		3251346
Instrument Surrogate Recovery (%)					
1,4-Difluorobenzene	%	97	96		3250629
4-Bromofluorobenzene	%	106	106		3250629
D10-Ethylbenzene	%	113	114		3250629
D4-1,2-Dichloroethane	%	100	101		3250629

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B393184
Report Date: 2013/06/21

exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Test Summary

Maxxam ID RW8512
Sample ID TRIP BLANK
Matrix Water

Collected 2013/06/11
Relinquished 2013/06/13
Received 2013/06/13

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Wat	HSGC/MSFD	3250629	N/A	2013/06/18	Sung Ho Kim
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	3251346	2013/06/18	2013/06/19	Ravinder Gaidhu
Dissolved Metals by ICPMS	ICP/MS	3253587	N/A	2013/06/20	Hua Ren

Maxxam ID RW8513
Sample ID F. BLANK
Matrix Water

Collected 2013/06/11
Relinquished 2013/06/13
Received 2013/06/13

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Wat	HSGC/MSFD	3250629	N/A	2013/06/18	Sung Ho Kim
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	3251346	2013/06/18	2013/06/19	Ravinder Gaidhu
Dissolved Metals by ICPMS	ICP/MS	3253587	N/A	2013/06/20	Hua Ren

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Maxxam Job #: B393184
Report Date: 2013/06/21

exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Package 1	2.0°C
Package 2	1.3°C
Package 3	2.0°C

Each temperature is the average of up to three cooler temperatures taken at receipt

GENERAL COMMENTS

Results relate only to the items tested.

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exp Energy Services Ltd.
Task Order#: 11070983
Site#: P12960
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Quality Assurance Report

Maxxam Job Number: B393184

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3250629	SHK	Method Blank	1,4-Difluorobenzene	2013/06/18		97	%	70 - 130
			4-Bromofluorobenzene	2013/06/18		105	%	70 - 130
			D10-Ethylbenzene	2013/06/18		104	%	70 - 130
			D4-1,2-Dichloroethane	2013/06/18		100	%	70 - 130
			Benzene	2013/06/18	<0.20		ug/L	
			Toluene	2013/06/18	<0.20		ug/L	
			Ethylbenzene	2013/06/18	<0.20		ug/L	
			o-Xylene	2013/06/18	<0.20		ug/L	
			p+m-Xylene	2013/06/18	<0.40		ug/L	
			Total Xylenes	2013/06/18	<0.40		ug/L	
			Hexane	2013/06/18	<5.0		ug/L	
			F1 (C6-C10)	2013/06/18	<25		ug/L	
			F1 (C6-C10) - BTEX	2013/06/18	<25		ug/L	
3251346	RGA	Method Blank	o-Terphenyl	2013/06/19		101	%	50 - 130
			F2 (C10-C16 Hydrocarbons)	2013/06/19	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2013/06/19	<200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2013/06/19	<200		ug/L	
3253587	HRE	Method Blank	Dissolved Lead (Pb)	2013/06/20	<0.50		ug/L	
3250629	SHK	LCS	1,4-Difluorobenzene	2013/06/19		97	%	70 - 130
			4-Bromofluorobenzene	2013/06/19		107	%	70 - 130
			D10-Ethylbenzene	2013/06/19		103	%	70 - 130
			D4-1,2-Dichloroethane	2013/06/19		99	%	70 - 130
			Benzene	2013/06/19		89	%	60 - 130
			Toluene	2013/06/19		89	%	60 - 130
			Ethylbenzene	2013/06/19		98	%	60 - 130
			o-Xylene	2013/06/19		100	%	60 - 130
			p+m-Xylene	2013/06/19		95	%	60 - 130
			Hexane	2013/06/19		75	%	70 - 130
			F1 (C6-C10)	2013/06/19		92	%	60 - 140
3251346	RGA	LCS	o-Terphenyl	2013/06/19		104	%	50 - 130
			F2 (C10-C16 Hydrocarbons)	2013/06/19		101	%	70 - 130
			F3 (C16-C34 Hydrocarbons)	2013/06/19		98	%	70 - 130
			F4 (C34-C50 Hydrocarbons)	2013/06/19		102	%	70 - 130
3253587	HRE	LCS	Dissolved Lead (Pb)	2013/06/20		100	%	80 - 120

LCS: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

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Validation Signature Page

Maxxam Job #: B393184

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Brad Newman, Scientific Specialist

Jeevaraj Jeevaratrnam, Senior Analyst

Suzana Popovic, Supervisor, Hydrocarbons

==========

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EXXONMOBIL/IMPERIAL OIL - MAXXAM
CHAIN-OF-CUSTODY RECORD
ANALYSIS REQUESTED

Page 1 of 1
C of C # 416710-03-01
416710

INVOICE INFORMATION	REPORT INFORMATION
Company Name: Imperial Oil, a partnership of Imperial Oil Limited and McColl Frontenac Petrole	Company Name: exp Energy Services Ltd.
Contact Name: Nadia Sullivan	Contact Name: Daina Marie Schreiber
Address: 90 Wynford Dr 5th Floor, Don Mills ON M3C 1K5	Address: 220 Commerce Valley Dr. W Suite 500, Markham ON L3T 0A8
Email: nadia.sullivan@esso.ca	Email: dainamarie.schreiber@exp.com
Phone: (416)441-7788	Phone: (905)695-3217 x3641
Sampler Name (Print): DARRAGH KILROY / DANIEL CLARKE	Consultant Project #: 11010

	FIELD SAMPLE ID	MATRIX: GROUND WATER	MATRIX: SURFACE WATER	MATRIX: SOIL	MATRIX: OTHER	# CONTAINERS	SAMPLING: DATE (YY/MM/DD)	SAMPLING: TIME	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	F1/BTEX (including n-hexane)	F2-F4	Load
1	Trip Blank				X	5	13/06/11	23:30			X	X	X
2	F. Blank				X	8	13/06/11	23:15			X	X	X
3													
4													
5													
6													
7													
8													
9													
10													

IOL SITE LOCATION: 1660 Merivale Road, Ottawa
IOL SITE # (if applicable): N/A
IOL PROJECT # (if applicable): P12960
MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM: 11070983 -

REGULATORY CRITERIA / DETECTION LIMITS:
☒ REG 153 Table 3 ☐ 2004 ☒ 2011 ☐ RSC
(Please indicate which Reg. version and if RSC required)
☐ ODWS ☐ PWQO
☐ Other

SPECIAL INSTRUCTIONS:
ICE-YES

JARS USED AND NOT SUBMITTED: N/A

TURNAROUND TIME
Standard (5 days) ☒
Rush (3 days) ☐
(2 days) ☐
(1 day) ☐
(same day) ☐
Date Required

COOLER ID: 11010-1	CUSTODY SEAL	YES	NO	COOLER ID: 11010-2	CUSTODY SEAL	YES	NO	COOLER ID: 11010-3	CUSTODY SEAL	YES	NO
TEMP: 2/3/1°C	PRESENT	✓		TEMP: 2/1/1°C	PRESENT	✓		TEMP: 2/2/2°C	PRESENT	✓	
	INTACT	✓			INTACT	✓			INTACT	✓	

LAB USE ONLY
MAXXAM JOB #: B393184

RELINQUISHED BY: (SIGN & PRINT)	DATE:(YYYY/MM/DD)	TIME:	RECEIVED BY: (SIGN & PRINT)	DATE:(YYYY/MM/DD)	TIME:
DARRAGH KILROY	2013/06/12	13:00	1. MORAYO NINALOWO	2013/06/13	10:15
2. MORAYO NINALOWO	2013/06/13	11:30	2. DAVID CHAN	2013/06/13	15:50
3.			3.		

SAMPLES
LABELED BY: ABH
VERIFIED BY: J.L

COC 1012 (01/13) IOL - ON White: Maxxam Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: **exp** Energy Services Ltd. Sampling Date: June 11, 2013

Location: 1660 Merivale Road, Ottawa Laboratory : Maxxam Analytics

Consultant Project Number: 11010 Sample Submission Number: B393184

Are All Laboratory QC Samples Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC met acceptance criteria
Extraction Surrogate Recovery	X			
Method Blank Concentration	X			
Matrix Duplicate RPD			X	
Matrix Spike Recovery			X	
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration	X			All field QC samples are within alert limits
Trip Blank Concentration	X			
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 48 hours (Yes/No)?:	Not applicable
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Was a Data Quality Waiver (DQW) issued (Yes/No)?: No

Date Issued: NA Date of Response: NA

Is data considered to be reliable (Yes/No)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Daina Marie Schreiber Data Reviewed by (Signature): 

Date: June 27, 2013

TECHNICAL STANDARDS and SAFETY AUTHORITY

14th Floor, Centre Tower
3300 Bloor Street West
Toronto, Ontario M8X 2X4
Toll free 1-877-682-8772
Fax (416) 231-1626
www.tssa.org

FS Inspection Report

Service Request #	**959944**
Inspection Report #	**4205213**

Inspection Address: **1660 MERIVALE RD** **NEPEAN;ON** **CA K2G 3K4**	Reference Number(s):	Inspection Completion Date: **DEC 17, 2012**
	Facility Type: **FS Gasoline Station - Self Serve**	Equipment Type:
Customer Name and Address: **CANADIAN TIRE CORP LTD C/O Canadian Tire Petroleum** **2180 YONGE ST P 0 B0X 770 STN K** **TORONTO;ON** **CA M4P 2V8**	Task Type: FS-LF Pre Lic Insp **The facility/equipment is inspected in accordance with Ontario's Technical Standards & Safety Act and the appropriate regulations and codes. When an Inspector's order is issued, time limits for compliance reflect the severity of the violation and serve to avoid disruption of service.**	

Task Notes

FIND ATTACHED YOUR COPY OF THE FUEL SAFETY INSPECTION ON DECEMBER 2012. SHOULD YOU HAVE ANY QUESTIONS, CONTACT DAVID NORMAN AT 613-2977422

ON SITE FOR NEW LICENCE AUDIT. ALL SUMP SENSORS INSTALLED TESTED AND WORKING.MONITOR CLEAR AND HAS PUMPS ONLY. ALL FIRE EQUIPMENT AND SIGNAGE IN PLACE AND UP TO DATE. SITE HAS TLC 350 TO MONITOR TANKS. STAFF TRAINED AND SIGNED OFF. SITE IN COMPLIANCE AT THE TIME OF THIS INSPECTION.

.
COMMENTS
FUEL SAFETY ADVISORY "CHECKLIST FOR GAS STATION ATTENDANTS AND OPERATORS" GIVEN TO OPERATOR.

Standard Notes

TSSA inspected the above mentioned location and did not find any non-compliances at the time of inspection.

Labour Detail

Date	Activity	Hours	Comments
DEC 17, 2012	Inspection	2	INSPECT FACILITY PREPARE AND ISSUE LICENCE
DEC 17, 2012	Travel	.5	MANDATED TRAVEL

Customer Signature & Position / Date:		**Inspector Name:** Norman, David	**Inspector Contact Number:** 613-284-8284
Report Received By:	**Customer Contact Number:**	**Inspector Email**: DNorman@tssa.org	**Inspector Fax**: 613-284-8296

As a not-for-profit regulatory authority, TSSA operates on a cost recovery basis. An Invoice will be issued for the Total Charges Incurred.
(Note: This is not an invoice)

14th Floor, Centre Tower
3300 Bloor Street West
Toronto, Ontario
Canada M8X 2X4
Tel.: 416.734.3300
Fax: 416.231.1626
Toll Free: 1.877.682.8772

www.tssa.org

May 10, 2012

Ms. Tiffany Wong
Imperial Oil Limited
90 Wynford Drive
Toronto, Ontario
M3C 1K5

Tank Replacement Program – 1660 Merivale Road, Ottawa, Ontario
TSSA Service Request # 791084

Dear Ms. Wong,

Thank you for submitting the following reports prepared by Barenco Inc. (Barenco) for the above referenced property. Barenco reports along with details are provided below:

- "*Phase II Environmental Assessment – 1660 Merivale Road, Ottawa, Ontario*", prepared by Barenco and dated September 14, 2011;
  - Barenco reports that they have conducted a Phase Two Environmental Site Assessment (ESA) on behalf of Imperial oil between August 23 and 31, 2011 by drilling five (5) boreholes (TH1 to TH5) and completing all of them as monitoring wells to understand soil and groundwater conditions at the site prior to its redevelopment. Barenco retained George Downing Estate Drilling Ltd to complete this activity.
  - Barenco reports that during drilling activities bed rock was encountered between 2.7 and 3.4 m below grade. However, monitoring wells were installed at a depth of 5.8 m below ground by coring into the bedrock.
  - Barenco collected a total of seven (7) soil samples including two (2) field duplicate and analysed for the laboratory analysis of benzene, toluene, ethylbenzene and xylenes (BTEX), petroleum hydrocarbon fractions (PHC F1 to F4), hexane, polycyclic aromatic hydrocarbons (PAHs) and metals. In addition, one soil sample was submitted and analysed for waste classification.
  - Barenco collected six (6) groundwater samples including one (1) field duplicate sample and submitted for the laboratory analysis of selected volatile organic compounds (including BTEX) and PHC F1 to F4 and lead.
  - Barenco selected the Ontario Ministry of the Environment (MOE) (O. Reg. 153/04) Table 3 full depth generic Site Condition Standards (SCS) for industrial/commercial/community property use in a non-potable groundwater condition with medium to fine textured soils as being applicable for use at this site.
  - Barenco reports that the depth to groundwater at the site ranged from 3.25 meters below ground surface (mbgs) to 4.21 mbgs and the inferred direction of groundwater flow was appears to be southwesterly.
  - Barenco reports that all soil samples analysed met the selected MOE Table 3 SCS.
  - Barenco reports that all groundwater samples analysed met the selected MOE Table 3 SCS with the exception of TH3/DUP1, TH4 and TH5 that exceeded one or more of BTEX and PHC F1 to F4.

- "Baseline *Environmental Assessment – 1660 Merivale Road, Ottawa, Ontario"*, prepared by Barenco and dated December 5, 2011
    - Barenco conducted a due diligence baseline assessment at the property to gain an understanding of the subsurface conditions at the subject site.
    - Barenco completed drilling investigation between October 18 and 19, 2011 by drilling two (2) boreholes (TH6 and TH7) and completing them as monitoring wells. Day lighting of boreholes and disposal of drill cuttings were completed by Veolia Environmental Services.
    - Barenco reportedly collected four (4) soil samples including one (1) field duplicate and submitted for the laboratory analysis of BTEX and PHC F1-F4, PAHs and selected metals.
    - Barenco collected three (3) groundwater samples including one (1) field duplicate and submitted for the laboratory analysis of BTEX and PHC F1-F4 and lead.
    - Barenco reports that the groundwater depths were ranged from 3.77 mbgs to 5.06 mbgs.
    - Barenco selected the Ontario Ministry of the Environment (MOE) (O. Reg. 153/04) Table 3 full depth generic Site Condition Standards (SCS) for industrial/commercial/community property use in a non-potable groundwater condition with medium to fine textured soils as being applicable for use at this site.
    - Barenco reports that all soil and groundwater sample results met the Table 3 SCS.
- "Tank Replacement Program – *1660 Merivale Road, Ottawa, Ontario"*, prepared by Barenco and dated December 23, 2011
    - Barenco monitored the replacement of underground storage tank (UST) at the above referenced property between October 24 and November 2, 2011. Barenco reports that ECS Engineering & Construction Limited (ECS) was retained by Imperial Oil to complete this work.
    - Barenco reports that approximately 870 litres of residual product were purged from the four (4) USTs prior to their removal by Triangle Pump Services and disposed at Veolia Environmental Services facility located in Ottawa, Ontario.
    - Barenco reports that ECS removed all USTs with capacities of one (1) with 45,000 L and rest three (3) with 25,000 L each between October 25 and 26, 2011.
    - Barenco reports that the soil from the pit that could be considered for reuse was stock piled onsite. However, approximately 627 tonnes of soil that was geotechnically unsuitable for reuse as backfill was disposed offsite at Waste Management in Carp, Ontario.
    - Barenco collected a total of sixteen (16) soil samples including two (2) field duplicates from the edges of the excavation and stock piles and submitted for the laboratory analysis of BTEX, PHC F1-F4 and Lead. In addition, Barenco analysed six (6) selected soil samples from the submitted samples for PAHs.
    - Barenco selected the Ontario Ministry of the Environment (MOE) (O. Reg. 153/04) Table 5 Stratified Site Condition Standards (SCS) for industrial/commercial/community property use in a non-potable groundwater condition with medium to fine textured soils as being applicable for use at this site.
    - Barenco reports that all soil sample results met the Table 5 SCS.

Based on the information provided, it is considered that the impacts identified at the site are not completely delineated. Therefore, please provide the action plan for the complete delineation of the impacts identified at the site.

If the additional work to fully delineate the impacts has already been completed, please provide a copy of the report to the TSSA. If the work has not been carried out, please provide a time line for the completion of this work to the TSSA by May 31, 2012.

If you have any further questions, please contact me directly. When contacting TSSA regarding this file, please refer to the Service Request Number listed above.

Yours truly,



Sridhar Sangaraju, P.Geo, PMP
Fuels Safety Program
Tel.: 416-734-3598
Fax: 416-231-7525
Email: ssangaraju@tssa.org

Cc: Ms. Patricia Stelmack, P.Eng – Barenco Inc.

TECHNICAL STANDARDS and SAFETY AUTHORITY

14th Floor, Centre Tower
3300 Bloor Street West
Toronto, Ontario M8X 2X4
Toll free 1-877-682-8772
Fax (416) 231-1626
www.tssa.org

FS Inspection Report

Service Request #	**672990**
Inspection Report #	**3520487**

Inspection Address: **1660 MERIVALE RD** **NEPEAN;ON** **CA K2G 3K4**	Reference Number(s):	Inspection Completion Date: **NOV 22, 2011**
	Facility Type: **FS Gasoline Station - Self Serve**	Equipment Type:
Customer Name and Address: **7095686 CANADA INC** **1660 MERIVALE RD** **OTTAWA;ON** **CA K2G 3K4**	Task Type: FS-LF Mod Inspect	
	The facility/equipment is inspected in accordance with Ontario's Technical Standards & Safety Act and the appropriate regulations and codes. When an Inspector's order is issued, time limits for compliance reflect the severity of the violation and serve to avoid disruption of service.	

Task Notes

ON SITE AT REQUEST OF ECS FOR FINAL INSPECTION. ARRIVED ON SITE 9:AM TO GO THROUGH SITE FOR COMPLIANCE. DISPENSER SENSORS SHUTTING DOWN THE HEAD POWER AS REQUIRED BUT FINDING LEAK DETECETION SYSTEN FOR SUPER STP NOT OPERATING . SENSOR NOT SHUTING DOWN STP AS REQUIRED. 3:18 P.M. G.P. MAINTANCE ON SITE BROUGHT THE SYSTEM TO WORKING ORDER.
ALL SUMP SENSORS INSTALLED AS PER CODE ALL SIGNAGE AND FIRE EQUIPMENT UP TO DATE. STAFF TRAINED AND SIGNED OFF. VIDEO CLEAR AND MEETS CODE. SITE IN COMPLIANCE AT THE TIME OF THIS INSPECTION
THIS MODIFICATION INSPECTION IS PASSED WITH NO ORDERS. THIS SITE MAY NOW OPEN FOR RETAIL GASOLINE SALES
FIND ATTACHED YOUR COPY OF THE FUEL SAFETY INSPECTION CONDUCTED ON NOVEMBER 30 2011. SHOULD YOU HAVE ANY QUESTIONS, CONTACT DAVID NORMAN AT 613-297-7422. FS INSPECTION REPORT SERVICE REQUEST

Standard Notes

TSSA inspected the above mentioned location and did not find any non-compliances at the time of inspection.

Labour Detail

Date	Activity	Hours	Comments
OCT 26, 2011	Inspection	1.5	ON SITE RE REMOVAL OF UNDERGROUND EQUIPMENT
NOV 22, 2011	Inspection	1.5	TRAVEL TO SITE WITNESS PRESSURE TESTS ON LINES
NOV 22, 2011	Inspection	6	FINAL INSPECTION PREPARE AND ISSUE REPORT

Customer Signature & Position / Date:		**Inspector Name:** Norman, David	**Inspector Contact Number:** 613-284-8284
Report Received By:	**Customer Contact Number:**	**Inspector Email**: DNorman@tssa.org	**Inspector Fax**: 613-284-8296

As a not-for-profit regulatory authority, TSSA operates on a cost recovery basis. An Invoice will be issued for the Total Charges Incurred.
(Note: This is not an invoice)



BARENCO INC.

Phase II Environmental Assessment

1660 Merivale Road
Ottawa, Ontario

September 14, 2011

For

Imperial Oil
90 Wynford Drive
Don Mills, Ontario
M3C 1K5

By
BARENCO INC.
P. O. Box 295
2561 Stouffville Road, Suite 202
Gormley, Ontario
L0H 1G0
Telephone (905) 887-6661

11010

"These documents and the information contained therein are confidential, property of Imperial Oil and any disclosure of same is governed by the provisions of each of the applicable provincial and territorial freedom of information legislation, the Privacy Act (Canada) 1980-81-82-83, c.111, Sch. II" 1",and the Access to Information Act (Canada) 1980-81-82-83, c.111, Sch. I "1", as such legislation may be amended from time to time."

THIS REPORT CONTAINS PROVISIONS LIMITING LIABILITY, THE SCOPE OF THE REPORT AND THIRD PARTY RELIANCE

SUMMARY SHEET
1660 MERIVALE ROAD, OTTAWA, ONTARIO

1. Site and Adjacent Land Conditions

Type of Facility	Operating Esso Gas Station
Date of Soil Sampling	August 23 and 24, 2011
Date of Ground Water Sampling	August 31, 2011
Number of Test Holes Drilled	5 (TH1 to TH5)
Number of Monitoring Wells Installed	5 (TH1 to TH5)
Type of OVM Meter	Eagle RKI
Adjacent Land Use (current)	North - Commercial South – Residential East – Community (High School) West - Residential
Aquifer Usage in 100 metre Radius	No

2. Site Soil Conditions

Soil Type	Maximum Depths (m)	Comments
Clayey/sandy silt till	3.4	Sand & gravel present up to 1.2 metres below grade. Limestone bedrock encountered at 2.7 metres below grade.

3. Ground Water

Depth (m)	Approximately 3 to 4 metres below grade
Inferred Ground Water Flow Direction	Southwesterly
Free Product Detected	No

4. Selected Soil and Ground Water Standards

Table 3 (industrial/commercial/community property use and fine and medium textured soils in a non-potable ground water condition)

5.Analytical Results (Samples exceeding applicable Regulation 153/04 standards)

Location	Medium	Depth (mbg)	Parameters
TH3/DUP1	Ground Water	N/A	F1, F2
TH4	Ground Water	N/A	B, E, X, H, F1, F2
TH5	Ground Water	N/A	B, E, X, H, F1, F2, F3, F4

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1.0 INTRODUCTION

1.1 Terms of Reference

Barenco Inc. was retained by Imperial Oil to conduct a due diligence Phase II environmental assessment at a site located on the southwest corner of Merivale Road and Viewmount Drive in Ottawa, Ontario. For the purpose of this report, the term subject property refers to the site with the municipal address of 1660 Merivale Road, Ottawa.

The objective of this work was to gain an understanding of subsurface conditions at the subject property prior to an underground storage tank replacement program. The Phase II environmental assessment involved a soil and ground water sampling program. Parameters chosen for analysis during the Phase II investigation were based upon use of the subject property as an operating gas station.

A geotechnical investigation occurred concurrently with the Phase II environmental assessment. Barenco subcontracted the geotechnical component of the investigation to **exp.** Associates Inc. The geotechnical investigation will reported under a separate cover.

The environmental assessment standards for the site were determined using Ontario Regulation 153/04 under Part XV.1 of the *Environmental Protection Act*. Soil and ground water samples were properly collected, preserved, and submitted to Maxxam Analytics Inc., a SCC accredited laboratory. All work was carried out following the Quality Management, Control and Assurance procedures outlined in Appendix A.

Barenco performed the Phase II environmental assessment following the principles of the Canadian Standards Association Z769 Guideline and in accordance with generally accepted professional practices. Subject to this standard of care, Barenco makes no expressed or implied warranties regarding its services and no third party beneficiaries are intended. Limitation of liability, scope of report and third party reliance are outlined in Section 7.0 of this report.

2.0 SITE BACKGROUND

2.1 Site Description

The subject property is located on the southwest corner of Merivale Road and

Viewmount Drive in Ottawa, Ontario. A locality plan is provided as Figure 1.

The subject property is zoned for mid-rise mixed use AM5[195]H(34), according to the City of Ottawa Planning Department.

The subject property was occupied by an Esso Gas Station at the time of the investigation. A site plan is provided as Figure 2.

It is proposed that the underground storage tanks will be replaced on the subject property. A site plan showing the proposed features of the gas station was not available at the time of the current investigation. It is understood that the new tank nest will be in approximately the same location as the current tank nest.

The surrounding properties are being used for residential, commercial and institutional purposes. Single family residences are present to the west and south, shopping malls are present to the north and northeast, and Merivale High School is present to the east of the subject property.

2.2 Native Soils and Topography

The site is located in the physiographic region known as the Russell and Prescott Sand Plains. The surface soils are predominantly sand and sandy loams (*Physiography of Southern Ontario*, Chapman and Putnam, 1984).

The land surface slopes slightly downward slightly toward the north.

Three soil samples were collected during the current investigation and were submitted to **exp.** Associates Inc., a geotechnical engineering firm, for grain size analysis. One sample was collected from TH3 at a depth of 2.3 to 2.9 metres below grade, one sample was collected from TH4 at a depth of 1.5 to 2.1 metres below grade and one sample was collected from TH4 at a depth of 2.3 to 2.9 metres below grade. All three samples are representative of the native soil on the site and were composed of 48%, 72%, and 59% of particles that were smaller than 75 microns, respectively. Per Regulation 153/04, to be classified as coarse textured soil, at least 1/3 of the soil on site must contain 50% or more particles that are larger than 75 microns. Since two of the three samples contain more than 50% of particles that were smaller than 75 microns and the third sample has approximately 50% particles that were smaller than 75 microns, soil at the subject property should be classified as medium and fine textured. A copy of the grain size analysis is provided within the geotechnical report in Appendix B.

Although sand is predominant in the area, a sandy/clayey silt till was encountered at the subject property. Hydraulic conductivity of the silt till is

estimated at 10^{-5} centimetres per second based on typical values in this type of soil (*Groundwater*, Freeze and Cherry, 1979).

2.3 Ground Water and Municipal Services

The subject property is serviced by municipal water and storm and sanitary sewers. The City of Ottawa obtains its potable water from the Ottawa River.

The depth to the ground water table is approximately 3 to 4 metres below grade, based on measurements made in monitors. The regional ground water flow direction is estimated to be site southeast towards Tributary of the Rideau River.

Table 1 summarizes the environmental setting and site characteristics. Table 2 shows Darcy's Law calculations of the estimated ground water flow velocity at the site. The ground water flow velocity was estimated to be approximately 0.45 metres per year.

3.0 ASSESSMENT STANDARDS

3.1 Ontario Regulation 153/04

Ontario Regulation 153/04 under Part XV.1 of the *Environmental Protection Act* provides generic remediation standards based on land use (agricultural, residential/parkland/institutional, or industrial/commercial/community), ground water use (potable or non-potable), soil type (coarse or medium and fine textured), and restoration depth (full or stratified).

Regulation 153/04 also provides alternate methods for assessment and remediation based on either restoring soil and ground water to background conditions or the use of a risk assessment. Generic standards for both soil and ground water are outlined in a document entitled *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act.*

3.2 Site Assessment Standards

The subject property is not considered to be potentially sensitive for the following reasons: there are no areas of natural or scientific interest on or immediately adjacent to the site according to the Ministry of Natural Resources Natural Heritage website; the pH of three soil samples collected during the current investigation were within the applicable ranges for surface and subsurface soils (as shown in Table 3); consolidated bedrock is not present at

depths of less than 2.0 metres on the site; and there are no surface water bodies within 30 metres of the site. Therefore, this site would not be considered potentially sensitive, and use of the generic standards is appropriate.

Based on the current use of the site as a gas station, as well as site environmental setting data shown in Table 1, the site would be classified as having commercial/ industrial/community property use with non-potable ground water. Ontario Regulation 153/04 (2011) Table 3 standards for commercial/ industrial/community property use and fine and medium textured soils are appropriate for evaluating conditions at this site.

4.0 SITE INVESTIGATION

4.1 Potential Contaminants of Concern

The objectives of the current investigation were to investigate potential sources of contamination to the subject property and to provide baseline environmental data prior to site redevelopment. Specifically, the following potential sources of contamination (with potential contaminants of concern in brackets) were identified:

- former handling of gasoline and diesel (BTEX, hexane, F1 to F4, 2 and 3 ring PAH, lead in soil; BTEX, hexane, F1 to F4, EDB, EDC, MTBE, lead in ground water)
- unknown nature of imported fill to site (BTEX, hexane, F1 to F4, metals, full suite PAH in soil)
- handling of waste oils, lubricants, solvents at the former service garage (BTEX, hexane, F1 to F4, arsenic, barium, chromium, copper, lead, zinc, full suite PAH, PCB in soil; BTEX, hexane, F1 to F4, EDB, EDC, MTBE, chlorinated VOC, lead in ground water)
- Current carwash on the subject property (BTEX, F1to F4, hexane, arsenic, barium, chromium, copper, lead, zinc, PAH in soil; BTEX, F1 to F4, hexane, EDB, EDC, MTBE, in ground water)

The locations of the test holes that were drilled to address these issues are shown on Figure 2.

4.2 Drilling Investigation

The drilling investigation was conducted on August 23 and 24, 2011. George Downing Estate Drilling Ltd. was contracted by Barenco to drill five test holes (TH1 to TH5). The test holes were drilled to the bedrock (a maximum depth of 3.4 metres below grade) using a CME 75 truck-mounted auger rig and a split

spoon sampler. All test holes were then cored to a maximum depth of 5.8 metres below grade.

Daylighting activities were performed to reduce the possibility that an unknown subsurface structure would be struck as drilling activities progressed. Barenco retained Green for Life Environmental Corporation Corp. (MOE Registration A680301) to provide the daylighting services. Green for Life also removed all of the drill cuttings from augering. Cuttings were disposed at GFL Environmental East Corp., a MOE licensed waste receiver (MOE Registration A680301).

Soil samples were collected from split spoon samplers as the drilling progressed. These samples were examined for geologic information and for physical evidence of chemical impact. Readings of the petroleum vapour concentrations in the soil samples collected during the drilling investigation were recorded using an Eagle RKI, where there was sufficient recovery. This instrument is designed to detect and measure concentrations of combustible gas in the atmosphere. It is equipped with two ranges of measurement, reading concentrations in parts per million vapour (ppmv) or in percentage lower explosive limit (LEL). The Gastechtor instrument can determine combustible vapour concentrations in the range equivalent to 0 to 11,000 ppmv of hexane. The 1238 ME was configured to eliminate any response from methane for all sampling conducted at the site. Instrument calibration is checked on a daily basis in both the ppmv range and LEL range using standard gases comprised of a known concentration of hexane in air. If the instrument readings are within ±10% of the standard gas value, then the instrument is deemed to be calibrated, however if the readings are greater than ±10% of the standard gas value then the instrument is re-calibrated prior to use.

During the drilling investigation, bedrock refusal was encountered between 2.7 and 3.4 metres below grade. As there was no evidence of the water table in the overburden material and no previous site data was available, coring was conducted to a maximum depth of 5.8 metres below grade.

Petroleum vapours ranged from non-detectable to 250 ppmv. The test hole logs are provided in Appendix C. A copy of the well record that was submitted to the MOE is also included in Appendix C.

All of the test holes (TH1 to TH5) were completed as subsurface monitors. The monitors are constructed of 50 millimetre diameter threaded PVC pipe. The lower section of pipe is slotted above and below the water table. The upper section of the pipe is solid. The lower part of the annulus of the hole is backfilled with clean sand up to approximately 0.3 metres above the top of the slotted section. A bentonite seal is placed above the sand to just below grade. Concrete is used to seal the monitors at grade. The monitor is equipped with a protective flushmount casing and locking lid.

4.3 Soil Disposal

One soil sample representative of the excess drill cuttings was submitted to the Mississauga facility of Maxxam Analytics Inc., a SCC accredited laboratory, for analysis of selected Ontario Regulation 558 parameters and ignitability. The soil sample was placed into sealed laboratory prepared glass jars, labelled, and transported to the laboratory stored in a cooler with ice at less than 10°C.

The results for the Regulation 558 analysis are provided in Table 4. The applicable Schedule 4 leachate criteria are also provided. The soil sample was within the leachate criteria for all of the substances that were analysed. It was also non-ignitable. Thus, soil removed from site during the tank replacement investigation can be removed as solid, non-hazardous waste at a MOE licensed waste disposal facility.

Copies of the laboratory Certificates of Analysis are provided in Appendix D.

4.4 Soil Chemical Analysis

A total of seven soil samples, including two field duplicate samples, were collected during this investigation and were submitted to the Mississauga facility of Maxxam Analytics Inc. for analysis of benzene, toluene, ethylbenzene, xylenes (BTEX), hexane, petroleum hydrocarbon fractions F1 to F4, 2 and 3 ring polycyclic aromatic hydrocarbons (PAH), and selected metals. A total of six soil samples, including one field duplicate sample, were collected and were submitted to Maxxam Analytics Inc. for analysis of the full suite of metals and PAH. Field blanks were also submitted for BTEX, hexane, and PAH. A trip blank was submitted for BTEX and hexane. The soil samples were placed into sealed laboratory prepared glass jars, labelled, and transported to the laboratory stored in a cooler with ice at less than 10°C.

The results of the soil chemical analysis for petroleum parameters are provided in Table 5. The applicable Regulation 153/04 (2011) Table 3 standards are also provided. All of the soil samples were within the applicable Table 3 standards for all of the petroleum parameters that were analysed. Soil analytical data for petroleum parameters are shown on Figure 4.

The results of the soil chemical analysis for PAH are provided in Table 6. The applicable Regulation 153/04 (2011) Table 3 standards are also provided. All of the soil samples were within the applicable Table 3 standards for all of the PAH that were analysed.

The results of the soil chemical analysis for inorganic parameters are provided in Table 7. The applicable Regulation 153/04 (2011) Table 3 standards are also provided. All of the soil samples were within the applicable Table 3 standards for all of the inorganic parameters that were analysed.

Copies of the laboratory Certificates of Analysis are provided in Appendix D.

4.5 Coring Water Chemical Analysis

One sample was collected from the water used for during the coring process and submitted to the Mississauga facility of Maxxam Analytics Inc. for chemical analysis of BTEX and petroleum hydrocarbon fractions F1 to F4. The coring water sample was placed into sealed laboratory prepared glass bottles and vials, labelled, and transported to the laboratory stored in a cooler with ice at less than 10°C.

The results of the coring water chemical analysis, along with the appropriate Regulation 153/04 (2011) Table 3 standards, are provided in Table 8. None of the parameters analysed were detected in the coring water.

Copies of the laboratory Certificates of Analysis are provided in Appendix D.

4.6 Ground Water Chemical Analysis

Following the conclusion of the drilling investigation, all five monitors were developed by purging three well volume equivalents.

A total of six ground water samples, one from each monitor and one field duplicate samples, were subsequently collected and submitted to the Mississauga facility of Maxxam Analytics Inc. for chemical analysis of selected volatile organic compounds (including BTEX), petroleum hydrocarbon fractions F1 to F4, and lead. A field blank and a trip blank were submitted for analysis of these parameters. All ground water samples were placed into sealed laboratory prepared glass bottles and vials, labelled, and transported to the laboratory stored in a cooler with ice at less than 10°C.

The results of the ground water chemical analysis, along with the appropriate Regulation 153/04 (2011) Table 3 standards, are provided in Table 9. All of the ground water samples were within the Table 3 standards for all of the parameters that were analysed except TH3/DUP1, TH4, and TH5 which exceeded for benzene, ethylbenzene, hexane, F1, F2, F3, and/or F4. Ground water analytical data for petroleum parameters are shown on Figure 5.

Copies of the laboratory Certificates of Analysis are provided in Appendix D.

4.7 Ground Water Monitoring and Surveying

The subsurface monitors were inspected for general physical condition, ground water depth, and petroleum vapour concentrations on August 30, 2011.

Petroleum vapour concentrations ranged from non-detectable to 8% LEL. No phase-separated product was observed. The depth to the ground water table ranged from 3.25 to 4.21 metres below grade.

The monitors were surveyed relative to a benchmark. The benchmark, which was assigned an elevation of 100.00 metres, was the north side of a manhole located on the west side of the kiosk. The monitoring and elevation data are provided in Table 9.

A ground water contour plan based on ground water elevations measured in the monitors on August 30, 2011 was prepared, as shown on Figure 6. Based on the data, the ground water flow direction appears to be southwesterly.

5.0 CURRENT SITE STATUS

During the Phase II environmental assessment, soil and ground water quality at the site was investigated. The results of soil and ground water sampling were compared to the Regulation 153/04 (2011) Table 3 standards for industrial/commercial/ community property use and fine and medium textured soil. Soil samples were analysed for petroleum hydrocarbons, metals, and polycyclic aromatic hydrocarbons. Ground water samples were analysed for volatile organic compounds, petroleum hydrocarbons and lead.

All of the soil and coring water samples were within the applicable Table 3 standards for all of the parameters that were analysed. All of the ground water samples were within the applicable Table 3 standards for all of the parameters that were analysed except TH3/DUP1, TH4, and TH5.

The ground water flow direction was estimated to be southwesterly at a rate of approximately 0.45 metres per year.

6.0 REFERENCES

Canadian Standards Association, *Z769 Standard, Phase II Environmental Site Assessment*, 2000.

Chapman, L.J. and D.F. Putnam, *The Physiography of Southern Ontario*, Third Edition, Ontario Ministry of Natural Resources, 1984.

Freeze, R.A. and J.A. Cherry, *Groundwater*, Prentice-Hall of Canada Ltd., 1979.

Ontario Regulation 153/04 made under Part XV.1 of the *Environmental Protection Act*, October 1, 2004.

Ontario Ministry of the Environment, *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act*, March 2004.

Ontario Ministry of the Environment, *Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario*, December 1996.

7.0 LIMITATION OF LIABILITY, SCOPE OF REPORT AND THIRD PARTY RELIANCE

This report has been prepared and the work referred to in this report has been undertaken by Barenco Inc. for Imperial Oil. It is intended for the sole and exclusive use of Imperial Oil, its affiliated companies and partners and the respective insurers, agents, employees and advisors (collectively, "Imperial Oil"). Any use, reliance on or decision made by any person other than Imperial Oil based on this report is the sole responsibility of such other person. Imperial Oil and Barenco Inc. make no representation or warranty to any other person with regard to this report and the work referred to in this report and they accept no duty of care to any other person or any liability or responsibility whatsoever for any losses, expenses, damages, fines, penalties, or other harm that may be suffered or incurred by any other person as a result of the use of, reliance on, any decision made or any action taken based on this report or the work referred to in this report.

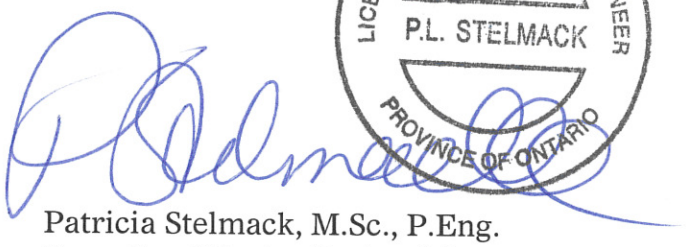
The investigation undertaken by Barenco Inc. with respect to this report and any conclusions or recommendations made in this report reflect Barenco Inc.'s judgement based on the site conditions observed at the time of the site inspection on the date(s) set out in this report and on information available at the time of preparation of this report. This report has been prepared for specific application to this site and it is based, in part, upon visual observation of the site, subsurface investigation at discrete locations and depths, and specific analysis of specific chemical parameters and materials during a specific time interval, all as described in this report. Unless otherwise stated, the findings cannot be extended to previous or future site conditions, portions of the site which were unavailable for direct investigation, subsurface locations which were not

investigated directly, or chemical parameters, materials or analysis which were not addressed. Substances other than those addressed by the investigation described in this report may exist within the site, substances addressed by the investigation may exist in areas of the site not investigated and concentrations of substances addressed which are different than those reported may exist in areas other than the locations from which the samples were taken.

If site conditions or applicable standards change or if any additional information becomes available at a future date, modifications to the findings, conclusions and recommendations in this report may be necessary.

Other than by Imperial Oil, copying or distribution of this report or the use of or reliance on the information contained herein, in whole or in part, is not permitted without the express written permission of Barenco Inc. Nothing in this report is intended to constitute or provide a legal opinion.

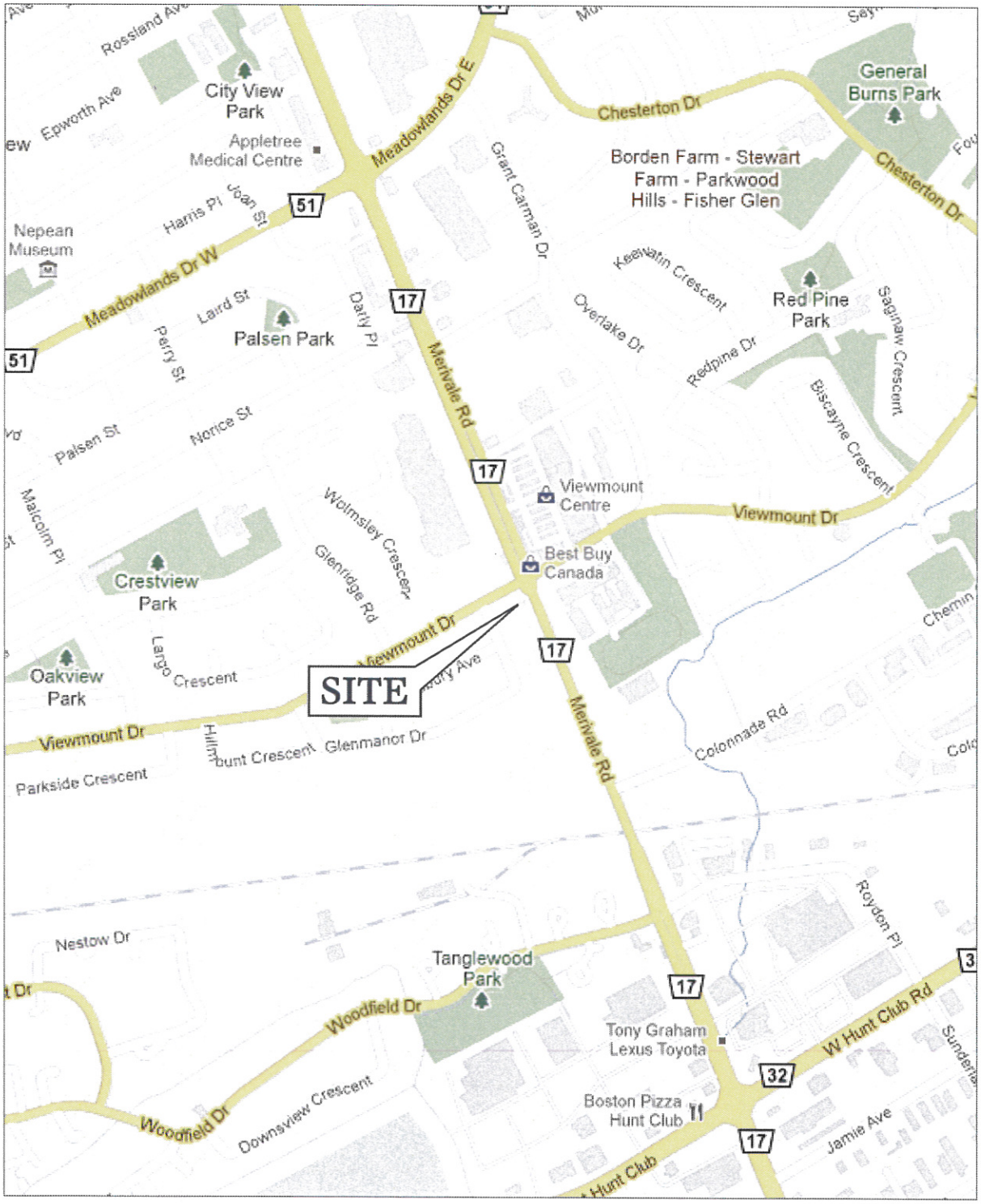
Respectfully submitted,
BARENCO INC.



Daina Marie Schreiber, B.Sc. (Geol)
Environmental Scientist

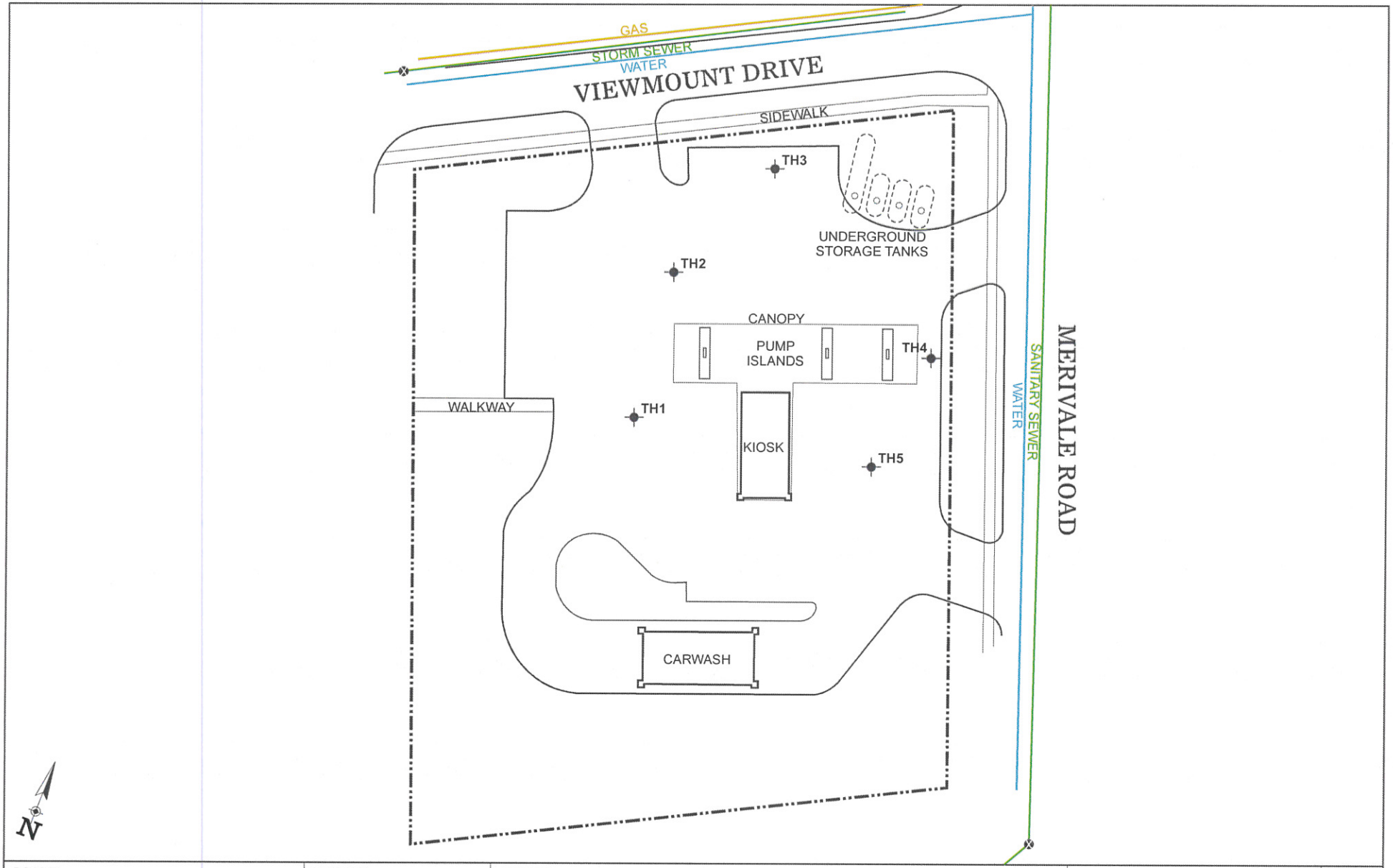
Patricia Stelmack, M.Sc., P.Eng.
Team Lead/Senior Project Manager

FIGURES



SCALE:	SOURCE:			FIGURE
1:12000	GOOGLE MAPS	N	LOCALITY PLAN	1
BARENCO	DRAWN BY: C.D.	CHECKED BY: D.K.S.	IMPERIAL OIL 1660 MERIVALE ROAD OTTAWA, ONTARIO	
			BARENCO JOB #: 11010	DATE: AUGUST 2011

11010-LOCALITY



SCALE:

0 15 30m

(APPROXIMATE)

BARENCO	DRAWN BY	CHECKED BY
	C.D.	D.K.S.

SOURCE:

BASED ON 'SITE PLAN' BY IMPERIAL OIL A0765 DATED JAN. 16, 1984 AND FIELD OBSERVATIONS BY BARENCO STAFF

LEGEND:

- PROPERTY BOUNDARY
- MANHOLE
- TEST HOLE WITH MONITOR

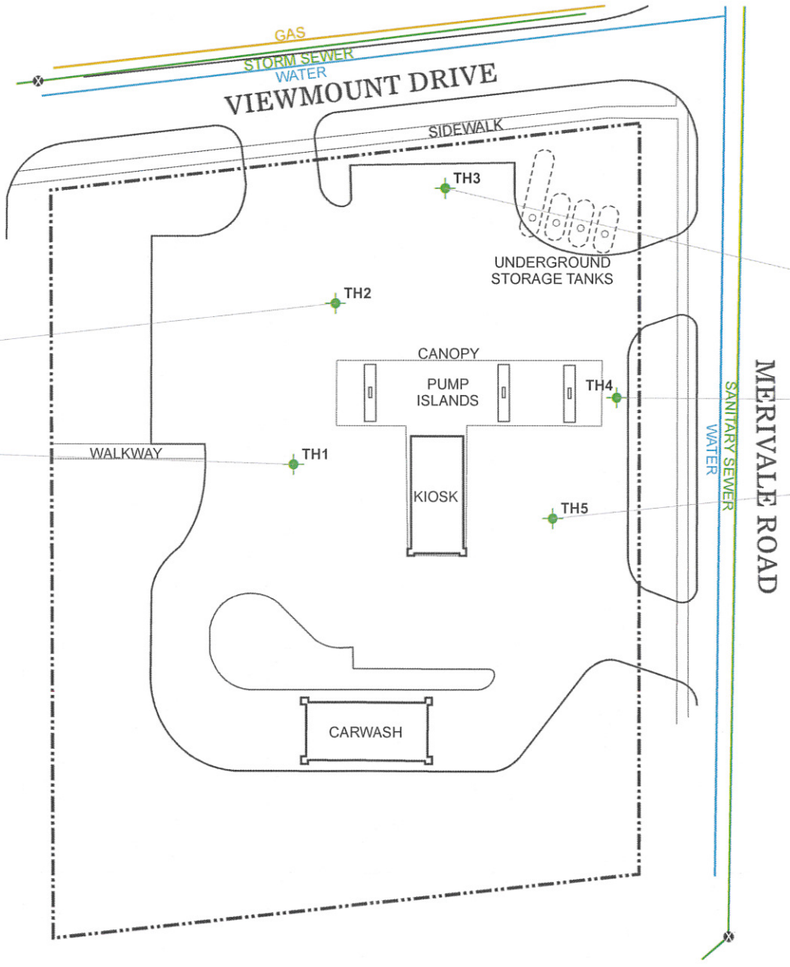
SITE PLAN

FIGURE 2

IMPERIAL OIL
1660 MERIVALE ROAD
OTTAWA, ONTARIO

BARENCO JOB #: 11010 | DATE: SEPTEMBER 2011

11010-SITE PLAN-SEP11



TH2										AUG23/11
DEPTH(m)	B	T	E	X	H(n)	F1	F2	F3	F4	Pb
2.3-2.9	0.02	ND	0.29	ND	ND	ND	ND	ND	ND	12

TH1										AUG23/11
DEPTH(m)	B	T	E	X	H(n)	F1	F2	F3	F4	Pb
3.0-3.7	ND	0.13	ND	ND	ND	ND	ND	ND	ND	7

TH3										AUG23/11
DEPTH(m)	B	T	E	X	H(n)	F1	F2	F3	F4	Pb
2.3-2.9	ND	ND	ND	ND	ND	ND	ND	ND	ND	7
2.3-2.9(DUP)	ND	ND	ND	ND	ND	ND	ND	ND	ND	8

TH4										AUG24/11
DEPTH(m)	B	T	E	X	H(n)	F1	F2	F3	F4	Pb
2.4-3.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	4

TH5										AUG24/11
DEPTH(m)	B	T	E	X	H(n)	F1	F2	F3	F4	Pb
2.3-2.9	ND	ND	0.05	ND	ND	ND	ND	ND	ND	7
2.3-2.9(DUP)	ND	ND	0.06	ND	ND	ND	ND	ND	ND	7

N

SCALE:

0 15 30m
(APPROXIMATE)

BARENCO

DRAWN BY	CHECKED BY
C.D.	D.K.S.

SOURCE:

BASED ON 'SITE PLAN' BY IMPERIAL OIL A0765 DATED JAN. 16, 1984 AND FIELD OBSERVATIONS BY BARENCO STAFF

LEGEND:

PROPERTY BOUNDARY
MANHOLE
TEST HOLE WITH MONITOR

LOCATION WHERE ALL SOIL SAMPLES MEET **REG 153/04 (2011) TABLE 3** STANDARDS FOR ALL PARAMETERS THAT WERE ANALYSED SHOWN AS GREEN

LOCATION WHERE AT LEAST ONE SOIL SAMPLE EXCEEDS **REG 153/04 (2011) TABLE 3** STANDARDS FOR AT LEAST ONE PARAMETER SHOWN AS RED

EXCEEDANCES OF **REG 153/04 (2011) TABLE 3** STANDARDS SHOWN IN TEXT AS **RED BOLD**

ALL ANALYTICAL RESULTS ARE IN µg/g, DRY WEIGHT BASIS

'ND' MEANS NOT DETECTED
'RDL' MEANS LABORATORY REPORTING DETECTION LIMIT

* STANDARDS SHOWN ARE FOR AN INDUSTRIAL/COMMERCIAL/COMMUNITY PROPERTY USE AND MEDIUM AND FINE TEXTURED SOILS IN A NON-POTABLE GROUND WATER CONDITION

PARAMETER	ABBREVIATION	153/04 (2011) TABLE 3 STANDARDS*	RDL
BENZENE	B	0.4	0.02
TOLUENE	T	19	0.02
ETHYLBENZENE	E	78	0.02
XYLENES	X	30	0.04
HEXANE (n)	H(n)	88	0.5
F1 (C_6-C_{10}) - BTEX	F1	65	10
F2 (C_{10}-C_{16})	F2	250	10
F3 (C_{16}-C_{34})	F3	2500	10
F4 (C_{34}-C_{50})	F4	6600	10
LEAD	Pb	120	5

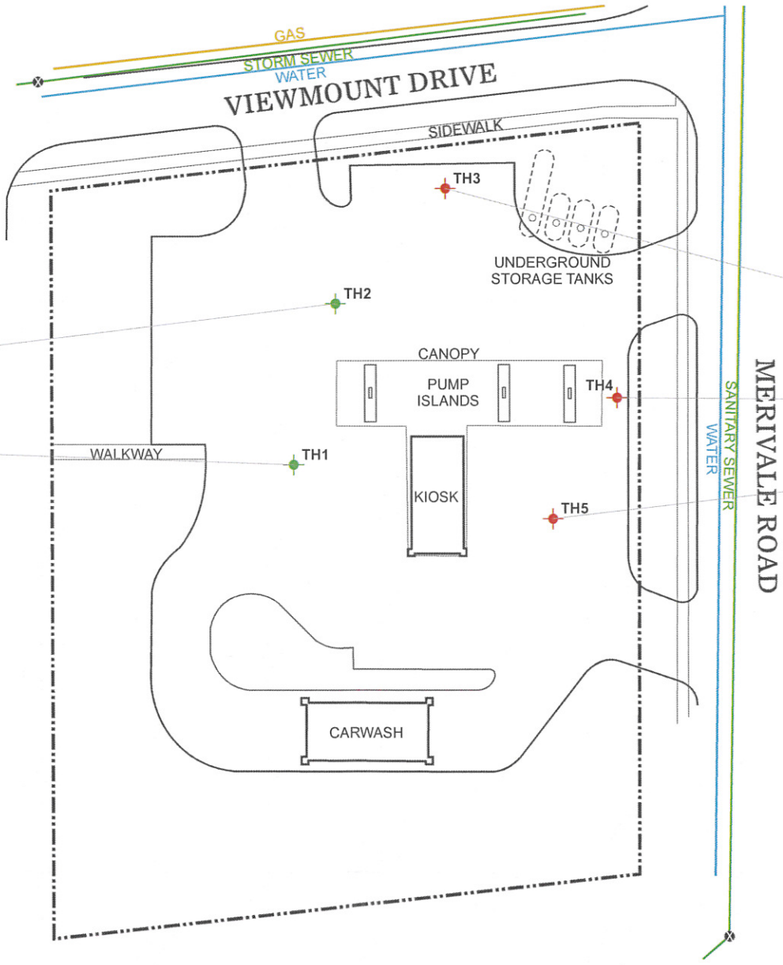
SOIL ANALYTICAL RESULTS

FIGURE 3

IMPERIAL OIL
1660 MERIVALE ROAD
OTTAWA, ONTARIO

BARENCO JOB #: 11010 | DATE: SEPTEMBER 2011

11010-SOIL RESULTS-SEP11



TH2 SCREEN INTERVAL = 3.2-4.7mbgs

DATE	B	T	E	X	H(n)	F1	F2	F3	F4	Pb
AUG31/11	0.77	ND	1.3	0.48	ND	ND	ND	ND	ND	ND

TH1 SCREEN INTERVAL = 2.6-5.6mbgs

DATE	B	T	E	X	H(n)	F1	F2	F3	F4	Pb
AUG31/11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

TH3 SCREEN INTERVAL = 3.2-4.7mbgs

DATE	B	T	E	X	H(n)	F1	F2	F3	F4	Pb
AUG31/11	27	2.4	79	150	20	**1100**	**430**	ND	130	3.8
AUG31/11(DUP)	23	2.1	69	130	17	**1100**	**380**	ND	110	3.9

TH4 SCREEN INTERVAL = 3.4-4.9mbgs

DATE	B	T	E	X	H(n)	F1	F2	F3	F4	Pb
AUG31/11	**610**	610	**3400**	**19000**	**540**	**26000**	**17000**	360	170	2.6

TH5 SCREEN INTERVAL = 3.5-5.0mbgs

DATE	B	T	E	X	H(n)	F1	F2	F3	F4	Pb
AUG31/11	**750**	140	**3000**	**13000**	**1400**	**85000**	**20000**	**690**	**620**	5.5

SCALE:

0 15 30m
(APPROXIMATE)

SOURCE:

BASED ON 'SITE PLAN' BY IMPERIAL OIL A0765 DATED JAN. 16, 1984 AND FIELD OBSERVATIONS BY BARENCO STAFF

LEGEND:

PROPERTY BOUNDARY
MANHOLE
TEST HOLE WITH MONITOR

MONITOR LOCATION WHERE GROUND WATER SAMPLE MEETS **REG153/04 (2011) TABLE 3** STANDARDS FOR ALL PARAMETERS THAT WERE ANALYSED SHOWN AS GREEN

MONITOR LOCATION WHERE GROUND WATER SAMPLE EXCEEDS **REG153/04 (2011) TABLE 3** STANDARDS FOR AT LEAST ONE PARAMETER SHOWN AS RED

EXCEEDANCES OF **REG153/04 (2011) TABLE 3** STANDARDS SHOWN IN TEXT AS **RED BOLD**

ALL ANALYTICAL RESULTS ARE IN µg/L
'ND' MEANS NOT DETECTED
'RDL' MEANS LABORATORY REPORTING DETECTION LIMIT

*STANDARDS SHOWN ARE FOR AN INDUSTRIAL/COMMERCIAL/COMMUNITY PROPERTY USE AND MEDIUM AND FINE TEXTURED SOILS IN A NON-POTABLE GROUND WATER CONDITION

PARAMETER	ABBREVIATION	153/04 (2011) TABLE 3 STANDARDS*	RDL (OR AS SHOWN)
BENZENE	B	430	0.20
TOLUENE	T	18000	0.20
ETHYLBENZENE	E	2300	0.20
XYLENES	X	4200	0.40
HEXANE (n)	H(n)	520	5.0
F1 (C_6-C_{10}) - BTEX	F1	750	25
F2 (C_{10}-C_{16})	F2	150	100
F3 (C_{16}-C_{34})	F3	500	100
F4 (C_{34}-C_{50})	F4	500	100
LEAD	Pb	25	0.5

GROUND WATER ANALYTICAL RESULTS

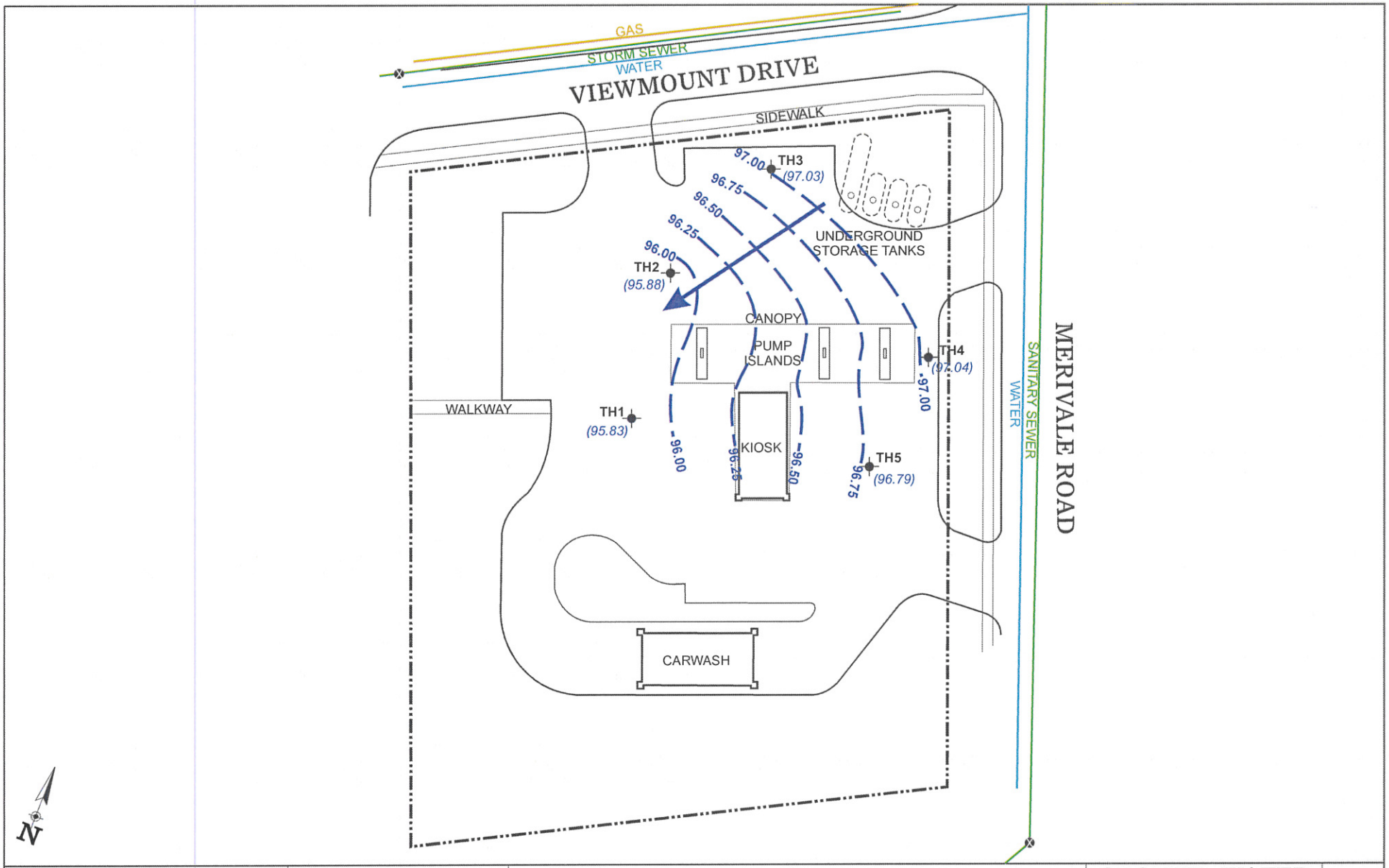
FIGURE 4

IMPERIAL OIL
1660 MERIVALE ROAD
OTTAWA, ONTARIO

BARENCO JOB #: 11010 | DATE: SEPTEMBER 2011

BARENCO	DRAWN BY	CHECKED BY
	C.D.	D.K.S.

11010-GW RESULTS-SEP11



SCALE:

0 15 30m

(APPROXIMATE)

BARENCO	DRAWN BY	CHECKED BY
	C.D.	D.K.S.

SOURCE:

BASED ON 'SITE PLAN' BY IMPERIAL OIL A0765 DATED JAN. 16, 1984 AND FIELD OBSERVATIONS BY BARENCO STAFF

NOTE:

BENCHMARK WAS THE NORTH SIDE OF A MANHOLE COVER ON THE WEST SIDE OF THE KIOSK WITH AN ASSUMED ELEVATION OF 100.0masl

LEGEND:

- PROPERTY BOUNDARY
- MANHOLE
- TEST HOLE WITH MONITOR
- 96.75 GROUND WATER ELEVATION CONTOUR (m)
- (96.79) GROUND WATER ELEVATION (m)
- GROUND WATER FLOW DIRECTION

GROUND WATER CONTOUR PLAN (AUGUST 30, 2011)

FIGURE 5

IMPERIAL OIL
1660 MERIVALE ROAD
OTTAWA, ONTARIO

BARENCO JOB #: 11010 | DATE: SEPTEMBER 2011

11010-GWC-SEP11

TABLES

Table 1

SITE ENVIRONMENTAL SETTING DATA

1660 Merivale Road, Ottawa, Ontario

NATIVE SOIL AND BEDROCK

Type:	Silt Till
Hydraulic Conductivity (cm/s):	1.55×10^{-6} to 4.59×10^{-6}
Percent Sand:	Less than 50%
Depth to Bedrock:	Between 2.7 to 3.4 metres below grade
Bedrock Type:	Limestone

GROUND WATER

Depth to Water Table:	Approximately 3 to 4 metres below grade (in bedrock)
Estimated or Measured:	Measured
Direction of Flow:	Southwest
Estimated or Measured:	Measured

POTABLE WATER AND SEWERS

Potable Water Source:	Municipal
Municipal Water Source:	Surface Water (Ottawa River)
Distance to Nearest Municipal Water Well:	Not Applicable
Distance to Nearest Private Water Well:	Not Applicable
Sanitary Sewage System:	Municipal Sewer
Storm Water System:	Municipal Sewer

OTHER UTILITIES

Power:	Hydro Ottawa
Natural Gas:	Enbridge
Telephone:	Bell Canada
Other:	City of Ottawa (street lights, water and sewer)

SURFACE WATER

Name of Nearest Water Body:	Nepean Creek
Distance from Site:	Approximately 250 metres southeast
Elevation Drop from Site:	Unknown
Direct Drainage from site:	No

Table 2

DARCY'S LAW CALCULATIONS

1660 Merivale Road, Ottawa, Ontraio

August 2011

v=ki/n

Overburden

Permeability k (m/sec) =	1.00E-07
(cm/sec) =	1.00E-05
Gradient i (m/m) =	0.050
Porosity* n =	0.35

* (from Freeze & Cherry, 1979)

Velocity v (m/sec) =	1.43E-08
(feet/sec) =	4.69E-08
(feet/day) =	4.05E-03
(feet/year) =	1.48E+00
(metres/year) =	4.51E-01

Permeability for silt till

Gradient measured across site using monitors installed onsite.

Table 3

SOIL CHEMICAL ANALYSIS - pH

1660 Merivale Road, Ottawa, Ontario

Sample	Test Hole TH1-1	Test Hole TH2-4	Test Hole TH5-4	Test Hole TH5-4 (DUP3)
Depth (m)	0.5 to 0.6	2.3 to 2.9	2.3 to 2.9	2.3 to 2.9
Soil Type	sand & gravel	Silt Till	Silt Till	Silt Till
Sample Date	23-Aug-11	23-Aug-11	23-Aug-11	23-Aug-11
Maxxam I.D.	KQ5827	KQ5829	KR0297	KR0298
pH	7.50	7.49	7.55	7.67

Analysis by Maxxam Analytics Inc.
pH range 5.0 to 9.0 for soil depths less than 1.5 m; pH range 5.0 to 11.0 for soil depths greater than 1.5 m
pH out of range are shown in **bold**.

BARENCO INC.

Table 4

REGULATION 558 LEACHATE ANALYSIS

1660 Merivale Road, Ottawa, Ontario

August 23, 2011

Sample	RDL*	REG 558 Leachate Sample	Ontario Regulation 558 Schedule 4 Leachate Criteria
Maxxam I.D.		KQ5842	
Nitrate/Nitrite	0.1	nd	1000
Free Cyanide	0.002	nd	20
Fluoride	0.1	nd	150
Arsenic	0.2	nd	2.5
Barium	0.2	1.2	100
Boron	0.1	0.1	500
Cadmium	0.05	nd	0.5
Chromium	0.1	nd	5.0
Lead	0.1	nd	5.0
Mercury	0.001	nd	0.1
Selenium	0.1	nd	1.0
Silver	0.01	nd	5.0
Uranium	0.01	nd	10
Benzene	0.02	nd	0.5
Carbon Tetrachloride	0.02	nd	0.5
Chlorobenzene	0.02	nd	8.0
Chloroform	0.02	nd	10
1,2-Dichlorobenzene	0.05	nd	20
1,4-Dichlorobenzene	0.05	nd	0.5
1,2-Dichloroethane	0.05	nd	0.5
1,1-Dichloroethene	0.02	nd	1.4
Dichloromethane	0.2	nd	5.0
Methyl Ethyl Ketone	1	nd	200
Tetrachloroethene	0.02	nd	3.0
Trichloroethene	0.02	nd	5.0
Vinyl Chloride	0.02	nd	0.2
Total PCB	0.003	nd	0.3
Benzo(a)pyrene	0.0001	nd	0.001

Analysis by Maxxam Analytics Inc.

All results in ppm (mg/L). nd means "not detected".

* Analytical reporting detection limits (RDLs) are shown except as indicated in brackets.

Other Analyses			
Ignitability (mm/min)		Not Ignitable	Not Ignitable

BARENCO INC.

11010

Table 5

SOIL CHEMICAL ANALYSIS - Petroleum Parameters

1660 Merivale Road, Ottawa, Ontario

Sample	RDL*	Test Hole TH1-5	Test Hole TH2-4	Test Hole TH3-4	Test Hole TH3-4 (DUP2)	Test Hole TH4-4	Test Hole TH5-4	Ontario Regulation 153/04 (2011) Table 3 Soil Standards **
Depth (m)		3.0 to 3.7	2.3 to 2.9	2.3 to 2.9	2.3 to 2.9	2.4 to 3.0	2.3 to 2.9	
Soil Type		silt till	silt till	silt till	silt till	silt till	silt till	
Sample Date		23-Aug-11	23-Aug-11	23-Aug-11	23-Aug-11	24-Aug-11	24-Aug-11	
Maxxam I.D.		KQ5828	KQ5829	KQ5830	KQ5831	KR0296	KR0297	
Field Vapour Reading		75 ppmv	nm	nm	nm	nm	250 ppmv	
Benzene	0.02	nd	0.02	nd	nd	nd	nd	0.4
Toluene	0.02	0.13	nd	nd	nd	nd	nd	78
Ethylbenzene	0.02	nd	0.29	nd	nd	nd	0.05	19
Xylenes	0.04	nd	nd	nd	nd	nd	nd	30
Hexane	0.5	nd	nd	nd	nd	nd	nd	88
F1 (C6 to C10 - BTEX)	10	nd	nd	nd	nd	nd	nd	65
F2 (C10 to C16)	10	nd	nd	nd	nd	nd	nd	250
F3 (C16 to C34)	10	nd	nd	nd	nd	nd	nd	2500
F4 (C34 to C50)	10	nd	nd	nd	nd	nd	nd	6600

Analysis by Maxxam Analytics Inc.

All results in ppm (ug/g) and based on dry weight basis. nd means "not detected" at reporting detection limit (RDL); nm means 'not measured'.

* Analytical RDLs are shown except as indicated in brackets

** Standards shown are for an industrial/commercial/community property use and medium and fine textured soils in a non-potable ground water condition

Exceedances of Table 3 standards are shown in **bold**

Table 5

SOIL CHEMICAL ANALYSIS - Petroleum Parameters

1660 Merivale Road, Ottawa, Ontario

Sample	RDL*	Test Hole TH5-4 (DUP3)	Field Blank	Trip Blank				Ontario Regulation 153/04 (2011) Table 3 Soil Standards **
Depth (m)		2.3 to 2.9	n/a	n/a				
Soil Type		silt till	n/a	n/a				
Sample Date		24-Aug-11	24-Aug-11	24-Aug-11				
Maxxam I.D.		KR0298	KR1554	KR1555				
Field Vapour Reading		250 ppmv	n/a	n/a				
Benzene	0.02	nd	nd	nd				0.4
Toluene	0.02	nd	nd	nd				78
Ethylbenzene	0.02	0.06	nd	nd				19
Xylenes	0.04	nd	nd	nd				30
Hexane	0.5	nd	nd	nd				88
F1 (C6 to C10 - BTEX)	10	nd	nd	nd				65
F2 (C10 to C16)	10	nd	na	na				250
F3 (C16 to C34)	10	nd	na	na				2500
F4 (C34 to C50)	10	nd	na	na				6600

Analysis by Maxxam Analytics Inc.

All results in ppm (ug/g) and based on dry weight basis. nd means "not detected" at reporting detection limit (RDL); na means 'not analysed'; n/a means 'not applicable'.

* Analytical RDLs are shown except as indicated in brackets

** Standards shown are for an industrial/commercial/community property use and medium and fine textured soils in a non-potable ground water condition

Exceedances of Table 3 standards are shown in **bold**

Table 6

SOIL CHEMICAL ANALYSIS - Polycyclic Aromatic Hydrocarbons

1660 Merivale Road, Ottawa, Ontario

Sample	RDL*	Test Hole TH1-4	Test Hole TH1-5	Test Hole TH2-3	Test Hole TH2-4	Test Hole TH3-3	Test Hole TH3-3 (DUP1)	Ontario Regulation 153/04 (2011) Table 3 Soil Standards **
Depth (m)		2.3 to 2.9	3.0 to 3.7	1.5 to 2.1	2.3 to 2.9	1.5 to 2.1	1.5 to 2.1	
Soil Type		silt till	silt till	silt till	silt till	silt till	silt till	
Sample Date		23-Aug-11	23-Aug-11	23-Aug-11	23-Aug-11	23-Aug-11	23-Aug-11	
Maxxam I.D.		KQ5753	KQ5828	KQ5754	KQ5829	KQ5755	KQ5756	
Acenaphthene	0.01	nd	nd	nd	nd	nd	nd	96
Acenaphthylene	0.005	0.007	nd	nd	nd	nd	nd	0.17
Anthracene	0.005	0.006	nd	nd	nd	nd	nd	0.74
Benzo(a)anthracene	0.01	nd	na	nd	na	nd	nd	0.96
Benzo(a)pyrene	0.005	0.012	na	nd	na	nd	nd	0.3
Benzo(b/j)fluoranthene	0.01	0.02	na	nd	na	nd	nd	0.96
Benzo(g,h,i)perylene	0.02	nd	na	nd	na	nd	nd	9.6
Benzo(k)fluoranthene	0.01	nd	na	nd	na	nd	nd	0.96
Chrysene	0.01	nd	na	nd	na	nd	nd	9.6
Dibenzo(a,h)anthracene	0.02	nd	na	nd	na	nd	nd	0.1
Fluoranthene	0.005	0.019	nd	nd	nd	nd	nd	9.6
Fluorene	0.005	nd	nd	nd	nd	nd	nd	69
Indeno(1,2,3-cd)pyrene	0.02	nd	na	nd	na	nd	nd	0.95
1-Methylnaphthalene	0.005	nd	nd	0.008	nd	nd	nd	85***
2-Methylnaphthalene	0.005	nd	nd	nd	nd	nd	nd	85***
Naphthalene	0.005	nd	nd	nd	nd	nd	nd	28
Phenanthrene	0.005	0.008	nd	nd	nd	nd	nd	16
Pyrene	0.005	0.015	na	nd	na	nd	nd	96

Analysis by Maxxam Analytics Inc.

All results in ppm (ug/g) and based on dry weight basis. nd means "not detected" at reporting detection limit (RDL); na means 'not analysed'; n/a means 'not applicable'.

* Analytical RDLs are shown except as indicated in brackets

** Standards shown are for an industrial/commercial/community property use and medium and fine textured soils in a non-potable ground water condition

*** The sum of 1- and 2-methylnaphthalene concentrations cannot exceed the soil standard if both are detected in the soil

Exceedances of Table 3 standards are shown in **bold**

SOIL CHEMICAL ANALYSIS - Polycyclic Aromatic Hydrocarbons

1660 Merivale Road, Ottawa, Ontario

Sample	RDL*	Test Hole TH3-4	Test Hole TH3-4 (DUP2)	Test Hole TH4-3	Test Hole TH4-4	Test Hole TH5-3	Test Hole TH5-4	Ontario Regulation 153/04 (2011) Table 3 Soil Standards **
Depth (m)		2.3 to 2.9	2.3 to 2.9	2.0 to 2.1	2.4 to 3.0	1.5 to 2.1	2.3 to 2.9	
Soil Type		silt till	silt till	silt till	silt till	silt till	silt till	
Sample Date		23-Aug-11	23-Aug-11	24-Aug-11	24-Aug-11	24-Aug-11	24-Aug-11	
Maxxam I.D.		KQ5830	KQ5831	KR0276	KR0296	KR0277	KR0297	
Acenaphthene	0.01	nd	nd	nd	nd	nd	nd	96
Acenaphthylene	0.005	nd	nd	nd	nd	0.025	nd	0.17
Anthracene	0.005	nd	nd	nd	nd	0.041	nd	0.74
Benzo(a)anthracene	0.01	na	na	nd	na	0.19	na	0.96
Benzo(a)pyrene	0.005	na	na	nd	na	0.20	na	0.3
Benzo(b/j)fluoranthene	0.01	na	na	nd	na	0.22	na	0.96
Benzo(g,h,i)perylene	0.02	na	na	nd	na	0.10	na	9.6
Benzo(k)fluoranthene	0.01	na	na	nd	na	0.09	na	0.96
Chrysene	0.01	na	na	nd	na	0.15	na	9.6
Dibenzo(a,h)anthracene	0.02	na	na	nd	na	0.03	na	0.1
Fluoranthene	0.005	nd	nd	nd	nd	0.34	0.011	9.6
Fluorene	0.005	nd	nd	nd	nd	0.007	nd	69
Indeno(1,2,3-cd)pyrene	0.02	na	na	nd	na	0.13	na	0.95
1-Methylnaphthalene	0.005	nd	nd	nd	nd	nd	nd	85***
2-Methylnaphthalene	0.005	nd	nd	nd	nd	nd	nd	85***
Naphthalene	0.005	nd	nd	nd	nd	nd	0.007	28
Phenanthrene	0.005	nd	nd	nd	nd	0.080	nd	16
Pyrene	0.005	na	na	nd	na	0.29	na	96

Analysis by Maxxam Analytics Inc.

All results in ppm (ug/g) and based on dry weight basis. nd means "not detected" at reporting detection limit (RDL); na means 'not analysed'; n/a means 'not applicable'.

* Analytical RDLs are shown except as indicated in brackets

** Standards shown are for an industrial/commercial/community property use and medium and fine textured soils in a non-potable ground water condition

*** The sum of 1- and 2-methylnaphthalene concentrations cannot exceed the soil standard if both are detected in the soil

Exceedances of Table 3 standards are shown in **bold**

Table 6

SOIL CHEMICAL ANALYSIS - Polycyclic Aromatic Hydrocarbons

1660 Merivale Road, Ottawa, Ontario

Sample	RDL*	Test Hole TH5-4 (DUP3)	Field Blank					Ontario Regulation 153/04 (2011) Table 3 Soil Standards **
Depth (m)		2.3 to 2.9	n/a					
Soil Type		silt till	silica sand					
Sample Date		24-Aug-11	24-Aug-11					
Maxxam I.D.		KR0298	KR1556					
Acenaphthene	0.01	nd	nd					96
Acenaphthylene	0.005	nd	nd					0.17
Anthracene	0.005	0.006	nd					0.74
Benzo(a)anthracene	0.01	na	nd					0.96
Benzo(a)pyrene	0.005	na	nd					0.3
Benzo(b/j)fluoranthene	0.01	na	nd					0.96
Benzo(g,h,i)perylene	0.02	na	nd					9.6
Benzo(k)fluoranthene	0.01	na	nd					0.96
Chrysene	0.01	na	nd					9.6
Dibenzo(a,h)anthracene	0.02	na	nd					0.1
Fluoranthene	0.005	0.054	nd					9.6
Fluorene	0.005	nd	nd					69
Indeno(1,2,3-cd)pyrene	0.02	na	nd					0.95
1-Methylnaphthalene	0.005	nd	nd					85***
2-Methylnaphthalene	0.005	nd	nd					85***
Naphthalene	0.005	0.013	nd					28
Phenanthrene	0.005	0.012	nd					16
Pyrene	0.005	na	nd					96

Analysis by Maxxam Analytics Inc.

All results in ppm (ug/g) and based on dry weight basis. nd means "not detected" at reporting detection limit (RDL); na means 'not analysed'; n/a means 'not applicable'.

* Analytical RDLs are shown except as indicated in brackets

** Standards shown are for an industrial/commercial/community property use and medium and fine textured soils in a non-potable ground water condition

*** The sum of 1- and 2-methylnaphthalene concentrations cannot exceed the soil standard if both are detected in the soil

Exceedances of Table 3 standards are shown in **bold**

Table 7

SOIL CHEMICAL ANALYSIS - Inorganic Parameters

1660 Merivale Road, Ottawa, Ontario

Sample	RDL*	Test Hole TH1-4	Test Hole TH1-5	Test Hole TH2-3	Test Hole TH2-4	Test Hole TH3-3	Test Hole TH3-3 (DUP1)	Ontario Regulation 153/04 (2011) Table 3 Soil Standards **
Depth (m)		2.3 to 2.9	3.0 to 3.7	1.5 to 2.1	2.3 to 2.9	1.5 to 2.1	1.5 to 2.1	
Soil Type		silt till	silt till	silt till	silt till	silt till	silt till	
Sample Date		23-Aug-11	23-Aug-11	23-Aug-11	23-Aug-11	23-Aug-11	23-Aug-11	
Maxxam I.D.		KQ5753	KQ5828	KQ5754	KQ5829	KQ5755	KQ5756	
Antimony	0.2	nd	na	nd	na	nd	nd	50
Arsenic	1	1	2	1	2	nd	nd	18
Barium	0.5	92	140	110	120	72	98	670
Beryllium	0.2	0.2	na	0.3	na	nd	0.2	10
Boron (total)	5	nd	na	nd	na	nd	nd	120
Cadmium	0.1	nd	na	nd	na	0.1	nd	1.9
Chromium	1	23	37	31	29	22	27	160
Cobalt	0.1	6.4	na	7.5	na	5.9	6.5	100
Copper	0.5	14	23	17	23	9.1	11	300
Lead	1	9	7	4	12	4	4	120
Molybdenum	0.5	nd	na	nd	na	nd	nd	40
Nickel	0.5	14	na	18	na	12	15	340
Selenium	0.5	nd	na	nd	na	nd	nd	5.5
Silver	0.2	nd	na	nd	na	nd	nd	50
Thallium	0.05	0.11	na	0.13	na	0.09	0.12	3.3
Uranium	0.05	0.61	na	0.48	na	0.55	0.55	33
Vanadium	5	32	na	36	na	24	27	86
Zinc	5	35	47	37	81	29	32	340

Analysis by Maxxam Analytics Inc.

All results in ppm (ug/g) and based on dry weight basis; nd means "not detected" at reporting detection limit (RDL); na means 'not analysed'.

* Analytical RDLs are shown except as indicated in brackets

** Standards shown are for an industrial/commercial/community property use and medium and fine textured soils in a non-potable ground water condition

Exceedances of Table 3 standards are shown in **bold**

Table 7

SOIL CHEMICAL ANALYSIS - Inorganic Parameters

1660 Merivale Road, Ottawa, Ontario

Sample	RDL*	Test Hole TH3-4	Test Hole TH3-4 (DUP2)	Test Hole TH4-3	Test Hole TH4-4	Test Hole TH5-3	Test Hole TH5-4	Ontario Regulation 153/04 (2011) Table 3 Soil Standards **
Depth (m)		2.3 to 2.9	2.3 to 2.9	2.0 to 2.1	2.4 to 3.0	1.5 to 2.1	2.3 to 2.9	
Soil Type		silt till	silt till	silt till	silt till	silt till	silt till	
Sample Date		23-Aug-11	23-Aug-11	24-Aug-11	24-Aug-11	24-Aug-11	24-Aug-11	
Maxxam I.D.		KQ5830	KQ5831	KR0276	KR0296	KR0277	KR0297	
Antimony	0.2	na	na	nd	na	nd	na	50
Arsenic	1	1	1	2	1	1	2	18
Barium	0.5	160	110	130	52	120	140	670
Beryllium	0.2	na	na	0.3	na	0.3	na	10
Boron (total)	5	na	na	nd	na	nd	na	120
Cadmium	0.1	na	na	nd	na	0.2	na	1.9
Chromium	1	42	26	21	11	32	34	160
Cobalt	0.1	na	na	7.4	na	9.3	na	100
Copper	0.5	19	18	17	9.6	21	23	300
Lead	1	7	8	8	4	22	7	120
Molybdenum	0.5	na	na	nd	na	nd	na	40
Nickel	0.5	na	na	16	na	20	na	340
Selenium	0.5	na	na	nd	na	nd	na	5.5
Silver	0.2	na	na	nd	na	nd	na	50
Thallium	0.05	na	na	0.12	na	0.15	na	3.3
Uranium	0.05	na	na	0.37	na	0.57	na	33
Vanadium	5	na	na	23	na	37	na	86
Zinc	5	51	42	28	15	71	49	340

Analysis by Maxxam Analytics Inc.

All results in ppm (ug/g) and based on dry weight basis; nd means "not detected" at reporting detection limit (RDL); na means 'not analysed'.

* Analytical RDLs are shown except as indicated in brackets

** Standards shown are for an industrial/commercial/community property use and medium and fine textured soils in a non-potable ground water condition

Exceedances of Table 3 standards are shown in **bold**

SOIL CHEMICAL ANALYSIS - Inorganic Parameters

1660 Merivale Road, Ottawa, Ontario

Sample	RDL*	Test Hole TH5-4 (DUP3)						Ontario Regulation 153/04 (2011) Table 3 Soil Standards **
Depth (m)		2.3 to 2.9						
Soil Type		silt till						
Sample Date		24-Aug-11						
Maxxam I.D.		KR0298						
Antimony	0.2	na						50
Arsenic	1	2						18
Barium	0.5	140						670
Beryllium	0.2	na						10
Boron (total)	5	na						120
Cadmium	0.1	na						1.9
Chromium	1	36						160
Cobalt	0.1	na						100
Copper	0.5	23						300
Lead	1	7						120
Molybdenum	0.5	na						40
Nickel	0.5	na						340
Selenium	0.5	na						5.5
Silver	0.2	na						50
Thallium	0.05	na						3.3
Uranium	0.05	na						33
Vanadium	5	na						86
Zinc	5	45						340

Analysis by Maxxam Analytics Inc.

All results in ppm (ug/g) and based on dry weight basis; nd means "not detected" at reporting detection limit (RDL); na means 'not analysed'.

* Analytical RDLs are shown except as indicated in brackets

** Standards shown are for an industrial/commercial/community property use and medium and fine textured soils in a non-potable ground water condition

Exceedances of Table 3 standards are shown in **bold**

Table 8

CORING WATER CHEMICAL ANALYSIS - Petroleum Parameters

1660 Merivale Road, Ottawa, Ontario

Sample	RDL*	Drilling Water WAT				Ontario Regulation 153/04 (2011) Table 3 Ground Water Standards**
Sample Date		24-Aug-11				
Maxxam I.D.		KR7990				
Benzene	0.20	nd				430
Toluene	0.20	nd				18000
Ethylbenzene	0.20	nd				2300
Xylenes	0.40	nd				4200
F1 (C6 to C10 - BTEX)	25	nd				750
F2 (C10 to C16)	100	nd				150
F3 (C16 to C34)	100	nd				500
F4 (C34 to C50)	100	nd				500

Analysis by Maxxam Analytics Inc.
All results in ppb (ug/L). nd means "not detected" at reporting detection limit (RDL); na means "not analysed"; n/a means "not applicable"
* Analytical RDLs are shown except as indicated in brackets
** Standards shown are for an industrial/commercial/community property use and medium and fine textured soils in a non-potable ground water condition
Exceedances of Table 3 standards are shown in **bold**

Table 9

GROUND WATER CHEMICAL ANALYSIS - VOC and Petroleum Parameters

1660 Merivale Road, Ottawa, Ontario

Sample	RDL*	Monitor TH1	Monitor TH2	Monitor TH3	Monitor TH3 (DUP1)	Ontario Regulation 153/04 (2011) Table 3 Ground Water Standards**
Sample Date		31-Aug-11	31-Aug-11	31-Aug-11	31-Aug-11	
Maxxam I.D.		KT3223	KT3224	KT3225	KT3228	
Benzene	0.20	nd	0.77	27	23	430
Dichlorodifluoromethane (FREON 12)	0.5	nd	nd	nd (10)	nd (10)	4400
Dichloroethane, - 1,1	0.1	nd	nd	nd (3)	nd (2)	3100
Dichloroethane, - 1,2	0.2	nd	nd	nd (5)	nd (4)	12
Dichloroethylene - 1,1	0.1	nd	nd	nd (3)	nd (2)	17
Dichloroethylene, cis - 1,2	0.1	nd	nd	nd (3)	nd (2)	17
Dichloroethylene, trans - 1,2	0.1	nd	nd	nd (3)	nd (2)	17
Ethylbenzene	0.20	nd	1.3	79	69	2300
Ethylene Dibromide	0.2	nd	nd	nd (5)	nd (4)	0.83
Hexane	5.0	nd	nd	20	17	520
Methyl t-Butyl Ether	0.2	9.8	0.2	nd (5)	nd (4)	1400
Tetrachloroethylene	0.1	nd	nd	nd (3)	nd (2)	17
Toluene	0.20	nd	nd	2.4	2.1	18000
Trichloroethane, - 1,1,1	0.1	nd	nd	nd (3)	nd (2)	6700
Trichloroethane, - 1,1,2	0.2	nd	nd	nd (5)	nd (4)	30
Trichloroethylene	0.1	nd	nd	nd (3)	nd (2)	17
Trichlorofluoromethane (FREON 11)	0.2	nd	nd	nd (5)	nd (4)	2500
Vinyl Chloride	0.2	nd	nd	nd (5)	nd (4)	1.7
Xylenes	0.40	nd	0.48	150	130	4200
F1 (C6 to C10 - BTEX)	25	nd	nd	**1100**	**1100**	750
F2 (C10 to C16)	100	nd	nd	**430**	**380**	150
F3 (C16 to C34)	100	nd	nd	nd	nd	500
F4 (C34 to C50)	100	nd	nd	130	110	500
Lead	0.5	nd	nd	3.8	3.9	25

Analysis by Maxxam Analytics Inc.

All results in ppb (ug/L). nd means "not detected" at reporting detection limit (RDL); na means "not analysed"; n/a means "not applicable"

* Analytical RDLs are shown except as indicated in brackets

** Standards shown are for an industrial/commercial/community property use and medium and fine textured soils in a non-potable ground water condition

Exceedances of Table 3 standards are shown in **bold**

Table 9

GROUND WATER CHEMICAL ANALYSIS - VOC and Petroleum Parameters

1660 Merivale Road, Ottawa, Ontario

Sample	RDL*	Monitor TH4	Monitor TH5	Field Blank	Trip Blank	Ontario Regulation 153/04 (2011) Table 3 Ground Water Standards**
Sample Date		31-Aug-11	31-Aug-11	31-Aug-11	31-Aug-11	
Maxxam I.D.		KT3226	KT3227	KT3365	KT3366	
Benzene	0.20	**610**	**750**	nd	nd	430
Dichlorodifluoromethane (FREON 12)	0.5	nd (1000)	nd (500)	nd	nd	4400
Dichloroethane, - 1,1	0.1	nd (200)	nd (100)	nd	nd	3100
Dichloroethane, - 1,2	0.2	nd (400)	nd (200)	nd	nd	12
Dichloroethylene - 1,1	0.1	nd (200)	nd (100)	nd	nd	17
Dichloroethylene, cis - 1,2	0.1	nd (200)	nd (100)	nd	nd	17
Dichloroethylene, trans - 1,2	0.1	nd (200)	nd (100)	nd	nd	17
Ethylbenzene	0.20	**3400**	**3000**	nd	nd	2300
Ethylene Dibromide	0.2	nd (400)	nd (200)	nd	nd	0.83
Hexane	5.0	**540**	**1400**	nd	nd	520
Methyl t-Butyl Ether	0.2	nd (400)	nd (200)	nd	nd	1400
Tetrachloroethylene	0.1	nd (200)	nd (100)	nd	nd	17
Toluene	0.20	610	140	nd	nd	18000
Trichloroethane, - 1,1,1	0.1	nd (200)	nd (100)	nd	nd	6700
Trichloroethane, - 1,1,2	0.2	nd (400)	nd (200)	nd	nd	30
Trichloroethylene	0.1	nd (200)	nd (100)	nd	nd	17
Trichlorofluoromethane (FREON 11)	0.2	nd (400)	nd (200)	nd	nd	2500
Vinyl Chloride	0.2	nd (400)	nd (200)	nd	nd	1.7
Xylenes	0.40	**19000**	**13000**	nd	nd	4200
F1 (C6 to C10 - BTEX)	25	**26000**	**85000**	nd	nd	750
F2 (C10 to C16)	100	**17000**	**20000**	nd	nd	150
F3 (C16 to C34)	100	360	**690**	nd	nd	500
F4 (C34 to C50)	100	170	**620**	nd	nd	500
Lead	0.5	2.6	5.5	nd	nd	25

Analysis by Maxxam Analytics Inc.

All results in ppb (ug/L). nd means "not detected" at reporting detection limit (RDL); na means "not analysed"; n/a means "not applicable"

* Analytical RDLs are shown except as indicated in brackets

** Standards shown are for an industrial/commercial/community property use and medium and fine textured soils in a non-potable ground water condition

Exceedances of Table 3 standards are shown in **bold**

Table 10

MONITORING AND ELEVATION DATA

1660 Merivale Road, Ottawa, Ontario

August 30, 2011

Monitor	Field Vapour Reading	Relative Top of Monitor Elevation (m)	Water Depth (m)	Product Depth (m)	Product Thickness (m)	Water Table Elevation (m)
TH 1	nd	99.91	4.08	none	none	95.83
TH 2	130 ppmv	99.98	4.10	none	none	95.88
TH 3	8% LEL	100.17	3.14	none	none	97.03
TH 4	45 ppmv	100.19	3.15	none	none	97.04
TH 5	450 ppmv	100.01	3.22	none	none	96.79

Note: Relative elevations were determined, assuming a bench mark elevation of 100.00 metres. The bench mark used was north side of a manhole cover located on the west side of the kiosk.
nd means "not detected".

BARENCO INC.

APPENDIX A

Quality Management, Control and Assurance

BARENCO

QUALITY MANAGEMENT, CONTROL AND ASSURANCE

Project Quality Management

Sampling analysis was performed using generally accepted principles and with appropriate sampling equipment. Written field and laboratory sampling procedures for soil and ground water developed by Barenco Inc. were used to ensure consistency in sample collection and preparation of samples for submission to the laboratory. The MOE document entitled *Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario*, December 1996, was used as a reference.

The staff involved in the field sampling have participated in regular, ongoing Barenco training programs and were qualified and experienced in collecting, describing, and preparing environmental samples for laboratory analysis.

Laboratory analysis was performed using generally accepted principles in accordance with the *Protocol for Analytical Methods Used in the Assessment of Properties* under Part XV.1 of the Environmental Protection Act (Protocol).

Data quality objectives for the parameters of concern were set to meet acceptable RDLs to achieve the goal of defining areas where such parameters are present at levels in excess of applicable generic standards, as defined in Ontario Regulation 153/04 as amended under the Environmental Protection Act, as amended by Regulation 511/09. This included providing written instruction to the participating analytical laboratory describing the required analyses on the Chain of Custody prepared and delivered with the samples. The laboratory has a standing contract with Imperial Oil which sets out specific data quality requirements. Any non-compliance with this contract is documented using a data quality waiver issued by the laboratory. When a data quality waiver is issued by the laboratory, it must be reviewed, signed by Barenco, and returned to the laboratory. Data quality waivers are included with all reports, along with the complete Certificate of Analysis.

Field Quality Assurance/ Quality Control

The soil and water sampling plan was prepared and executed based on professional judgment at the time of the investigation.

Field observations were made and documented in a field book in accordance with generally accepted practices and with the procedures developed and utilized by Barenco.

Barenco field sampling QA/QC protocols are tailored to the investigation and include, where appropriate:

- the collection of at least one duplicate sample per site for both soil and ground water (where three or more such samples are collected);

- where volatile organic chemical analysis is required, the collection of discrete samples directly into sample vials with teflon-lined lids with methanol preservative and immediate placement into a cooler with free ice to maintain the temperature at less than 10° C for transport to the laboratory;

- the use of dedicated equipment for ground water sampling at different monitors;

- where sampling for trace organics (organic chemicals with a criterion value of less than 1 ug/g and/or samples collected for determination of background trace organic concentrations), ensuring that neither the bare hand or latex glove comes into contact with the water as it is being placed into the laboratory sample container;

- the inclusion of one soil trip blank and field blank per site (where three or more samples are collected) for volatiles; the vials containing both the field blank and trip blank are prepared by the laboratory; the vials containing the field blank are opened in the field during the sample collection process; after sampling both the field blank and trip blank are kept in the cooler on ice and returned to the laboratory for analysis as part of the submission;

- the inclusion of one soil field blank per site for all organic chemicals in soil except hydrocarbon fractions; the jars containing the field blank are prepared in the field using silica during the sample collection process and returned to the laboratory for analysis;

- the inclusion of one water trip blank and field blank per site (where three or more samples are collected) for all chemicals in ground water except pH and electrical conductivity; the bottles containing the field blank are prepared in the field during the sample collection process and returned to the laboratory for analysis; the bottles containing the trip blank are prepared by the laboratory, kept in the cooler on ice for the duration of the sampling event, and returned to the laboratory for analysis as part of the submission.

The results of the duplicate, field blank and trip blank samples are presented along with the tabulated data in the report. Tabulated data are presented to a maximum of two significant digits.

Laboratory Quality Assurance/Quality Control

All laboratory analyses were completed by Maxxam Analytics Inc., a Standards Council of Canada (SCC) accredited laboratory, for these tests. Maxxam performed the work following formal written methods and procedures. These methods include all the minimum requirements as specified in the Protocol.

Barenco Inc. has accepted the data provided by Maxxam based on the assurance from Maxxam that as a minimum, the following requirements have been met and documentation to demonstrate compliance can be produced on request:

- the method performance criteria identified in the Protocol were met;
- sample storage requirements, pre-analysis processing techniques, and holding times for all sample types as identified in the Protocol were met following receipt and sign-off of the samples from Barenco staff;
- the results of all laboratory QC samples were within statistically determined control limits and if not, reasons were provided;
- surrogate recoveries (for organic analyses) were monitored and recorded;
- details on the precision and accuracy of the data have been recorded and retained and are available from the laboratory should they be required as a result of an MOE audit;
- the analytical data were reported without blank correction (unless the correction was clearly identified on the Certificate of Analysis);
- a Certificate of Analysis with all QA/QC sample data, including surrogate recoveries, has been received from the laboratory and is appended.

A data quality review checklist has been prepared by Barenco for each laboratory submission to ensure that data quality has been reviewed and that the effect of any anomalies has been considered. The checklist is appended with the Certificate of Analysis.

Laboratory QA/QC duplicate analyses are tabulated in the attached tables. For this phase of the project, the laboratory conducted 1 laboratory QA/QC duplicate

soil analyses of petroleum parameters, 2 laboratory QA/QC duplicate soil analyses of inorganic parameters, and 2 laboratory QA/QC duplicate ground water analyses of petroleum parameters.

Two soil field duplicate samples were collected and submitted for laboratory analysis of benzene, toluene, ethylbenzene, xylene (BTEX), hexane, and petroleum hydrocarbon fractions F1 to F4. Three soil field duplicate samples were collected and submitted for laboratory analysis of polycyclic aromatic hydrocarbons (PAHs) and select metals. The relative percent differences (RPDs) of the soil field duplicate samples are provided in this appendix. It should be noted that meaningful RPDs cannot be calculated if one or both of the analytical results are less than five times the reporting detection limits (RDLs). All of the RPDs were either within the alert limits for all of the parameters that were analysed or not calculable.

One field blank soil sample was submitted for laboratory analysis of PAH. One field blank and one trip blank soil sample were submitted for laboratory analysis of BTEX and hexane. The field blanks were prepared in the field following standard sampling protocols. The concentrations of all of the parameters that were analysed were within five times the RDLs.

One ground water field duplicate sample was collected and submitted for laboratory analysis of selected volatile organic compounds (VOC), petroleum hydrocarbon fractions F1 to F4, and lead. The relative percent differences (RPDs) of the ground water field duplicate sample are provided in this appendix. It should be noted that meaningful RPDs cannot be calculated if one or both of the analytical results are less than five times the reporting detection limits (RDLs). All of the RPDs were within the alert limits or not calculable for all of the parameters that were analyzed.

One field blank water sample was submitted for laboratory analysis of volatile organic compounds (VOC), petroleum hydrocarbon fractions F1 to F4, and lead. The field blank was prepared in the field following standard sampling protocols. The concentrations of all of the parameters that were analysed were not detectable.

One laboratory prepared trip blank water sample was submitted for laboratory analysis of volatile organic compounds (VOC), petroleum hydrocarbon fractions F1 to F4, and lead. The trip blank was prepared by the laboratory following standard protocols. The concentrations of all of the parameters that were analysed were not detectable.

Results of the field blank and trip blank analyses indicate that field sampling techniques, sample preservatives, sample bottles, sample transportation, or laboratory analysis of the samples contributed a negligible amount to the sample analytical results reported in the laboratory Certificates of Analysis, and to the interpretation of the results described in this report.

A summary of data quality waivers and other data issues is presented in the attached table.

DATA QUALITY WAIVERS AND OTHER LABORATORY DATA ISSUES

Maxxam Job #	DQW #	Matrix	Sample ID	Test Affected	Deviation	Interpretation
B1C8784	N/A	Soil	N/A	PAH	Naphthalene test is out of statistical control (4 out of 5 points are below 1 sigma); Phenanthrene test is out of statistical control (2 out of 3 points are below 2 sigma).	Possible false positive indication of an issue. Deviations should not have a material effect on conclusions presented in this report, since all other laboratory QC samples were within the acceptance criteria.
B1C8803	N/A	Soil	N/A	PAH	Naphthalene test is out of statistical control (4 out of 5 points are below 1 sigma); Phenanthrene test is out of statistical control (2 out of 3 points are below 2 sigma).	Possible false positive indication of an issue. Deviations should not have a material effect on conclusions presented in this report, since all other laboratory QC samples were within the acceptance criteria.
B1C8810	N/A	Soil	N/A	PAH	Metribuzin test is out of statistical control (4 out of 5 points are above 1 sigma).	Possible false positive indication of an issue. Deviations should not have a material effect on conclusions presented in this report, since metribuzin was not identified as a parameter of concern in this investigation.
B1C9700	N/A	Soil	N/A	PAH	Naphthalene test is out of statistical control (4 out of 5 points are below 1 sigma); Phenanthrene test is out of statistical control (2 out of 3 points are below 2 sigma).	Possible false positive indication of an issue. Deviations should not have a material effect on conclusions presented in this report, since all other laboratory QC samples were within the acceptance criteria.

DATA QUALITY WAIVERS AND OTHER LABORATORY DATA ISSUES						
Maxxam Job #	**DQW #**	**Matrix**	**Sample ID**	**Test Affected**	**Deviation**	**Interpretation**
B1C9706	N/A	Soil	TH4-4	PAH	D8-acenaphthylene extraction surrogate recovery for TH4-4 (49%) is below acceptance criteria (50 to 130%).	Possible low bias of data. Deviations should not have a material effect on conclusions presented in this report, since reported PAH parameters in these samples were less than the reporting detection limits.
			N/A	N/A	Chain of custody not completed by Maxxam (Samples have not been verified).	This issue would not affect the data represented in this report since the certificate of analysis has been signed off on.
B1D4694	N/A	Soil	N/A	Inorganics	Lead test is out of statistical control (2 out of 3 points are below 2 sigma).	Possible false positive indication of an issue. Deviations should not have a material effect on conclusions presented in this report, since all other laboratory QC samples for inorganic parameters were within the acceptance criteria.
				BTEX/F1	Toluene test is out of statistical control (2 out of 3 points are below 2 sigma).	Possible false positive indication of an issue. Deviations should not have a material effect on conclusions presented in this report, since all other laboratory QC samples for petroleum parameters were within the acceptance criteria.
B1D4730	N/A	Soil	N/A	BTEX/F1	Toluene test is out of statistical control (above 3 sigma).	Possible false positive indication of an issue. Deviations should not have a material effect on conclusions presented in this report, since all other laboratory QC samples were within the acceptance criteria.

Soil Field Duplicates - Relative Percent Differences

1660 Merivale Road, Ottawa, Ontario
August 23, 2011

Location	RDL	TH3-4	TH3-4 (DUP2)	RPD (%)	Alert Limit
Depth (m)		2.3 to 2.9	2.3 to 2.9		
Maxxam I.D.		KQ5830	KQ5831		
Benzene	0.02	nd	nd	nc	100%
Toluene	0.02	nd	nd	nc	100%
Ethylbenzene	0.02	nd	nd	nc	100%
Xylenes	0.04	nd	nd	nc	100%
Hexane	0.5	nd	nd	nc	100%
F1 (C6 to C10 - BTEX)	10	nd	nd	nc	100%
F2 (C10 to C16)	10	nd	nd	nc	100%
F3 (C16 to C34)	10	nd	nd	nc	100%
F4 (C34 to C50)	10	nd	nd	nc	100%

'nd' means not detected.
'nc' means not calculable, since one (or both) of the results are <5x RDL.
Results shown are in ug/g (ppm).
Exceedances of alert limits are shown in **bold**.

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Soil Field Duplicates - Relative Percent Differences

1660 Merivale Road, Ottawa, Ontario
August 24, 2011

Location	RDL	TH5-4	TH5-4 (DUP3)	RPD (%)	Alert Limit
Depth (m)		2.3 to 2.9	2.3 to 2.9		
Maxxam I.D.		KR0297	KR0298		
Benzene	0.02	nd	nd	nc	100%
Toluene	0.02	nd	nd	nc	100%
Ethylbenzene	0.02	0.05	0.06	nc	100%
Xylenes	0.04	nd	nd	nc	100%
Hexane	0.5	nd	nd	nc	100%
F1 (C6 to C10 - BTEX)	10	nd	nd	nc	100%
F2 (C10 to C16)	10	nd	nd	nc	100%
F3 (C16 to C34)	10	nd	nd	nc	100%
F4 (C34 to C50)	10	nd	nd	nc	100%

'nd' means not detected.
'nc' means not calculable, since one (or both) of the results are <5x RDL.
Results shown are in ug/g (ppm).
Exceedances of alert limits are shown in **bold**.

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Soil Field Duplicates - Relative Percent Differences

1660 Merivale Road, Ottawa, Ontario
August 23, 2011

Location	RDL	TH3-3	TH3-3 (DUP1)	RPD (%)	Alert Limit
Depth (m)		1.5 to 2.1	1.5 to 2.1		
Maxxam I.D.		KQ5755	KQ5756		
Acenaphthene	0.01	nd	nd	nc	100%
Acenaphthylene	0.005	nd	nd	nc	100%
Anthracene	0.005	nd	nd	nc	100%
Benzo(a)anthracene	0.01	nd	nd	nc	100%
Benzo(a)pyrene	0.005	nd	nd	nc	100%
Benzo(b/j)fluoranthene	0.005	nd	nd	nc	100%
Benzo(g,h,i)perylene	0.02	nd	nd	nc	100%
Benzo(k)fluoranthene	0.01	nd	nd	nc	100%
Chrysene	0.01	nd	nd	nc	100%
Dibenzo(a,h)anthracene	0.02	nd	nd	nc	100%
Fluoranthene	0.005	nd	nd	nc	100%
Fluorene	0.005	nd	nd	nc	100%
Indeno(1,2,3-cd)pyrene	0.02	nd	nd	nc	100%
1-Methylnaphthalene	0.005	nd	nd	nc	100%
2-Methylnaphthalene	0.005	nd	nd	nc	100%
Naphthalene	0.005	nd	nd	nc	100%
Phenanthrene	0.005	nd	nd	nc	100%
Pyrene	0.005	nd	nd	nc	100%

'nd' means not detected.
'nc' means not calculable, since one (or both) of the results are <5x RDL.
Results shown are in ug/g (ppm).
Exceedances of alert limits are shown in bold.

BARENCO INC.

Soil Field Duplicates - Relative Percent Differences

1660 Merivale Road, Ottawa, Ontario
August 23, 2011

Location	RDL	TH3-4	TH3-4 (DUP2)	RPD (%)	Alert Limit
Depth (m)		2.3 to 2.9	2.3 to 2.9		
Maxxam I.D.		KQ5830	KQ5831		
Acenaphthene	0.01	nd	nd	nc	100%
Acenaphthylene	0.005	nd	nd	nc	100%
Anthracene	0.005	nd	nd	nc	100%
Fluoranthene	0.005	nd	nd	nc	100%
Fluorene	0.005	nd	nd	nc	100%
1-Methylnaphthalene	0.005	nd	nd	nc	100%
2-Methylnaphthalene	0.005	nd	nd	nc	100%
Naphthalene	0.005	nd	nd	nc	100%
Phenanthrene	0.005	nd	nd	nc	100%

'nd' means not detected.
'nc' means not calculable, since one (or both) of the results are <5x RDL.
Results shown are in ug/g (ppm).
Exceedances of alert limits are shown in bold.

BARENCO INC.

Soil Field Duplicates - Relative Percent Differences

1660 Merivale Road, Ottawa, Ontario
August 24, 2011

Location	RDL	TH5-4	TH5-4 (DUP3)	RPD (%)	Alert Limit
Depth (m)		2.3 to 2.9	2.3 to 2.9		
Maxxam I.D.		KR0297	KR0298		
Acenaphthene	0.01	nd	nd	nc	100%
Acenaphthylene	0.005	nd	nd	nc	100%
Anthracene	0.005	nd	0.006	nc	100%
Fluoranthene	0.005	0.011	0.054	nc	100%
Fluorene	0.005	nd	nd	nc	100%
1-Methylnaphthalene	0.005	nd	nd	nc	100%
2-Methylnaphthalene	0.005	nd	nd	nc	100%
Naphthalene	0.005	0.007	0.013	nc	100%
Phenanthrene	0.005	nd	0.012	nc	100%

'nd' means not detected.
'nc' means not calculable, since one (or both) of the results are <5x RDL.
Results shown are in ug/g (ppm).
Exceedances of alert limits are shown in bold.

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Soil Field Duplicates - Relative Percent Differences

1660 Merivale Road, Ottawa, Ontario

August 23, 2011

Location	RDL	TH3-3	TH3-3 (DUP1)	RPD (%)	Alert Limit
Depth (m)		1.5 to 2.1	1.5 to 2.1		
Maxxam I.D.		KQ5755	KQ5756		
Antimony	0.2	nd	nd	nc	100%
Arsenic	1	nd	nd	nc	100%
Barium	0.5	72	98	31	100%
Beryllium	0.2	nd	0.2	nc	100%
Boron (total)	5	nd	nd	nc	100%
Cadmium	0.1	0.1	nd	nc	100%
Chromium	1	22	27	20	100%
Cobalt	0.1	5.9	6.5	10	100%
Copper	0.5	9.1	11	nc	100%
Lead	1	4	4	nc	100%
Molybdenum	0.5	nd	nd	nc	100%
Nickel	0.5	12	15	22	100%
Selenium	0.5	nd	nd	nc	100%
Silver	0.2	nd	nd	nc	100%
Thallium	0.05	0.09	0.12	nc	100%
Uranium	0.05	0.55	0.55	0	100%
Vanadium	5	24	27	nc	100%
Zinc	5	29	32	10	100%

'nd' means not detected.
'nc' means not calculable, since one (or both) of the results are <5x RDL.
Results shown are in ug/g (ppm).
Exceedances of alert limits are shown in **bold**.

BARENCO INC.

Soil Field Duplicates - Relative Percent Differences

1660 Merivale Road, Ottawa, Ontario

August 23, 2011

Location	RDL	TH3-4	TH3-4 (DUP2)	RPD (%)	Alert Limit
Depth (m)		2.3 to 2.9	2.3 to 2.9		
Maxxam I.D.		KQ5830	KQ5831		
Arsenic	1	1	1	nc	100%
Barium	0.5	160	110	37	100%
Chromium	1	42	26	47	100%
Copper	0.5	19	18	5	100%
Lead	1	7	8	13	100%
Zinc	5	51	42	19	100%

'nd' means not detected.

'nc' means not calculable, since one (or both) of the results are <5x RDL.

Results shown are in ug/g (ppm).

Exceedances of alert limits are shown in **bold**.

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Soil Field Duplicates - Relative Percent Differences

1660 Merivale Road, Ottawa, Ontario

August 24, 2011

Location	RDL	TH5-4	TH5-4 (DUP3)	RPD (%)	Alert Limit
Depth (m)		2.3 to 2.9	2.3 to 2.9		
Maxxam I.D.		KR0297	KR0298		
Arsenic	1	2	2	nc	100%
Barium	0.5	140	140	0	100%
Chromium	1	34	36	6	100%
Copper	0.5	23	23	0	100%
Lead	1	7	7	0	100%
Zinc	5	49	45	9	100%

'nd' means not detected.
'nc' means not calculable, since one (or both) of the results are <5x RDL.
Results shown are in ug/g (ppm).
Exceedances of alert limits are shown in **bold**.

BARENCO INC.

Ground Water Field Duplicates - Relative Percent Differences

1660 Merivale Road, Ottawa, Ontario
August 31, 2011

Location Maxxam I.D.	RDL	TH3 KT3225	TH3 (DUP1) KT3228	RPD (%)	Alert Limit
Benzene	0.20	27	23	16	80%
Dichlorodifluoromethane (FREON 12)	10	nd	nd	nc	80%
Dichloroethane, - 1,1	3	nd	nd (2)	nc	80%
Dichloroethane, - 1,2	5	nd	nd (4)	nc	80%
Dichloroethylene - 1,1	3	nd	nd (2)	nc	80%
Dichloroethylene, cis - 1,2	3	nd	nd (2)	nc	80%
Dichloroethylene, trans - 1,2	3	nd	nd (2)	nc	80%
Ethylbenzene	0.20	79	69	14	80%
Ethylene Dibromide	5	nd	nd (4)	nc	80%
Hexane	5.0	20	17	nc	80%
Methyl t-Butyl Ether	5	nd	nd (4)	nc	80%
Tetrachloroethylene	3	nd	nd (2)	nc	80%
Toluene	0.20	2.4	2.1	13	80%
Trichloroethane, - 1,1,1	3	nd	nd (2)	nc	80%
Trichloroethane, - 1,1,2	5	nd	nd (4)	nc	80%
Trichloroethylene	3	nd	nd (2)	nc	80%
Trichlorofluoromethane (FREON 11)	5	nd	nd (4)	nc	80%
Vinyl Chloride	5	nd	nd (4)	nc	80%
Xylenes	0.40	150	130	14	80%
F1 (C6 to C10 - BTEX)	25	1100	1100	0	80%
F2 (C10 to C16)	100	430	380	nc	80%
F3 (C16 to C34)	100	nd	nd	nc	80%
F4 (C34 to C50)	100	130	110	nc	80%
Lead	0.5	3.8	3.9	3	50%

'nd' means not detected.
'nc' means not calculable, since one (or both) of the results are <5x RDL.
Results shown are in ug/L (ppb).
Exceedances of alert limits are shown in **bold**.

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Laboratory QA/QC Duplicate Soil Chemical Analyses - Petroleum Parameters

1660 Merivale Road, Ottawa, Ontario

Sample		Test Hole TH5-4 (DUP3)						Ontario Regulation 153/04 (2011) Table 3 Soil Standards **
Depth (m)		2.3 to 2.9						
Soil Type		silt till						
Sample Date	RDL*	24-Aug-11						
Maxxam I.D.		KR0298						
Benzene	0.02	nd						0.4
Toluene	0.02	nd						78
Ethylbenzene	0.02	0.06						19
Xylenes	0.04	nd						30
Hexane	0.5	nd						88
F1 (C6 to C10 - BTEX)	10	nd						65
F2 (C10 to C16)	10	na						250
F3 (C16 to C34)	10	na						2500
F4 (C34 to C50)	10	na						6600

Analysis by Maxxam Analytics Inc.

All results in ppm (ug/g) and based on dry weight basis. nd means "not detected" at reporting detection limit (RDL); na means 'not analysed'.

* Analytical RDLs are shown except as indicated in brackets

** Standards shown are for an industrial/commercial/community property use and medium and fine textured soils in a non-potable ground water condition

Exceedances of Table 3 standards are shown in **bold**

BARENCO INC.

Laboratory QA/QC Duplicate Soil Chemical Analyses - Inorganic Parameters

1660 Merivale Road, Ottawa, Ontario

Sample	RDL*	Test Hole TH1-5	Test Hole TH5-3					Ontario Regulation 153/04 (2011) Table 3 Soil Standards **
Depth (m)		3.0 to 3.7	1.5 to 2.1					
Soil Type		silt till	silt till					
Sample Date		23-Aug-11	24-Aug-11					
Maxxam I.D.		KQ5828	KR0277					
Antimony	0.2	na	nd					50
Arsenic	1	2	1					18
Barium	0.5	130	130					670
Beryllium	0.2	na	0.3					10
Boron (total)	5	na	nd					120
Cadmium	0.1	na	0.2					1.9
Chromium	1	37	32					160
Cobalt	0.1	na	9.5					100
Copper	0.5	23	21					300
Lead	1	7	23					120
Molybdenum	0.5	na	nd					40
Nickel	0.5	na	20					340
Selenium	0.5	na	nd					5.5
Silver	0.2	na	nd					50
Thallium	0.05	na	0.16					3.3
Uranium	0.05	na	0.60					33
Vanadium	5	na	39					86
Zinc	5	45	75					340

Analysis by Maxxam Analytics Inc.

All results in ppm (ug/g) and based on dry weight basis. nd means "not detected" at reporting detection limit (RDL); na means 'not analysed'.

* Analytical RDLs are shown except as indicated in brackets

** Standards shown are for an industrial/commercial/community property use and medium and fine textured soils in a non-potable ground water condition

Exceedances of Table 3 standards are shown in **bold**

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Laboratory QA/QC Duplicate Ground Water Analyses - VOC and Petroleum Parameters

1660 Merivale Road, Ottawa, Ontario

Sample		Monitor TH1	Monitor TH2					Ontario Regulation 153/04 (2011) Table 3 Ground Water Standards**
Sample Date	RDL*	31-Aug-11	31-Aug-11					
Maxxam I.D.		KT3223	KT3224					
Benzene	0.20	na	na					430
chlorodifluoromethane (FREON 1	0.5	na	nd					4400
Dichloroethane, - 1,1	0.1	na	nd					3100
Dichloroethane, - 1,2	0.2	na	nd					12
Dichloroethylene - 1,1	0.1	na	nd					17
Dichloroethylene, cis - 1,2	0.1	na	nd					17
Dichloroethylene, trans - 1,2	0.1	na	nd					17
Ethylbenzene	0.20	na	na					2300
Ethylene Dibromide	0.2	na	nd					0.83
Hexane	5.0	na	na					520
Methyl t-Butyl Ether	0.2	na	0.2					1400
Tetrachloroethylene	0.1	na	nd					17
Toluene	0.20	na	na					18000
Trichloroethane, - 1,1,1	0.1	na	nd					6700
Trichloroethane, - 1,1,2	0.2	na	nd					30
Trichloroethylene	0.1	na	nd					17
richlorofluoromethane (FREON 1	0.2	na	nd					2500
Vinyl Chloride	0.2	na	na					1.7
Xylenes	0.40	na	na					4200
F1 (C6 to C10 - BTEX)	25	na	na					750
F2 (C10 to C16)	100	na	na					150
F3 (C16 to C34)	100	na	na					500
F4 (C34 to C50)	100	na	na					500
Lead	0.5	nd	na					25

Analysis by Maxxam Analytics Inc.

All results in ppb (ug/L). nd means "not detected" at reporting detection limit (RDL); na means "not analysed".

* Analytical RDLs are shown except as indicated in brackets

** Standards shown are for an industrial/commercial/community property use and medium and fine textured soils in a non-potable ground water condition

*** F4G (gravimetric determination) result shown because chromatograph did not return to baseline and F4G result is larger than F4 (GC determination) result

Exceedances of Table 3 standards are shown in **bold**

BARENCO INC.

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APPENDIX B

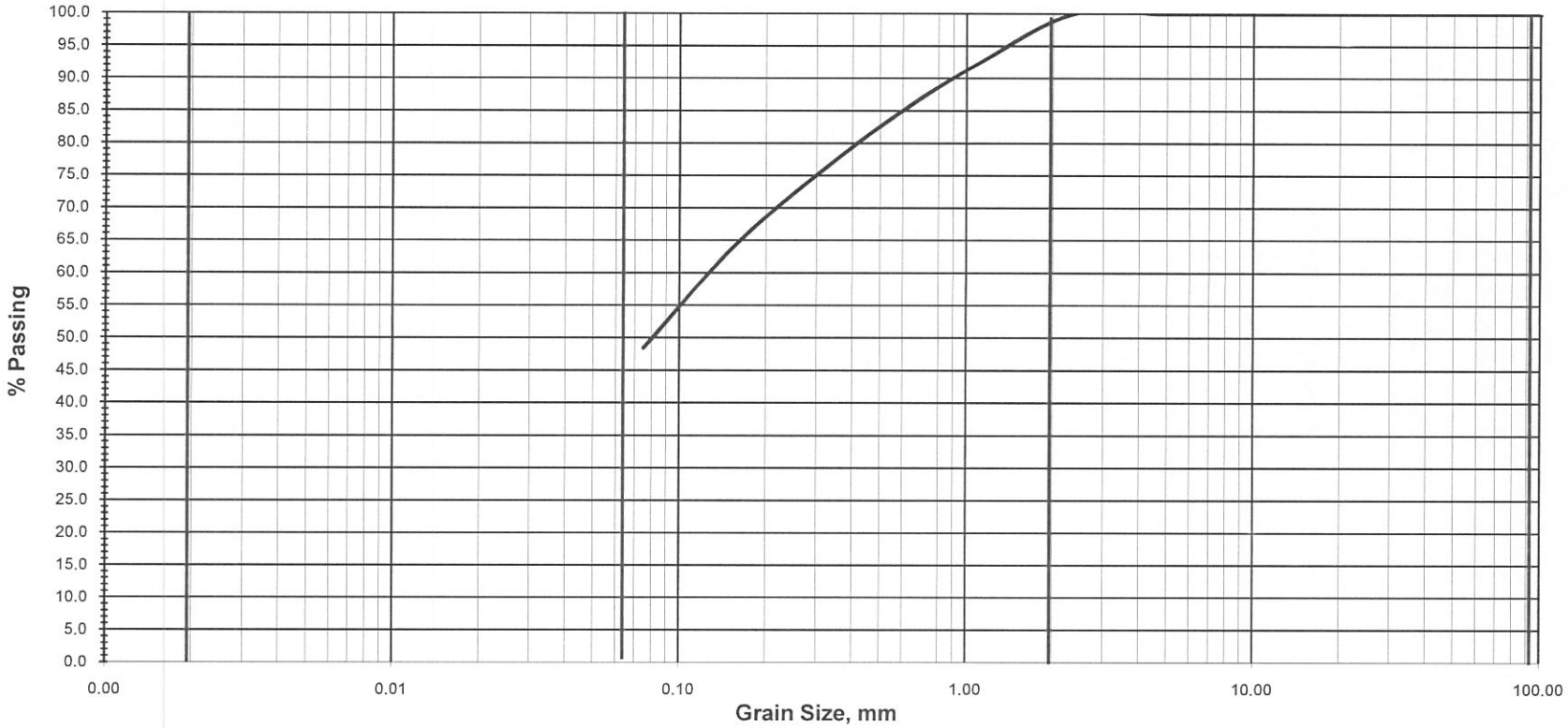
Grain Size Analyses

exp Services Inc.
100-2650 Queensview Drive
Ottawa, ON K2B 8H6

Method of Test for Sieve Analysis of Aggregate

(Note: Material Description and Curve on particles smaller than 2.36 mm, in accordance with O.Reg 153. Particles larger than 2.36 mm eremoved from Sample is 11 %)

Grain Size Distribution Curve



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	
	SILT			SAND			GRAVEL			
Modified M.I.T. Classification										

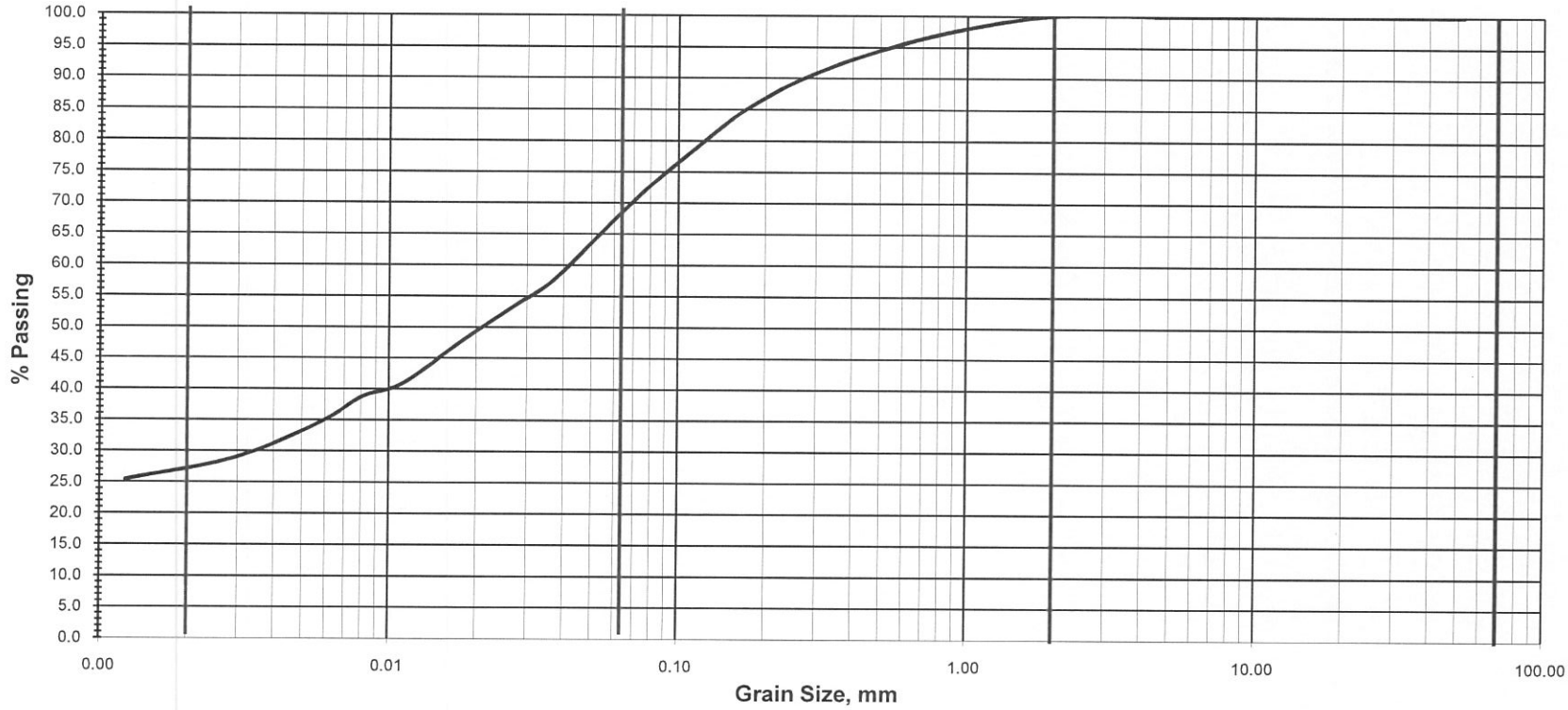
Trow Project No.:	OTT-00202456-A0	Project Name :	Geotechnical Investigation - Proposed Tank Replacement		
Client :	Barenco/GOR-IMP#011010-00	Project Location :	Imperial Oil - 1660 Merivale Road, Ottawa, Ontario		
Date Sampled :	August 24, 2011	Borehole No.: TH 3	Sample No.: SS1	Depth (m) :	2.3 to 2.9
Classification of Sample	Silty Sand Till, Some Gravel - Coarse Textured Soil (48 % of Particle smaller than 0.075 mm sieve)			Figure :	7

exp Services Inc.
100-2650 Queensview Drive
Ottawa, ON K2B 8H6

Method of Test for Particle Size Analysis of Soil

(Note: Material Description and Curve on particles smaller than 2.00 mm, in accordance with O.Reg 153. Particles larger than 2.00 mm removed from Sample is 8 %)

Grain Size Distribution Curve



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	
	SILT			SAND			GRAVEL			
Modified M.I.T. Classification										

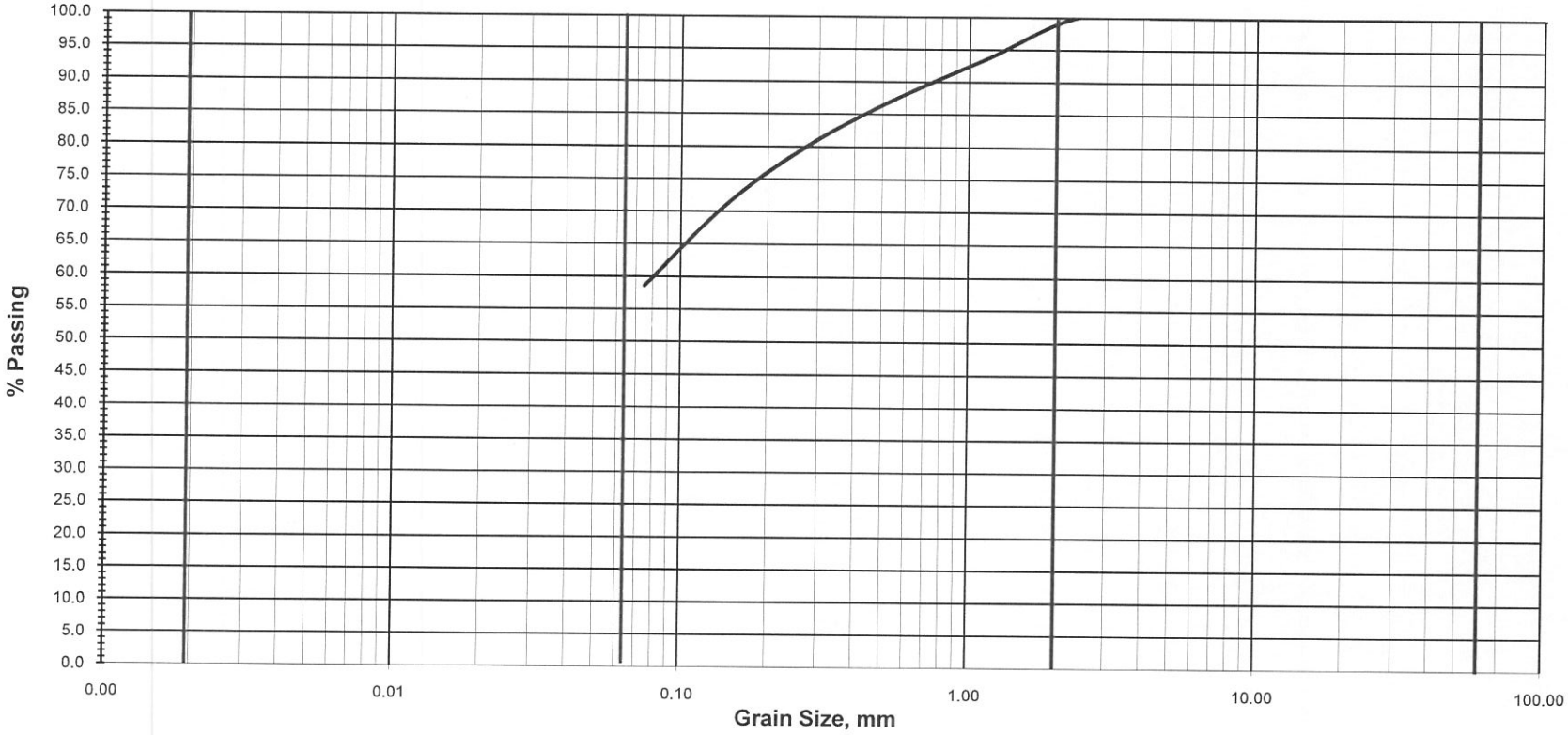
Trow Project No.:	OTT-000203546-AO	Project Name :	Geotechnical Investigation - Proposed Tank Replacement			
Client :	Barenco/GOR-IMP#011010-00	Project Location :	Imperial Oil - 1660 Merivale Road, Ottawa, Ontario			
Date Sampled :	August 24, 2011	Bore Hole No.:	TH 4	Sample No.:	SS1	Depth (m) : 1.5 to 2.1
Classification of Sample :	Clayey Silty Sand Till, Trace Gravel - Fine Textured Soils (72 % of Particle is smaller than 0.075 mm sieve)					Figure : 8

exp Services Inc.
100-2650 Queensview Drive
Ottawa, ON K2B 8H6

Method of Test for Sieve Analysis of Aggregate

(Note: Material Description and Curve on particles smaller than 2.36 mm, in accordance with O.Reg 153. Particles larger than 2.36 mm eremoved from Sample is 13 %)

Grain Size Distribution Curve



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	
	SILT			SAND			GRAVEL			
Modified M.I.T. Classification										

Trow Project No.:	OTT-00202456-A0	Project Name :	Geotechnical Investigation - Proposed Tank Replacement		
Client :	Barenco/GOR-IMP#011010-00	Project Location :	Imperial Oil - 1660 Merivale Road, Ottawa, Ontario		
Date Sampled :	August 24, 2011	Borehole No.: TH 4	Sample No.: SS2	Depth (m) :	2.3 to 2.9
Classification of Sample:	**Sand-Silt, Some Clay - Fine Textured Soil** (59 % of Particle smaller than 0.075 mm sieve)			Figure :	9

APPENDIX C

Test Hole Logs and MOE Well Record

BARENCO

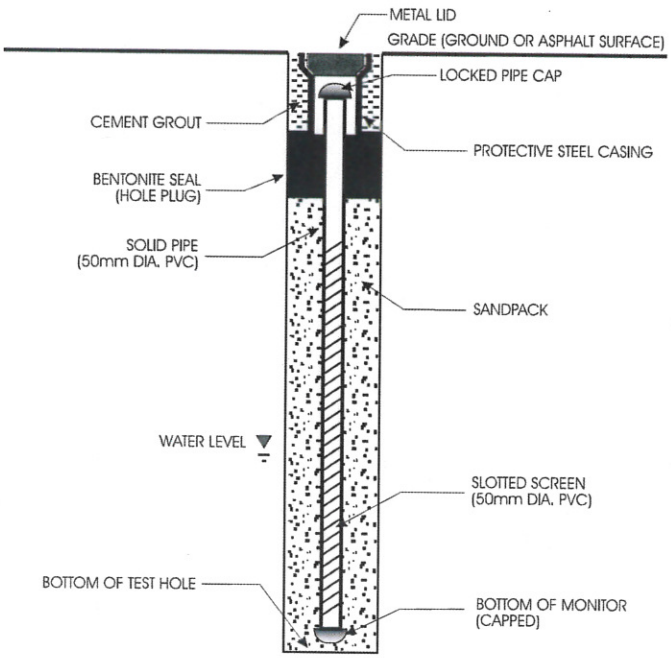
LEGEND
BARENCO TEST HOLE LOGS
(TH1 to TH5)

STANDARD INFORMATION (applies to all test holes on this project, unless otherwise noted in the legend or log)

Project Site & Number:	Operating Esso Gas Station 1660 Merivale Road, Ottawa, Ontario Job #11010
Drilling Contractor:	George Downing Estate Drilling Ltd.
Test Hole Diameter:	216 mm
Monitor Details:	Casing Type = Flushmount Screen Type = 10 slot, 50 mm PVC Riser Type = 50 mm PVC No filter sock used. (see typical monitor legend for further details)
Dedicated Sampling Equipment:	HDPE Bailers
Site Benchmark:	Elevations are related to a temporary benchmark- the north side of a manhole cover located on the west side of the kiosk with assigned elevation = 100.00 metres (Barenco 2011)
Other Notes:	The attached test hole logs are part of the complete report and are to be used only in conjunction with the report. The data contained in the attached logs require interpretation by Barenco personnel.
Attached Graphical Legends:	Refer to Soil Symbol Identification Detail Refer to Typical Monitor Construction Detail

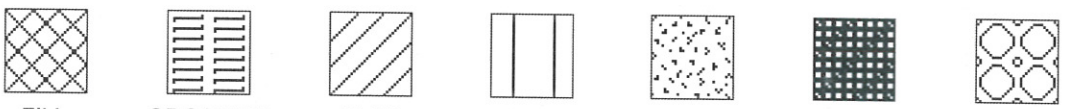
CONVENTIONS
USED IN TEST HOLE LOGS

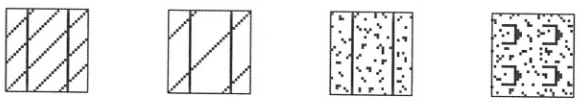
MONITOR INFORMATION



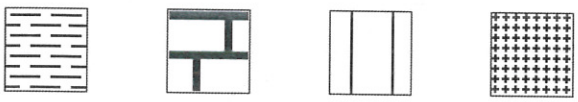
GEOLOGIC SYMBOLS

SOILS

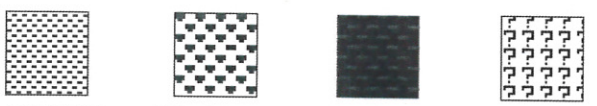




ROCK



OTHER



BARENCO

PROJECT # 11010 TECHNICIAN DD	**TEST HOLE LOG TH1** **DRILL DATE: August 23, 2011**	**SHEET#** ONE of ONE **WEATHER:**

EQUIPMENT: CME75 Truckmount
TOP OF GROUND ELEVATION: 100.01m
TOP OF MONITOR ELEVATION: 99.91m
GROUND WATER DEPTH: ▼ 4.08m. (30/08/2011)

SITE: Esso Gas Station
ADDRESS: 1660 Merivale Road, Ottawa ON
UTM: **Northing** **Easting**

SAMPLE #	TYPE	BLOW COUNT (Blows per ft)	VAPOUR READING	RECOVERY %	ANALYSIS REQUESTED
1	GR		ND		pH
2	GR		50 PPM		
3	SS	01/01/13/11	50 PPM		
4	SS	03/03/04/07	75 PPM		Metals-PAHs
5	SS	04/30/17(3")	75 PPM		BTEX-F1/F4-Metals-PAHs

DEPTH (M): 0.5, 0.6, 1.1, 1.2, 1.5, 2.1, 2.3, 2.9, 3.0, 3.7

STRATAPLOT

DESCRIPTION OF STRATIGRAPHY

DEPTH (M): 0.2, 1.1, 3.4, 5.8

ASPHALT :

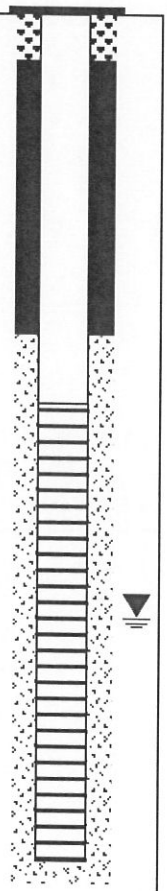
SAND+GRAVEL : Daylighted to 1.5m. Brown SAND & GRAVEL (fill), moist, no staining, no odour. Layers of asphalt found at 0.8m and 0.9m.

SILT : Brown to GreySILT TILL, sand seams from 1.1 to 2.1 m and 2.7 to 3.4m, clayey layer from 2.1 to 2.7m, moist, no staining, no odour.

LIMESTONE : Bedrock

5.79 m - END OF TEST HOLE

MONITOR



LEGEND: AU = Auger Sample SS = Split Spoon GR = Grab Sample
ND = non detect NM = not measured due to insufficient sample volume

BARENCO

PROJECT # 11010	TEST HOLE LOG TH2	SHEET# ONE of ONE
TECHNICIAN DD	DRILL DATE: August 23, 2011	WEATHER:

EQUIPMENT: CME 75 Truckmount
TOP OF GROUND ELEVATION: 100.07m
TOP OF MONITOR ELEVATION: 99.98m
GROUND WATER DEPTH: ▼ 4.10m. (30/08/2011)

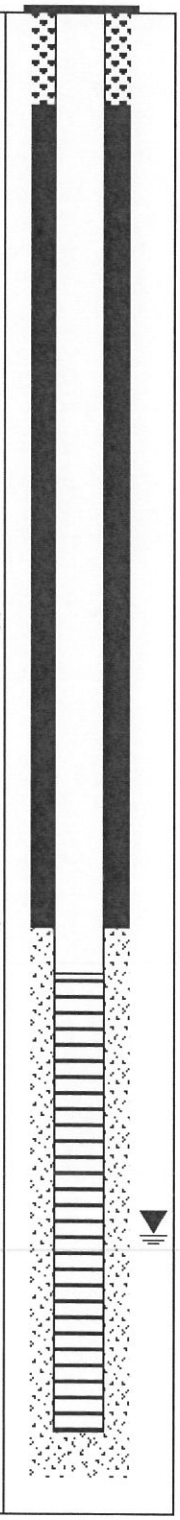
SITE: Esso Gas Station
ADDRESS: 1660 Merivale Road, Ottawa ON
UTM: Northing Easting

SAMPLE #	TYPE	BLOW COUNT (Blows per ft)	VAPOUR READING	RECOVERY %	ANALYSIS REQUESTED	DEPTH (M)
1	GR		ND			0.5
						0.6
						1
2	GR		50 PPM			1.2
						1.4
						1.5
3	SS	05/06/07/07	175 PPM	75%	Metals-PAHs	2
						2.1
						2.3
4	SS	02/01/00/00	NM	25%	BTEX-F1/F4-Metals-PAHs-pH	2.9
						3
						4

STRATAPLOT

DESCRIPTION OF STRATIGRAPHY	DEPTH (M)
ASPHALT :	0.2
SAND+GRAVEL : Daylighted to 1.5m. Brown SAND & GRAVEL, moist, no staining, no odour.	1
	1.2
SILT : Brown to Grey SILT TILL, sand seams from 1.2 to 1.8m, clayey layer from 1.8m to 2.7m, moist, black staining from 2.3 to 2.7m, petroleum odour from 1.7 to 2.7m.	2
	2.7
LIMESTONE : Bedrock	3
	4
4.88 m - END OF TEST HOLE	4.9

MONITOR



LEGEND: AU = Auger Sample SS = Split Spoon GR = Grab Sample
ND = non detect NM = not measured due to insufficient sample volume

BARENCO

PROJECT # 11010	TEST HOLE LOG TH3	SHEET# ONE of ONE
TECHNICIAN DD	DRILL DATE: August 23, 2011	WEATHER:

EQUIPMENT: CME75 Truckmount
TOP OF GROUND ELEVATION: 100.30m
TOP OF MONITOR ELEVATION: 100.17m
GROUND WATER DEPTH: ▼ 3.14m. (30/08/2011)

SITE: Esso Gas Station
ADDRESS: 1660 Merivale Road, Ottawa ON
UTM: **Northing** **Easting**

SAMPLE #	TYPE	BLOW COUNT (Blows per ft)	VAPOUR READING	RECOVERY %	ANALYSIS REQUESTED	DEPTH (M)
1	GR		ND			0.5
						0.6
2	GR		50 PPM			1.1
						1.2
3	SS	02/04/05/08	NM	75%	Metals-PAHs	1.5
						2.1
4	SS	05/07/07/24	NM		BTEX-F1/F4-Metals-PAHs	2.3
						2.9

STRATAPLOT

DESCRIPTION OF STRATIGRAPHY	DEPTH (M)
ASPHALT :	0.2
SAND+GRAVEL : Dayllighted to 1.5m. Brown SAND & GRAVEL, moist, no staining, no odour.	1.1
SILT : Brown to grey SILT TILL, some sand, trace gravel, moist, no staining, no odour.	2.9
LIMESTONE : Bedrock	4.9
4.88 m - END OF TEST HOLE	

MONITOR

LEGEND: AU = Auger Sample SS = Split Spoon GR = Grab Sample
ND = non detect NM = not measured due to insufficient sample volume

BARENCO

PROJECT # 11010	TEST HOLE LOG TH4	SHEET# ONE of ONE
TECHNICIAN DD	DRILL DATE: August 24, 2011	WEATHER:

EQUIPMENT: CME 75 Truckmount
TOP OF GROUND ELEVATION: 100.27m
TOP OF MONITOR ELEVATION: 100.19m
GROUND WATER DEPTH: ▼ 3.15m. (30/08/2011)

SITE: Esso Gas Station
ADDRESS: 1660 Merivale Road, Ottawa ON
UTM: Northing Easting

SAMPLE #	TYPE	BLOW COUNT (Blows per ft)	VAPOUR READING	RECOVERY %	ANALYSIS REQUESTED
1	GR		25 PPM		
2	GR		50 PPM		
3	GR		50 PPM		Metals-PAHs
4	SS	01/04/21/45	NM		BTEX-F1/F4-Metals-PAHs

DEPTH (M): 0.6, 0.8, 1, 1.2, 1.4, 2.0, 2.1, 2, 2.4, 3.0, 3, 4, 5, 6, 7, 8, 9

STRATAPLOT

DESCRIPTION OF STRATIGRAPHY

ASPHALT :

SAND+GRAVEL : Daylighted to 2.4m. Brown SAND & GRAVEL, moist no staining, no odour.

SILT : Brown SILT TILL, some sand, trace clay & gravel, moist, no staining, no odour.

LIMESTONE : Bedrock

5.18 m - END OF TEST HOLE

DEPTH (M): 0.2, 1, 1.2, 2, 3.0, 3, 4, 5, 5.2, 6, 7, 8, 9

MONITOR

LEGEND: AU = Auger Sample SS = Split Spoon GR = Grab Sample
ND = non detect NM = not measured due to insufficient sample volume

BARENCO

PROJECT # 11010 TECHNICIAN DD	**TEST HOLE LOG TH5** **DRILL DATE: August 24, 2011**	**SHEET#** ONE of ONE **WEATHER:**

EQUIPMENT: CME 75 Truckmount
TOP OF GROUND ELEVATION: 100.13m
TOP OF MONITOR ELEVATION: 100.01m
GROUND WATER DEPTH: ▼ 3.22m. (30/08/2011)

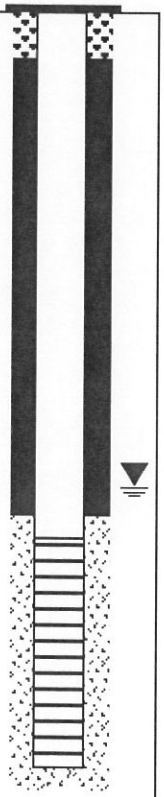
SITE: Esso Gas Station
ADDRESS: 1660 Merivale Road, Ottawa ON
UTM: **Northing** **Easting**

SAMPLE #	TYPE	BLOW COUNT (Blows per ft)	VAPOUR READING	RECOVERY %	ANALYSIS REQUESTED	DEPTH (M)
1	GR		ND			0.5 / 0.6
2	GR		50 PPM			1.1 / 1.2
3	SS	02/11/09/05	NM	25%	Metals-PAHs	1.5 / 2.1
4	SS	04/04/04/04	250 PPM	75%	BTEX-F1/F4-Metals-PAHs-pH	2.3 / 2.9
5	SS	06	NM	100%		3.0 / 3.2

STRATAPLOT

DESCRIPTION OF STRATIGRAPHY	DEPTH (M)
ASPHALT :	0.2
SAND+GRAVEL : Daylighted to 1.5m. Brown SAND & GRAVEL, moist, no staining, no odour.	1.1
SILT : Brown to grey SILT TILL, sand seams from 1.2 to 2.1 m, clayey layer from 2.1 to 3.2m, moist, no staining, no odour.	3.2
LIMESTONE : Bedrock	5.2
5.18 m - END OF TEST HOLE	

MONITOR



LEGEND: AU = Auger Sample SS = Split Spoon GR = Grab Sample
ND = non detect NM = not measured due to insufficient sample volume

BARENCO

Ontario Ministry of the Environment

Sent to Client -> Dec 7 2011

Well Tag No. for Master Well *(Place Sticker and/or Print Below)*: **A110641**

Master Well Record for Cluster Well Construction

Regulation 903 Ontario Water Resources Act

Page 1 of 2

Master Well Owner's and Land Owner's Information

First Name	Last Name	E-mail Address
Imperial Oil Limited		

Mailing Address (Street Number/Name, RR)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
90 Wynford Drive	Toronto North York	On	M3C1K5	4161441174106

Location and Construction of the Master Well in the Cluster

Address of Well Location (Street Number/Name, RR)	Township	Lot	Concession
1660 Menvale Street		10	

County/District/Municipality	City/Town/Village	Province	Postal Code
	Ottawa	Ontario	

UTM Coordinates	Zone	Easting	Northing	GPS Unit Make	Model	Mode of Operation
NAD	18	344282	5021134	Garmin	Etrex	☐ Undifferentiated ☒ Averaged ☐ Differentiated, specify

Overburden and Bedrock Materials *(see Instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (Metres) From	Depth (Metres) To
	Asphalt			0	0.2
Brown	sand	sand/gravel	fill	0.2	1.1
Brown grey	silt	sand/clay	moist	1.1	3.0
grey	Limestone		hard	3.0	5.0

Hole Details

Depth (Metres) From	Depth (Metres) To	Diameter (Centimetres)
0	5.3	20

Water Use

☐ Public ☐ Industrial ☐ Not used ☐ Other, *specify*
☐ Domestic ☐ Commercial ☐ Dewatering
☐ Livestock ☐ Municipal ☒ Monitoring
☐ Irrigation ☒ Hole ☐ Cooling & Air Conditioning

Method of Construction

☐ Cable Tool ☐ Air Percussion ☐ Digging
☐ Rotary (Conventional) ☐ Diamond ☐ Boring
☐ Rotary (Reverse) ☐ Jetting ☒ Other, *specify* HSA
☐ Rotary (Air) ☐ Driving

Status of Well

☒ Test Hole ☐ Abandoned, Insufficient Supply
☐ Replacement Well ☐ Abandoned, Poor Water Quality
☐ Dewatering Well ☐ Other, *specify*
☐ Alteration (Construction) ☐ Abandoned, other, *specify*

Construction Details

Inside Diameter (Centimetres)	Material (steel, plastic, fibreglass, concrete, galvanized)	Wall Thickness	Depth (Metres) From	Depth (Metres) To
5.1	PVC	SCHED 40	0	3.6

No Casing and Screen Used

Open Hole ☐ Yes ☒ No

Static Water Level Test

Metres

Screen

☐ Galvanized ☐ Steel ☐ Fibreglass ☐ Concrete ☒ Plastic

Outside Diameter (Centimetres)	Slot No.
5.8	10

Annular Space/Abandonment Sealing Record

Depth Set at (Metres) From	Depth Set at (Metres) To	Type of Sealant Used (Material and Type)	Volume Used (Cubic Metres)
0	0.4	Bentonite	0.01

Water Details

Water found at Depth ___ Metres ☐ Gas ☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals — Kind of Water
Water found at Depth ___ Metres ☐ Gas ☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals — Kind of Water
Water found at Depth ___ Metres ☐ Gas ☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals — Kind of Water

Disinfected ☐ Yes ☒ No If no, provide reason: Monitoring Well

Date Master Well Completed (yyyy/mm/dd): 2011/10/18

Cluster Information *(Please also fill out the additional Cluster Well Information for Well Construction for each parcel of land and cluste*

Total Wells in Cluster	Please indicate Number of Cluster We Information Log Sheets Submitted
5	1
Total Wells on this Property: unknow	

Location of Well Cluster

Detailed Map must be provided as an attachment no larger than legal size (8.5" x 14"). Sketches are not allowed.
☒ Check box to confirm detailed map is provided as per Section 11.1 (3)

Consent to release additional information concerning the cluster to the Director upon request

Signature of Technician/Contractor: [signature] Date (yyyy/mm/dd): 2011/12/07

Master Well Owner's/Land Owner's consent to use Cluster Form

Signature: Date (yyyy/mm/dd):

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
George Downing Estate Drilling	1844

Business Address (Street No./Name, number, RR)	Municipality
410 rue principale	Grenville-sur-la-Rouge

Province	Postal Code	Business E-mail Address
Qc	J0V1B0	downing@hawk.ias.net

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
8192426469	Downing, Bruce

Well Technician's Licence No.	Signature of Technician	Date Submitted (yyyy/mm/dd)
2173	[signature]	2011/12/07

Ministry Use Only

Audit No.	Well Contractor No.
M 08599	

Date Received (yyyy/mm/dd)	Date of Inspection (yyyy/mm/dd)

Remarks:

1992 (11/2006)

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Ontario Ministry of the Environment

Well Tag No. for Master Well *(Print Well Tag No.)*: **A110641**

Cluster Well Information for Cluster Well Construction

Regulation 903 Ontario Water Resources Act

Property Owner's Information

First Name	Last Name	Mailing Address (Street No./Name, RR)	Municipality
Imperial Oil Ltd		90 Wynford	North York Toronto

Province	Postal Code	E-mail Address	Telephone No. (inc. area code)
Ontario			4164474016

Cluster Well Information

Address of Well Location (Street Number/Name, RR)	Lot	Concession	Township	County/District/Municipality
1660 Merivale Road	10			

City/Town/Village	Province	Postal Code	GPS Unit Make	Model	Unit Mode of Operation
Ottawa	Ontario		Garmin	Etrex	☐ Undifferentiated ☒ Averaged ☐ Differentiated, specify:

Consent

Property Owner's Consent to use cluster form

Signature	Date *(yyyy/mm/dd)*

Consent to release additional information to the Director upon request

Signature of Technician/Contractor	Date *(yyyy/mm/dd)*
Bruce Downing	2011/12/07

Well # on Sketch	UTM Coordinates Zone	Easting	Northing	Full Depth of Hole (metres)	Hole Diameter (cm)	Method of Construction	Casing Material	Casing Length (metres)	Screen Interval (metres) From	Screen Interval (metres) To	Annular Space Sealant Used	Static Water Level (metres)	Abandonment Sealant Used	Comments	Date of Completion *(yyyy/mm/dd)*
TH 2	18	442812	5012113611	4.88	20	HAS	PVC	3.3	3.3	4.8		4.1			2011/08/23
TH 3	18	442831	5012113719	4.88	↓	↓	↓	3.3	3.3	4.8		3.1			2011/08/23
TH 4	18	442854	5012113610	5.18	↓	↓	↓	3.4	3.4	4.9		3.0			2011/08/24
TH 5	18	442857	5012113148		↓	↓	↓	3.5	3.5	5.0		3.2			2011/08/24

Well Contractor and Well Technician Information

Business Name of Well Contractor	Business Address (Street Number/Name, RR)	Municipality	Province
George Downing Estate Drilling Ltd	410 rue principale	Grenville-sur-la-Rouge	Qc

Postal Code	Business Telephone No. *(inc. area code)*	Well Contractor's Licence No.	Business E-mail Address
J0V1B0	8199241261619	1814	downing@hawk.igs.net

Name of Well Technician (First Name, Last Name)	Well Technician's Licence No.	Date Submitted *(yyyy/mm/dd)*	Signature of Technician
Bruce Downing	2173	2011/12/07	

Date 1st Well in Cluster Constructed *(yyyy/mm/dd)*	Date Last Well in Cluster Constructed *(yyyy/mm/dd)*
2011/08/23	2011/10/18

Ministry Use Only

Date Received *(yyyy/mm/dd)*	Date Inspected *(yyyy/mm/dd)*
Audit No. C 13679	Remarks

1991 (11/2006)

Ministry's Copy

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APPENDIX D

Laboratory Certificates of Analysis

Attached are copies of the original Certificates of Analysis provided by the laboratory. The data contained in these analyses is to be read only in conjunction with the report to which it is attached. For interpretation of the chemical data, see the attached text.

All samples are submitted to and reported by the laboratory using purchase order numbers and sample location codes. These are only discernible to persons familiar with the purchase order system and the location codes. For descriptions of the locations of the samples, see the attached text.

Not all data contained in the original laboratory certificate of analysis may have been referenced in the report. Samples may have been submitted as travel or field blanks or as duplicates. Some samples may be for control purposes and represent soil that is no longer on the site and is not relevant to the report.

Since the laboratory data contains scientific terms and references, only trained persons familiar with sampling and laboratory methods should attempt to interpret the raw data.

BARENCO

Maxxam

Success Through Science®

Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010
Your C.O.C. #: 59517

Attention: Daina Marie Schreiber
Barenco Inc
2561 Stouffville Rd
PO Box 295
Gormley, ON
L0H 1G0

Report Date: 2011/08/29

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B1C8784
Received: 2011/08/24, 07:30

Sample Matrix: Soil
Samples Received: 4

Analyses	Quantity	Laboratory Method	Method Primary reference
Acid Extr. Metals (aqua regia) by ICPMS	4	CAM SOP-00447	EPA 6020
Moisture	4	CAM SOP-00445	McKeague 2nd ed 1978
PAH Compounds in Soil by GC/MS (SIM)	4	CAM SOP - 00318	EPA 8270

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act.

The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following the 'Alberta Environment Draft Addenda to the CWS-PHC, Appendix 6, Validation of Alternate Methods'. Documentation is available upon request. Maxxam has made the following improvements to the CWS-PHC reference benchmark method: (i) Headspace for F1; and, (ii) Mechanical extraction for F2-F4. Note: F4G cannot be added to the C6 to C50 hydrocarbons.

Maxxam Analytics is accredited by SCC (Lab ID 97) for all specific parameters as required by GUCSO and O'Reg 153/04. Maxxam Analytics is limited in liability to the actual cost of analysis unless otherwise agreed in writing. There is no other warranty expressed or implied. Samples will be retained at Maxxam Analytics for three weeks from receipt of data or as per contract.

All data is in statistical control and has met all QC and method performance criteria unless otherwise flagged. All samples were analysed within hold time unless otherwise flagged. All soil samples for BTEX analysis were methanol extracted within 24 hours unless otherwise flagged.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010
Your C.O.C. #: 59517

Attention: Daina Marie Schreiber
Barenco Inc
2561 Stouffville Rd
PO Box 295
Gormley, ON
L0H 1G0

Report Date: 2011/08/29

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B1C8784
Received: 2011/08/24, 07:30

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Patricia Opoku
29 Aug 2011 16:07:22 -04:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

PATRICIA OPOKU, Project Manager
Email: POpoku@maxxam.ca
Phone# (905) 817-5700

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B1C8784
Report Date: 2011/08/29

Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

O'REG 153 ICPMS METALS (SOIL)

Maxxam ID		KQ5753	KQ5754	KQ5755	KQ5756		
Sampling Date		2011/08/23 09:30	2011/08/23 12:30	2011/08/23 13:00	2011/08/23 13:00		
COC Number		59517	59517	59517	59517		
	Units	**TH1-4**	**TH2-3**	**TH3-3**	**DUP1**	**RDL**	**QC Batch**
Acid Extractable Antimony (Sb)	ug/g	<0.2	<0.2	<0.2	<0.2	0.2	2595804
Acid Extractable Arsenic (As)	ug/g	1	1	<1	<1	1	2595804
Acid Extractable Barium (Ba)	ug/g	92	110	72	98	0.5	2595804
Acid Extractable Beryllium (Be)	ug/g	0.2	0.3	<0.2	0.2	0.2	2595804
Acid Extractable Boron (B)	ug/g	<5	<5	<5	<5	5	2595804
Acid Extractable Cadmium (Cd)	ug/g	<0.1	<0.1	0.1	<0.1	0.1	2595804
Acid Extractable Chromium (Cr)	ug/g	23	31	22	27	1	2595804
Acid Extractable Cobalt (Co)	ug/g	6.4	7.5	5.9	6.5	0.1	2595804
Acid Extractable Copper (Cu)	ug/g	14	17	9.1	11	0.5	2595804
Acid Extractable Lead (Pb)	ug/g	9	4	4	4	1	2595804
Acid Extractable Molybdenum (Mo)	ug/g	<0.5	<0.5	<0.5	<0.5	0.5	2595804
Acid Extractable Nickel (Ni)	ug/g	14	18	12	15	0.5	2595804
Acid Extractable Selenium (Se)	ug/g	<0.5	<0.5	<0.5	<0.5	0.5	2595804
Acid Extractable Silver (Ag)	ug/g	<0.2	<0.2	<0.2	<0.2	0.2	2595804
Acid Extractable Thallium (Tl)	ug/g	0.11	0.13	0.09	0.12	0.05	2595804
Acid Extractable Uranium (U)	ug/g	0.61	0.48	0.55	0.55	0.05	2595804
Acid Extractable Vanadium (V)	ug/g	32	36	24	27	5	2595804
Acid Extractable Zinc (Zn)	ug/g	35	37	29	32	5	2595804

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B1C8784
Report Date: 2011/08/29

Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

O'REG 153 PAHS (SOIL)

Maxxam ID		KQ5753	KQ5754	KQ5755	KQ5755		
Sampling Date		2011/08/23 09:30	2011/08/23 12:30	2011/08/23 13:00	2011/08/23 13:00		
COC Number		59517	59517	59517	59517		
	Units	**TH1-4**	**TH2-3**	**TH3-3**	**TH3-3 Lab-Dup**	**RDL**	**QC Batch**
Moisture	%	16	19	16	17	1	2595652
Acenaphthene	ug/g	<0.01	<0.01	<0.01		0.01	2593301
Acenaphthylene	ug/g	0.007	<0.005	<0.005		0.005	2593301
Anthracene	ug/g	0.006	<0.005	<0.005		0.005	2593301
Benzo(a)anthracene	ug/g	<0.01	<0.01	<0.01		0.01	2593301
Benzo(a)pyrene	ug/g	0.012	<0.005	<0.005		0.005	2593301
Benzo(b/j)fluoranthene	ug/g	0.02	<0.01	<0.01		0.01	2593301
Benzo(g,h,i)perylene	ug/g	<0.02	<0.02	<0.02		0.02	2593301
Benzo(k)fluoranthene	ug/g	<0.01	<0.01	<0.01		0.01	2593301
Chrysene	ug/g	<0.01	<0.01	<0.01		0.01	2593301
Dibenz(a,h)anthracene	ug/g	<0.02	<0.02	<0.02		0.02	2593301
Fluoranthene	ug/g	0.019	<0.005	<0.005		0.005	2593301
Fluorene	ug/g	<0.005	<0.005	<0.005		0.005	2593301
Indeno(1,2,3-cd)pyrene	ug/g	<0.02	<0.02	<0.02		0.02	2593301
1-Methylnaphthalene	ug/g	<0.005	0.008	<0.005		0.005	2593301
2-Methylnaphthalene	ug/g	<0.005	<0.005	<0.005		0.005	2593301
Naphthalene	ug/g	<0.005	<0.005	<0.005		0.005	2593301
Phenanthrene	ug/g	0.008	<0.005	<0.005		0.005	2593301
Pyrene	ug/g	0.015	<0.005	<0.005		0.005	2593301
Extraction Surrogate Recovery (%)							
D10-Anthracene	%	86	85	84			2593301
D14-Terphenyl (FS)	%	87	88	86			2593301
D8-Acenaphthylene	%	73	87	82			2593301

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
QC Batch = Quality Control Batch

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Maxxam Job #: B1C8784
Report Date: 2011/08/29

Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

O'REG 153 PAHS (SOIL)

Maxxam ID		KQ5756		
Sampling Date		2011/08/23 13:00		
COC Number		59517		
	Units	**DUP1**	**RDL**	**QC Batch**
Moisture	%	14	1	2595652
Acenaphthene	ug/g	<0.01	0.01	2593301
Acenaphthylene	ug/g	<0.005	0.005	2593301
Anthracene	ug/g	<0.005	0.005	2593301
Benzo(a)anthracene	ug/g	<0.01	0.01	2593301
Benzo(a)pyrene	ug/g	<0.005	0.005	2593301
Benzo(b/j)fluoranthene	ug/g	<0.01	0.01	2593301
Benzo(g,h,i)perylene	ug/g	<0.02	0.02	2593301
Benzo(k)fluoranthene	ug/g	<0.01	0.01	2593301
Chrysene	ug/g	<0.01	0.01	2593301
Dibenz(a,h)anthracene	ug/g	<0.02	0.02	2593301
Fluoranthene	ug/g	<0.005	0.005	2593301
Fluorene	ug/g	<0.005	0.005	2593301
Indeno(1,2,3-cd)pyrene	ug/g	<0.02	0.02	2593301
1-Methylnaphthalene	ug/g	<0.005	0.005	2593301
2-Methylnaphthalene	ug/g	<0.005	0.005	2593301
Naphthalene	ug/g	<0.005	0.005	2593301
Phenanthrene	ug/g	<0.005	0.005	2593301
Pyrene	ug/g	<0.005	0.005	2593301
Extraction Surrogate Recovery (%)				
D10-Anthracene	%	84		2593301
D14-Terphenyl (FS)	%	86		2593301
D8-Acenaphthylene	%	83		2593301

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B1C8784
Report Date: 2011/08/29

Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Test Summary

Maxxam ID KQ5753 **Collected** 2011/08/23
Sample ID TH1-4 **Shipped** 2011/08/23
Matrix Soil **Received** 2011/08/24

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Acid Extr. Metals (aqua regia) by ICPMS	ICP/MS	2595804	2011/08/26	2011/08/26	VIVIANA CANZONIERI
Moisture	BAL	2595652	N/A	2011/08/26	LAKHVIR KALER
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	2593301	2011/08/24	2011/08/25	DARRYL TILLER

Maxxam ID KQ5754 **Collected** 2011/08/23
Sample ID TH2-3 **Shipped** 2011/08/23
Matrix Soil **Received** 2011/08/24

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Acid Extr. Metals (aqua regia) by ICPMS	ICP/MS	2595804	2011/08/26	2011/08/26	VIVIANA CANZONIERI
Moisture	BAL	2595652	N/A	2011/08/26	LAKHVIR KALER
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	2593301	2011/08/24	2011/08/25	DARRYL TILLER

Maxxam ID KQ5755 **Collected** 2011/08/23
Sample ID TH3-3 **Shipped** 2011/08/23
Matrix Soil **Received** 2011/08/24

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Acid Extr. Metals (aqua regia) by ICPMS	ICP/MS	2595804	2011/08/26	2011/08/26	VIVIANA CANZONIERI
Moisture	BAL	2595652	N/A	2011/08/26	LAKHVIR KALER
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	2593301	2011/08/24	2011/08/25	DARRYL TILLER

Maxxam ID KQ5755 Dup **Collected** 2011/08/23
Sample ID TH3-3 **Shipped** 2011/08/23
Matrix Soil **Received** 2011/08/24

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Moisture	BAL	2595652	N/A	2011/08/26	LAKHVIR KALER

Maxxam ID KQ5756 **Collected** 2011/08/23
Sample ID DUP1 **Shipped** 2011/08/23
Matrix Soil **Received** 2011/08/24

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Acid Extr. Metals (aqua regia) by ICPMS	ICP/MS	2595804	2011/08/26	2011/08/26	VIVIANA CANZONIERI
Moisture	BAL	2595652	N/A	2011/08/26	LAKHVIR KALER
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	2593301	2011/08/24	2011/08/25	DARRYL TILLER

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Maxxam Job #: B1C8784
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Barenco Inc
Task Order#: 11068757
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Project #: 11010

Package 1	2.3°C

Each temperature is the average of up to three cooler temperatures taken at receipt

GENERAL COMMENTS

SQC trend rule failure for naphthalene, Batch 2593301. 4 of 5 consecutive points greater than 1SD below the mean. SQC trend rule failure for phenanthrene, Batch 2593301. 2 of 3 consecutive points greater than 2SD below the mean.

Results relate only to the items tested.

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Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Quality Assurance Report

Maxxam Job Number: B1C8784

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2593301 DTI	Method Blank	D10-Anthracene	2011/08/25		76	%	50 - 130
		D14-Terphenyl (FS)	2011/08/25		81	%	50 - 130
		D8-Acenaphthylene	2011/08/25		76	%	50 - 130
		Acenaphthene	2011/08/25	<0.01		ug/g	
		Acenaphthylene	2011/08/25	<0.005		ug/g	
		Anthracene	2011/08/25	<0.005		ug/g	
		Benzo(a)anthracene	2011/08/25	<0.01		ug/g	
		Benzo(a)pyrene	2011/08/25	<0.005		ug/g	
		Benzo(b/j)fluoranthene	2011/08/25	<0.01		ug/g	
		Benzo(g,h,i)perylene	2011/08/25	<0.02		ug/g	
		Benzo(k)fluoranthene	2011/08/25	<0.01		ug/g	
		Chrysene	2011/08/25	<0.01		ug/g	
		Dibenz(a,h)anthracene	2011/08/25	<0.02		ug/g	
		Fluoranthene	2011/08/25	<0.005		ug/g	
		Fluorene	2011/08/25	<0.005		ug/g	
		Indeno(1,2,3-cd)pyrene	2011/08/25	<0.02		ug/g	
		1-Methylnaphthalene	2011/08/25	<0.005		ug/g	
		2-Methylnaphthalene	2011/08/25	<0.005		ug/g	
		Naphthalene	2011/08/25	<0.005		ug/g	
		Phenanthrene	2011/08/25	<0.005		ug/g	
		Pyrene	2011/08/25	<0.005		ug/g	
2595804 VIV	Method Blank	Acid Extractable Antimony (Sb)	2011/08/26	<0.2		ug/g	
		Acid Extractable Arsenic (As)	2011/08/26	<1		ug/g	
		Acid Extractable Barium (Ba)	2011/08/26	<0.5		ug/g	
		Acid Extractable Beryllium (Be)	2011/08/26	<0.2		ug/g	
		Acid Extractable Boron (B)	2011/08/26	<5		ug/g	
		Acid Extractable Cadmium (Cd)	2011/08/26	<0.1		ug/g	
		Acid Extractable Chromium (Cr)	2011/08/26	<1		ug/g	
		Acid Extractable Cobalt (Co)	2011/08/26	<0.1		ug/g	
		Acid Extractable Copper (Cu)	2011/08/26	<0.5		ug/g	
		Acid Extractable Lead (Pb)	2011/08/26	<1		ug/g	
		Acid Extractable Molybdenum (Mo)	2011/08/26	<0.5		ug/g	
		Acid Extractable Nickel (Ni)	2011/08/26	<0.5		ug/g	
		Acid Extractable Selenium (Se)	2011/08/26	<0.5		ug/g	
		Acid Extractable Silver (Ag)	2011/08/26	<0.2		ug/g	
		Acid Extractable Thallium (Tl)	2011/08/26	<0.05		ug/g	
		Acid Extractable Uranium (U)	2011/08/26	<0.05		ug/g	
		Acid Extractable Vanadium (V)	2011/08/26	<5		ug/g	
		Acid Extractable Zinc (Zn)	2011/08/26	<5		ug/g	
2595652 BOP	RPD [KQ5755-01]	Moisture	2011/08/26	3.7		%	20
2593301 DTI	LCS	D10-Anthracene	2011/08/25		72	%	50 - 130
		D14-Terphenyl (FS)	2011/08/25		82	%	50 - 130
		D8-Acenaphthylene	2011/08/25		72	%	50 - 130
		Acenaphthene	2011/08/25		80	%	50 - 130
		Acenaphthylene	2011/08/25		78	%	50 - 130
		Anthracene	2011/08/25		78	%	50 - 130
		Benzo(a)anthracene	2011/08/25		91	%	50 - 130
		Benzo(a)pyrene	2011/08/25		109	%	50 - 130
		Benzo(b/j)fluoranthene	2011/08/25		99	%	50 - 130
		Benzo(g,h,i)perylene	2011/08/25		79	%	50 - 130
		Benzo(k)fluoranthene	2011/08/25		102	%	50 - 130
		Chrysene	2011/08/25		89	%	50 - 130
		Dibenz(a,h)anthracene	2011/08/25		80	%	50 - 130
		Fluoranthene	2011/08/25		88	%	50 - 130
		Fluorene	2011/08/25		79	%	50 - 130

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Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Quality Assurance Report (Continued)

Maxxam Job Number: B1C8784

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2593301 DTI	LCS	Indeno(1,2,3-cd)pyrene	2011/08/25		82	%	50 - 130
		1-Methylnaphthalene	2011/08/25		77	%	50 - 130
		2-Methylnaphthalene	2011/08/25		74	%	50 - 130
		Naphthalene	2011/08/25		82	%	50 - 130
		Phenanthrene	2011/08/25		80	%	50 - 130
		Pyrene	2011/08/25		91	%	50 - 130
2595804 VIV	SRM	Acid Extractable Antimony (Sb)	2011/08/26		96	%	75 - 125
		Acid Extractable Arsenic (As)	2011/08/26		95	%	75 - 125
		Acid Extractable Barium (Ba)	2011/08/26		94	%	75 - 125
		Acid Extractable Beryllium (Be)	2011/08/26		92	%	75 - 125
		Acid Extractable Boron (B)	2011/08/26		95	%	75 - 125
		Acid Extractable Cadmium (Cd)	2011/08/26		96	%	75 - 125
		Acid Extractable Chromium (Cr)	2011/08/26		92	%	75 - 125
		Acid Extractable Cobalt (Co)	2011/08/26		92	%	75 - 125
		Acid Extractable Copper (Cu)	2011/08/26		95	%	75 - 125
		Acid Extractable Lead (Pb)	2011/08/26		101	%	75 - 125
		Acid Extractable Molybdenum (Mo)	2011/08/26		96	%	75 - 125
		Acid Extractable Nickel (Ni)	2011/08/26		93	%	75 - 125
		Acid Extractable Selenium (Se)	2011/08/26		94	%	75 - 125
		Acid Extractable Silver (Ag)	2011/08/26		94	%	75 - 125
		Acid Extractable Thallium (Tl)	2011/08/26		101	%	75 - 125
		Acid Extractable Uranium (U)	2011/08/26		109	%	75 - 125
		Acid Extractable Vanadium (V)	2011/08/26		90	%	75 - 125
		Acid Extractable Zinc (Zn)	2011/08/26		97	%	75 - 125

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
SRM: A blank matrix sample to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
LCS: A blank matrix sample to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

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Validation Signature Page

Maxxam Job #: B1C8784

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

BRAD NEWMAN, Scientific Specialist

FLOYD MAYEDE, Senior Analyst

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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EXXONMÔBIL/IMPERIAL OIL - MAXXAM CHAIN-OF-CUSTODY RECORD

C of C # 59517

INVOICE INFORMATION

Company Name: ☒ Imperial Oil ☐ ExxonMobil
Contact Name: TARIK MADI
Address:
Email:
Ph:
Sampler Name (Print): DARREN DOHERTY

REPORT INFORMATION

Company Name: BARENCO Inc.
Contact Name: DAINA MARIE SCHREIBER
Address: 2561 Stouffville Rd Gormley, ON L0H 1G0
Email: dschreiber@barenco.ca
Ph: 905-887-6661
Consultant Project #: 11010

	FIELD SAMPLE ID	MATRIX: GROUND WATER	MATRIX: SURFACE WATER	MATRIX: SOIL	MATRIX: OTHER	# CONTAINERS	SAMPLING: DATE (YYYY/MM/DD)	SAMPLING: TIME	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	BTEX	F1	F2-F4	OIL & GREASE - TOTAL / MINERAL (SPECIFY)	VOC	PCB	PAH	LEAD	ICP METALS	ICPMS METALS (REG 153)	MERCURY	SAR / CRVI (SPECIFY)	BORON HOT WATER SOLUBLE	IGNITABILITY	REG 558 - INORGANICS	REG 558 - PCB LEACHATE	REG 558 - BENZENE / VOLATILES (SPECIFY)	REG 558 - B(a)P / SEMI-VOLATILES (SPECIFY)	* Limited Sample.						
1	TH1-4			X		2	11/08/23	0930									X			X															
2	TH2-3			X		2		1230									X			X															
3	TH3-3			X		1		1300									X			X									X						
4	DUP1			X		1		1300									X			X									X						
5																																			
6																																			
7																																			
8																																			
9																																			

IOL SITE LOCATION: 1660 Merivale Road, Ottawa
IOL SITE # (if applicable): NA
IOL PROJECT # (if applicable): P12894
MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM: 11068757

REGULATORY CRITERIA / DETECTION LIMITS:
☒ Reg 153 Table 2 ☐ 2004 ☒ 2011 ☐ RSC
(please indicate which Reg. version and if RSC required)
☐ PWQO ☐ ODWS
☐ Other

SPECIAL INSTRUCTIONS
- Voids may occur due to nature of material

ICE - YES

JARS USED AND NOT SUBMITTED: 0

TURNAROUND TIME
Standard (5 days) ☐
Rush (3 days) ☒
(2 days) ☐
(1 day) ☐
(same day) ☐
Date Required

COOLER ID	CUSTODY SEAL	YES	NO	COOLER ID	CUSTODY SEAL	YES	NO	COOLER ID	CUSTODY SEAL	YES	NO
11010-1	PRESENT	✓			PRESENT				PRESENT		
TEMP 1/3/3°C	INTACT	✓		TEMP	INTACT			TEMP	INTACT		
1 2 3				1 2 3				1 2 3			

RELINQUISHED BY (SIGN & PRINT)	DATE (YYYY/MM/DD)	TIME	RECEIVED BY (SIGN & PRINT)	DATE (YYYY/MM/DD)	TIME
1. DARREN DOHERTY	2011/08/23	1700	1. ASAD BHAIDV	2011/08/24	07:30
2.			2.		
3.			3.		

LAB USE ONLY
MAXXAM JOB # B1C8784
SAMPLES
LABELED BY: T-L
VERIFIED BY: ABH

COC -1612 (01/10) IOL - ON
White: Maxxam Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Barenco Inc.

Sampling Date: August 23, 2011

Location: 1660 Merivale Road, Ottawa

Laboratory : Maxxam Analytics Inc.

Consultant Project Number: 11010

Sample Submission Number: B1C8784

Are All Laboratory QC Samples Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery			X	All laboratory QC samples are within the acceptance criteria.
Extraction Surrogate Recovery	X			
Method Blank Concentration	X			
Matrix Duplicate RPD			X	
Matrix Spike Recovery			X	
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	All field QC samples are within alert limits.
Trip Blank Concentration			X	
Field Duplicate RPD	X			

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	No
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 48 hours (Yes/No)?:	not required
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Was a Data Quality Waiver (DQW) issued (Yes/No)?: No

Date Issued: NA

Date of Response: NA

Is data considered to be reliable (Yes/No)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Daina Marie Schreiber

Data Reviewed by (Signature): 

Date: August 31, 2011

Maxxam

Success Through Science®

Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010
Your C.O.C. #: 59534

Attention: Daina Marie Schreiber
Barenco Inc
2561 Stouffville Rd
PO Box 295
Gormley, ON
L0H 1G0

Report Date: 2011/08/29

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B1C8803
Received: 2011/08/24, 07:30

Sample Matrix: Soil
Samples Received: 5

Analyses	Quantity	Laboratory Method	Method Primary reference
Petroleum Hydro. CCME F1 & BTEX in Soil	4	CAM SOP-00315	CCME CWS
Petroleum Hydrocarbons F2-F4 in Soil	4	CAM SOP-00316	CCME CWS
Acid Extr. Metals (aqua regia) by ICPMS	4	CAM SOP-00447	EPA 6020
Moisture	4	CAM SOP-00445	McKeague 2nd ed 1978
PAH Compounds in Soil by GC/MS (SIM)	4	CAM SOP - 00318	EPA 8270
pH CaCl2 EXTRACT	2	CAM SOP-00413	SM 4500 H

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act.

The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following the 'Alberta Environment Draft Addenda to the CWS-PHC, Appendix 6, Validation of Alternate Methods'. Documentation is available upon request. Maxxam has made the following improvements to the CWS-PHC reference benchmark method: (i) Headspace for F1; and, (ii) Mechanical extraction for F2-F4. Note: F4G cannot be added to the C6 to C50 hydrocarbons.

Maxxam Analytics is accredited by SCC (Lab ID 97) for all specific parameters as required by GUCSO and O'Reg 153/04. Maxxam Analytics is limited in liability to the actual cost of analysis unless otherwise agreed in writing. There is no other warranty expressed or implied. Samples will be retained at Maxxam Analytics for three weeks from receipt of data or as per contract.

All data is in statistical control and has met all QC and method performance criteria unless otherwise flagged. All samples were analysed within hold time unless otherwise flagged. All soil samples for BTEX analysis were methanol extracted within 24 hours unless otherwise flagged.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010
Your C.O.C. #: 59534

Attention: Daina Marie Schreiber
Barenco Inc
2561 Stouffville Rd
PO Box 295
Gormley, ON
L0H 1G0

Report Date: 2011/08/29

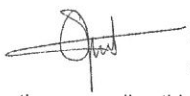
CERTIFICATE OF ANALYSIS

-2-

MAXXAM JOB #: B1C8803
Received: 2011/08/24, 07:30

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key



Patricia Opoku
29 Aug 2011 16:21:27 -04:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

PATRICIA OPOKU, Project Manager
Email: POpoku@maxxam.ca
Phone# (905) 817-5700

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B1C8803
Report Date: 2011/08/29

Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

O'REG 153 ICPMS METALS (SOIL)

Maxxam ID		KQ5828	KQ5828	KQ5829	KQ5830		
Sampling Date		2011/08/23 09:00	2011/08/23 09:00	2011/08/23 12:00	2011/08/23 14:00		
COC Number		59534	59534	59534	59534		
	Units	**TH1-5**	**TH1-5 Lab-Dup**	**TH2-4**	**TH3-4**	**RDL**	**QC Batch**
Acid Extractable Arsenic (As)	ug/g	2	2	2	1	1	2595804
Acid Extractable Barium (Ba)	ug/g	140	130	120	160	0.5	2595804
Acid Extractable Chromium (Cr)	ug/g	37	37	29	42	1	2595804
Acid Extractable Copper (Cu)	ug/g	23	23	23	19	0.5	2595804
Acid Extractable Lead (Pb)	ug/g	7	7	12	7	1	2595804
Acid Extractable Zinc (Zn)	ug/g	47	45	81	51	5	2595804

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
QC Batch = Quality Control Batch

Maxxam ID		KQ5831		
Sampling Date		2011/08/23 14:00		
COC Number		59534		
	Units	**DUP2**	**RDL**	**QC Batch**
Acid Extractable Arsenic (As)	ug/g	1	1	2595804
Acid Extractable Barium (Ba)	ug/g	110	0.5	2595804
Acid Extractable Chromium (Cr)	ug/g	26	1	2595804
Acid Extractable Copper (Cu)	ug/g	18	0.5	2595804
Acid Extractable Lead (Pb)	ug/g	8	1	2595804
Acid Extractable Zinc (Zn)	ug/g	42	5	2595804

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B1C8803
Report Date: 2011/08/29

Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

O'REG 153 PETROLEUM HYDROCARBONS (SOIL)

Maxxam ID		KQ5828	KQ5829	KQ5829	KQ5830		
Sampling Date		2011/08/23 09:00	2011/08/23 12:00	2011/08/23 12:00	2011/08/23 14:00		
COC Number		59534	59534	59534	59534		
	Units	**TH1-5**	**TH2-4**	**TH2-4 Lab-Dup**	**TH3-4**	**RDL**	**QC Batch**
Moisture	%	19	22	24	19	1	2596676
Benzene	ug/g	<0.02	0.02		<0.02	0.02	2595730
Toluene	ug/g	0.13	<0.02		<0.02	0.02	2595730
Ethylbenzene	ug/g	<0.02	0.29		<0.02	0.02	2595730
o-Xylene	ug/g	<0.02	<0.02		<0.02	0.02	2595730
p+m-Xylene	ug/g	<0.04	<0.04		<0.04	0.04	2595730
Total Xylenes	ug/g	<0.04	<0.04		<0.04	0.04	2595730
Hexane	ug/g	<0.5	<0.5		<0.5	0.5	2595730
F1 (C6-C10)	ug/g	<10	<10		<10	10	2595730
F1 (C6-C10) - BTEX	ug/g	<10	<10		<10	10	2595730
F2 (C10-C16 Hydrocarbons)	ug/g	<10	<10		<10	10	2593445
F3 (C16-C34 Hydrocarbons)	ug/g	<10	<10		<10	10	2593445
F4 (C34-C50 Hydrocarbons)	ug/g	<10	<10		<10	10	2593445
Reached Baseline at C50	ug/g	Yes	Yes		Yes		2593445
Extraction Surrogate Recovery (%)							
D10-Ethylbenzene	%	110	78		90		2595730
o-Terphenyl	%	94	98		93		2593445
Instrument Surrogate Recovery (%)							
1,4-Difluorobenzene	%	111	106		101		2595730
4-Bromofluorobenzene	%	100	100		99		2595730
D4-1,2-Dichloroethane	%	103	103		104		2595730

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
QC Batch = Quality Control Batch

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Maxxam Job #: B1C8803
Report Date: 2011/08/29

Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

O'REG 153 PETROLEUM HYDROCARBONS (SOIL)

Maxxam ID		KQ5831		
Sampling Date		2011/08/23 14:00		
COC Number		59534		
	Units	**DUP2**	**RDL**	**QC Batch**
Moisture	%	14	1	2596676
Benzene	ug/g	<0.02	0.02	2595730
Toluene	ug/g	<0.02	0.02	2595730
Ethylbenzene	ug/g	<0.02	0.02	2595730
o-Xylene	ug/g	<0.02	0.02	2595730
p+m-Xylene	ug/g	<0.04	0.04	2595730
Total Xylenes	ug/g	<0.04	0.04	2595730
Hexane	ug/g	<0.5	0.5	2595730
F1 (C6-C10)	ug/g	<10	10	2595730
F1 (C6-C10) - BTEX	ug/g	<10	10	2595730
F2 (C10-C16 Hydrocarbons)	ug/g	<10	10	2593445
F3 (C16-C34 Hydrocarbons)	ug/g	<10	10	2593445
F4 (C34-C50 Hydrocarbons)	ug/g	<10	10	2593445
Reached Baseline at C50	ug/g	Yes		2593445
Extraction Surrogate Recovery (%)				
D10-Ethylbenzene	%	83		2595730
o-Terphenyl	%	88		2593445
Instrument Surrogate Recovery (%)				
1,4-Difluorobenzene	%	102		2595730
4-Bromofluorobenzene	%	99		2595730
D4-1,2-Dichloroethane	%	104		2595730

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B1C8803
Report Date: 2011/08/29

Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

RESULTS OF ANALYSES OF SOIL

Maxxam ID		KQ5827	KQ5829	
Sampling Date		2011/08/23 08:30	2011/08/23 12:00	
COC Number		59534	59534	
	Units	**TH1-1**	**TH2-4**	**QC Batch**
Available (CaCl2) pH	pH	7.50	7.49	2595169

QC Batch = Quality Control Batch

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Maxxam Job #: B1C8803
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Barenco Inc
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Project #: 11010

SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		KQ5828	KQ5829	KQ5830	KQ5831		
Sampling Date		2011/08/23 09:00	2011/08/23 12:00	2011/08/23 14:00	2011/08/23 14:00		
COC Number		59534	59534	59534	59534		
	Units	**TH1-5**	**TH2-4**	**TH3-4**	**DUP2**	**RDL**	**QC Batch**
Acenaphthene	ug/g	<0.01	<0.01	<0.01	<0.01	0.01	2593301
Acenaphthylene	ug/g	<0.005	<0.005	<0.005	<0.005	0.005	2593301
Anthracene	ug/g	<0.005	<0.005	<0.005	<0.005	0.005	2593301
Fluoranthene	ug/g	<0.005	0.005	<0.005	<0.005	0.005	2593301
Fluorene	ug/g	<0.005	0.005	<0.005	<0.005	0.005	2593301
1-Methylnaphthalene	ug/g	<0.005	0.009	<0.005	<0.005	0.005	2593301
2-Methylnaphthalene	ug/g	<0.005	<0.005	<0.005	<0.005	0.005	2593301
Naphthalene	ug/g	<0.005	0.009	<0.005	<0.005	0.005	2593301
Phenanthrene	ug/g	<0.005	0.016	<0.005	<0.005	0.005	2593301
Extraction Surrogate Recovery (%)							
D10-Anthracene	%	79	78	81	81		2593301
D14-Terphenyl (FS)	%	81	82	84	85		2593301
D8-Acenaphthylene	%	74	60	76	83		2593301

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B1C8803
Report Date: 2011/08/29

Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Test Summary

Maxxam ID KQ5827 **Collected** 2011/08/23
Sample ID TH1-1 **Shipped** 2011/08/23
Matrix Soil **Received** 2011/08/24

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
pH CaCl2 EXTRACT		2595169	2011/08/26	2011/08/26	XUANHONG QIU

Maxxam ID KQ5828 **Collected** 2011/08/23
Sample ID TH1-5 **Shipped** 2011/08/23
Matrix Soil **Received** 2011/08/24

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	2595730	2011/08/24	2011/08/27	SUNG HO KIM
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	2593445	2011/08/24	2011/08/25	RAVINDER GAIDHU
Acid Extr. Metals (aqua regia) by ICPMS	ICP/MS	2595804	2011/08/26	2011/08/26	VIVIANA CANZONIERI
Moisture	BAL	2596676	N/A	2011/08/27	LAKHVIR KALER
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	2593301	2011/08/24	2011/08/26	DARRYL TILLER

Maxxam ID KQ5828 Dup **Collected** 2011/08/23
Sample ID TH1-5 **Shipped** 2011/08/23
Matrix Soil **Received** 2011/08/24

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Acid Extr. Metals (aqua regia) by ICPMS	ICP/MS	2595804	2011/08/26	2011/08/26	VIVIANA CANZONIERI

Maxxam ID KQ5829 **Collected** 2011/08/23
Sample ID TH2-4 **Shipped** 2011/08/23
Matrix Soil **Received** 2011/08/24

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	2595730	2011/08/24	2011/08/27	SUNG HO KIM
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	2593445	2011/08/24	2011/08/25	RAVINDER GAIDHU
Acid Extr. Metals (aqua regia) by ICPMS	ICP/MS	2595804	2011/08/26	2011/08/26	VIVIANA CANZONIERI
Moisture	BAL	2596676	N/A	2011/08/27	LAKHVIR KALER
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	2593301	2011/08/24	2011/08/26	DARRYL TILLER
pH CaCl2 EXTRACT		2595169	2011/08/26	2011/08/26	XUANHONG QIU

Maxxam ID KQ5829 Dup **Collected** 2011/08/23
Sample ID TH2-4 **Shipped** 2011/08/23
Matrix Soil **Received** 2011/08/24

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Moisture	BAL	2596676	N/A	2011/08/27	LAKHVIR KALER

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Maxxam Job #: B1C8803
Report Date: 2011/08/29

Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Test Summary

Maxxam ID KQ5830 **Collected** 2011/08/23
Sample ID TH3-4 **Shipped** 2011/08/23
Matrix Soil **Received** 2011/08/24

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	2595730	2011/08/24	2011/08/27	SUNG HO KIM
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	2593445	2011/08/24	2011/08/25	RAVINDER GAIDHU
Acid Extr. Metals (aqua regia) by ICPMS	ICP/MS	2595804	2011/08/26	2011/08/26	VIVIANA CANZONIERI
Moisture	BAL	2596676	N/A	2011/08/27	LAKHVIR KALER
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	2593301	2011/08/24	2011/08/26	DARRYL TILLER

Maxxam ID KQ5831 **Collected** 2011/08/23
Sample ID DUP2 **Shipped** 2011/08/23
Matrix Soil **Received** 2011/08/24

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	2595730	2011/08/24	2011/08/27	SUNG HO KIM
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	2593445	2011/08/24	2011/08/25	RAVINDER GAIDHU
Acid Extr. Metals (aqua regia) by ICPMS	ICP/MS	2595804	2011/08/26	2011/08/26	VIVIANA CANZONIERI
Moisture	BAL	2596676	N/A	2011/08/27	LAKHVIR KALER
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	2593301	2011/08/24	2011/08/26	DARRYL TILLER

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Maxxam Job #: B1C8803
Report Date: 2011/08/29

Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Package 1	2.3°C

Each temperature is the average of up to three cooler temperatures taken at receipt

GENERAL COMMENTS

SQC trend rule failure for naphthalene, Batch 2593301. 4 of 5 consecutive points greater than 1SD below the mean. SQC trend rule failure for phenanthrene, Batch 2593301. 2 of 3 consecutive points greater than 2SD below the mean.

Results relate only to the items tested.

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Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Quality Assurance Report

Maxxam Job Number: B1C8803

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2593301 DTI	Method Blank	D10-Anthracene	2011/08/25		76	%	50 - 130
		D14-Terphenyl (FS)	2011/08/25		81	%	50 - 130
		D8-Acenaphthylene	2011/08/25		76	%	50 - 130
		Acenaphthene	2011/08/25	<0.01		ug/g	
		Acenaphthylene	2011/08/25	<0.005		ug/g	
		Anthracene	2011/08/25	<0.005		ug/g	
		Fluoranthene	2011/08/25	<0.005		ug/g	
		Fluorene	2011/08/25	<0.005		ug/g	
		1-Methylnaphthalene	2011/08/25	<0.005		ug/g	
		2-Methylnaphthalene	2011/08/25	<0.005		ug/g	
		Naphthalene	2011/08/25	<0.005		ug/g	
		Phenanthrene	2011/08/25	<0.005		ug/g	
2593445 RGA	Method Blank	o-Terphenyl	2011/08/25		94	%	30 - 130
		F2 (C10-C16 Hydrocarbons)	2011/08/25	<10		ug/g	
		F3 (C16-C34 Hydrocarbons)	2011/08/25	<10		ug/g	
		F4 (C34-C50 Hydrocarbons)	2011/08/25	<10		ug/g	
2595730 SHK	Method Blank	1,4-Difluorobenzene	2011/08/27		102	%	60 - 140
		4-Bromofluorobenzene	2011/08/27		97	%	60 - 140
		D10-Ethylbenzene	2011/08/27		81	%	30 - 130
		D4-1,2-Dichloroethane	2011/08/27		96	%	60 - 140
		Benzene	2011/08/27	<0.02		ug/g	
		Toluene	2011/08/27	<0.02		ug/g	
		Ethylbenzene	2011/08/27	<0.02		ug/g	
		o-Xylene	2011/08/27	<0.02		ug/g	
		p+m-Xylene	2011/08/27	<0.04		ug/g	
		Total Xylenes	2011/08/27	<0.04		ug/g	
		Hexane	2011/08/27	<0.5		ug/g	
		F1 (C6-C10)	2011/08/27	<10		ug/g	
		F1 (C6-C10) - BTEX	2011/08/27	<10		ug/g	
2595804 VIV	Method Blank	Acid Extractable Arsenic (As)	2011/08/26	<1		ug/g	
		Acid Extractable Barium (Ba)	2011/08/26	<0.5		ug/g	
		Acid Extractable Chromium (Cr)	2011/08/26	<1		ug/g	
		Acid Extractable Copper (Cu)	2011/08/26	<0.5		ug/g	
		Acid Extractable Lead (Pb)	2011/08/26	<1		ug/g	
		Acid Extractable Zinc (Zn)	2011/08/26	<5		ug/g	
	RPD [KQ5828-01]	Acid Extractable Arsenic (As)	2011/08/26	NC		%	35
		Acid Extractable Barium (Ba)	2011/08/26	3.7		%	35
		Acid Extractable Chromium (Cr)	2011/08/26	0.2		%	35
		Acid Extractable Copper (Cu)	2011/08/26	1.5		%	35
		Acid Extractable Lead (Pb)	2011/08/26	8.1		%	35
		Acid Extractable Zinc (Zn)	2011/08/26	4.4		%	35
2596676 BOP	RPD [KQ5829-01]	Moisture	2011/08/27	4.8		%	20
2595804 VIV	Matrix Spike [KQ5828-01]	Acid Extractable Arsenic (As)	2011/08/26		97	%	75 - 125
		Acid Extractable Barium (Ba)	2011/08/26		NC (1)	%	75 - 125
		Acid Extractable Chromium (Cr)	2011/08/26		NC (1)	%	75 - 125
		Acid Extractable Copper (Cu)	2011/08/26		96	%	75 - 125
		Acid Extractable Lead (Pb)	2011/08/26		101	%	75 - 125
		Acid Extractable Zinc (Zn)	2011/08/26		NC (1)	%	75 - 125
2593301 DTI	LCS	D10-Anthracene	2011/08/25		72	%	50 - 130
		D14-Terphenyl (FS)	2011/08/25		82	%	50 - 130
		D8-Acenaphthylene	2011/08/25		72	%	50 - 130
		Acenaphthene	2011/08/25		80	%	50 - 130
		Acenaphthylene	2011/08/25		78	%	50 - 130
		Anthracene	2011/08/25		78	%	50 - 130

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Quality Assurance Report (Continued)

Maxxam Job Number: B1C8803

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2593301 DTI	LCS	Fluoranthene	2011/08/25		88	%	50 - 130
		Fluorene	2011/08/25		79	%	50 - 130
		1-Methylnaphthalene	2011/08/25		77	%	50 - 130
		2-Methylnaphthalene	2011/08/25		74	%	50 - 130
		Naphthalene	2011/08/25		82	%	50 - 130
		Phenanthrene	2011/08/25		80	%	50 - 130
2593445 RGA	LCS	o-Terphenyl	2011/08/25		91	%	30 - 130
		F2 (C10-C16 Hydrocarbons)	2011/08/25		76	%	60 - 130
		F3 (C16-C34 Hydrocarbons)	2011/08/25		83	%	60 - 130
		F4 (C34-C50 Hydrocarbons)	2011/08/25		94	%	60 - 130
2595730 SHK	LCS	1,4-Difluorobenzene	2011/08/27		103	%	60 - 140
		4-Bromofluorobenzene	2011/08/27		98	%	60 - 140
		D10-Ethylbenzene	2011/08/27		81	%	30 - 130
		D4-1,2-Dichloroethane	2011/08/27		96	%	60 - 140
		Benzene	2011/08/27		74	%	60 - 140
		Toluene	2011/08/27		78	%	60 - 140
		Ethylbenzene	2011/08/27		84	%	60 - 140
		o-Xylene	2011/08/27		84	%	60 - 140
		p+m-Xylene	2011/08/27		83	%	60 - 140
		Hexane	2011/08/27		77	%	60 - 140
		F1 (C6-C10)	2011/08/27		80	%	60 - 140
2595804 VIV	SRM	Acid Extractable Arsenic (As)	2011/08/26		95	%	75 - 125
		Acid Extractable Barium (Ba)	2011/08/26		94	%	75 - 125
		Acid Extractable Chromium (Cr)	2011/08/26		92	%	75 - 125
		Acid Extractable Copper (Cu)	2011/08/26		95	%	75 - 125
		Acid Extractable Lead (Pb)	2011/08/26		101	%	75 - 125
		Acid Extractable Zinc (Zn)	2011/08/26		97	%	75 - 125

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
SRM: A blank matrix sample to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
LCS: A blank matrix sample to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.
(1) The recovery in the matrix spike was not calculated (NC). Spiked concentration was less than 2x that native to the sample.

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Validation Signature Page

Maxxam Job #: B1C8803

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

BRAD NEWMAN, Scientific Specialist

FLOYD MAYEDE, Senior Analyst

MEDHAT RISKALLAH, Manager, Hydrocarbon Department

SUZANA POPOVIC, Supervisor, Hydrocarbons

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Toll Free: 1-800-563-6266

EXXONMOBIL/IMPERIAL OIL - MAXXAM CHAIN-OF-CUSTODY RECORD

C of C # 59534

ANALYSIS REQUESTED

INVOICE INFORMATION	REPORT INFORMATION
Company Name: [X] Imperial Oil [ ] ExxonMobil	Company Name: BARENCO Inc.
Contact Name: TARIK MADI	Contact Name: BIANA MARIE SCHREIBER
Address:	Address: 2561 Stouffville Rd Gormley, ON L0H1G0
Email:	Email: dschreiber@barenco.ca
Ph:	Ph: 905-887-6661
Sampler Name (Print): DARREN DOHERTY	Consultant Project #: 11010

	FIELD SAMPLE ID	MATRIX: GROUND WATER	SURFACE WATER	SOIL	OTHER	# CONTAINERS	SAMPLING: DATE (YYYY/MM/DD)	TIME	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	BTEX (hexane)	F1	F2-F4	OIL & GREASE - TOTAL / MINERAL (SPECIFY)	VOC	PCB	PAH (2+3 Rings)	LEAD	ICP METALS (Arsenic, Barium, Chromium, Copper, Zinc, Lead)	ICPMS METALS (REG 153)	MERCURY	SAR / CRVI (SPECIFY)	BORON HOT WATER SOLUBLE	IGNITABILITY	REG 558 - INORGANICS	REG 558 - PCB LEACHATE	REG 558 - BENZENE / VOLATILES (SPECIFY)	REG 558 - B(a)P / SEMI-VOLATILES (SPECIFY)	pH								
1	TH1-1			X		1	11/08/23	0830																					X								
2	TH1-5			X		4		0900			X	X	X				X		X																	
3	TH2-4			X		4		1200			X	X	X				X		X										X								
4	TH3-4			X		4		1400			X	X	X				X		X																		
5	DUP2			X		4		1400			X	X	X				X		X																		
6																																						
7																																						
8																																						
9																																						

IOL SITE LOCATION: 1660 Merivale Road, Ottawa
IOL SITE # (if applicable): NA
IOL PROJECT # (if applicable): P12894
MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM: 11068757

REGULATORY CRITERIA / DETECTION LIMITS:
[X] Reg 153 Table 2 [ ] 2004 [X] 2011 [ ] RSC
(please indicate which Reg. version and if RSC required)
[ ] PWQO [ ] ODWS
[ ] Other _____

SPECIAL INSTRUCTIONS
- Voids may occur due to nature of material.
- Stones may be present in vials
ICE-YES

JARS USED AND NOT SUBMITTED: 0

TURNAROUND TIME
Standard (5 days) [ ]
Rush (3 days) [X]
(2 days) [ ]
(1 day) [ ]
(same day) [ ]
Date Required

COOLER ID	CUSTODY SEAL	YES	NO	COOLER ID	CUSTODY SEAL	YES	NO	COOLER ID	CUSTODY SEAL	YES	NO
11010-1	PRESENT	✓			PRESENT				PRESENT		
TEMP 1/3/3°C	INTACT	✓		TEMP	INTACT			TEMP	INTACT		
1 2 3				1 2 3				1 2 3			

LAB USE ONLY
MAXXAM JOB # B1C8803

RELINQUISHED BY (SIGN & PRINT)	DATE (YYYY/MM/DD)	TIME	RECEIVED BY (SIGN & PRINT)	DATE (YYYY/MM/DD)	TIME
1. DARREN DOHERTY	2011/08/23	1700	1. ASAD BHAIDU	2011/08/24	07:30
2.			2.		
3.			3.		

SAMPLES: LABELED BY 7-L; VERIFIED BY ABH

COC - 1012 (01/10) IOL - ON

White: Maxxam Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Barenco Inc.

Sampling Date: August 23, 2011

Location: 1660 Merivale Road, Ottawa

Laboratory : Maxxam Analytics Inc.

Consultant Project Number: 11010

Sample Submission Number: B1C8803

Are All Laboratory QC Samples Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC samples are within the acceptance criteria.
Extraction Surrogate Recovery	X			
Method Blank Concentration	X			
Matrix Duplicate RPD	X			
Matrix Spike Recovery	X			
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	All field QC samples are within alert limits.
Trip Blank Concentration			X	
Field Duplicate RPD	X			

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	No
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 48 hours (Yes/No)?:	Yes
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Was a Data Quality Waiver (DQW) issued (Yes/No)?: No

Date Issued: NA

Date of Response: NA

Is data considered to be reliable (Yes/No)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Daina Marie Schreiber

Data Reviewed by (Signature):

Date: August 31, 2011

Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010
Your C.O.C. #: 59518

Attention: Daina Marie Schreiber
Barenco Inc
2561 Stouffville Rd
PO Box 295
Gormley, ON
L0H 1G0

Report Date: 2011/08/29

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B1C8810
Received: 2011/08/24, 07:30

Sample Matrix: Soil
Samples Received: 1

Analyses	Quantity	Laboratory Method	Method Primary reference
Semivolatile Organic Compounds (TCLP)	1	CAM SOP-00301	EPA 8270 modified
Cyanide (WAD) in Leachates	1	CAM SOP-00457	SM 4500 CN-I
Fluoride by ISE in Leachates	1	CAM SOP-00448	SM 4500FC
Mercury (TCLP Leachable) (mg/L)	1	CAM SOP-00453	EPA 7470
Total Metals in TCLP Leachate by ICPMS	1	CAM SOP-00447	EPA 6020
Nitrate(NO3) + Nitrite(NO2) in Leachate	1	CAM SOP-00440	SM 4500 NO3I/NO2B
Polychlorinated Biphenyl in Leachate	1	CAM SOP-00309	SW846 8082
TCLP - % Solids	1	CAM SOP-00401	EPA 1311 modified
TCLP - Extraction Fluid	1	CAM SOP-00401	EPA 1311 modified
TCLP - Initial and final pH	1	CAM SOP-00401	EPA 1311 modified
TCLP Zero Headspace Extraction	1	CAM SOP-00430	EPA 1311 modified
VOCs in ZHE Leachates	1	CAM SOP 00226	EPA 8260 modified

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act.

The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following the 'Alberta Environment Draft Addenda to the CWS-PHC, Appendix 6, Validation of Alternate Methods'. Documentation is available upon request. Maxxam has made the following improvements to the CWS-PHC reference benchmark method: (i) Headspace for F1; and, (ii) Mechanical extraction for F2-F4. Note: F4G cannot be added to the C6 to C50 hydrocarbons.

Maxxam Analytics is accredited by SCC (Lab ID 97) for all specific parameters as required by GUCSO and O'Reg 153/04. Maxxam Analytics is limited in liability to the actual cost of analysis unless otherwise agreed in writing. There is no other warranty expressed or implied. Samples will be retained at Maxxam Analytics for three weeks from receipt of data or as

Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010
Your C.O.C. #: 59518

Attention: Daina Marie Schreiber
Barenco Inc
2561 Stouffville Rd
PO Box 295
Gormley, ON
L0H 1G0

Report Date: 2011/08/29

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B1C8810
Received: 2011/08/24, 07:30
per contract.

All data is in statistical control and has met all QC and method performance criteria unless otherwise flagged. All samples were analysed within hold time unless otherwise flagged. All soil samples for BTEX analysis were methanol extracted within 24 hours unless otherwise flagged.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Patricia Opoku
29 Aug 2011 17:21:14 -04:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

PATRICIA OPOKU, Project Manager
Email: POpoku@maxxam.ca
Phone# (905) 817-5700

==========

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Maxxam Job #: B1C8810
Report Date: 2011/08/29

Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

O'REG 558 TCLP VOLATILE ORGANICS (SOIL)

Maxxam ID		KQ5842	KQ5842		
Sampling Date		2011/08/23 12:00	2011/08/23 12:00		
COC Number		59518	59518		
	Units	**REG 558**	**REG 558 Lab-Dup**	**RDL**	**QC Batch**
Amount Extracted (Wet Weight) (g)	N/A	25	25	N/A	2592446
Leachable Benzene	mg/L	<0.02	<0.02	0.02	2593660
Leachable Carbon Tetrachloride	mg/L	<0.02	<0.02	0.02	2593660
Leachable Chlorobenzene	mg/L	<0.02	<0.02	0.02	2593660
Leachable Chloroform	mg/L	<0.02	<0.02	0.02	2593660
Leachable 1,2-Dichlorobenzene	mg/L	<0.05	<0.05	0.05	2593660
Leachable 1,4-Dichlorobenzene	mg/L	<0.05	<0.05	0.05	2593660
Leachable 1,2-Dichloroethane	mg/L	<0.05	<0.05	0.05	2593660
Leachable 1,1-Dichloroethylene	mg/L	<0.02	<0.02	0.02	2593660
Leachable Methylene Chloride(Dichloromethane)	mg/L	<0.2	<0.2	0.2	2593660
Leachable Methyl Ethyl Ketone (2-Butanone)	mg/L	<1	<1	1	2593660
Leachable Tetrachloroethylene	mg/L	<0.02	<0.02	0.02	2593660
Leachable Trichloroethylene	mg/L	<0.02	<0.02	0.02	2593660
Leachable Vinyl Chloride	mg/L	<0.02	<0.02	0.02	2593660
Instrument Surrogate Recovery (%)					
Leachable 4-Bromofluorobenzene	%	94	94		2593660
Leachable D4-1,2-Dichloroethane	%	107	110		2593660
Leachable D8-Toluene	%	96	96		2593660

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B1C8810
Report Date: 2011/08/29

Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

O'REG 558 TCLP BENZO(A)PYRENE

Maxxam ID		KQ5842	KQ5842		
Sampling Date		2011/08/23 12:00	2011/08/23 12:00		
COC Number		59518	59518		
	Units	**REG 558**	**REG 558 Lab-Dup**	**RDL**	**QC Batch**
Leachable Benzo(a)pyrene	mg/L	<0.0001	<0.0001	0.0001	2595561
Extraction Surrogate Recovery (%)					
Leachable 2-Fluorobiphenyl	%	65	66		2595561
Leachable D14-Terphenyl (FS)	%	106	105		2595561
Leachable D5-Nitrobenzene	%	59	63		2595561

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B1C8810
Report Date: 2011/08/29

Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

O'REG 558 TCLP INORGANICS PACKAGE (SOIL)

Maxxam ID		KQ5842	KQ5842		
Sampling Date		2011/08/23 12:00	2011/08/23 12:00		
COC Number		59518	59518		
	Units	**REG 558**	**REG 558 Lab-Dup**	**RDL**	**QC Batch**
Leachable Fluoride (F-)	mg/L	<0.1	<0.1	0.1	2593746
Leachable Free Cyanide	mg/L	<0.002		0.002	2593752
Leachable Nitrite (N)	mg/L	<0.01		0.01	2592853
Leachable Nitrate (N)	mg/L	<0.1		0.1	2592853
Leachable Nitrate + Nitrite	mg/L	<0.1		0.1	2592853
Leachable Mercury (Hg)	mg/L	<0.001	<0.001	0.001	2593836
Leachable Arsenic (As)	mg/L	<0.2	<0.2	0.2	2593878
Leachable Barium (Ba)	mg/L	1.2	1.2	0.2	2593878
Leachable Boron (B)	mg/L	0.1	<0.1	0.1	2593878
Leachable Cadmium (Cd)	mg/L	<0.05	<0.05	0.05	2593878
Leachable Chromium (Cr)	mg/L	<0.1	<0.1	0.1	2593878
Leachable Lead (Pb)	mg/L	<0.1	<0.1	0.1	2593878
Leachable Selenium (Se)	mg/L	<0.1	<0.1	0.1	2593878
Leachable Silver (Ag)	mg/L	<0.01	<0.01	0.01	2593878
Leachable Uranium (U)	mg/L	<0.01	<0.01	0.01	2593878

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B1C8810
Report Date: 2011/08/29

Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

O'REG 558 TCLP LEACHATE PREPARATION (SOIL)

Maxxam ID		KQ5842	KQ5842		
Sampling Date		2011/08/23 12:00	2011/08/23 12:00		
COC Number		59518	59518		
	Units	**REG 558**	**REG 558 Lab-Dup**	**RDL**	**QC Batch**
Final pH	pH	5.72	5.75		2593677
Initial pH	pH	9.32	9.35		2593677
TCLP - % Solids	%	100	100	0.2	2593673
TCLP Extraction Fluid	N/A	FLUID 1	FLUID 1		2593676

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B1C8810
Report Date: 2011/08/29

Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

POLYCHLORINATED BIPHENYLS BY GC-ECD (SOIL)

Maxxam ID		KQ5842		
Sampling Date		2011/08/23 12:00		
COC Number		59518		
	Units	**REG 558**	**RDL**	**QC Batch**
Leachable Total PCB	mg/L	<0.003	0.003	2593735
Extraction Surrogate Recovery (%)				
Leachable 2,4,5,6-Tetrachloro-m-xylene	%	93		2593735
Leachable Decachlorobiphenyl	%	94		2593735

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B1C8810
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Barenco Inc
Task Order#: 11068757
Site#: P12894
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Project #: 11010

Test Summary

Maxxam ID KQ5842 **Collected** 2011/08/23
Sample ID REG 558 **Shipped** 2011/08/23
Matrix Soil **Received** 2011/08/24

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Semivolatile Organic Compounds (TCLP)	GC/MS	2595561	2011/08/26	2011/08/27	MICHAEL WANG
Cyanide (WAD) in Leachates	TECH/CN	2593752	N/A	2011/08/25	CHRISTINE PHAM
Fluoride by ISE in Leachates	ISE	2593746	2011/08/25	2011/08/25	YOGESH PATEL
Mercury (TCLP Leachable) (mg/L)	CVAA	2593836	N/A	2011/08/25	MAGDALENA CARLOS
Total Metals in TCLP Leachate by ICPMS	ICP1/MS	2593878	2011/08/25	2011/08/25	JOHN BOWMAN
Nitrate(NO3) + Nitrite(NO2) in Leachate	LACH	2592853	N/A	2011/08/25	LEYLA SIAHPOOSH
Polychlorinated Biphenyl in Leachate	GC/ECD	2593735	2011/08/25	2011/08/25	LI PENG
TCLP - % Solids	BAL	2593673	2011/08/24	2011/08/25	JIAN (KEN) WANG
TCLP - Extraction Fluid		2593676	N/A	2011/08/25	JIAN (KEN) WANG
TCLP - Initial and final pH	PH	2593677	N/A	2011/08/25	JIAN (KEN) WANG
TCLP Zero Headspace Extraction		2592446	2011/08/24	2011/08/24	FOZIA TABASUM
VOCs in ZHE Leachates	GC/MS	2593660	2011/08/25	2011/08/25	MOMTAZ ALI

Maxxam ID KQ5842 Dup **Collected** 2011/08/23
Sample ID REG 558 **Shipped** 2011/08/23
Matrix Soil **Received** 2011/08/24

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Semivolatile Organic Compounds (TCLP)	GC/MS	2595561	2011/08/26	2011/08/27	MICHAEL WANG
Fluoride by ISE in Leachates	ISE	2593746	2011/08/25	2011/08/25	YOGESH PATEL
Mercury (TCLP Leachable) (mg/L)	CVAA	2593836	N/A	2011/08/25	MAGDALENA CARLOS
Total Metals in TCLP Leachate by ICPMS	ICP1/MS	2593878	2011/08/25	2011/08/25	JOHN BOWMAN
TCLP - % Solids	BAL	2593673	2011/08/24	2011/08/25	JIAN (KEN) WANG
TCLP - Extraction Fluid		2593676	N/A	2011/08/25	JIAN (KEN) WANG
TCLP - Initial and final pH	PH	2593677	N/A	2011/08/25	JIAN (KEN) WANG
TCLP Zero Headspace Extraction		2592446	2011/08/24	2011/08/24	FOZIA TABASUM
VOCs in ZHE Leachates	GC/MS	2593660	2011/08/25	2011/08/25	MOMTAZ ALI

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Maxxam Job #: B1C8810
Report Date: 2011/08/29

Barenco Inc
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Project #: 11010

Package 1	2.3°C

Each temperature is the average of up to three cooler temperatures taken at receipt

GENERAL COMMENTS

ABN Analysis: SQC trend rule failure for metribuzin, Batch 2595561. 4 of 5 consecutive points greater than 1SD above the mean.

Results relate only to the items tested.

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Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Quality Assurance Report

Maxxam Job Number: B1C8810

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2592853 LS	Method Blank	Leachable Nitrite (N)	2011/08/25	<0.01		mg/L	
		Leachable Nitrate (N)	2011/08/25	<0.1		mg/L	
		Leachable Nitrate + Nitrite	2011/08/25	<0.1		mg/L	
2593660 MAL	Method Blank	Leachable 4-Bromofluorobenzene	2011/08/25		94	%	70 - 130
		Leachable D4-1,2-Dichloroethane	2011/08/25		107	%	70 - 130
		Leachable D8-Toluene	2011/08/25		97	%	70 - 130
		Leachable Benzene	2011/08/25	<0.02		mg/L	
		Leachable Carbon Tetrachloride	2011/08/25	<0.02		mg/L	
		Leachable Chlorobenzene	2011/08/25	<0.02		mg/L	
		Leachable Chloroform	2011/08/25	<0.02		mg/L	
		Leachable 1,2-Dichlorobenzene	2011/08/25	<0.05		mg/L	
		Leachable 1,4-Dichlorobenzene	2011/08/25	<0.05		mg/L	
		Leachable 1,2-Dichloroethane	2011/08/25	<0.05		mg/L	
		Leachable 1,1-Dichloroethylene	2011/08/25	<0.02		mg/L	
		Leachable Methylene Chloride(Dichlorometha	2011/08/25	<0.2		mg/L	
		Leachable Methyl Ethyl Ketone (2-Butanone)	2011/08/25	<1		mg/L	
		Leachable Tetrachloroethylene	2011/08/25	<0.02		mg/L	
		Leachable Trichloroethylene	2011/08/25	<0.02		mg/L	
		Leachable Vinyl Chloride	2011/08/25	<0.02		mg/L	
2593735 LPG	Method Blank	Leachable 2,4,5,6-Tetrachloro-m-xylene	2011/08/25		81	%	30 - 130
		Leachable Decachlorobiphenyl	2011/08/25		86	%	30 - 130
		Leachable Total PCB	2011/08/25	<0.003		mg/L	
2593746 YPA	Method Blank	Leachable Fluoride (F-)	2011/08/25	<0.1		mg/L	
2593752 CP	Method Blank	Leachable Free Cyanide	2011/08/25	<0.002		mg/L	
2593836 MC	Method Blank	Leachable Mercury (Hg)	2011/08/25	<0.001		mg/L	
2595561 MWG	Method Blank	Leachable 2-Fluorobiphenyl	2011/08/26		69	%	30 - 130
		Leachable D14-Terphenyl (FS)	2011/08/26		107	%	30 - 130
		Leachable D5-Nitrobenzene	2011/08/26		65	%	30 - 130
		Leachable Benzo(a)pyrene	2011/08/26	<0.0001		mg/L	
2593660 MAL	RPD [KQ5842-04]	Leachable Benzene	2011/08/25	NC		%	30
		Leachable Carbon Tetrachloride	2011/08/25	NC		%	30
		Leachable Chlorobenzene	2011/08/25	NC		%	30
		Leachable Chloroform	2011/08/25	NC		%	30
		Leachable 1,2-Dichlorobenzene	2011/08/25	NC		%	30
		Leachable 1,4-Dichlorobenzene	2011/08/25	NC		%	30
		Leachable 1,2-Dichloroethane	2011/08/25	NC		%	30
		Leachable 1,1-Dichloroethylene	2011/08/25	NC		%	30
		Leachable Methylene Chloride(Dichlorometha	2011/08/25	NC		%	30
		Leachable Methyl Ethyl Ketone (2-Butanone)	2011/08/25	NC		%	30
		Leachable Tetrachloroethylene	2011/08/25	NC		%	30
		Leachable Trichloroethylene	2011/08/25	NC		%	30
		Leachable Vinyl Chloride	2011/08/25	NC		%	30
2593746 YPA	RPD [KQ5842-01]	Leachable Fluoride (F-)	2011/08/25	NC		%	25
2593836 MC	RPD [KQ5842-01]	Leachable Mercury (Hg)	2011/08/25	NC		%	25
2593878 JBW	RPD [KQ5842-01]	Leachable Arsenic (As)	2011/08/25	NC		%	25
		Leachable Barium (Ba)	2011/08/25	1		%	25
		Leachable Boron (B)	2011/08/25	NC		%	25
		Leachable Cadmium (Cd)	2011/08/25	NC		%	25
		Leachable Chromium (Cr)	2011/08/25	NC		%	25
		Leachable Lead (Pb)	2011/08/25	NC		%	25
		Leachable Selenium (Se)	2011/08/25	NC		%	25
		Leachable Silver (Ag)	2011/08/25	NC		%	25
		Leachable Uranium (U)	2011/08/25	NC		%	25
2595561 MWG	RPD [KQ5842-01]	Leachable Benzo(a)pyrene	2011/08/27	NC		%	40
2593660 MAL	Matrix Spike [KQ5842-04]	Leachable 4-Bromofluorobenzene	2011/08/25		102	%	70 - 130

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Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Quality Assurance Report (Continued)

Maxxam Job Number: B1C8810

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2593660 MAL	Matrix Spike [KQ5842-04]	Leachable D4-1,2-Dichloroethane	2011/08/25		103	%	70 - 130
		Leachable D8-Toluene	2011/08/25		99	%	70 - 130
		Leachable Benzene	2011/08/25		102	%	70 - 130
		Leachable Carbon Tetrachloride	2011/08/25		108	%	70 - 130
		Leachable Chlorobenzene	2011/08/25		102	%	70 - 130
		Leachable Chloroform	2011/08/25		107	%	70 - 130
		Leachable 1,2-Dichlorobenzene	2011/08/25		106	%	70 - 130
		Leachable 1,4-Dichlorobenzene	2011/08/25		104	%	70 - 130
		Leachable 1,2-Dichloroethane	2011/08/25		105	%	70 - 130
		Leachable 1,1-Dichloroethylene	2011/08/25		104	%	70 - 130
		Leachable Methylene Chloride(Dichlorometha	2011/08/25		102	%	70 - 130
		Leachable Methyl Ethyl Ketone (2-Butanone)	2011/08/25		106	%	60 - 140
		Leachable Tetrachloroethylene	2011/08/25		105	%	70 - 130
		Leachable Trichloroethylene	2011/08/25		105	%	70 - 130
		Leachable Vinyl Chloride	2011/08/25		96	%	70 - 130
2593746 YPA	Matrix Spike [KQ5842-01]	Leachable Fluoride (F-)	2011/08/25		97	%	80 - 120
2593836 MC	Matrix Spike [KQ5842-01]	Leachable Mercury (Hg)	2011/08/25		105	%	75 - 125
2593878 JBW	Matrix Spike [KQ5842-01]	Leachable Arsenic (As)	2011/08/25		98	%	75 - 125
		Leachable Barium (Ba)	2011/08/25		NC (1)	%	75 - 125
		Leachable Boron (B)	2011/08/25		102	%	75 - 125
		Leachable Cadmium (Cd)	2011/08/25		98	%	75 - 125
		Leachable Chromium (Cr)	2011/08/25		96	%	75 - 125
		Leachable Lead (Pb)	2011/08/25		98	%	75 - 125
		Leachable Selenium (Se)	2011/08/25		102	%	75 - 125
		Leachable Silver (Ag)	2011/08/25		92	%	75 - 125
		Leachable Uranium (U)	2011/08/25		101	%	75 - 125
2595561 MWG	Matrix Spike [KQ5842-01]	Leachable 2-Fluorobiphenyl	2011/08/27		73	%	30 - 130
		Leachable D14-Terphenyl (FS)	2011/08/27		107	%	30 - 130
		Leachable D5-Nitrobenzene	2011/08/27		64	%	30 - 130
		Leachable Benzo(a)pyrene	2011/08/27		110	%	30 - 130
2592853 LS	LCS	Leachable Nitrite (N)	2011/08/25		99	%	85 - 115
		Leachable Nitrate (N)	2011/08/25		99	%	85 - 115
2593660 MAL	LCS	Leachable 4-Bromofluorobenzene	2011/08/25		100	%	70 - 130
		Leachable D4-1,2-Dichloroethane	2011/08/25		108	%	70 - 130
		Leachable D8-Toluene	2011/08/25		100	%	70 - 130
		Leachable Benzene	2011/08/25		103	%	70 - 130
		Leachable Carbon Tetrachloride	2011/08/25		107	%	70 - 130
		Leachable Chlorobenzene	2011/08/25		101	%	70 - 130
		Leachable Chloroform	2011/08/25		108	%	70 - 130
		Leachable 1,2-Dichlorobenzene	2011/08/25		105	%	70 - 130
		Leachable 1,4-Dichlorobenzene	2011/08/25		101	%	70 - 130
		Leachable 1,2-Dichloroethane	2011/08/25		107	%	70 - 130
		Leachable 1,1-Dichloroethylene	2011/08/25		104	%	70 - 130
		Leachable Methylene Chloride(Dichlorometha	2011/08/25		105	%	70 - 130
		Leachable Methyl Ethyl Ketone (2-Butanone)	2011/08/25		115	%	60 - 140
		Leachable Tetrachloroethylene	2011/08/25		102	%	70 - 130
		Leachable Trichloroethylene	2011/08/25		103	%	70 - 130
		Leachable Vinyl Chloride	2011/08/25		98	%	70 - 130
2593735 LPG	LCS	Leachable 2,4,5,6-Tetrachloro-m-xylene	2011/08/25		80	%	30 - 130
		Leachable Decachlorobiphenyl	2011/08/25		85	%	30 - 130

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Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Quality Assurance Report (Continued)

Maxxam Job Number: B1C8810

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2593735	LPG	LCS	Leachable Total PCB	2011/08/25		94	%	30 - 130
2593746	YPA	LCS	Leachable Fluoride (F-)	2011/08/25		101	%	85 - 115
2593752	CP	LCS	Leachable Free Cyanide	2011/08/25		103	%	80 - 120
2593836	MC	LCS	Leachable Mercury (Hg)	2011/08/25		97	%	80 - 120
2593878	JBW	LCS	Leachable Arsenic (As)	2011/08/25		98	%	85 - 115
			Leachable Barium (Ba)	2011/08/25		99	%	85 - 115
			Leachable Boron (B)	2011/08/25		112	%	85 - 115
			Leachable Cadmium (Cd)	2011/08/25		98	%	85 - 115
			Leachable Chromium (Cr)	2011/08/25		94	%	85 - 115
			Leachable Lead (Pb)	2011/08/25		99	%	85 - 115
			Leachable Selenium (Se)	2011/08/25		99	%	85 - 115
			Leachable Silver (Ag)	2011/08/25		91	%	85 - 115
			Leachable Uranium (U)	2011/08/25		100	%	85 - 115
2595561	MWG	LCS	Leachable 2-Fluorobiphenyl	2011/08/27		83	%	30 - 130
			Leachable D14-Terphenyl (FS)	2011/08/27		113	%	30 - 130
			Leachable D5-Nitrobenzene	2011/08/27		76	%	30 - 130
			Leachable Benzo(a)pyrene	2011/08/27		114	%	30 - 130
2592853	LS	Leachate Blank	Leachable Nitrite (N)	2011/08/25	<0.01		mg/L	
			Leachable Nitrate (N)	2011/08/25	<0.1		mg/L	
			Leachable Nitrate + Nitrite	2011/08/25	<0.1		mg/L	
2593746	YPA	Leachate Blank	Leachable Fluoride (F-)	2011/08/25	<0.1		mg/L	
2593752	CP	Leachate Blank	Leachable Free Cyanide	2011/08/25	<0.002		mg/L	
2593836	MC	Leachate Blank	Leachable Mercury (Hg)	2011/08/25	<0.001		mg/L	
2593878	JBW	Leachate Blank	Leachable Arsenic (As)	2011/08/25	<0.2		mg/L	
			Leachable Barium (Ba)	2011/08/25	<0.2		mg/L	
			Leachable Boron (B)	2011/08/25	<0.1		mg/L	
			Leachable Cadmium (Cd)	2011/08/25	<0.05		mg/L	
			Leachable Chromium (Cr)	2011/08/25	<0.1		mg/L	
			Leachable Lead (Pb)	2011/08/25	<0.1		mg/L	
			Leachable Selenium (Se)	2011/08/25	<0.1		mg/L	
			Leachable Silver (Ag)	2011/08/25	<0.01		mg/L	
			Leachable Uranium (U)	2011/08/25	<0.01		mg/L	

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
Leachate Blank: A blank matrix containing all reagents used in the leaching procedure. Used to determine any process contamination.
LCS: A blank matrix sample to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.
(1) The recovery in the matrix spike was not calculated (NC). Spiked concentration was less than 2x that native to the sample.

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Validation Signature Page

Maxxam Job #: B1C8810

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

BRAD NEWMAN, Scientific Specialist

CHARLES ANCKER, B.Sc., M.Sc., C.Chem, Senior Analyst

FLOYD MAYEDE, Senior Analyst

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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EXXONMOBIL/IMPERIAL OIL - MAXXAM CHAIN-OF-CUSTODY RECORD

Page 1 of 1

C of C # 59518

INVOICE INFORMATION

Company Name: [X] Imperial Oil [ ] ExxonMobil
Contact Name: TARIK MODI
Address:
Email:
Ph:
Sampler Name (Print): DARREN DOHERTY

REPORT INFORMATION

Company Name: BARENCO Inc.
Contact Name: DAINA MARIE SCHREIBER
Address: 2561 Stouffville Rd
Gormley, ON
L0H 1G0
Email: dschreiber@barenco.ca
Ph: 905-887-6661
Consultant Project #: 11010

ANALYSIS REQUESTED

FIELD SAMPLE ID	MATRIX: GROUND WATER	MATRIX: SURFACE WATER	MATRIX: SOIL	MATRIX: OTHER	# CONTAINERS	SAMPLING: DATE (YYYY/MM/DD)	SAMPLING: TIME	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	BTEX	F1	F2-F4	OIL & GREASE - TOTAL / MINERAL (SPECIFY)	VOC	PCB	PAH	LEAD	ICP METALS	ICPMS METALS (REG 153)	MERCURY	SAR / CRVI (SPECIFY)	BORON HOT WATER SOLUBLE	IGNITABILITY	REG 558 - INORGANICS	REG 558 - PCB LEACHATE	REG 558 - BENZENE (VOLATILES (SPECIFY))	REG 558 - B(a)P (SEMI-VOLATILES (SPECIFY))
1 Reg 558			X		4	11/08/23	1200																	X	X	X	X
2																											
3																											
4																											
5																											
6																											
7																											
8																											
9																											

IOL SITE LOCATION: 1660 Merivale Road, Ottawa
IOL SITE # (if applicable): NA
IOL PROJECT # (if applicable): P12894
MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM: 1106875?

REGULATORY CRITERIA / DETECTION LIMITS:
[X] Reg 153 Table [X] [ ] 2004 [X] 2011 [ ] RSC
(please indicate which Reg. version and if RSC required)
[ ] PWQO [ ] ODWS
[X] Other Reg 558

SPECIAL INSTRUCTIONS
-Voids may occur due to nature of material
ICE-YES

JARS USED AND NOT SUBMITTED: 0

TURNAROUND TIME
Standard (5 days) [ ]
Rush (3 days) [X]
(2 days) [ ]
(1 day) [ ]
(same day) [ ]
Date Required

COOLER ID	CUSTODY SEAL	YES	NO	TEMP
11010-1	PRESENT	✓		1/3/3°C
	INTACT	✓		1 2 3
	PRESENT			
	INTACT			1 2 3
	PRESENT			
	INTACT			1 2 3

LAB USE ONLY
MAXXAM JOB #: B1C8810
SAMPLES
LABELED BY: T-L
VERIFIED BY: ABH

RELINQUISHED BY (SIGN & PRINT)	DATE (YYYY/MM/DD)	TIME	RECEIVED BY (SIGN & PRINT)	DATE (YYYY/MM/DD)	TIME
1. DARREN DOHERTY	2011/08/23	1700	1. ASAD BHAIDI	2011/08/24	07:30
2.			2.		
3.			3.		

COC -1012 (01/10). IOL - ON White: Maxxam Yellow: Client

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DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Barenco Inc.

Sampling Date: August 23, 2011

Location: 1660 Merivale Road, Ottawa

Laboratory : Maxxam Analytics Inc.

Consultant Project Number: 11010

Sample Submission Number: B1C8810

Are All Laboratory QC Samples Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC samples are within the acceptance criteria.
Extraction Surrogate Recovery	X			
Method Blank Concentration	X			
Matrix Duplicate RPD	X			
Matrix Spike Recovery	X			
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	No field QC samples were submitted.
Trip Blank Concentration			X	
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	No
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 48 hours (Yes/No)?:	Yes
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Was a Data Quality Waiver (DQW) issued (Yes/No)?: No

Date Issued: NA

Date of Response: NA

Is data considered to be reliable (Yes/No)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Daina Marie Schreiber

Data Reviewed by (Signature):

Date: August 31, 2011

Maxxam

Success Through Science®

Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010
Your C.O.C. #: 59520

Attention: Daina Marie Schreiber
Barenco Inc
2561 Stouffville Rd
PO Box 295
Gormley, ON
L0H 1G0

Report Date: 2011/08/30

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B1C9700
Received: 2011/08/25, 08:30

Sample Matrix: Soil
Samples Received: 2

Analyses	Quantity	Laboratory Method	Method Primary reference
Acid Extr. Metals (aqua regia) by ICPMS	2	CAM SOP-00447	EPA 6020
Moisture	2	CAM SOP-00445	McKeague 2nd ed 1978
PAH Compounds in Soil by GC/MS (SIM)	2	CAM SOP - 00318	EPA 8270

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act.

The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following the 'Alberta Environment Draft Addenda to the CWS-PHC, Appendix 6, Validation of Alternate Methods'. Documentation is available upon request. Maxxam has made the following improvements to the CWS-PHC reference benchmark method: (i) Headspace for F1; and, (ii) Mechanical extraction for F2-F4. Note: F4G cannot be added to the C6 to C50 hydrocarbons.

Maxxam Analytics is accredited by SCC (Lab ID 97) for all specific parameters as required by GUCSO and O'Reg 153/04. Maxxam Analytics is limited in liability to the actual cost of analysis unless otherwise agreed in writing. There is no other warranty expressed or implied. Samples will be retained at Maxxam Analytics for three weeks from receipt of data or as per contract.

All data is in statistical control and has met all QC and method performance criteria unless otherwise flagged. All samples were analysed within hold time unless otherwise flagged. All soil samples for BTEX analysis were methanol extracted within 24 hours unless otherwise flagged.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010
Your C.O.C. #: 59520

Attention: Daina Marie Schreiber
Barenco Inc
2561 Stouffville Rd
PO Box 295
Gormley, ON
L0H 1G0

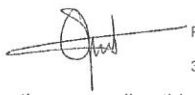
Report Date: 2011/08/30

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B1C9700
Received: 2011/08/25, 08:30

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key



Patricia Opoku
30 Aug 2011 17:51:59 -04:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

PATRICIA OPOKU, Project Manager
Email: POpoku@maxxam.ca
Phone# (905) 817-5700

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B1C9700
Report Date: 2011/08/30

Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

O'REG 153 ICPMS METALS (SOIL)

Maxxam ID		KR0276	KR0277	KR0277		
Sampling Date		2011/08/24 09:00	2011/08/24 10:00	2011/08/24 10:00		
COC Number		59520	59520	59520		
	Units	**TH4-3**	**TH5-3**	**TH5-3 Lab-Dup**	**RDL**	**QC Batch**
Acid Extractable Antimony (Sb)	ug/g	<0.2	<0.2	<0.2	0.2	2598368
Acid Extractable Arsenic (As)	ug/g	2	1	1	1	2598368
Acid Extractable Barium (Ba)	ug/g	130	120	130	0.5	2598368
Acid Extractable Beryllium (Be)	ug/g	0.3	0.3	0.3	0.2	2598368
Acid Extractable Boron (B)	ug/g	<5	<5	<5	5	2598368
Acid Extractable Cadmium (Cd)	ug/g	<0.1	0.2	0.2	0.1	2598368
Acid Extractable Chromium (Cr)	ug/g	21	32	32	1	2598368
Acid Extractable Cobalt (Co)	ug/g	7.4	9.3	9.5	0.1	2598368
Acid Extractable Copper (Cu)	ug/g	17	21	21	0.5	2598368
Acid Extractable Lead (Pb)	ug/g	8	22	23	1	2598368
Acid Extractable Molybdenum (Mo)	ug/g	<0.5	<0.5	<0.5	0.5	2598368
Acid Extractable Nickel (Ni)	ug/g	16	20	20	0.5	2598368
Acid Extractable Selenium (Se)	ug/g	<0.5	<0.5	<0.5	0.5	2598368
Acid Extractable Silver (Ag)	ug/g	<0.2	<0.2	<0.2	0.2	2598368
Acid Extractable Thallium (Tl)	ug/g	0.12	0.15	0.16	0.05	2598368
Acid Extractable Uranium (U)	ug/g	0.37	0.57	0.60	0.05	2598368
Acid Extractable Vanadium (V)	ug/g	23	37	39	5	2598368
Acid Extractable Zinc (Zn)	ug/g	28	71	75	5	2598368

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
QC Batch = Quality Control Batch

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Maxxam Job #: B1C9700
Report Date: 2011/08/30

Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

O'REG 153 PAHS (SOIL)

Maxxam ID		KR0276	KR0276	KR0277		
Sampling Date		2011/08/24 09:00	2011/08/24 09:00	2011/08/24 10:00		
COC Number		59520	59520	59520		
	Units	**TH4-3**	**TH4-3 Lab-Dup**	**TH5-3**	**RDL**	**QC Batch**
Moisture	%	16	16	18	1	2596852
Acenaphthene	ug/g	<0.01		<0.01	0.01	2594571
Acenaphthylene	ug/g	<0.005		0.025	0.005	2594571
Anthracene	ug/g	<0.005		0.041	0.005	2594571
Benzo(a)anthracene	ug/g	<0.01		0.19	0.01	2594571
Benzo(a)pyrene	ug/g	<0.005		0.20	0.005	2594571
Benzo(b/j)fluoranthene	ug/g	<0.01		0.22	0.01	2594571
Benzo(g,h,i)perylene	ug/g	<0.02		0.10	0.02	2594571
Benzo(k)fluoranthene	ug/g	<0.01		0.09	0.01	2594571
Chrysene	ug/g	<0.01		0.15	0.01	2594571
Dibenz(a,h)anthracene	ug/g	<0.02		0.03	0.02	2594571
Fluoranthene	ug/g	<0.005		0.34	0.005	2594571
Fluorene	ug/g	<0.005		0.007	0.005	2594571
Indeno(1,2,3-cd)pyrene	ug/g	<0.02		0.13	0.02	2594571
1-Methylnaphthalene	ug/g	<0.005		<0.005	0.005	2594571
2-Methylnaphthalene	ug/g	<0.005		<0.005	0.005	2594571
Naphthalene	ug/g	<0.005		<0.005	0.005	2594571
Phenanthrene	ug/g	<0.005		0.080	0.005	2594571
Pyrene	ug/g	<0.005		0.29	0.005	2594571
Extraction Surrogate Recovery (%)						
D10-Anthracene	%	86		85		2594571
D14-Terphenyl (FS)	%	90		89		2594571
D8-Acenaphthylene	%	86		79		2594571

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
QC Batch = Quality Control Batch

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Maxxam Job #: B1C9700
Report Date: 2011/08/30

Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Test Summary

Maxxam ID KR0276 **Collected** 2011/08/24
Sample ID TH4-3 **Shipped** 2011/08/24
Matrix Soil **Received** 2011/08/25

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Acid Extr. Metals (aqua regia) by ICPMS	ICP/MS	2598368	2011/08/30	2011/08/30	VIVIANA CANZONIERI
Moisture	BAL	2596852	N/A	2011/08/27	LAKHVIR KALER
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	2594571	2011/08/25	2011/08/29	DARRYL TILLER

Maxxam ID KR0276 Dup **Collected** 2011/08/24
Sample ID TH4-3 **Shipped** 2011/08/24
Matrix Soil **Received** 2011/08/25

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Moisture	BAL	2596852	N/A	2011/08/27	LAKHVIR KALER

Maxxam ID KR0277 **Collected** 2011/08/24
Sample ID TH5-3 **Shipped** 2011/08/24
Matrix Soil **Received** 2011/08/25

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Acid Extr. Metals (aqua regia) by ICPMS	ICP/MS	2598368	2011/08/30	2011/08/30	VIVIANA CANZONIERI
Moisture	BAL	2596852	N/A	2011/08/27	LAKHVIR KALER
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	2594571	2011/08/25	2011/08/29	DARRYL TILLER

Maxxam ID KR0277 Dup **Collected** 2011/08/24
Sample ID TH5-3 **Shipped** 2011/08/24
Matrix Soil **Received** 2011/08/25

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Acid Extr. Metals (aqua regia) by ICPMS	ICP/MS	2598368	2011/08/30	2011/08/30	VIVIANA CANZONIERI

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Maxxam Job #: B1C9700
Report Date: 2011/08/30

Barenco Inc
Task Order#: 11068757
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Project #: 11010

Package 1	2.3°C

Each temperature is the average of up to three cooler temperatures taken at receipt

GENERAL COMMENTS

PAH Analysis: SQC trend rule failure for Phenanthrene, Batch 2594571. 2 of 3 consecutive points greater than 2SD below the mean.

PAH Analysis: SQC trend rule failure for Naphthalene, Batch 2594571. 4 of 5 consecutive points greater than 1SD below the mean.

Results relate only to the items tested.

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Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Quality Assurance Report

Maxxam Job Number: B1C9700

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2594571 DTI	Method Blank	D10-Anthracene	2011/08/26		81	%	50 - 130
		D14-Terphenyl (FS)	2011/08/26		86	%	50 - 130
		D8-Acenaphthylene	2011/08/26		61	%	50 - 130
		Acenaphthene	2011/08/26	<0.01		ug/g	
		Acenaphthylene	2011/08/26	<0.005		ug/g	
		Anthracene	2011/08/26	<0.005		ug/g	
		Benzo(a)anthracene	2011/08/26	<0.01		ug/g	
		Benzo(a)pyrene	2011/08/26	<0.005		ug/g	
		Benzo(b/j)fluoranthene	2011/08/26	<0.01		ug/g	
		Benzo(g,h,i)perylene	2011/08/26	<0.02		ug/g	
		Benzo(k)fluoranthene	2011/08/26	<0.01		ug/g	
		Chrysene	2011/08/26	<0.01		ug/g	
		Dibenz(a,h)anthracene	2011/08/26	<0.02		ug/g	
		Fluoranthene	2011/08/26	<0.005		ug/g	
		Fluorene	2011/08/26	<0.005		ug/g	
		Indeno(1,2,3-cd)pyrene	2011/08/26	<0.02		ug/g	
		1-Methylnaphthalene	2011/08/26	<0.005		ug/g	
		2-Methylnaphthalene	2011/08/26	<0.005		ug/g	
		Naphthalene	2011/08/26	<0.005		ug/g	
		Phenanthrene	2011/08/26	<0.005		ug/g	
		Pyrene	2011/08/26	<0.005		ug/g	
2598368 VIV	Method Blank	Acid Extractable Antimony (Sb)	2011/08/30	<0.2		ug/g	
		Acid Extractable Arsenic (As)	2011/08/30	<1		ug/g	
		Acid Extractable Barium (Ba)	2011/08/30	<0.5		ug/g	
		Acid Extractable Beryllium (Be)	2011/08/30	<0.2		ug/g	
		Acid Extractable Boron (B)	2011/08/30	<5		ug/g	
		Acid Extractable Cadmium (Cd)	2011/08/30	<0.1		ug/g	
		Acid Extractable Chromium (Cr)	2011/08/30	<1		ug/g	
		Acid Extractable Cobalt (Co)	2011/08/30	<0.1		ug/g	
		Acid Extractable Copper (Cu)	2011/08/30	<0.5		ug/g	
		Acid Extractable Lead (Pb)	2011/08/30	<1		ug/g	
		Acid Extractable Molybdenum (Mo)	2011/08/30	<0.5		ug/g	
		Acid Extractable Nickel (Ni)	2011/08/30	<0.5		ug/g	
		Acid Extractable Selenium (Se)	2011/08/30	<0.5		ug/g	
		Acid Extractable Silver (Ag)	2011/08/30	<0.2		ug/g	
		Acid Extractable Thallium (Tl)	2011/08/30	<0.05		ug/g	
		Acid Extractable Uranium (U)	2011/08/30	<0.05		ug/g	
		Acid Extractable Vanadium (V)	2011/08/30	<5		ug/g	
		Acid Extractable Zinc (Zn)	2011/08/30	<5		ug/g	
2596852 LKA	RPD [KR0276-01]	Moisture	2011/08/27	2.5		%	20
2598368 VIV	RPD [KR0277-01]	Acid Extractable Antimony (Sb)	2011/08/30	NC		%	35
		Acid Extractable Arsenic (As)	2011/08/30	NC		%	35
		Acid Extractable Barium (Ba)	2011/08/30	6.3		%	35
		Acid Extractable Beryllium (Be)	2011/08/30	NC		%	35
		Acid Extractable Boron (B)	2011/08/30	NC		%	35
		Acid Extractable Cadmium (Cd)	2011/08/30	NC		%	35
		Acid Extractable Chromium (Cr)	2011/08/30	0.5		%	35
		Acid Extractable Cobalt (Co)	2011/08/30	2.2		%	35
		Acid Extractable Copper (Cu)	2011/08/30	1.3		%	35
		Acid Extractable Lead (Pb)	2011/08/30	2.2		%	35
		Acid Extractable Molybdenum (Mo)	2011/08/30	NC		%	35
		Acid Extractable Nickel (Ni)	2011/08/30	1.0		%	35
		Acid Extractable Selenium (Se)	2011/08/30	NC		%	35
		Acid Extractable Silver (Ag)	2011/08/30	NC		%	35
		Acid Extractable Thallium (Tl)	2011/08/30	NC		%	35

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Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Quality Assurance Report (Continued)

Maxxam Job Number: B1C9700

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2598368 VIV	RPD [KR0277-01]	Acid Extractable Uranium (U)	2011/08/30	5.1		%	25
		Acid Extractable Vanadium (V)	2011/08/30	4.7		%	35
		Acid Extractable Zinc (Zn)	2011/08/30	5.4		%	35
	Matrix Spike [KR0277-01]	Acid Extractable Antimony (Sb)	2011/08/30		95	%	75 - 125
		Acid Extractable Arsenic (As)	2011/08/30		105	%	75 - 125
		Acid Extractable Barium (Ba)	2011/08/30		NC (1)	%	75 - 125
		Acid Extractable Beryllium (Be)	2011/08/30		100	%	75 - 125
		Acid Extractable Boron (B)	2011/08/30		100	%	75 - 125
		Acid Extractable Cadmium (Cd)	2011/08/30		107	%	75 - 125
		Acid Extractable Chromium (Cr)	2011/08/30		NC (1)	%	75 - 125
		Acid Extractable Cobalt (Co)	2011/08/30		104	%	75 - 125
		Acid Extractable Copper (Cu)	2011/08/30		104	%	75 - 125
		Acid Extractable Lead (Pb)	2011/08/30		105	%	75 - 125
		Acid Extractable Molybdenum (Mo)	2011/08/30		106	%	75 - 125
		Acid Extractable Nickel (Ni)	2011/08/30		110	%	75 - 125
		Acid Extractable Selenium (Se)	2011/08/30		108	%	75 - 125
		Acid Extractable Silver (Ag)	2011/08/30		102	%	75 - 125
		Acid Extractable Thallium (Tl)	2011/08/30		96	%	75 - 125
		Acid Extractable Uranium (U)	2011/08/30		109	%	75 - 125
		Acid Extractable Vanadium (V)	2011/08/30		NC (1)	%	75 - 125
		Acid Extractable Zinc (Zn)	2011/08/30		NC (1)	%	75 - 125
2594571 DTI	LCS	D10-Anthracene	2011/08/26		80	%	50 - 130
		D14-Terphenyl (FS)	2011/08/26		86	%	50 - 130
		D8-Acenaphthylene	2011/08/26		66	%	50 - 130
		Acenaphthene	2011/08/26		84	%	50 - 130
		Acenaphthylene	2011/08/26		88	%	50 - 130
		Anthracene	2011/08/26		80	%	50 - 130
		Benzo(a)anthracene	2011/08/26		95	%	50 - 130
		Benzo(a)pyrene	2011/08/26		105	%	50 - 130
		Benzo(b/j)fluoranthene	2011/08/26		91	%	50 - 130
		Benzo(g,h,i)perylene	2011/08/26		98	%	50 - 130
		Benzo(k)fluoranthene	2011/08/26		90	%	50 - 130
		Chrysene	2011/08/26		90	%	50 - 130
		Dibenz(a,h)anthracene	2011/08/26		104	%	50 - 130
		Fluoranthene	2011/08/26		86	%	50 - 130
		Fluorene	2011/08/26		86	%	50 - 130
		Indeno(1,2,3-cd)pyrene	2011/08/26		104	%	50 - 130
		1-Methylnaphthalene	2011/08/26		82	%	50 - 130
		2-Methylnaphthalene	2011/08/26		77	%	50 - 130
		Naphthalene	2011/08/26		81	%	50 - 130
		Phenanthrene	2011/08/26		83	%	50 - 130
		Pyrene	2011/08/26		88	%	50 - 130
2598368 VIV	SRM	Acid Extractable Antimony (Sb)	2011/08/30		98	%	75 - 125
		Acid Extractable Arsenic (As)	2011/08/30		97	%	75 - 125
		Acid Extractable Barium (Ba)	2011/08/30		97	%	75 - 125
		Acid Extractable Beryllium (Be)	2011/08/30		91	%	75 - 125
		Acid Extractable Boron (B)	2011/08/30		93	%	75 - 125
		Acid Extractable Cadmium (Cd)	2011/08/30		98	%	75 - 125
		Acid Extractable Chromium (Cr)	2011/08/30		98	%	75 - 125
		Acid Extractable Cobalt (Co)	2011/08/30		96	%	75 - 125
		Acid Extractable Copper (Cu)	2011/08/30		99	%	75 - 125
		Acid Extractable Lead (Pb)	2011/08/30		98	%	75 - 125
		Acid Extractable Molybdenum (Mo)	2011/08/30		96	%	75 - 125
		Acid Extractable Nickel (Ni)	2011/08/30		98	%	75 - 125

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Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Quality Assurance Report (Continued)

Maxxam Job Number: B1C9700

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2598368 VIV	SRM	Acid Extractable Selenium (Se)	2011/08/30		100	%	75 - 125
		Acid Extractable Silver (Ag)	2011/08/30		94	%	75 - 125
		Acid Extractable Thallium (Tl)	2011/08/30		97	%	75 - 125
		Acid Extractable Uranium (U)	2011/08/30		101	%	75 - 125
		Acid Extractable Vanadium (V)	2011/08/30		97	%	75 - 125
		Acid Extractable Zinc (Zn)	2011/08/30		100	%	75 - 125

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
SRM: A blank matrix sample to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
LCS: A blank matrix sample to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.
(1) The recovery in the matrix spike was not calculated (NC). Spiked concentration was less than 2x that native to the sample.

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Validation Signature Page

Maxxam Job #: B1C9700

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

BRAD NEWMAN, Scientific Specialist

CRISTINA CARRIERE, Scientific Services

YUAN ZHOU, gc\ms Technician

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Maxxam
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Toll Free: 1-800-563-6266

EXXONMOBIL/IMPERIAL OIL - MAXXAM CHAIN-OF-CUSTODY RECORD

ANALYSIS REQUESTED

C of C # 59520

INVOICE INFORMATION	REPORT INFORMATION
Company Name: [X] Imperial Oil [ ] ExxonMobil	Company Name: Barenco Inc.
Contact Name: Tarik Madi	Contact Name: Daina Marie Schreiber
Address:	Address: 2561 Stouffville Rd Gormley, ON L0H 1G0
Email:	Email: dschreiber@barenco.ca
Ph:	Ph: 905-887-6661
Sampler Name (Print): Darren Doherty	Consultant Project #: 11010

	FIELD SAMPLE ID	MATRIX: GROUND WATER	MATRIX: SURFACE WATER	MATRIX: SOIL	MATRIX: OTHER	# CONTAINERS	SAMPLING: DATE (YY/MM/DD)	SAMPLING: TIME	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	BTEX	F1	F2-F4	OIL & GREASE – TOTAL / MINERAL (SPECIFY)	VOC	PCB	PAH	LEAD	ICP METALS	ICPMS METALS (REG 153)	MERCURY	SAR / CRVI (SPECIFY)	BORON HOT WATER SOLUBLE	IGNITABILITY	REG 558 - INORGANICS	REG 558 - PCB LEACHATE	REG 558 - BENZENE / VOLATILES (SPECIFY)	REG 558 - B(a)P / SEMI-VOLATILES (SPECIFY)	* Limited Sample
1	TH4-3			X		2	11/08/24	0900									X			X									
2	TH5-3			X		1	11/08/24	1000									X			X									X
3																													
4																													
5																													
6																													
7																													
8																													
9																													

IOL SITE LOCATION: 1660 Merivale Road, Ottawa
IOL SITE # (if applicable): NA
IOL PROJECT # (if applicable): P12894
MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM: 11068757

REGULATORY CRITERIA / DETECTION LIMITS:
[X] Reg 153 Table 2 [ ] 2004 [X] 2011 [ ] RSC
(please indicate which Reg. version and if RSC required)
[ ] PWQO [ ] ODWS
[ ] Other _____

SPECIAL INSTRUCTIONS: -Voids may occur due to the nature of material

JARS USED AND NOT SUBMITTED: 0

TURNAROUND TIME
Standard (5 days) [ ]
Rush (3 days) [X]
(2 days) [ ]
(1 day) [ ]
(same day) [ ]
Date Required

COOLER ID	CUSTODY SEAL	YES	NO	COOLER ID	CUSTODY SEAL	YES	NO	COOLER ID	CUSTODY SEAL	YES	NO
TEMP 21.3/2°C (1 2 3)	PRESENT	✓		TEMP (1 2 3)	PRESENT			TEMP (1 2 3)	PRESENT		
	INTACT	✓			INTACT				INTACT		

ICE-YES

RELINQUISHED BY (SIGN & PRINT)	DATE (YYYY/MM/DD)	TIME	RECEIVED BY (SIGN & PRINT)	DATE (YYYY/MM/DD)	TIME
1. Darren Doherty	2011/08/24	1400	1. ASAD BHAIDU	2011/08/25	08:30
2.			2.		
3.			3.		

LAB USE ONLY
MAXXAM JOB # B1C9700
SAMPLES
LABELED BY: DKN
VERIFIED BY: T-L

COC-1012 (01/10) IOL - ON White: Maxxam Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Barenco Inc.

Sampling Date: August 24, 2011

Location: 1660 Merivale Road, Ottawa

Laboratory : Maxxam Analytics Inc.

Consultant Project Number: 11010

Sample Submission Number: B1C9700

Are All Laboratory QC Samples Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery			X	All laboratory QC samples are within the acceptance criteria.
Extraction Surrogate Recovery	X			
Method Blank Concentration	X			
Matrix Duplicate RPD	X			
Matrix Spike Recovery	X			
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	No field QC samples were submitted.
Trip Blank Concentration			X	
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	No
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 48 hours (Yes/No)?:	Yes
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Was a Data Quality Waiver (DQW) issued (Yes/No)?: No

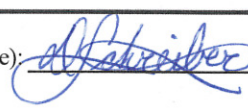
Date Issued: NA

Date of Response: NA

Is data considered to be reliable (Yes/No)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Daina Marie Schreiber

Data Reviewed by (Signature): 

Date: August 31, 2011

Maxxam

Success Through Science®

Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010
Your C.O.C. #: 59521

Attention: Daina Marie Schreiber
Barenco Inc
2561 Stouffville Rd
PO Box 295
Gormley, ON
L0H 1G0

Report Date: 2011/08/30

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B1C9706
Received: 2011/08/25, 08:30

Sample Matrix: Soil
Samples Received: 3

Analyses	Quantity	Laboratory Method	Method Primary reference
Petroleum Hydro. CCME F1 & BTEX in Soil	3	CAM SOP-00315	CCME CWS
Petroleum Hydrocarbons F2-F4 in Soil	3	CAM SOP-00316	CCME CWS
Acid Extr. Metals (aqua regia) by ICPMS	3	CAM SOP-00447	EPA 6020
Moisture	3	CAM SOP-00445	McKeague 2nd ed 1978
PAH Compounds in Soil by GC/MS (SIM)	3	CAM SOP - 00318	EPA 8270
pH CaCl2 EXTRACT	2	CAM SOP-00413	SM 4500 H

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act.

The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following the 'Alberta Environment Draft Addenda to the CWS-PHC, Appendix 6, Validation of Alternate Methods'. Documentation is available upon request. Maxxam has made the following improvements to the CWS-PHC reference benchmark method: (i) Headspace for F1; and, (ii) Mechanical extraction for F2-F4. Note: F4G cannot be added to the C6 to C50 hydrocarbons.

Maxxam Analytics is accredited by SCC (Lab ID 97) for all specific parameters as required by GUCSO and O'Reg 153/04. Maxxam Analytics is limited in liability to the actual cost of analysis unless otherwise agreed in writing. There is no other warranty expressed or implied. Samples will be retained at Maxxam Analytics for three weeks from receipt of data or as per contract.

All data is in statistical control and has met all QC and method performance criteria unless otherwise flagged. All samples were analysed within hold time unless otherwise flagged. All soil samples for BTEX analysis were methanol extracted within 24 hours unless otherwise flagged.

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Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010
Your C.O.C. #: 59521

Attention: Daina Marie Schreiber
Barenco Inc
2561 Stouffville Rd
PO Box 295
Gormley, ON
L0H 1G0

Report Date: 2011/08/30

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B1C9706
Received: 2011/08/25, 08:30

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Kudrat Cheema

Kudrat Cheema

30 Aug 2011 17:48:53 -04:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

PATRICIA OPOKU, Project Manager
Email: POpoku@maxxam.ca
Phone# (905) 817-5700

==========

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Maxxam Job #: B1C9706
Report Date: 2011/08/30

Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

O'REG 153 ICPMS METALS (SOIL)

Maxxam ID		KR0296	KR0297	KR0298		
Sampling Date		2011/08/24 09:30	2011/08/24 10:30	2011/08/24 10:30		
COC Number		59521	59521	59521		
	Units	**TH4-4**	**TH5-4**	**DUP3**	**RDL**	**QC Batch**
Acid Extractable Arsenic (As)	ug/g	1	2	2	1	2598368
Acid Extractable Barium (Ba)	ug/g	52	140	140	0.5	2598368
Acid Extractable Chromium (Cr)	ug/g	11	34	36	1	2598368
Acid Extractable Copper (Cu)	ug/g	9.6	23	23	0.5	2598368
Acid Extractable Lead (Pb)	ug/g	4	7	7	1	2598368
Acid Extractable Zinc (Zn)	ug/g	15	49	45	5	2598368

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B1C9706
Report Date: 2011/08/30

Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

O'REG 153 PETROLEUM HYDROCARBONS (SOIL)

Maxxam ID		KR0296	KR0297	KR0298	KR0298		
Sampling Date		2011/08/24 09:30	2011/08/24 10:30	2011/08/24 10:30	2011/08/24 10:30		
COC Number		59521	59521	59521	59521		
	Units	**TH4-4**	**TH5-4**	**DUP3**	**DUP3 Lab-Dup**	**RDL**	**QC Batch**
Moisture	%	10	19	19		1	2596057
Benzene	ug/g	<0.02	<0.02	<0.02	<0.02	0.02	2596455
Toluene	ug/g	<0.02	<0.02	<0.02	<0.02	0.02	2596455
Ethylbenzene	ug/g	<0.02	0.05	0.06	0.06	0.02	2596455
o-Xylene	ug/g	<0.02	<0.02	<0.02	<0.02	0.02	2596455
p+m-Xylene	ug/g	<0.04	<0.04	<0.04	<0.04	0.04	2596455
Total Xylenes	ug/g	<0.04	<0.04	<0.04	<0.04	0.04	2596455
Hexane	ug/g	<0.5	<0.5	<0.5	<0.5	0.5	2596455
F1 (C6-C10)	ug/g	<10	<10	<10	<10	10	2596455
F1 (C6-C10) - BTEX	ug/g	<10	<10	<10	<10	10	2596455
F2 (C10-C16 Hydrocarbons)	ug/g	<10	<10	<10		10	2595316
F3 (C16-C34 Hydrocarbons)	ug/g	<10	<10	<10		10	2595316
F4 (C34-C50 Hydrocarbons)	ug/g	<10	<10	<10		10	2595316
Reached Baseline at C50	ug/g	Yes	Yes	Yes			2595316
Extraction Surrogate Recovery (%)							
D10-Ethylbenzene	%	86	84	82	79		2596455
o-Terphenyl	%	95	92	92			2595316
Instrument Surrogate Recovery (%)							
1,4-Difluorobenzene	%	103	103	102	103		2596455
4-Bromofluorobenzene	%	99	99	98	98		2596455
D4-1,2-Dichloroethane	%	101	102	99	99		2596455

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
QC Batch = Quality Control Batch

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Maxxam Job #: B1C9706
Report Date: 2011/08/30

Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

RESULTS OF ANALYSES OF SOIL

Maxxam ID		KR0297	KR0298	
Sampling Date		2011/08/24 10:30	2011/08/24 10:30	
COC Number		59521	59521	
	Units	**TH5-4**	**DUP3**	**QC Batch**
Available (CaCl2) pH	pH	7.55	7.67	2595600

QC Batch = Quality Control Batch

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Maxxam Job #: B1C9706
Report Date: 2011/08/30

Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		KR0296	KR0297	KR0298		
Sampling Date		2011/08/24 09:30	2011/08/24 10:30	2011/08/24 10:30		
COC Number		59521	59521	59521		
	Units	**TH4-4**	**TH5-4**	**DUP3**	**RDL**	**QC Batch**
Acenaphthene	ug/g	<0.01	<0.01	<0.01	0.01	2595778
Acenaphthylene	ug/g	<0.005	<0.005	<0.005	0.005	2595778
Anthracene	ug/g	<0.005	<0.005	0.006	0.005	2595778
Fluoranthene	ug/g	<0.005	0.011	0.054	0.005	2595778
Fluorene	ug/g	<0.005	<0.005	<0.005	0.005	2595778
1-Methylnaphthalene	ug/g	<0.005	<0.005	<0.005	0.005	2595778
2-Methylnaphthalene	ug/g	<0.005	<0.005	<0.005	0.005	2595778
Naphthalene	ug/g	<0.005	0.007	0.013	0.005	2595778
Phenanthrene	ug/g	<0.005	<0.005	0.012	0.005	2595778
Extraction Surrogate Recovery (%)						
D10-Anthracene	%	71	73	93		2595778
D14-Terphenyl (FS)	%	81	82	99		2595778
D8-Acenaphthylene	%	49 (1)	61	78		2595778

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Surrogate recovery was below the lower control limit due to matrix interference. This may represent a low bias in some results.

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Maxxam Job #: B1C9706
Report Date: 2011/08/30

Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Test Summary

Maxxam ID KR0296 **Collected** 2011/08/24
Sample ID TH4-4 **Shipped** 2011/08/24
Matrix Soil **Received** 2011/08/25

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	2596455	2011/08/25	2011/08/30	ANCA GANEA
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	2595316	2011/08/26	2011/08/26	ZHIYUE (FRANK) ZHU
Acid Extr. Metals (aqua regia) by ICPMS	ICP/MS	2598368	2011/08/30	2011/08/30	VIVIANA CANZONIERI
Moisture	BAL	2596057	N/A	2011/08/26	LAKHVIR KALER
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	2595778	2011/08/26	2011/08/30	DARRYL TILLER

Maxxam ID KR0297 **Collected** 2011/08/24
Sample ID TH5-4 **Shipped** 2011/08/24
Matrix Soil **Received** 2011/08/25

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	2596455	2011/08/25	2011/08/30	ANCA GANEA
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	2595316	2011/08/26	2011/08/26	ZHIYUE (FRANK) ZHU
Acid Extr. Metals (aqua regia) by ICPMS	ICP/MS	2598368	2011/08/30	2011/08/30	VIVIANA CANZONIERI
Moisture	BAL	2596057	N/A	2011/08/26	LAKHVIR KALER
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	2595778	2011/08/26	2011/08/30	DARRYL TILLER
pH CaCl2 EXTRACT		2595600	2011/08/26	2011/08/26	XUANHONG QIU

Maxxam ID KR0298 **Collected** 2011/08/24
Sample ID DUP3 **Shipped** 2011/08/24
Matrix Soil **Received** 2011/08/25

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	2596455	2011/08/25	2011/08/30	ANCA GANEA
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	2595316	2011/08/26	2011/08/26	ZHIYUE (FRANK) ZHU
Acid Extr. Metals (aqua regia) by ICPMS	ICP/MS	2598368	2011/08/30	2011/08/30	VIVIANA CANZONIERI
Moisture	BAL	2596057	N/A	2011/08/26	LAKHVIR KALER
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	2595778	2011/08/26	2011/08/30	DARRYL TILLER
pH CaCl2 EXTRACT		2595600	2011/08/26	2011/08/26	XUANHONG QIU

Maxxam ID KR0298 Dup **Collected** 2011/08/24
Sample ID DUP3 **Shipped** 2011/08/24
Matrix Soil **Received** 2011/08/25

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	2596455	2011/08/25	2011/08/30	ANCA GANEA

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Maxxam Job #: B1C9706
Report Date: 2011/08/30

Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Package 1	2.3°C

Each temperature is the average of up to three cooler temperatures taken at receipt

GENERAL COMMENTS

Results relate only to the items tested.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Quality Assurance Report

Maxxam Job Number: B1C9706

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2595316 ZZ	Method Blank	o-Terphenyl	2011/08/26		99	%	30 - 130
		F2 (C10-C16 Hydrocarbons)	2011/08/26	<10		ug/g	
		F3 (C16-C34 Hydrocarbons)	2011/08/26	<10		ug/g	
		F4 (C34-C50 Hydrocarbons)	2011/08/26	<10		ug/g	
2595778 DTI	Method Blank	D10-Anthracene	2011/08/29		82	%	50 - 130
		D14-Terphenyl (FS)	2011/08/29		80	%	50 - 130
		D8-Acenaphthylene	2011/08/29		75	%	50 - 130
		Acenaphthene	2011/08/29	<0.01		ug/g	
		Acenaphthylene	2011/08/29	<0.005		ug/g	
		Anthracene	2011/08/29	<0.005		ug/g	
		Fluoranthene	2011/08/29	<0.005		ug/g	
		Fluorene	2011/08/29	<0.005		ug/g	
		1-Methylnaphthalene	2011/08/29	<0.005		ug/g	
		2-Methylnaphthalene	2011/08/29	<0.005		ug/g	
		Naphthalene	2011/08/29	<0.005		ug/g	
		Phenanthrene	2011/08/29	<0.005		ug/g	
2596455 AGA	Method Blank	1,4-Difluorobenzene	2011/08/30		103	%	60 - 140
		4-Bromofluorobenzene	2011/08/30		98	%	60 - 140
		D10-Ethylbenzene	2011/08/30		83	%	30 - 130
		D4-1,2-Dichloroethane	2011/08/30		100	%	60 - 140
		Benzene	2011/08/30	<0.02		ug/g	
		Toluene	2011/08/30	<0.02		ug/g	
		Ethylbenzene	2011/08/30	<0.02		ug/g	
		o-Xylene	2011/08/30	<0.02		ug/g	
		p+m-Xylene	2011/08/30	<0.04		ug/g	
		Total Xylenes	2011/08/30	<0.04		ug/g	
		Hexane	2011/08/30	<0.5		ug/g	
		F1 (C6-C10)	2011/08/30	<10		ug/g	
		F1 (C6-C10) - BTEX	2011/08/30	<10		ug/g	
2598368 VIV	Method Blank	Acid Extractable Arsenic (As)	2011/08/30	<1		ug/g	
		Acid Extractable Barium (Ba)	2011/08/30	<0.5		ug/g	
		Acid Extractable Chromium (Cr)	2011/08/30	<1		ug/g	
		Acid Extractable Copper (Cu)	2011/08/30	<0.5		ug/g	
		Acid Extractable Lead (Pb)	2011/08/30	<1		ug/g	
		Acid Extractable Zinc (Zn)	2011/08/30	<5		ug/g	
2596455 AGA	RPD [KR0298-03]	Benzene	2011/08/30	NC		%	50
		Toluene	2011/08/30	NC		%	50
		Ethylbenzene	2011/08/30	NC		%	50
		o-Xylene	2011/08/30	NC		%	50
		p+m-Xylene	2011/08/30	NC		%	50
		Total Xylenes	2011/08/30	NC		%	50
		Hexane	2011/08/30	NC		%	50
		F1 (C6-C10)	2011/08/30	NC		%	50
		F1 (C6-C10) - BTEX	2011/08/30	NC		%	50
	Matrix Spike [KR0297-03]	1,4-Difluorobenzene	2011/08/30		103	%	60 - 140
		4-Bromofluorobenzene	2011/08/30		99	%	60 - 140
		D10-Ethylbenzene	2011/08/30		84	%	30 - 130
		D4-1,2-Dichloroethane	2011/08/30		100	%	60 - 140
		Benzene	2011/08/30		78	%	60 - 140
		Toluene	2011/08/30		81	%	60 - 140
		Ethylbenzene	2011/08/30		81	%	60 - 140
		o-Xylene	2011/08/30		88	%	60 - 140
		p+m-Xylene	2011/08/30		83	%	60 - 140
		Hexane	2011/08/30		118	%	60 - 140

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Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Quality Assurance Report (Continued)

Maxxam Job Number: B1C9706

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2596455 AGA	Matrix Spike [KR0297-03]	F1 (C6-C10)	2011/08/30		75	%	60 - 140
2595316 ZZ	LCS	o-Terphenyl	2011/08/26		93	%	30 - 130
		F2 (C10-C16 Hydrocarbons)	2011/08/26		88	%	60 - 130
		F3 (C16-C34 Hydrocarbons)	2011/08/26		80	%	60 - 130
		F4 (C34-C50 Hydrocarbons)	2011/08/26		84	%	60 - 130
2595778 DTI	LCS	D10-Anthracene	2011/08/29		69	%	50 - 130
		D14-Terphenyl (FS)	2011/08/29		73	%	50 - 130
		D8-Acenaphthylene	2011/08/29		57	%	50 - 130
		Acenaphthene	2011/08/29		73	%	50 - 130
		Acenaphthylene	2011/08/29		73	%	50 - 130
		Anthracene	2011/08/29		70	%	50 - 130
		Fluoranthene	2011/08/29		75	%	50 - 130
		Fluorene	2011/08/29		74	%	50 - 130
		1-Methylnaphthalene	2011/08/29		57	%	50 - 130
		2-Methylnaphthalene	2011/08/29		60	%	50 - 130
		Naphthalene	2011/08/29		67	%	50 - 130
		Phenanthrene	2011/08/29		72	%	50 - 130
2596455 AGA	LCS	1,4-Difluorobenzene	2011/08/30		104	%	60 - 140
		4-Bromofluorobenzene	2011/08/30		98	%	60 - 140
		D10-Ethylbenzene	2011/08/30		83	%	30 - 130
		D4-1,2-Dichloroethane	2011/08/30		98	%	60 - 140
		Benzene	2011/08/30		78	%	60 - 140
		Toluene	2011/08/30		84	%	60 - 140
		Ethylbenzene	2011/08/30		90	%	60 - 140
		o-Xylene	2011/08/30		89	%	60 - 140
		p+m-Xylene	2011/08/30		87	%	60 - 140
		Hexane	2011/08/30		114	%	60 - 140
		F1 (C6-C10)	2011/08/30		77	%	60 - 140
2598368 VIV	SRM	Acid Extractable Arsenic (As)	2011/08/30		97	%	75 - 125
		Acid Extractable Barium (Ba)	2011/08/30		97	%	75 - 125
		Acid Extractable Chromium (Cr)	2011/08/30		98	%	75 - 125
		Acid Extractable Copper (Cu)	2011/08/30		99	%	75 - 125
		Acid Extractable Lead (Pb)	2011/08/30		98	%	75 - 125
		Acid Extractable Zinc (Zn)	2011/08/30		100	%	75 - 125

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
SRM: A blank matrix sample to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
LCS: A blank matrix sample to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.

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Validation Signature Page

Maxxam Job #: B1C9706

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

BRAD NEWMAN, Scientific Specialist

MEDHAT RISKALLAH, Manager, Hydrocarbon Department

SUZANA POPOVIC, Supervisor, Hydrocarbons

YUAN ZHOU, gc\ms Technician

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Toll Free: 1-800-563-6266

EXXONMOBIL/IMPERIAL OIL - MAXXAM CHAIN-OF-CUSTODY RECORD

C of C # 59521

INVOICE INFORMATION	REPORT INFORMATION
Company Name: ☒ Imperial Oil ☐ ExxonMobil	Company Name: BARENCO INC
Contact Name: TARIK MADI	Contact Name: DAINA MARIE SCHREIBER
Address:	Address: 2561 Stouffville Rd Goimley, ON L0H 1G0
Email:	Email: dschreiber@barenco.ca
Ph:	Ph: 905-887-6661
Sampler Name (Print): DARREN DOHERTY	Consultant Project #: 11010

	FIELD SAMPLE ID	MATRIX: GROUND WATER	MATRIX: SURFACE WATER	MATRIX: SOIL	MATRIX: OTHER	# CONTAINERS	SAMPLING: DATE (YY/MM/DD)	SAMPLING: TIME	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	BTEX (Hexane)	F1	F2-F4	OIL & GREASE – TOTAL / MINERAL (SPECIFY)	VOC	PCB	PAH (2 + 3 Ring)	LEAD	ICP METALS (Arsenic, Barium, Chromium, Copper, Zinc, Lead)	ICPMS METALS (REG 153)	MERCURY	SAR / CRVI (SPECIFY)	BORON HOT WATER SOLUBLE	IGNITABILITY	REG 558 - INORGANICS	REG 558 - PCB LEACHATE	REG 558 - BENZENE / VOLATILES (SPECIFY)	REG 558 - BaP / SEMI-VOLATILES (SPECIFY)	pH
1	TH4-4			X		4	11/08/24	0930			X	X	X				X	X	X										
2	TH5-4			X		4	↓	1030			X	X	X				X	X	X										X
3	DUP3			X		4	↓	1030			X	X	X				X	X	X										X
4																													
5																													
6																													
7																													
8																													
9																													

IOL SITE LOCATION: 1660 Merivale Road, Ottawa
IOL SITE # (if applicable): NA
IOL PROJECT # (if applicable): D12894
MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM: 11068757

REGULATORY CRITERIA / DETECTION LIMITS:
☒ Reg 153 Table 2 ☐ 2004 ☒ 2011 ☐ RSC
(please indicate which Reg. version and if RSC required)
☐ PWQO ☐ ODWS
☐ Other _____

SPECIAL INSTRUCTIONS
- Voids may occur due to nature of the material.
- Stones may be present in vials.
ICE - YES

JARS USED AND NOT SUBMITTED: 0

TURNAROUND TIME
Standard (5 days) ☐
Rush (3 days) ☒
(2 days) ☐
(1 day) ☐
(same day) ☐
Date Required

COOLER ID	CUSTODY SEAL	YES	NO	COOLER ID	CUSTODY SEAL	YES	NO	COOLER ID	CUSTODY SEAL	YES	NO
11010-1	PRESENT	✓			PRESENT				PRESENT		
TEMP 2 / 3 / 2 °C (1 2 3)	INTACT	✓		TEMP (1 2 3)	INTACT			TEMP (1 2 3)	INTACT		

LAB USE ONLY
MAXXAM JOB # B1C9706
SAMPLES
LABELED BY: DKN
VERIFIED BY:

RELINQUISHED BY (SIGN & PRINT)	DATE (YYYY/MM/DD)	TIME	RECEIVED BY (SIGN & PRINT)	DATE (YYYY/MM/DD)	TIME
1. DARREN DOHERTY	2011/08/24	1400	1. ASAD BHATTI	2011/08/25	08:30
2.			2.		
3.			3.		

COC -1012 (01/10) IOL - ON
White: Maxxam Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Barenco Inc.

Sampling Date: August 24, 2011

Location: 1660 Merivale Road, Ottawa

Laboratory : Maxxam Analytics Inc.

Consultant Project Number: 11010

Sample Submission Number: B1C9706

Are All Laboratory QC Samples Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			Extraction surrogate recovery for d8-acenaphthylene
Extraction Surrogate Recovery		X		for TH4-4, 49%, is below acceptance criteria
Method Blank Concentration	X			(50 to 130%).
Matrix Duplicate RPD	X			
Matrix Spike Recovery	X			
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	All field QC samples are within alert limits.
Trip Blank Concentration			X	
Field Duplicate RPD	X			

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 48 hours (Yes/No)?:	Yes
Is Chain of Custody completed and signed (Yes/No)?:	No
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Was a Data Quality Waiver (DQW) issued (Yes/No)?: No

Date Issued: NA

Date of Response: NA

Is data considered to be reliable (Yes/No)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Daina Marie Schreiber

Data Reviewed by (Signature): 

Date: August 31, 2011

Maxxam

Success Through Science®

Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010
Your C.O.C. #: 59535

Attention: Daina Marie Schreiber
Barenco Inc
2561 Stouffville Rd
PO Box 295
Gormley, ON
L0H 1G0

Report Date: 2011/09/01

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B1C9946
Received: 2011/08/25, 08:30

Sample Matrix: Soil
Samples Received: 3

Analyses	Quantity	Laboratory Method	Method Primary reference
Petroleum Hydro. CCME F1 & BTEX in Soil	2	CAM SOP-00315	CCME CWS
Moisture	1	CAM SOP-00445	McKeague 2nd ed 1978
PAH Compounds in Soil by GC/MS (SIM)	1	CAM SOP - 00318	EPA 8270

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act.

The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following the 'Alberta Environment Draft Addenda to the CWS-PHC, Appendix 6, Validation of Alternate Methods'. Documentation is available upon request. Maxxam has made the following improvements to the CWS-PHC reference benchmark method: (i) Headspace for F1; and, (ii) Mechanical extraction for F2-F4. Note: F4G cannot be added to the C6 to C50 hydrocarbons.

Maxxam Analytics is accredited by SCC (Lab ID 97) for all specific parameters as required by GUCSO and O'Reg 153/04. Maxxam Analytics is limited in liability to the actual cost of analysis unless otherwise agreed in writing. There is no other warranty expressed or implied. Samples will be retained at Maxxam Analytics for three weeks from receipt of data or as per contract.

All data is in statistical control and has met all QC and method performance criteria unless otherwise flagged. All samples were analysed within hold time unless otherwise flagged. All soil samples for BTEX analysis were methanol extracted within 24 hours unless otherwise flagged.

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Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010
Your C.O.C. #: 59535

Attention: Daina Marie Schreiber
Barenco Inc
2561 Stouffville Rd
PO Box 295
Gormley, ON
L0H 1G0

Report Date: 2011/09/01

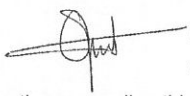
CERTIFICATE OF ANALYSIS

-2-

MAXXAM JOB #: B1C9946
Received: 2011/08/25, 08:30

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key



Patricia Opoku
01 Sep 2011 15:28:23 -04:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

PATRICIA OPOKU, Project Manager
Email: POpoku@maxxam.ca
Phone# (905) 817-5700

==========

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Maxxam Job #: B1C9946
Report Date: 2011/09/01

Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

O'REG 153 PAHS (SOIL)

Maxxam ID		KR1556		
Sampling Date		2011/08/24 13:30		
COC Number		59535		
	Units	**PAH BLANK**	**RDL**	**QC Batch**
Moisture	%	<1	1	2597957
Acenaphthene	ug/g	<0.01	0.01	2595799
Acenaphthylene	ug/g	<0.005	0.005	2595799
Anthracene	ug/g	<0.005	0.005	2595799
Benzo(a)anthracene	ug/g	<0.01	0.01	2595799
Benzo(a)pyrene	ug/g	<0.005	0.005	2595799
Benzo(b/j)fluoranthene	ug/g	<0.01	0.01	2595799
Benzo(g,h,i)perylene	ug/g	<0.02	0.02	2595799
Benzo(k)fluoranthene	ug/g	<0.01	0.01	2595799
Chrysene	ug/g	<0.01	0.01	2595799
Dibenz(a,h)anthracene	ug/g	<0.02	0.02	2595799
Fluoranthene	ug/g	<0.005	0.005	2595799
Fluorene	ug/g	<0.005	0.005	2595799
Indeno(1,2,3-cd)pyrene	ug/g	<0.02	0.02	2595799
1-Methylnaphthalene	ug/g	<0.005	0.005	2595799
2-Methylnaphthalene	ug/g	<0.005	0.005	2595799
Naphthalene	ug/g	<0.005	0.005	2595799
Phenanthrene	ug/g	<0.005	0.005	2595799
Pyrene	ug/g	<0.005	0.005	2595799
Extraction Surrogate Recovery (%)				
D10-Anthracene	%	77		2595799
D14-Terphenyl (FS)	%	80		2595799
D8-Acenaphthylene	%	60		2595799

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B1C9946
Report Date: 2011/09/01

Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		KR1554	KR1555		
Sampling Date		2011/08/24 13:00	2011/08/24 14:00		
COC Number		59535	59535		
	Units	**FIELD BLANK**	**TRIP BLANK**	**RDL**	**QC Batch**
Benzene	ug/g	<0.02	<0.02	0.02	2596103
Toluene	ug/g	<0.02	<0.02	0.02	2596103
Ethylbenzene	ug/g	<0.02	<0.02	0.02	2596103
o-Xylene	ug/g	<0.02	<0.02	0.02	2596103
p+m-Xylene	ug/g	<0.04	<0.04	0.04	2596103
Total Xylenes	ug/g	<0.04	<0.04	0.04	2596103
Hexane	ug/g	<0.5	<0.5	0.5	2596103
F1 (C6-C10)	ug/g	<10	<10	10	2596103
F1 (C6-C10) - BTEX	ug/g	<10	<10	10	2596103
Extraction Surrogate Recovery (%)					
D10-Ethylbenzene	%	89	98		2596103
Instrument Surrogate Recovery (%)					
1,4-Difluorobenzene	%	100	100		2596103
4-Bromofluorobenzene	%	97	96		2596103
D4-1,2-Dichloroethane	%	100	101		2596103

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B1C9946
Report Date: 2011/09/01

Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Test Summary

Maxxam ID KR1554 **Collected** 2011/08/24
Sample ID FIELD BLANK **Shipped** 2011/08/24
Matrix Soil **Received** 2011/08/25

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	2596103	2011/08/26	2011/08/29	MAMDOUH SALIB

Maxxam ID KR1555 **Collected** 2011/08/24
Sample ID TRIP BLANK **Shipped** 2011/08/24
Matrix Soil **Received** 2011/08/25

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	2596103	2011/08/26	2011/08/29	MAMDOUH SALIB

Maxxam ID KR1556 **Collected** 2011/08/24
Sample ID PAH BLANK **Shipped** 2011/08/24
Matrix Soil **Received** 2011/08/25

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Moisture	BAL	2597957	N/A	2011/08/29	LAKHVIR KALER
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	2595799	2011/08/26	2011/08/27	YUAN ZHOU

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Maxxam Job #: B1C9946
Report Date: 2011/09/01

Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Package 1	2.3°C

Each temperature is the average of up to three cooler temperatures taken at receipt

GENERAL COMMENTS

Results relate only to the items tested.

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Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Quality Assurance Report

Maxxam Job Number: B1C9946

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2595799 YZ	Method Blank	D10-Anthracene	2011/08/27		74	%	50 - 130
		D14-Terphenyl (FS)	2011/08/27		79	%	50 - 130
		D8-Acenaphthylene	2011/08/27		64	%	50 - 130
		Acenaphthene	2011/08/27	<0.01		ug/g	
		Acenaphthylene	2011/08/27	<0.005		ug/g	
		Anthracene	2011/08/27	<0.005		ug/g	
		Benzo(a)anthracene	2011/08/27	<0.01		ug/g	
		Benzo(a)pyrene	2011/08/27	<0.005		ug/g	
		Benzo(b/j)fluoranthene	2011/08/27	<0.01		ug/g	
		Benzo(g,h,i)perylene	2011/08/27	<0.02		ug/g	
		Benzo(k)fluoranthene	2011/08/27	<0.01		ug/g	
		Chrysene	2011/08/27	<0.01		ug/g	
		Dibenz(a,h)anthracene	2011/08/27	<0.02		ug/g	
		Fluoranthene	2011/08/27	<0.005		ug/g	
		Fluorene	2011/08/27	<0.005		ug/g	
		Indeno(1,2,3-cd)pyrene	2011/08/27	<0.02		ug/g	
		1-Methylnaphthalene	2011/08/27	<0.005		ug/g	
		2-Methylnaphthalene	2011/08/27	<0.005		ug/g	
		Naphthalene	2011/08/27	<0.005		ug/g	
		Phenanthrene	2011/08/27	<0.005		ug/g	
		Pyrene	2011/08/27	<0.005		ug/g	
2596103 MSB	Method Blank	1,4-Difluorobenzene	2011/08/29		100	%	60 - 140
		4-Bromofluorobenzene	2011/08/29		99	%	60 - 140
		D10-Ethylbenzene	2011/08/29		88	%	30 - 130
		D4-1,2-Dichloroethane	2011/08/29		95	%	60 - 140
		Benzene	2011/08/29	<0.02		ug/g	
		Toluene	2011/08/29	<0.02		ug/g	
		Ethylbenzene	2011/08/29	<0.02		ug/g	
		o-Xylene	2011/08/29	<0.02		ug/g	
		p+m-Xylene	2011/08/29	<0.04		ug/g	
		Total Xylenes	2011/08/29	<0.04		ug/g	
		Hexane	2011/08/29	<0.5		ug/g	
		F1 (C6-C10)	2011/08/29	<10		ug/g	
		F1 (C6-C10) - BTEX	2011/08/29	<10		ug/g	
2595799 YZ	LCS	D10-Anthracene	2011/08/27		76	%	50 - 130
		D14-Terphenyl (FS)	2011/08/27		82	%	50 - 130
		D8-Acenaphthylene	2011/08/27		63	%	50 - 130
		Acenaphthene	2011/08/27		74	%	50 - 130
		Acenaphthylene	2011/08/27		73	%	50 - 130
		Anthracene	2011/08/27		68	%	50 - 130
		Benzo(a)anthracene	2011/08/27		86	%	50 - 130
		Benzo(a)pyrene	2011/08/27		69	%	50 - 130
		Benzo(b/j)fluoranthene	2011/08/27		79	%	50 - 130
		Benzo(g,h,i)perylene	2011/08/27		56	%	50 - 130
		Benzo(k)fluoranthene	2011/08/27		77	%	50 - 130
		Chrysene	2011/08/27		77	%	50 - 130
		Dibenz(a,h)anthracene	2011/08/27		54	%	50 - 130
		Fluoranthene	2011/08/27		76	%	50 - 130
		Fluorene	2011/08/27		74	%	50 - 130
		Indeno(1,2,3-cd)pyrene	2011/08/27		54	%	50 - 130
		1-Methylnaphthalene	2011/08/27		61	%	50 - 130
		2-Methylnaphthalene	2011/08/27		63	%	50 - 130
		Naphthalene	2011/08/27		64	%	50 - 130
		Phenanthrene	2011/08/27		72	%	50 - 130
		Pyrene	2011/08/27		78	%	50 - 130

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Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Quality Assurance Report (Continued)

Maxxam Job Number: B1C9946

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2596103 MSB	LCS	1,4-Difluorobenzene	2011/08/29		97	%	60 - 140
		4-Bromofluorobenzene	2011/08/29		101	%	60 - 140
		D10-Ethylbenzene	2011/08/29		87	%	30 - 130
		D4-1,2-Dichloroethane	2011/08/29		93	%	60 - 140
		Benzene	2011/08/29		80	%	60 - 140
		Toluene	2011/08/29		84	%	60 - 140
		Ethylbenzene	2011/08/29		90	%	60 - 140
		o-Xylene	2011/08/29		93	%	60 - 140
		p+m-Xylene	2011/08/29		88	%	60 - 140
		Hexane	2011/08/29		67	%	60 - 140
		F1 (C6-C10)	2011/08/29		75	%	60 - 140

LCS: A blank matrix sample to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

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Validation Signature Page

Maxxam Job #: B1C9946

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

BRAD NEWMAN, Scientific Specialist

FLOYD MAYEDE, Senior Analyst

MEDHAT RISKALLAH, Manager, Hydrocarbon Department

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Toll Free: 1-800-563-6266

EXXONMOBIL/IMPERIAL OIL - MAXXAM CHAIN-OF-CUSTODY RECORD

C of C # 59535

ANALYSIS REQUESTED

INVOICE INFORMATION	REPORT INFORMATION
Company Name: ☒ Imperial Oil ☐ ExxonMobil	Company Name: Barenco Inc.
Contact Name: Tarik Madi	Contact Name: Dawn Marie Schreiber
Address:	Address: 2561 Stouffville Rd Gormley, ON L0H 1G0
Email:	Email: dschreiber@barenco.ca
Ph:	Ph: 905-887-6661
Sampler Name (Print): Darren Doherty	Consultant Project #: 11010

FIELD SAMPLE ID	MATRIX: GROUND WATER	SURFACE WATER	SOIL	OTHER	# CONTAINERS	SAMPLING: DATE (YYYY/MM/DD)	TIME	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	BTEX	F1	F2-F4	OIL & GREASE – TOTAL / MINERAL (SPECIFY)	VOC	PCB	PAH	LEAD	ICP METALS	ICPMS METALS (REG 153)	MERCURY	SAR / CRVI (SPECIFY)	BORON HOT WATER SOLUBLE	IGNITABILITY	REG 558 - INORGANICS	REG 558 - PCB LEACHATE	REG 558 - BENZENE / VOLATILES (SPECIFY)	REG 558 - B(a)P / SEMI-VOLATILES (SPECIFY)
1 Field Blank				X	2	11/08/24	1300			X	X																
2 Trip Blank				X	2	↓	1400			X	X																
3 PAH Blank				X	1	↓	1330			[redacted]						X											
4																											
5																											
6																											
7																											
8																											
9																											

Chrysene

IOL SITE LOCATION: 1660 Merivale Road, Ottawa
IOL SITE # (if applicable): NA
IOL PROJECT # (if applicable): P12894
MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM: 11068757

REGULATORY CRITERIA / DETECTION LIMITS:
☒ Reg 153 Table 2 ☐ 2004 ☒ 2011 ☐ RSC
(please indicate which Reg. version and if RSC required)
☐ PWQO ☐ ODWS
☐ Other _____

SPECIAL INSTRUCTIONS: ICE-YES

JARS USED AND NOT SUBMITTED: 0

TURNAROUND TIME
Standard (5 days) ☒
Rush (3 days) ☐
(2 days) ☐
(1 day) ☐
(same day) ☐
Date Required

COOLER ID	CUSTODY SEAL	YES	NO	COOLER ID	CUSTODY SEAL	YES	NO	COOLER ID	CUSTODY SEAL	YES	NO
11010-1	PRESENT	✓			PRESENT				PRESENT		
TEMP 2/3/2°C (1 2 3)	INTACT	✓		TEMP (1 2 3)	INTACT			TEMP (1 2 3)	INTACT		

RELINQUISHED BY (SIGN & PRINT)	DATE (YYYY/MM/DD)	TIME	RECEIVED BY (SIGN & PRINT)	DATE (YYYY/MM/DD)	TIME
1. Darren Doherty	2011/08/24	1400	1. Asad Bhatti	2011/08/25	08:30
2.			2.		
3.			3.		

LAB USE ONLY
MAXXAM JOB # B1C9946
SAMPLES
LABELED BY: ABH
VERIFIED BY: FW

COC - 1912 (01/10) IOL - ON White: Maxxam Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Barenco Inc. Sampling Date: August 24, 2011

Location: 1660 Merivale Road, Ottawa Laboratory : Maxxam Analytics Inc.

Consultant Project Number: 11010 Sample Submission Number: B1C9946

Are All Laboratory QC Samples Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC samples are within the acceptance criteria.
Extraction Surrogate Recovery	X			
Method Blank Concentration	X			
Matrix Duplicate RPD			X	
Matrix Spike Recovery			X	
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration	X			All field QC samples are within alert limits.
Trip Blank Concentration	X			
Field Duplicate RPD			X	

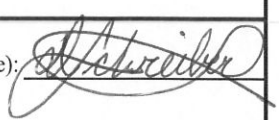
Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 48 hours (Yes/No)?:	not required
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Was a Data Quality Waiver (DQW) issued (Yes/No)?: No

Date Issued: NA Date of Response: NA

Is data considered to be reliable (Yes/No)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Daina Marie Schreiber Data Reviewed by (Signature): 

Date: September 1, 2011

Maxxam

Success Through Science®

Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010
Your C.O.C. #: 59522

Attention: Daina Marie Schreiber
Barenco Inc
2561 Stouffville Rd
PO Box 295
Gormley, ON
L0H 1G0

Report Date: 2011/09/02

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B1D1382
Received: 2011/08/26, 08:00

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Laboratory Method	Method Primary reference
Petroleum Hydro. CCME F1 & BTEX in Water	1	CAM SOP-00315	CCME CWS
F1 + F2 Calculation	1	CAM SOP-00316	CCME Hydrocarbons
Petroleum Hydrocarbons F2-F4 in Water	1	CAM SOP-00316	CCME Hydrocarbons
F3 + F4 Calculation	1	CAM SOP-00316	CCME Hydrocarbons

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act.

The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following the 'Alberta Environment Draft Addenda to the CWS-PHC, Appendix 6, Validation of Alternate Methods'. Documentation is available upon request. Maxxam has made the following improvements to the CWS-PHC reference benchmark method: (i) Headspace for F1; and, (ii) Mechanical extraction for F2-F4. Note: F4G cannot be added to the C6 to C50 hydrocarbons.

Maxxam Analytics is accredited by SCC (Lab ID 97) for all specific parameters as required by GUCSO and O'Reg 153/04. Maxxam Analytics is limited in liability to the actual cost of analysis unless otherwise agreed in writing. There is no other warranty expressed or implied. Samples will be retained at Maxxam Analytics for three weeks from receipt of data or as per contract.

All data is in statistical control and has met all QC and method performance criteria unless otherwise flagged. All samples were analysed within hold time unless otherwise flagged. All soil samples for BTEX analysis were methanol extracted within 24 hours unless otherwise flagged.

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Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010
Your C.O.C. #: 59522

Attention: Daina Marie Schreiber
Barenco Inc
2561 Stouffville Rd
PO Box 295
Gormley, ON
L0H 1G0

Report Date: 2011/09/02

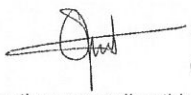
CERTIFICATE OF ANALYSIS

-2-

MAXXAM JOB #: B1D1382
Received: 2011/08/26, 08:00

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key



Patricia Opoku
02 Sep 2011 11:33:26 -04:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

PATRICIA OPOKU, Project Manager
Email: POpoku@maxxam.ca
Phone# (905) 817-5700

==========

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Maxxam Job #: B1D1382
Report Date: 2011/09/02

Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

OREG 153 PETROLEUM HYDROCARBONS (WATER)

Maxxam ID		KR7990	KR7990		
Sampling Date		2011/08/24 12:00	2011/08/24 12:00		
COC Number		59522	59522		
	Units	**WAT**	**WAT Lab-Dup**	**RDL**	**QC Batch**
Benzene	ug/L	<0.20		0.20	2599999
Toluene	ug/L	<0.20		0.20	2599999
Ethylbenzene	ug/L	<0.20		0.20	2599999
o-Xylene	ug/L	<0.20		0.20	2599999
p+m-Xylene	ug/L	<0.40		0.40	2599999
Total Xylenes	ug/L	<0.40		0.40	2599999
F1 (C6-C10)	ug/L	<25		25	2599999
F1 (C6-C10) - BTEX	ug/L	<25		25	2599999
F2 (C10-C16 Hydrocarbons)	ug/L	<100	<100	100	2596698
F3 (C16-C34 Hydrocarbons)	ug/L	<100	<100	100	2596698
F4 (C34-C50 Hydrocarbons)	ug/L	<100	<100	100	2596698
Reached Baseline at C50	ug/L	Yes	Yes		2596698
F1 + F2	ug/L	<100		100	2596667
F3 + F4	ug/L	<100	<100	100	2596668
Extraction Surrogate Recovery (%)					
o-Terphenyl	%	96	97		2596698
Instrument Surrogate Recovery (%)					
1,4-Difluorobenzene	%	100			2599999
4-Bromofluorobenzene	%	103			2599999
D10-Ethylbenzene	%	102			2599999
D4-1,2-Dichloroethane	%	101			2599999

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
QC Batch = Quality Control Batch

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Maxxam Job #: B1D1382
Report Date: 2011/09/02

Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Test Summary

Maxxam ID KR7990 **Collected** 2011/08/24
Sample ID WAT **Shipped** 2011/08/25
Matrix Water **Received** 2011/08/26

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Wat	HSGC/MSFD	2599999	N/A	2011/09/01	DAN CAO
F1 + F2 Calculation		2596667	N/A	2011/09/01	AUTOMATED STATCHK
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	2596698	2011/08/27	2011/08/27	ZHIYUE (FRANK) ZHU
F3 + F4 Calculation		2596668	N/A	2011/08/29	AUTOMATED STATCHK

Maxxam ID KR7990 Dup **Collected** 2011/08/24
Sample ID WAT **Shipped** 2011/08/25
Matrix Water **Received** 2011/08/26

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	2596698	2011/08/27	2011/08/27	ZHIYUE (FRANK) ZHU
F3 + F4 Calculation		2596668	N/A	2011/09/01	AUTOMATED STATCHK

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Maxxam Job #: B1D1382
Report Date: 2011/09/02

Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Package 1	2.0°C

Each temperature is the average of up to three cooler temperatures taken at receipt

GENERAL COMMENTS

Results relate only to the items tested.

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Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Quality Assurance Report

Maxxam Job Number: B1D1382

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2596698 ZZ	Method Blank	o-Terphenyl	2011/08/27		99	%	30 - 130
		F2 (C10-C16 Hydrocarbons)	2011/08/27	<100		ug/L	
		F3 (C16-C34 Hydrocarbons)	2011/08/27	<100		ug/L	
		F4 (C34-C50 Hydrocarbons)	2011/08/27	<100		ug/L	
2599999 DCA	Method Blank	1,4-Difluorobenzene	2011/09/01		98	%	70 - 130
		4-Bromofluorobenzene	2011/09/01		101	%	70 - 130
		D10-Ethylbenzene	2011/09/01		101	%	70 - 130
		D4-1,2-Dichloroethane	2011/09/01		100	%	70 - 130
		Benzene	2011/09/01	<0.20		ug/L	
		Toluene	2011/09/01	<0.20		ug/L	
		Ethylbenzene	2011/09/01	<0.20		ug/L	
		o-Xylene	2011/09/01	<0.20		ug/L	
		p+m-Xylene	2011/09/01	<0.40		ug/L	
		Total Xylenes	2011/09/01	<0.40		ug/L	
		F1 (C6-C10)	2011/09/01	<25		ug/L	
		F1 (C6-C10) - BTEX	2011/09/01	<25		ug/L	
2596698 ZZ	RPD [KR7990-02]	F2 (C10-C16 Hydrocarbons)	2011/08/27	NC		%	50
		F3 (C16-C34 Hydrocarbons)	2011/08/27	NC		%	50
		F4 (C34-C50 Hydrocarbons)	2011/08/27	NC		%	50
	LCS	o-Terphenyl	2011/08/27		101	%	30 - 130
		F2 (C10-C16 Hydrocarbons)	2011/08/27		79	%	60 - 130
		F3 (C16-C34 Hydrocarbons)	2011/08/27		99	%	60 - 130
		F4 (C34-C50 Hydrocarbons)	2011/08/27		98	%	60 - 130
2599999 DCA	LCS	1,4-Difluorobenzene	2011/09/01		98	%	70 - 130
		4-Bromofluorobenzene	2011/09/01		101	%	70 - 130
		D10-Ethylbenzene	2011/09/01		97	%	70 - 130
		D4-1,2-Dichloroethane	2011/09/01		98	%	70 - 130
		Benzene	2011/09/01		89	%	70 - 130
		Toluene	2011/09/01		92	%	70 - 130
		Ethylbenzene	2011/09/01		95	%	70 - 130
		o-Xylene	2011/09/01		106	%	70 - 130
		p+m-Xylene	2011/09/01		94	%	70 - 130
		F1 (C6-C10)	2011/09/01		86	%	70 - 130

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
LCS: A blank matrix sample to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.

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Validation Signature Page

Maxxam Job #: B1D1382

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

BRAD NEWMAN, Scientific Specialist

MEDHAT RISKALLAH, Manager, Hydrocarbon Department

MAMDOUH SALIB, Analyst, Hydrocarbons

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Maxxam

mpobello Road
uga, ON L5N 2L8
xxamanalytics.com
Phone: (905) 817-5700
Fax: (905) 817-5779
Toll Free: 1-800-563-6266

EXXONMOBIL/IMPERIAL OIL - MAXXAM CHAIN-OF-CUSTODY RECORD

ANALYSIS REQUESTED

C of C # 59522

INVOICE INFORMATION	REPORT INFORMATION
Company Name: [X] Imperial Oil [ ] ExxonMobil	Company Name: BARENCO INC
Contact Name: TARIK MADI	Contact Name: DAINA MARIE SCHREIBER
Address:	Address: 2561 Stouffville Rd Gormley, ON L0H 1G0
Email:	Email: dschreiber@barenco.ca
Ph:	Ph: 905-887-6661
Sampler Name (Print): DARREN DOHERTY	Consultant Project #: 11010

FIELD SAMPLE ID	MATRIX: GROUND WATER	SURFACE WATER	SOIL	OTHER	# CONTAINERS	SAMPLING: DATE (YY/MM/DD)	TIME	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	BTEX	F1	F2-F4	OIL & GREASE - TOTAL / MINERAL (SPECIFY)	VOC	PCB	PAH	LEAD	ICP METALS	ICPMS METALS (REG 153)	MERCURY	SAR / CRVI (SPECIFY)	BORON HOT WATER SOLUBLE	IGNITABILITY	REG 558 - INORGANICS	REG 558 - PCB LEACHATE	REG 558 - BENZENE / VOLATILES (SPECIFY)	REG 558 - B(a)P / SEMI-VOLATILES (SPECIFY)
1 WAT				X	7	11/08/24	1200			X	X	X															
2																											
3																											
4																											
5																											
6																											
7																											
8																											
9																											

IOL SITE LOCATION: 1660 Merivale Road, Ottawa

IOL SITE # (if applicable): NA

IOL PROJECT # (if applicable): P12894

MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM: 11068757

REGULATORY CRITERIA / DETECTION LIMITS:
[X] Reg 153 Table 2 [ ] 2004 [X] 2011 [ ] RSC
(please indicate which Reg. version and if RSC required)
[ ] PWQO [ ] ODWS
[ ] Other _____

SPECIAL INSTRUCTIONS: -Tiny bubbles may occur due to degassing
ICE-YES

JARS USED AND NOT SUBMITTED: NA

TURNAROUND TIME
Standard (5 days) [X]
Rush (3 days) [ ]
(2 days) [ ]
(1 day) [ ]
(same day) [ ]
Date Required

COOLER ID	CUSTODY SEAL	YES	NO	COOLER ID	CUSTODY SEAL	YES	NO	COOLER ID	CUSTODY SEAL	YES	NO
11010-1	PRESENT	✓			PRESENT				PRESENT		
TEMP 1 1/3/2 2 3 °C	INTACT	✓		TEMP 1 2 3	INTACT			TEMP 1 2 3	INTACT		

LAB USE ONLY
MAXXAM JOB # B1D1382

RELINQUISHED BY (SIGN & PRINT)	DATE (YYYY/MM/DD)	TIME	RECEIVED BY (SIGN & PRINT)	DATE (YYYY/MM/DD)	TIME
1. DARREN DOHERTY	2011/08/25	1300	1. DAVID CHAN	2011/08/26	08:00
2.			2.		
3.			3.		

SAMPLES
LABELED BY: DKN
VERIFIED BY: FW

COC-1012 (01/10) IOL - ON White: Maxxam Yellow: Client

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Barenco Inc.

Sampling Date: August 24, 2011

Location: 1660 Merivale Road, Ottawa

Laboratory : Maxxam Analytics Inc.

Consultant Project Number: 11010

Sample Submission Number: B1D1382

Are All Laboratory QC Samples Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC samples are within the acceptance criteria.
Extraction Surrogate Recovery	X			
Method Blank Concentration	X			
Matrix Duplicate RPD	X			
Matrix Spike Recovery			X	
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	No field QC samples were submitted.
Trip Blank Concentration			X	
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	Yes
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 48 hours (Yes/No)?:	not required
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Was a Data Quality Waiver (DQW) issued (Yes/No)?: No

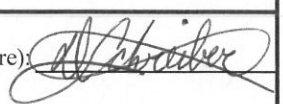
Date Issued: NA

Date of Response: NA

Is data considered to be reliable (Yes/No)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Daina Marie Schreiber

Data Reviewed by (Signature): 

Date: September 2, 2011

Maxxam

Success Through Science®

Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010
Your C.O.C. #: 62873

Attention: Daina Marie Schreiber
Barenco Inc
2561 Stouffville Rd
PO Box 295
Gormley, ON
L0H 1G0

Report Date: 2011/11/29
This report supersedes all previous reports with the same Maxxam job number

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B1D4694
Received: 2011/09/01, 17:35

Sample Matrix: Water
Samples Received: 6

Analyses	Quantity	Laboratory Method	Method Primary reference
Petroleum Hydro. CCME F1 & BTEX in Water	6	CAM SOP-00315	CCME CWS
F1 + F2 Calculation	6	CAM SOP-00316	CCME Hydrocarbons
Petroleum Hydrocarbons F2-F4 in Water	6	CAM SOP-00316	CCME Hydrocarbons
F3 + F4 Calculation	6	CAM SOP-00316	CCME Hydrocarbons
Dissolved Metals by ICPMS	6	CAM SOP-00447	EPA 6020
Volatile Organic Compounds in Water	6	CAM SOP-00226	EPA 8260 modified

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act.

The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following the 'Alberta Environment Draft Addenda to the CWS-PHC, Appendix 6, Validation of Alternate Methods'. Documentation is available upon request. Maxxam has made the following improvements to the CWS-PHC reference benchmark method: (i) Headspace for F1; and, (ii) Mechanical extraction for F2-F4. Note: F4G cannot be added to the C6 to C50 hydrocarbons.

Maxxam Analytics is accredited by SCC (Lab ID 97) for all specific parameters as required by GUCSO and O'Reg 153/04. Maxxam Analytics is limited in liability to the actual cost of analysis unless otherwise agreed in writing. There is no other warranty expressed or implied. Samples will be retained at Maxxam Analytics for three weeks from receipt of data or as per contract.

All data is in statistical control and has met all QC and method performance criteria unless otherwise flagged. All samples were analysed within hold time unless otherwise flagged. All soil samples for BTEX analysis were methanol extracted

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010
Your C.O.C. #: 62873

Attention: Daina Marie Schreiber
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2561 Stouffville Rd
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Report Date: 2011/11/29
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CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B1D4694
Received: 2011/09/01, 17:35
within 24 hours unless otherwise flagged.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Patricia Opoku
29 Nov 2011 13:37:31 -05:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

PATRICIA OPOKU, Project Manager
Email: POpoku@maxxam.ca
Phone# (905) 817-5700

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B1D4694
Report Date: 2011/11/29

Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

OREG 153 PETROLEUM HYDROCARBONS (WATER)

Maxxam ID		KT3223	KT3224	KT3225		KT3226		
Sampling Date		2011/08/31 10:30	2011/08/31 11:00	2011/08/31 11:30		2011/08/31 12:00		
COC Number		62873	62873	62873		62873		
	Units	**TH1**	**TH2**	**TH3**	**RDL**	**TH4**	**RDL**	**QC Batch**
Benzene	ug/L	<0.20	0.77	27	0.20	610	10	2603052
Toluene	ug/L	<0.20	<0.20	2.4	0.20	610	10	2603052
Ethylbenzene	ug/L	<0.20	1.3	79	0.20	3400	10	2603052
o-Xylene	ug/L	<0.20	<0.20	6.4	0.20	4200	10	2603052
p+m-Xylene	ug/L	<0.40	0.48	150	0.40	15000	20	2603052
Total Xylenes	ug/L	<0.40	0.48	150	0.40	19000	20	2603052
Hexane	ug/L	<5.0	<5.0	20	5.0	540	250	2603052
F1 (C6-C10)	ug/L	<25	<25	1400	25	50000	1300	2603052
F1 (C6-C10) - BTEX	ug/L	<25	<25	1100	25	26000	1300	2603052
F2 (C10-C16 Hydrocarbons)	ug/L	<100	<100	430	100	17000	100	2602836
F3 (C16-C34 Hydrocarbons)	ug/L	<100	<100	<100	100	360	100	2602836
F4 (C34-C50 Hydrocarbons)	ug/L	<100	<100	130	100	170	100	2602836
Reached Baseline at C50	ug/L	Yes	Yes	Yes		Yes		2602836
F1 + F2	ug/L	<100	<100	1600	100	43000	1000	2601919
F3 + F4	ug/L	<100	<100	130	100	540	100	2601920
Extraction Surrogate Recovery (%)								
o-Terphenyl	%	101	100	101		101		2602836
Instrument Surrogate Recovery (%)								
1,4-Difluorobenzene	%	102	103	100		98		2603052
4-Bromofluorobenzene	%	106	104	105		111		2603052
D10-Ethylbenzene	%	115	115	110		92		2603052
D4-1,2-Dichloroethane	%	106	105	105		96		2603052

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B1D4694
Report Date: 2011/11/29

Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

OREG 153 PETROLEUM HYDROCARBONS (WATER)

Maxxam ID		KT3227		KT3228		
Sampling Date		2011/08/31 12:30		2011/08/31 11:30		
COC Number		62873		62873		
	Units	**TH5**	**RDL**	**DUP1**	**RDL**	**QC Batch**
Benzene	ug/L	750	10	23	0.20	2603052
Toluene	ug/L	140	10	2.1	0.20	2603052
Ethylbenzene	ug/L	3000	10	69	0.20	2603052
o-Xylene	ug/L	1100	10	5.4	0.20	2603052
p+m-Xylene	ug/L	12000	20	130	0.40	2603052
Total Xylenes	ug/L	13000	20	130	0.40	2603052
Hexane	ug/L	1400	250	17	5.0	2603052
F1 (C6-C10)	ug/L	100000	1300	1400	25	2603052
F1 (C6-C10) - BTEX	ug/L	85000	1300	1100	25	2603052
F2 (C10-C16 Hydrocarbons)	ug/L	20000	100	380	100	2602836
F3 (C16-C34 Hydrocarbons)	ug/L	690	100	<100	100	2602836
F4 (C34-C50 Hydrocarbons)	ug/L	620	100	110	100	2602836
Reached Baseline at C50	ug/L	Yes		Yes		2602836
F1 + F2	ug/L	100000	1000	1500	100	2601919
F3 + F4	ug/L	1300	100	110	100	2601920
Extraction Surrogate Recovery (%)						
o-Terphenyl	%	101		99		2602836
Instrument Surrogate Recovery (%)						
1,4-Difluorobenzene	%	97		98		2603052
4-Bromofluorobenzene	%	109		109		2603052
D10-Ethylbenzene	%	95		94		2603052
D4-1,2-Dichloroethane	%	96		99		2603052

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B1D4694
Report Date: 2011/11/29

Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

LEAD (DISSOLVED) IN WATER

Maxxam ID		KT3223	KT3223	KT3224	KT3225	KT3226		
Sampling Date		2011/08/31 10:30	2011/08/31 10:30	2011/08/31 11:00	2011/08/31 11:30	2011/08/31 12:00		
COC Number		62873	62873	62873	62873	62873		
	Units	**TH1**	**TH1 Lab-Dup**	**TH2**	**TH3**	**TH4**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	<0.5	<0.5	<0.5	3.8	2.6	0.5	2603041

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
QC Batch = Quality Control Batch

Maxxam ID		KT3227	KT3228		
Sampling Date		2011/08/31 12:30	2011/08/31 11:30		
COC Number		62873	62873		
	Units	**TH5**	**DUP1**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	5.5	3.9	0.5	2603041

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B1D4694
Report Date: 2011/11/29

Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

VOLATILE ORGANICS BY GC/MS (WATER)

Maxxam ID		KT3223	KT3224	KT3224		KT3225		
Sampling Date		2011/08/31 10:30	2011/08/31 11:00	2011/08/31 11:00		2011/08/31 11:30		
COC Number		62873	62873	62873		62873		
	Units	**TH1**	**TH2**	**TH2 Lab-Dup**	**RDL**	**TH3**	**RDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ug/L	<0.5	<0.5	<0.5	0.5	<10	10	2602798
1,1-Dichloroethane	ug/L	<0.1	<0.1	<0.1	0.1	<3	3	2602798
1,2-Dichloroethane	ug/L	<0.2	<0.2	<0.2	0.2	<5	5	2602798
1,1-Dichloroethylene	ug/L	<0.1	<0.1	<0.1	0.1	<3	3	2602798
cis-1,2-Dichloroethylene	ug/L	<0.1	<0.1	<0.1	0.1	<3	3	2602798
trans-1,2-Dichloroethylene	ug/L	<0.1	<0.1	<0.1	0.1	<3	3	2602798
Ethylene Dibromide	ug/L	<0.2	<0.2	<0.2	0.2	<5	5	2602798
Methyl t-butyl ether (MTBE)	ug/L	9.8	0.2	0.2	0.2	<5	5	2602798
Tetrachloroethylene	ug/L	<0.1	<0.1	<0.1	0.1	<3	3	2602798
1,1,1-Trichloroethane	ug/L	<0.1	<0.1	<0.1	0.1	<3	3	2602798
1,1,2-Trichloroethane	ug/L	<0.2	<0.2	<0.2	0.2	<5	5	2602798
Trichloroethylene	ug/L	<0.1	<0.1	<0.1	0.1	<3	3	2602798
Vinyl Chloride	ug/L	<0.2	<0.2	<0.2	0.2	<5	5	2602798
Trichlorofluoromethane (FREON 11)	ug/L	<0.2	<0.2	<0.2	0.2	<5	5	2602798
Instrument Surrogate Recovery (%)								
4-Bromofluorobenzene	%	95	96	97		99		2602798
D4-1,2-Dichloroethane	%	106	100	102		96		2602798
D8-Toluene	%	94	97	97		100		2602798

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
QC Batch = Quality Control Batch

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Maxxam Job #: B1D4694
Report Date: 2011/11/29

Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

VOLATILE ORGANICS BY GC/MS (WATER)

Maxxam ID		KT3226		KT3227		KT3228		
Sampling Date		2011/08/31 12:00		2011/08/31 12:30		2011/08/31 11:30		
COC Number		62873		62873		62873		
	Units	**TH4**	**RDL**	**TH5**	**RDL**	**DUP1**	**RDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ug/L	<1000	1000	<500	500	<10	10	2602798
1,1-Dichloroethane	ug/L	<200	200	<100	100	<2	2	2602798
1,2-Dichloroethane	ug/L	<400	400	<200	200	<4	4	2602798
1,1-Dichloroethylene	ug/L	<200	200	<100	100	<2	2	2602798
cis-1,2-Dichloroethylene	ug/L	<200	200	<100	100	<2	2	2602798
trans-1,2-Dichloroethylene	ug/L	<200	200	<100	100	<2	2	2602798
Ethylene Dibromide	ug/L	<400	400	<200	200	<4	4	2602798
Methyl t-butyl ether (MTBE)	ug/L	<400	400	<200	200	<4	4	2602798
Tetrachloroethylene	ug/L	<200	200	<100	100	<2	2	2602798
1,1,1-Trichloroethane	ug/L	<200	200	<100	100	<2	2	2602798
1,1,2-Trichloroethane	ug/L	<400	400	<200	200	<4	4	2602798
Trichloroethylene	ug/L	<200	200	<100	100	<2	2	2602798
Vinyl Chloride	ug/L	<400	400	<200	200	<4	4	2602798
Trichlorofluoromethane (FREON 11)	ug/L	<400	400	<200	200	<4	4	2602798
Instrument Surrogate Recovery (%)								
4-Bromofluorobenzene	%	102		100		99		2602798
D4-1,2-Dichloroethane	%	99		96		94		2602798
D8-Toluene	%	97		99		102		2602798

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B1D4694
Report Date: 2011/11/29

Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Test Summary

Maxxam ID KT3223
Sample ID TH1
Matrix Water

Collected 2011/08/31
Shipped 2011/09/01
Received 2011/09/01

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Wat	HSGC/MSFD	2603052	N/A	2011/09/04	ABDI MOHAMUD
F1 + F2 Calculation		2601919	N/A	2011/09/07	AUTOMATED STATCHK
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	2602836	2011/09/02	2011/09/03	ZHIYUE (FRANK) ZHU
F3 + F4 Calculation		2601920	N/A	2011/09/07	AUTOMATED STATCHK
Dissolved Metals by ICPMS	ICP/MS	2603041	N/A	2011/09/02	KEVIN COMERFORD
Volatile Organic Compounds in Water	P&T/MS	2602798	N/A	2011/09/07	MOMTAZ ALI

Maxxam ID KT3223 Dup
Sample ID TH1
Matrix Water

Collected 2011/08/31
Shipped 2011/09/01
Received 2011/09/01

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Dissolved Metals by ICPMS	ICP/MS	2603041	N/A	2011/09/02	KEVIN COMERFORD

Maxxam ID KT3224
Sample ID TH2
Matrix Water

Collected 2011/08/31
Shipped 2011/09/01
Received 2011/09/01

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Wat	HSGC/MSFD	2603052	N/A	2011/09/04	ABDI MOHAMUD
F1 + F2 Calculation		2601919	N/A	2011/09/07	AUTOMATED STATCHK
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	2602836	2011/09/02	2011/09/03	ZHIYUE (FRANK) ZHU
F3 + F4 Calculation		2601920	N/A	2011/09/07	AUTOMATED STATCHK
Dissolved Metals by ICPMS	ICP/MS	2603041	N/A	2011/09/02	KEVIN COMERFORD
Volatile Organic Compounds in Water	P&T/MS	2602798	N/A	2011/09/07	MOMTAZ ALI

Maxxam ID KT3224 Dup
Sample ID TH2
Matrix Water

Collected 2011/08/31
Shipped 2011/09/01
Received 2011/09/01

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Volatile Organic Compounds in Water	P&T/MS	2602798	N/A	2011/09/07	MOMTAZ ALI

Maxxam ID KT3225
Sample ID TH3
Matrix Water

Collected 2011/08/31
Shipped 2011/09/01
Received 2011/09/01

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Wat	HSGC/MSFD	2603052	N/A	2011/09/04	ABDI MOHAMUD
F1 + F2 Calculation		2601919	N/A	2011/09/07	AUTOMATED STATCHK
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	2602836	2011/09/02	2011/09/03	ZHIYUE (FRANK) ZHU
F3 + F4 Calculation		2601920	N/A	2011/09/07	AUTOMATED STATCHK
Dissolved Metals by ICPMS	ICP/MS	2603041	N/A	2011/09/02	KEVIN COMERFORD
Volatile Organic Compounds in Water	P&T/MS	2602798	N/A	2011/09/07	MOMTAZ ALI

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Maxxam Job #: B1D4694
Report Date: 2011/11/29

Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Test Summary

Maxxam ID KT3226
Sample ID TH4
Matrix Water

Collected 2011/08/31
Shipped 2011/09/01
Received 2011/09/01

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Wat	HSGC/MSFD	2603052	N/A	2011/09/04	ABDI MOHAMUD
F1 + F2 Calculation		2601919	N/A	2011/09/07	AUTOMATED STATCHK
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	2602836	2011/09/02	2011/09/03	ZHIYUE (FRANK) ZHU
F3 + F4 Calculation		2601920	N/A	2011/09/07	AUTOMATED STATCHK
Dissolved Metals by ICPMS	ICP/MS	2603041	N/A	2011/09/02	KEVIN COMERFORD
Volatile Organic Compounds in Water	P&T/MS	2602798	N/A	2011/09/07	MOMTAZ ALI

Maxxam ID KT3227
Sample ID TH5
Matrix Water

Collected 2011/08/31
Shipped 2011/09/01
Received 2011/09/01

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Wat	HSGC/MSFD	2603052	N/A	2011/09/04	ABDI MOHAMUD
F1 + F2 Calculation		2601919	N/A	2011/09/07	AUTOMATED STATCHK
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	2602836	2011/09/02	2011/09/03	ZHIYUE (FRANK) ZHU
F3 + F4 Calculation		2601920	N/A	2011/09/07	AUTOMATED STATCHK
Dissolved Metals by ICPMS	ICP/MS	2603041	N/A	2011/09/02	KEVIN COMERFORD
Volatile Organic Compounds in Water	P&T/MS	2602798	N/A	2011/09/07	MOMTAZ ALI

Maxxam ID KT3228
Sample ID DUP1
Matrix Water

Collected 2011/08/31
Shipped 2011/09/01
Received 2011/09/01

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Wat	HSGC/MSFD	2603052	N/A	2011/09/04	ABDI MOHAMUD
F1 + F2 Calculation		2601919	N/A	2011/09/07	AUTOMATED STATCHK
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	2602836	2011/09/02	2011/09/03	ZHIYUE (FRANK) ZHU
F3 + F4 Calculation		2601920	N/A	2011/09/07	AUTOMATED STATCHK
Dissolved Metals by ICPMS	ICP/MS	2603041	N/A	2011/09/02	KEVIN COMERFORD
Volatile Organic Compounds in Water	P&T/MS	2602798	N/A	2011/09/07	MOMTAZ ALI

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B1D4694
Report Date: 2011/11/29

Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Package 1	1.3°C
Package 2	3.3°C
Package 3	4.0°C

Each temperature is the average of up to three cooler temperatures taken at receipt

GENERAL COMMENTS

Revised Report: As per client request additional parameters for VOC analysis reported in this C of A.

SQC trend rule failure for Pb, Batch 2603041. 2 of 3 consecutive points greater than 2SD below the mean.

SQC trend rule failure for Toluene, Batch 2603052. 2 of 3 consecutive points greater than 2SD below the mean.

VOC Analysis: Due to high concentrations of non-target analytes, some samples required dilution. Detection limits were adjusted accordingly.

The following bottles contained visual sediment, which was included in the analysis as per the Protocol for Analytical Methods Use in the Assessment of Properties under part XV.1 of the Environmental Protection Act.

For Samples TH1:
1 x 1L amber glass bottle for F4G contains <1 cm of sediment.
2 of 2 x 500mL amber glass bottles for F2-F4 contain <1 cm of sediment.
3 of 3 x 40mL clear glass vials for F1/BTEX contain <1 cm of sediment.
4 of 4 x 40mL clear glass vials for VOCs contain <1 cm of sediment.

For Samples TH2, TH3 and DUP1:
1 x 1L amber glass bottle for F4G contains <1 cm of sediment.
2 of 2 x 500mL amber glass bottles for F2-F4 contain <1 cm of sediment.
4 of 4 x 40mL clear glass vials for F1/BTEX contain <1 cm of sediment.
4 of 4 x 40mL clear glass vials for VOCs contain <1 cm of sediment.

For Sample TH4:
1 x 1L amber glass bottle for F4G contains 2.6 cm of sediment.
1st of 2 x 500mL amber glass bottle for F2-F4 contains 1.8 cm of sediment.
2nd of 2 x 500mL amber glass bottle for F2-F4 contains 2.0 cm of sediment.
1st of 4x 40mL clear glass vial for F1/BTEX contains 3.0 cm of sediment.
2nd of 4 x 40mL clear glass vial for F1/BTEX contains 3.2 cm of sediment.
2 of 4 x 40mL clear glass vials for F1/BTEX contain 3.1 cm of sediment.
1 of 4 x 40mL clear glass vial for VOCW contains 2.9 cm of sediment.
3 of 4 x 40mL clear glass vials for VOCW contain 3.0 cm of sediment.

For Sample TH5:
1 x 1L amber glass bottle for F4G contains 2.5 cm of sediment.
1st of 2 x 500mL amber glass bottle for F2-F4 contains 2.4 cm of sediment.
2nd of 2 x 500mL amber glass bottle for F2-F4 contains 2.5 cm of sediment.
1st of 4x 40mL clear glass vial for F1/BTEX contains 1.5 cm of sediment.
2nd of 4 x 40mL clear glass vial for F1/BTEX contains 1.5 cm of sediment.
3rd of 4 x 40mL clear glass vial for F1/BTEX contains 1.5 cm of sediment.
4th of 4 x 40mL clear glass vial for F1/BTEX contains 1.6 cm of sediment.
3 of 4 x 40mL clear glass vials for VOCW contain 1.2 cm of sediment.
1 of 4 x 40mL clear glass vial for VOCW contains 1.1 cm of sediment.

Results relate only to the items tested.

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Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Quality Assurance Report

Maxxam Job Number: B1D4694

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2602798 MAL	Method Blank	4-Bromofluorobenzene	2011/09/07		95	%	70 - 130
		D4-1,2-Dichloroethane	2011/09/07		102	%	70 - 130
		D8-Toluene	2011/09/07		96	%	70 - 130
		Dichlorodifluoromethane (FREON 12)	2011/09/07	<0.5		ug/L	
		1,1-Dichloroethane	2011/09/07	<0.1		ug/L	
		1,2-Dichloroethane	2011/09/07	<0.2		ug/L	
		1,1-Dichloroethylene	2011/09/07	<0.1		ug/L	
		cis-1,2-Dichloroethylene	2011/09/07	<0.1		ug/L	
		trans-1,2-Dichloroethylene	2011/09/07	<0.1		ug/L	
		Ethylene Dibromide	2011/09/07	<0.2		ug/L	
		Methyl t-butyl ether (MTBE)	2011/09/07	<0.2		ug/L	
		Tetrachloroethylene	2011/09/07	<0.1		ug/L	
		1,1,1-Trichloroethane	2011/09/07	<0.1		ug/L	
		1,1,2-Trichloroethane	2011/09/07	<0.2		ug/L	
		Trichloroethylene	2011/09/07	<0.1		ug/L	
		Vinyl Chloride	2011/09/07	<0.2		ug/L	
		Trichlorofluoromethane (FREON 11)	2011/09/07	<0.2		ug/L	
2602836 ZZ	Method Blank	o-Terphenyl	2011/09/02		110	%	50 - 130
		F2 (C10-C16 Hydrocarbons)	2011/09/02	<100		ug/L	
		F3 (C16-C34 Hydrocarbons)	2011/09/02	<100		ug/L	
		F4 (C34-C50 Hydrocarbons)	2011/09/02	<100		ug/L	
2603041 KCO	Method Blank	Dissolved Lead (Pb)	2011/09/02	<0.5		ug/L	
2603052 ABD	Method Blank	1,4-Difluorobenzene	2011/09/04		98	%	70 - 130
		4-Bromofluorobenzene	2011/09/04		103	%	70 - 130
		D10-Ethylbenzene	2011/09/04		102	%	70 - 130
		D4-1,2-Dichloroethane	2011/09/04		100	%	70 - 130
		Benzene	2011/09/04	<0.20		ug/L	
		Toluene	2011/09/04	<0.20		ug/L	
		Ethylbenzene	2011/09/04	<0.20		ug/L	
		o-Xylene	2011/09/04	<0.20		ug/L	
		p+m-Xylene	2011/09/04	<0.40		ug/L	
		Total Xylenes	2011/09/04	<0.40		ug/L	
		Hexane	2011/09/04	<5.0		ug/L	
		F1 (C6-C10)	2011/09/04	<25		ug/L	
		F1 (C6-C10) - BTEX	2011/09/04	<25		ug/L	
2603041 KCO	RPD [KT3223-03]	Dissolved Lead (Pb)	2011/09/02	NC		%	20
2602798 MAL	RPD [KT3224-04]	Dichlorodifluoromethane (FREON 12)	2011/09/07	NC		%	30
		1,1-Dichloroethane	2011/09/07	NC		%	30
		1,2-Dichloroethane	2011/09/07	NC		%	30
		1,1-Dichloroethylene	2011/09/07	NC		%	30
		cis-1,2-Dichloroethylene	2011/09/07	NC		%	30
		trans-1,2-Dichloroethylene	2011/09/07	NC		%	30
		Ethylene Dibromide	2011/09/07	NC		%	30
		Methyl t-butyl ether (MTBE)	2011/09/07	NC		%	30
		Tetrachloroethylene	2011/09/07	NC		%	30
		1,1,1-Trichloroethane	2011/09/07	NC		%	30
		1,1,2-Trichloroethane	2011/09/07	NC		%	30
		Trichloroethylene	2011/09/07	NC		%	30
		Vinyl Chloride	2011/09/07	NC		%	30
		Trichlorofluoromethane (FREON 11)	2011/09/07	NC		%	30
	Matrix Spike [KT3223-04]	4-Bromofluorobenzene	2011/09/07		101	%	70 - 130
		D4-1,2-Dichloroethane	2011/09/07		100	%	70 - 130
		D8-Toluene	2011/09/07		102	%	70 - 130
		Dichlorodifluoromethane (FREON 12)	2011/09/07		91	%	60 - 140

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Barenco Inc
Task Order#: 11068757
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Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Quality Assurance Report (Continued)

Maxxam Job Number: B1D4694

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2602798 MAL	Matrix Spike [KT3223-04]	1,1-Dichloroethane	2011/09/07		106	%	70 - 130
		1,2-Dichloroethane	2011/09/07		108	%	70 - 130
		1,1-Dichloroethylene	2011/09/07		104	%	70 - 130
		cis-1,2-Dichloroethylene	2011/09/07		102	%	70 - 130
		trans-1,2-Dichloroethylene	2011/09/07		101	%	70 - 130
		Ethylene Dibromide	2011/09/07		105	%	70 - 130
		Methyl t-butyl ether (MTBE)	2011/09/07		104	%	70 - 130
		Tetrachloroethylene	2011/09/07		96	%	70 - 130
		1,1,1-Trichloroethane	2011/09/07		107	%	70 - 130
		1,1,2-Trichloroethane	2011/09/07		100	%	70 - 130
		Trichloroethylene	2011/09/07		101	%	70 - 130
		Vinyl Chloride	2011/09/07		97	%	70 - 130
		Trichlorofluoromethane (FREON 11)	2011/09/07		98	%	70 - 130
2603041 KCO	Matrix Spike [KT3223-03]	Dissolved Lead (Pb)	2011/09/02		92	%	80 - 120
2602798 MAL	LCS	4-Bromofluorobenzene	2011/09/07		101	%	70 - 130
		D4-1,2-Dichloroethane	2011/09/07		97	%	70 - 130
		D8-Toluene	2011/09/07		103	%	70 - 130
		Dichlorodifluoromethane (FREON 12)	2011/09/07		90	%	60 - 140
		1,1-Dichloroethane	2011/09/07		102	%	70 - 130
		1,2-Dichloroethane	2011/09/07		102	%	70 - 130
		1,1-Dichloroethylene	2011/09/07		101	%	70 - 130
		cis-1,2-Dichloroethylene	2011/09/07		98	%	70 - 130
		trans-1,2-Dichloroethylene	2011/09/07		97	%	70 - 130
		Ethylene Dibromide	2011/09/07		102	%	70 - 130
		Methyl t-butyl ether (MTBE)	2011/09/07		99	%	70 - 130
		Tetrachloroethylene	2011/09/07		100	%	70 - 130
		1,1,1-Trichloroethane	2011/09/07		104	%	70 - 130
		1,1,2-Trichloroethane	2011/09/07		97	%	70 - 130
		Trichloroethylene	2011/09/07		102	%	70 - 130
		Vinyl Chloride	2011/09/07		95	%	70 - 130
		Trichlorofluoromethane (FREON 11)	2011/09/07		96	%	70 - 130
2602836 ZZ	LCS	o-Terphenyl	2011/09/03		116	%	50 - 130
		F2 (C10-C16 Hydrocarbons)	2011/09/03		101	%	70 - 130
		F3 (C16-C34 Hydrocarbons)	2011/09/03		100	%	70 - 130
		F4 (C34-C50 Hydrocarbons)	2011/09/03		107	%	70 - 130
2603041 KCO	LCS	Dissolved Lead (Pb)	2011/09/02		95	%	80 - 120
2603052 ABD	LCS	1,4-Difluorobenzene	2011/09/04		101	%	70 - 130
		4-Bromofluorobenzene	2011/09/04		106	%	70 - 130
		D10-Ethylbenzene	2011/09/04		101	%	70 - 130
		D4-1,2-Dichloroethane	2011/09/04		99	%	70 - 130
		Benzene	2011/09/04		85	%	70 - 130
		Toluene	2011/09/04		90	%	70 - 130
		Ethylbenzene	2011/09/04		94	%	70 - 130
		o-Xylene	2011/09/04		92	%	70 - 130
		p+m-Xylene	2011/09/04		93	%	70 - 130
		Hexane	2011/09/04		81	%	70 - 130
		F1 (C6-C10)	2011/09/04		96	%	70 - 130

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
LCS: A blank matrix sample to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a

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Barenco Inc
Task Order#: 11068757
Site#: P12894
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Project #: 11010

Quality Assurance Report (Continued)

Maxxam Job Number: B1D4694

reliable calculation.

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Validation Signature Page

Maxxam Job #: B1D4694

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

BRAD NEWMAN, Scientific Specialist

EWA PRANJIC, M.Sc., C.Chem, Scientific Specialist

MEDHAT RISKALLAH, Manager, Hydrocarbon Department

SUZANA POPOVIC, Supervisor, Hydrocarbons

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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EXXONMOBIL/IMPERIAL OIL - MAXXAM CHAIN-OF-CUSTODY RECORD

C of C # 62873

ANALYSIS REQUESTED

INVOICE INFORMATION

Company Name: ☒ Imperial Oil ☐ ExxonMobil
Contact Name: Tarik Madi
Address:
Email:
Ph:
Sampler Name (Print): Alex Cancelli & Daniel Oliveira

REPORT INFORMATION

Company Name: Barnes Inc.
Contact Name: Daina Marie Schreiber
Address: 2561 Stouffville Rd. Gormley, ON L0H 1G0
Email: dschreiber@barnes.ca.
Ph: 905 887 1661
Consultant Project #: 11010

FIELD SAMPLE ID	MATRIX: GROUND WATER	MATRIX: SURFACE WATER	MATRIX: SOIL	MATRIX: OTHER	# CONTAINERS	SAMPLING: DATE (YY/MM/DD)	SAMPLING: TIME	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	BTEX including hexane	F1	F2-F4	OIL & GREASE - TOTAL / MINERAL (SPECIFY)	VOC (EDB; EDC; MTBE)	PCB	PAH	LEAD	ICP METALS	ICPMS METALS (REG 153)	MERCURY	SAR / CRVI (SPECIFY)	BORON HOT WATER SOLUBLE	IGNITABILITY	REG 558 - INORGANICS	REG 558 - PCB LEACHATE	REG 558 - BENZENE / VOLATILES (SPECIFY)	REG 558 - B(a)P / SEMI-VOLATILES (SPECIFY)	* limited sample	
1 TH1	X				11	11/08/31	10:30	X		X	X	X		X			X											*	3 vials for VOC.
2 TH2	X				12		11:00	X		X	X	X		X			X												
3 TH3	X				12		11:30	X		X	X	X		X			X												
4 TH4	X				12		12:00	X		X	X	X		X			X												
5 TH5	X				12		12:30	X		X	X	X		X			X												
6 DUP1	X				12	↓	11:30	X		X	X	X		X			X												
7																													
8																													
9																													

Tiny bubbles may occur due to degassing
Particulate may be present.

IOL SITE LOCATION: 1660 Merivale Road, Ottawa.
IOL SITE # (if applicable): NA
IOL PROJECT # (if applicable): #12894
MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM: 11068757

REGULATORY CRITERIA / DETECTION LIMITS:
☒ Reg 153 Table 3 ☐ 2004 ☒ 2011 ☐ RSC
(please indicate which Reg. version and if RSC required)
☐ PWQO ☐ ODWS
☐ Other

SPECIAL INSTRUCTIONS

JARS USED AND NOT SUBMITTED: NA

TURNAROUND TIME
Standard (5 days) ☐
Rush (3 days) ☐
(2 days) ☒
(1 day) ☐
(same day) ☐
Date Required

ICE - YES

COOLER ID	CUSTODY SEAL	YES	NO	COOLER ID	CUSTODY SEAL	YES	NO	COOLER ID	CUSTODY SEAL	YES	NO
TEMP 1 2/1/1°C 2 3	PRESENT	✓		TEMP 1 2 3/4/3°C 3	PRESENT	✓		TEMP 1 5/4/3°C 2 3	PRESENT	✓	
11010-2	INTACT	✓		11010-3	INTACT	✓		11010-4	INTACT	✓	

LAB USE ONLY
MAXXAM JOB #: B1D4694

RELINQUISHED BY (SIGN & PRINT)	DATE (YYYY/MM/DD)	TIME	RECEIVED BY (SIGN & PRINT)	DATE (YYYY/MM/DD)	TIME
1. Alex Cancelli / AlCancelli	2011/08/31	16:00	1. JvanFrankenhuyzen	2011/09/01	1:300
2. JvanFrankenhuyzen	2011/09/01	1600	2. DAVID CHAN	2011/09/01	17:35
3.			3.		

SAMPLES
LABELED BY: FW
VERIFIED BY: DKN

CCC - 1012 (01/13) IOL - CN

White: Maxxam Yellow: Client

Maxxam

EXXONMOBIL / IMPERIAL OIL - MAXXAM ADDITIONAL ANALYSIS REQUEST RECORD

Consultant Name: Barenco Inc

Contact Name: Daina Marie Schreiber

Consultant Project #: 11010

Maxxam Job #: B1D4694

(Please complete this form on a per job basis - i.e. one form per original Maxxam Job#)

IOL Site Location: 1660 Merivale Road, Ottawa

IOL Project Manager: Tarik Madi

IOL Task Order or Service Order #: 11068757

Line Item: _____ (if applicable)

Maxxam Location: Mississauga, Ontario

TURNAROUND TIME		
Standard	(5 days)	☑
Rush	(3 days)	☐
	(2 days)	☐
	(1 day)	☐
	(same day)	☐
Date Required:		

Applicable Guidelines (please specify):

Reg 153, Table 3, 2011

CLIENT SAMPLE ID	Original COC #	LAB ID	Matrix	SAMPLING DATE (YY/MM/DD)	SAMPLING Time HH:MM	ADDITIONAL ANALYSIS REQUEST: 1,1-DCA, tetrachloroethylene, trichloroethylene, 1,1-DCE, cis-1,2-DCE, trans-1,2-DCE, vinyl chloride, 1,1,1-trichloroethane, 1,1,2-trichloroethane, CFC	Sample previously submitted on hold (Y/N)	SPECIAL INSTRUCTIONS
TH1	62873	KT3223	GW	11/08/31	10:30	X	N	IOL Site #: NA
TH2	62873	KT3224	GW	11/08/31	11:00	X	N	
TH3	62873	KT3225	GW	11/08/31	11:30	X	N	IOL Project #: P12894
TH4	62873	KT3226	GW	11/08/31	12:00	X	N	
TH5	62873	KT3227	GW	11/08/31	12:30	X	N	
DUP1	62873	KT3228	GW	11/08/31	11:30	X	N	

LAB USE ONLY

Original COC analysis completed and invoiced at time of add-on (circle one)

(YES) NO

(if yes original coc in invoice package is for reference only)

New Maxxam Job # (if applicable)

NA

REQUESTED BY: (Please Sign & Print)	Daina Marie Schreiber	DATE: (YYYY/MM/DD) 2011/11/23	TIME: (HH:MM) 16:00
RECEIVED BY: (Please Sign & Print)	Kudrat Cheema / KUDRAT CHEEMA	DATE: (YYYY/MM/DD) 2011/11/23	TIME: (HH:MM) 16:25

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DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Barenco Inc.

Sampling Date: August 31, 2011

Location: 1660 Merivale Road, Ottawa

Laboratory : Maxxam Analytics Inc.

Consultant Project Number: 11010

Sample Submission Number: B1D4694

Are All Laboratory QC Samples Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC samples are within the acceptance criteria.
Extraction Surrogate Recovery	X			
Method Blank Concentration	X			
Matrix Duplicate RPD	X			
Matrix Spike Recovery			X	
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration			X	All field QC samples are within alert limits.
Trip Blank Concentration			X	
Field Duplicate RPD	X			

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	No
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 48 hours (Yes/No)?:	not required
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Was a Data Quality Waiver (DQW) issued (Yes/No)?: No

Date Issued: NA

Date of Response: NA

Is data considered to be reliable (Yes/No)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Daina Marie Schreiber

Data Reviewed by (Signature): 

Date: September 7, 2011

Maxxam

Success Through Science®

Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010
Your C.O.C. #: 62870

Attention: Daina Marie Schreiber
Barenco Inc
2561 Stouffville Rd
PO Box 295
Gormley, ON
L0H 1G0

Report Date: 2011/11/29
This report supersedes all previous reports with the same Maxxam job number

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B1D4730
Received: 2011/09/01, 17:35

Sample Matrix: Water
Samples Received: 2

Analyses	Quantity	Laboratory Method	Method Primary reference
Petroleum Hydro. CCME F1 & BTEX in Water	2	CAM SOP-00315	CCME CWS
F1 + F2 Calculation	2	CAM SOP-00316	CCME Hydrocarbons
Petroleum Hydrocarbons F2-F4 in Water	2	CAM SOP-00316	CCME Hydrocarbons
F3 + F4 Calculation	2	CAM SOP-00316	CCME Hydrocarbons
Dissolved Metals by ICPMS	2	CAM SOP-00447	EPA 6020
Volatile Organic Compounds in Water	2	CAM SOP-00226	EPA 8260 modified

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act.

The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following the 'Alberta Environment Draft Addenda to the CWS-PHC, Appendix 6, Validation of Alternate Methods'. Documentation is available upon request. Maxxam has made the following improvements to the CWS-PHC reference benchmark method: (i) Headspace for F1; and, (ii) Mechanical extraction for F2-F4. Note: F4G cannot be added to the C6 to C50 hydrocarbons.

Maxxam Analytics is accredited by SCC (Lab ID 97) for all specific parameters as required by GUCSO and O'Reg 153/04. Maxxam Analytics is limited in liability to the actual cost of analysis unless otherwise agreed in writing. There is no other warranty expressed or implied. Samples will be retained at Maxxam Analytics for three weeks from receipt of data or as per contract.

All data is in statistical control and has met all QC and method performance criteria unless otherwise flagged. All samples were analysed within hold time unless otherwise flagged. All soil samples for BTEX analysis were methanol extracted

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010
Your C.O.C. #: 62870

Attention: Daina Marie Schreiber
Barenco Inc
2561 Stouffville Rd
PO Box 295
Gormley, ON
L0H 1G0

Report Date: 2011/11/29
This report supersedes all previous reports with the same Maxxam job number

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B1D4730
Received: 2011/09/01, 17:35
within 24 hours unless otherwise flagged.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Patricia Opoku
29 Nov 2011 13:53:31 -05:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

PATRICIA OPOKU, Project Manager
Email: POpoku@maxxam.ca
Phone# (905) 817-5700

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B1D4730
Report Date: 2011/11/29

Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

OREG 153 PETROLEUM HYDROCARBONS (WATER)

Maxxam ID		KT3365	KT3366		
Sampling Date		2011/08/31 13:00	2011/08/31 16:00		
COC Number		62870	62870		
	Units	**F. BLANK**	**TRIP BLANK**	**RDL**	**QC Batch**
Benzene	ug/L	<0.20	<0.20	0.20	2605762
Toluene	ug/L	<0.20	<0.20	0.20	2605762
Ethylbenzene	ug/L	<0.20	<0.20	0.20	2605762
o-Xylene	ug/L	<0.20	<0.20	0.20	2605762
p+m-Xylene	ug/L	<0.40	<0.40	0.40	2605762
Total Xylenes	ug/L	<0.40	<0.40	0.40	2605762
Hexane	ug/L	<5.0	<5.0	5.0	2605762
F1 (C6-C10)	ug/L	<25	<25	25	2605762
F1 (C6-C10) - BTEX	ug/L	<25	<25	25	2605762
F2 (C10-C16 Hydrocarbons)	ug/L	<100	<100	100	2605766
F3 (C16-C34 Hydrocarbons)	ug/L	<100	<100	100	2605766
F4 (C34-C50 Hydrocarbons)	ug/L	<100	<100	100	2605766
Reached Baseline at C50	ug/L	Yes	Yes		2605766
F1 + F2	ug/L	<100	<100	100	2602730
F3 + F4	ug/L	<100	<100	100	2602731
Extraction Surrogate Recovery (%)					
o-Terphenyl	%	108	109		2605766
Instrument Surrogate Recovery (%)					
1,4-Difluorobenzene	%	98	99		2605762
4-Bromofluorobenzene	%	102	104		2605762
D10-Ethylbenzene	%	103	101		2605762
D4-1,2-Dichloroethane	%	92	94		2605762

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B1D4730
Report Date: 2011/11/29

Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

LEAD (DISSOLVED) IN WATER

Maxxam ID		KT3365	KT3366		
Sampling Date		2011/08/31 13:00	2011/08/31 16:00		
COC Number		62870	62870		
	Units	**F. BLANK**	**TRIP BLANK**	**RDL**	**QC Batch**
Dissolved Lead (Pb)	ug/L	<0.5	<0.5	0.5	2604546

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B1D4730
Report Date: 2011/11/29

Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

VOLATILE ORGANICS BY GC/MS (WATER)

Maxxam ID		KT3365	KT3366		
Sampling Date		2011/08/31 13:00	2011/08/31 16:00		
COC Number		62870	62870		
	Units	**F. BLANK**	**TRIP BLANK**	**RDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ug/L	<0.5	<0.5	0.5	2601477
1,1-Dichloroethane	ug/L	<0.1	<0.1	0.1	2601477
1,2-Dichloroethane	ug/L	<0.2	<0.2	0.2	2601477
1,1-Dichloroethylene	ug/L	<0.1	<0.1	0.1	2601477
cis-1,2-Dichloroethylene	ug/L	<0.1	<0.1	0.1	2601477
trans-1,2-Dichloroethylene	ug/L	<0.1	<0.1	0.1	2601477
Ethylene Dibromide	ug/L	<0.2	<0.2	0.2	2601477
Methyl t-butyl ether (MTBE)	ug/L	<0.2	<0.2	0.2	2601477
Tetrachloroethylene	ug/L	<0.1	<0.1	0.1	2601477
1,1,1-Trichloroethane	ug/L	<0.1	<0.1	0.1	2601477
1,1,2-Trichloroethane	ug/L	<0.2	<0.2	0.2	2601477
Trichloroethylene	ug/L	<0.1	<0.1	0.1	2601477
Vinyl Chloride	ug/L	<0.2	<0.2	0.2	2601477
Trichlorofluoromethane (FREON 11)	ug/L	<0.2	<0.2	0.2	2601477
Instrument Surrogate Recovery (%)					
4-Bromofluorobenzene	%	94	97		2601477
D4-1,2-Dichloroethane	%	101	103		2601477
D8-Toluene	%	95	95		2601477

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B1D4730
Report Date: 2011/11/29

Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Test Summary

Maxxam ID KT3365
Sample ID F. BLANK
Matrix Water

Collected 2011/08/31
Shipped 2011/09/01
Received 2011/09/01

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Wat	HSGC/MSFD	2605762	N/A	2011/09/07	MAMDOUH SALIB
F1 + F2 Calculation		2602730	N/A	2011/09/08	AUTOMATED STATCHK
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	2605766	2011/09/07	2011/09/07	JEEVARAJ JEEVARATRNAM
F3 + F4 Calculation		2602731	N/A	2011/09/08	AUTOMATED STATCHK
Dissolved Metals by ICPMS	ICP/MS	2604546	N/A	2011/09/08	AREFA DABHAD
Volatile Organic Compounds in Water	P&T/MS	2601477	N/A	2011/09/07	AMPOMAH ADUTWUM

Maxxam ID KT3366
Sample ID TRIP BLANK
Matrix Water

Collected 2011/08/31
Shipped 2011/09/01
Received 2011/09/01

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Wat	HSGC/MSFD	2605762	N/A	2011/09/07	MAMDOUH SALIB
F1 + F2 Calculation		2602730	N/A	2011/09/08	AUTOMATED STATCHK
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	2605766	2011/09/07	2011/09/07	JEEVARAJ JEEVARATRNAM
F3 + F4 Calculation		2602731	N/A	2011/09/08	AUTOMATED STATCHK
Dissolved Metals by ICPMS	ICP/MS	2604546	N/A	2011/09/08	AREFA DABHAD
Volatile Organic Compounds in Water	P&T/MS	2601477	N/A	2011/09/07	AMPOMAH ADUTWUM

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Maxxam Job #: B1D4730
Report Date: 2011/11/29

Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Package 1	2.7°C

Each temperature is the average of up to three cooler temperatures taken at receipt

GENERAL COMMENTS

Revised Report: As per client request additional parameters for VOC analysis reported in this C of A.

Sample KT3365-01: VOC Analysis: SQC out of statistical control failure for Toluene, Batch 2601477. Greater than 3 SD above the mean.

Sample KT3366-01: VOC Analysis: SQC out of statistical control failure for Toluene, Batch 2601477. Greater than 3 SD above the mean.

Results relate only to the items tested.

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Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Quality Assurance Report

Maxxam Job Number: B1D4730

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2601477 AAD	Method Blank	4-Bromofluorobenzene	2011/09/07		96	%	70 - 130
		D4-1,2-Dichloroethane	2011/09/07		102	%	70 - 130
		D8-Toluene	2011/09/07		96	%	70 - 130
		Dichlorodifluoromethane (FREON 12)	2011/09/07	<0.5		ug/L	
		1,1-Dichloroethane	2011/09/07	<0.1		ug/L	
		1,2-Dichloroethane	2011/09/07	<0.2		ug/L	
		1,1-Dichloroethylene	2011/09/07	<0.1		ug/L	
		cis-1,2-Dichloroethylene	2011/09/07	<0.1		ug/L	
		trans-1,2-Dichloroethylene	2011/09/07	<0.1		ug/L	
		Ethylene Dibromide	2011/09/07	<0.2		ug/L	
		Methyl t-butyl ether (MTBE)	2011/09/07	<0.2		ug/L	
		Tetrachloroethylene	2011/09/07	<0.1		ug/L	
		1,1,1-Trichloroethane	2011/09/07	<0.1		ug/L	
		1,1,2-Trichloroethane	2011/09/07	<0.2		ug/L	
		Trichloroethylene	2011/09/07	<0.1		ug/L	
		Vinyl Chloride	2011/09/07	<0.2		ug/L	
		Trichlorofluoromethane (FREON 11)	2011/09/07	<0.2		ug/L	
2604546 ADA	Method Blank	Dissolved Lead (Pb)	2011/09/08	<0.5		ug/L	
2605762 MSB	Method Blank	1,4-Difluorobenzene	2011/09/07		99	%	70 - 130
		4-Bromofluorobenzene	2011/09/07		106	%	70 - 130
		D10-Ethylbenzene	2011/09/07		104	%	70 - 130
		D4-1,2-Dichloroethane	2011/09/07		92	%	70 - 130
		Benzene	2011/09/07	<0.20		ug/L	
		Toluene	2011/09/07	<0.20		ug/L	
		Ethylbenzene	2011/09/07	<0.20		ug/L	
		o-Xylene	2011/09/07	<0.20		ug/L	
		p+m-Xylene	2011/09/07	<0.40		ug/L	
		Total Xylenes	2011/09/07	<0.40		ug/L	
		Hexane	2011/09/07	<5.0		ug/L	
		F1 (C6-C10)	2011/09/07	<25		ug/L	
		F1 (C6-C10) - BTEX	2011/09/07	<25		ug/L	
2605766 JJE	Method Blank	o-Terphenyl	2011/09/07		109	%	50 - 130
		F2 (C10-C16 Hydrocarbons)	2011/09/07	<100		ug/L	
		F3 (C16-C34 Hydrocarbons)	2011/09/07	<100		ug/L	
		F4 (C34-C50 Hydrocarbons)	2011/09/07	<100		ug/L	
2601477 AAD	LCS	4-Bromofluorobenzene	2011/09/07		101	%	70 - 130
		D4-1,2-Dichloroethane	2011/09/07		100	%	70 - 130
		D8-Toluene	2011/09/07		100	%	70 - 130
		Dichlorodifluoromethane (FREON 12)	2011/09/07		92	%	60 - 140
		1,1-Dichloroethane	2011/09/07		103	%	70 - 130
		1,2-Dichloroethane	2011/09/07		108	%	70 - 130
		1,1-Dichloroethylene	2011/09/07		102	%	70 - 130
		cis-1,2-Dichloroethylene	2011/09/07		102	%	70 - 130
		trans-1,2-Dichloroethylene	2011/09/07		99	%	70 - 130
		Ethylene Dibromide	2011/09/07		108	%	70 - 130
		Methyl t-butyl ether (MTBE)	2011/09/07		108	%	70 - 130
		Tetrachloroethylene	2011/09/07		100	%	70 - 130
		1,1,1-Trichloroethane	2011/09/07		105	%	70 - 130
		1,1,2-Trichloroethane	2011/09/07		103	%	70 - 130
		Trichloroethylene	2011/09/07		103	%	70 - 130
		Vinyl Chloride	2011/09/07		96	%	70 - 130
		Trichlorofluoromethane (FREON 11)	2011/09/07		97	%	70 - 130
2604546 ADA	LCS	Dissolved Lead (Pb)	2011/09/08		100	%	80 - 120
2605762 MSB	LCS	1,4-Difluorobenzene	2011/09/07		94	%	70 - 130
		4-Bromofluorobenzene	2011/09/07		104	%	70 - 130

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Barenco Inc
Task Order#: 11068757
Site#: P12894
Site Location: 1660 MERIVALE ROAD, OTTAWA
Project #: 11010

Quality Assurance Report (Continued)

Maxxam Job Number: B1D4730

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2605762 MSB	LCS	D10-Ethylbenzene	2011/09/07		109	%	70 - 130
		D4-1,2-Dichloroethane	2011/09/07		90	%	70 - 130
		Benzene	2011/09/07		99	%	70 - 130
		Toluene	2011/09/07		106	%	70 - 130
		Ethylbenzene	2011/09/07		107	%	70 - 130
		o-Xylene	2011/09/07		109	%	70 - 130
		p+m-Xylene	2011/09/07		106	%	70 - 130
		Hexane	2011/09/07		97	%	70 - 130
		F1 (C6-C10)	2011/09/07		97	%	70 - 130
2605766 JJE	LCS	o-Terphenyl	2011/09/07		108	%	50 - 130
		F2 (C10-C16 Hydrocarbons)	2011/09/07		110	%	70 - 130
		F3 (C16-C34 Hydrocarbons)	2011/09/07		111	%	70 - 130
		F4 (C34-C50 Hydrocarbons)	2011/09/07		111	%	70 - 130

LCS: A blank matrix sample to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

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Validation Signature Page

Maxxam Job #: B1D4730

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

BRAD NEWMAN, Scientific Specialist

EWA PRANJIC, M.Sc., C.Chem, Scientific Specialist

MEDHAT RISKALLAH, Manager, Hydrocarbon Department

SUZANA POPOVIC, Supervisor, Hydrocarbons

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Toll Free: 1-800-563-6266

EXXONMOBIL/IMPERIAL OIL - MAXXAM CHAIN-OF-CUSTODY RECORD

ANALYSIS REQUESTED

C of C # 62870

INVOICE INFORMATION	REPORT INFORMATION
Company Name: ☒ Imperial Oil ☐ ExxonMobil	Company Name: Barenco Inc.
Contact Name: Tarik Hadi	Contact Name: Daina Marie Schreiber
Address:	Address: 2561 Stouffville Rd Gormley, ON L0H 1G0
Email:	Email: dschreiber@barenco.ca
Ph:	Ph: 905 887 6661
Sampler Name (Print): Alex Cancell & Daniel Oliveira	Consultant Project #: 11010

	FIELD SAMPLE ID	MATRIX: GROUND WATER	MATRIX: SURFACE WATER	MATRIX: SOIL	MATRIX: OTHER	# CONTAINERS	SAMPLING: DATE (YY/MM/DD)	SAMPLING: TIME	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	BTEX (including benzene)	F1	F2-F4	OIL & GREASE - TOTAL / MINERAL (SPECIFY)	VOC (CCl4, CHCl3, MTBE)	PCB	PAH	LEAD	ICP METALS	ICPMS METALS (REG 153)	MERCURY	SAR / CRVI (SPECIFY)	BORON HOT WATER SOLUBLE	IGNITABILITY	REG 558 - INORGANICS	REG 558 - PCB LEACHATE	REG 558 - BENZENE / VOLATILES (SPECIFY)	REG 558 - B(a)P / SEMI-VOLATILES (SPECIFY)
1	F. Blank				X	12	11/08/31	13:00			X	X	X		X			X										
2	Trip Blank				X	8	11/08/31	16:00			X	X	X		X			X										
3																												
4																												
5																												
6																												
7																												
8																												
9																												

IOL SITE LOCATION: 1660 Merivale Road, Ottawa

IOL SITE # (if applicable): NA

IOL PROJECT # (if applicable): P12894

MAXXAM TASK ORDER # OR SERVICE ORDER # + LINE ITEM: 11068757

REGULATORY CRITERIA / DETECTION LIMITS:
☒ Reg 153 Table 3 ☐ 2004 ☒ 2011 ☐ RSC
(please indicate which Reg. version and if RSC required)
☐ PWQO ☐ ODWS
☐ Other

SPECIAL INSTRUCTIONS: ICE-YES

JARS USED AND NOT SUBMITTED: NA

TURNAROUND TIME
Standard (5 days) ☒
Rush (3 days) ☐
(2 days) ☐
(1 day) ☐
(same day) ☐
Date Required

COOLER ID	CUSTODY SEAL	YES	NO	COOLER ID	CUSTODY SEAL	YES	NO	COOLER ID	CUSTODY SEAL	YES	NO
11010-1	PRESENT	✓			PRESENT				PRESENT		
TEMP 4/1/3.5°C	INTACT	✓		TEMP 1 2 3	INTACT			TEMP 1 2 3	INTACT		

LAB USE ONLY
MAXXAM JOB # B1D4730
SAMPLES
LABELED BY: FW
VERIFIED BY: MAF

RELINQUISHED BY (SIGN & PRINT)	DATE (YYYY/MM/DD)	TIME	RECEIVED BY (SIGN & PRINT)	DATE (YYYY/MM/DD)	TIME
1. Alex Cancell	2011/08/31	16:00	1. Ivan Frankenhuysen	2011/09/01	1300
2. Ivan Frankenhuysen	2011/09/01	1600	2. DAVID CHAN	2011/09/01	17:35
3.			3.		

COC-1012 (07/10) IOL - ON White: Maxxam Yellow: Client

Maxxam

EXXONMOBIL / IMPERIAL OIL - MAXXAM ADDITIONAL ANALYSIS REQUEST RECORD

Consultant Name: Barenco Inc

Contact Name: Daina Marie Schreiber

Consultant Project #: 11010

Maxxam Job #: B1D4730

(Please complete this form on a per job basis - i.e. one form per original Maxxam Job#)

IOL Site Location: 1660 Merivale Road, Ottawa

IOL Project Manager: Tarik Madi

IOL Task Order or Service Order #: 11068757

Line Item: _____ (if applicable)

Maxxam Location: Mississauga, Ontario

TURNAROUND TIME		
Standard	(5 days)	☑
Rush	(3 days)	☐
	(2 days)	☐
	(1 day)	☐
	(same day)	☐
Date Required :		

Applicable Guidelines (please specify):

Reg 153, Table 3, 2011

CLIENT SAMPLE ID	Original COC #	LAB ID	Matrix	SAMPLING DATE (YY/MM/DD)	SAMPLING Time HH:MM	ADDITIONAL ANALYSIS REQUEST: 1,1-DCA, tetrachloroethylene, trichloroethylene, 1,1-DCE, cis-1,2-DCE, trans-1,2-DCE, vinyl chloride, 1,1,1-trichloroethane, 1,1,2-trichloroethane, CFC	Sample previously submitted on hold (Y/N)	SPECIAL INSTRUCTIONS
F.Blank	62870	KT3365	Other	11/08/31	13:00	X	N	IOL Site #: NA
Trip Blank	62870	KT3366	Other	11/08/31	16:00	X	N	
							N	IOL Project #: P12894
							N	
							N	
							N	

LAB USE ONLY

Original COC analysis completed and invoiced at time of add-on (circle one)

(YES) NO

(if yes original coc in invoice package is for reference only)

New Maxxam Job # (if applicable)

NA

REQUESTED BY: (Please Sign & Print)	Daina Marie Schreiber	DATE: (YYYY/MM/DD)	2011/11/23
		TIME: (HH:MM)	16:00
RECEIVED BY: (Please Sign & Print)	Kudrat Cheema / KUDRAT CHEEMA	DATE: (YYYY/MM/DD)	2011/11/23
		TIME: (HH:MM)	16:25

COR FCD-00106 / 3

1

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: Barenco Inc.

Sampling Date: August 31, 2011

Location: 1660 Merivale Road, Ottawa

Laboratory : Maxxam Analytics Inc.

Consultant Project Number: 11010

Sample Submission Number: B1D4730

Are All Laboratory QC Samples Within Acceptance Criteria (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Instrument Surrogate Recovery	X			All laboratory QC samples are within the acceptance criteria.
Extraction Surrogate Recovery	X			
Method Blank Concentration	X			
Matrix Duplicate RPD			X	
Matrix Spike Recovery			X	
Lab Control Sample Recovery	X			

Are All Field QC Samples Within Alert Limits (Yes, No, Not Applicable)?

	Yes	No	NA	Comments
Field Blank Concentration	X			All field QC samples are within alert limits.
Trip Blank Concentration	X			
Field Duplicate RPD			X	

Has CoA been signed off (Yes/No)?:	Yes
Has lab warranted all tests were in statistical control in CoA (Yes/No)?:	No
Has lab warranted all tests were analyzed following SOP's in CoA (Yes/No)?:	Yes
Were all samples analyzed within hold times (Yes/No)?:	Yes
All volatiles samples methanol extracted (if required) within 48 hours (Yes/No)?:	not required
Is Chain of Custody completed and signed (Yes/No)?:	Yes
Were sample temperatures acceptable when they reached lab (Yes/No)?:	Yes

Was a Data Quality Waiver (DQW) issued (Yes/No)?: No

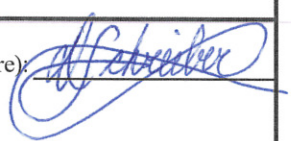
Date Issued: NA

Date of Response: NA

Is data considered to be reliable (Yes/No)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by (Print): Daina Marie Schreiber

Data Reviewed by (Signature): 

Date: September 12, 2011

Technical Standards and Safety Authority

Inspector's Report - Part A

Issued under Ontario's **Energy Act** and/or **Gasoline Handling Act**

Report No. E- 053093

PLEASE PRINT

Location Inspected	Owner's Name
1414806 ONTARIO INC (ESSO)	
Address: 1660 MERIVALE RD	Address
City/town: NEPEAN	City/town
Postal Code: K7M 7J3 Tel. No.: 613 226 2207	Postal Code Tel. No.
Operator's Name: FAHIM PAYMAN	Fuel Supplier City
Licence No.: 007662157 2	
Contractor	Registration No.

OPERATION/SUB	LOC TYPE	POP DEN	FUEL	CLASS	REASON	TRIGGER	ACTION
11	02	01	GAS	03	22	01	01

ACT	REG	DURATION	TRAVEL	BILLABLE	BILL	OCC RATE	CAUSE
TSSA	217 (01)	2.5	1	1.5	(1) 2 3	02	

CON FACT	OCC DATE	OCC TIME	FIELD 1	SITE REM	COMPLETED?
				☐ Yes ☐ No	☑ Yes ☐ No

Investigation/Audit/Occurrence Summary

ON SITE TO INSPECT FUEL FACILITY FOR PRE-LICENCE INSPECTOR'S INSTRUCTIONS ISSUED

PRE-LICENCE ISSUED

MAR 12 2002

Equipment/Appliance/Component

Type	
Description	
Manufacturer	
Model	Serial No.
Material	
Fuel Input Rating	
Date of Manufacture	
Installation Date	
Supply Pressure	Manifold Pressure

Equipment/Appliance/Component

Type	
Description	
Manufacturer	
Model	Serial No.
Material	
Fuel Input Rating	
Date of Manufacture	
Installation Date	
Supply Pressure	Manifold Pressure

TECHNICAL STANDARDS & SAFETY AUTHORITY RECEIVED MAR 06 2002 FUELS SAFETY CORPORATE SERVICES DIVISION

As a not-for-profit regulatory authority, the Technical Standards and Safety Authority operates on a cost recovery basis. An invoice will be issued for this activity.

Client's Signature	Inspector's Name	Badge #	Date of Inspection
Fahim Payman	D	254	2002 02 25

FS 09181 (12/99)

Les demandes d'une version française du présent document seront prises en considération.

Head Office

Technical Standards and Safety Authority

Inspector's Instructions/Orders Part B

0693270 7

Report No. EOS3093

Issued under Ontario's **Energy Act** and **Gasoline Handling Act**

Date: 2002 02 25 (Y M D)

Location Address (No RR's): 1660 MERIVALE RD NEPEAN

Issued To: | Position:

Mailing Address: 1414806 ONTARIO INC 1660 MERIVALE RD NEPEAN K7M 7J3

Your attention is requested pursuant to: Act: TSSA | Regulation: 217 01

Licence #	Expiry	Registration #	Expiry	Certificate #	Expiry
0076621522					

Order #	Section	You are hereby instructed to correct the following infraction(s)	Compliance Date
1	6.2.1	**At every dispensing facility there shall be installed visible to all persons as they approach the dispensing location signage which shall [a] be not less than 20 by 28 centimeters and display either (1) the words in black letters not less than 25 mm in height on a yellow background "No Smoking Within 3 Meters- Turn ignition Off", or (2) the international "No Smoking- Ignition Off" symbols in red and black at least 10 centimeters in diameter on a white background.**	MARCH 25 2002
2	5.1.6	**AT EACH SELF-SERVE DISPENSER THERE SHALL BE INSTALLED A LEGIBLE SIGN VISIBLE TO ALL PERSONS USING THE DISPENSER BEARING THE WORDS** **WARNING** **TO AVOID SPILLAGE EASE UP ON THE NOZZLE TRIGGER WHEN FILLING THE TOP PORTION OF THE TANK**	

HR 02

HR 01

IMPORTANT THE BACK OF THIS FORM MUST BE FILLED IN AND RETURNED OR ADDITIONAL CHARGES MAY APPLY !

Received By: (print)	Inspector: (print) DAVE NORMAN
Position:	Signature:
Signature:	Inspector's Badge #: 254

FS 09221(09/98)

Head Office

Technical Standards and Safety Authority

Inspector's Instructions/Orders Part B

Report No. E053093

06938707

Issued under Ontario's **Energy Act** and **Gasoline Handling Act**

Date: 2002 (Y) 02 (M) 25 (D)

Location Address (No RR's): 1660 MERIVALE RD NEPEAN

Issued To: | Position:

Mailing Address: 1414806 ONTARIO INC 1660 MERIVALE RD NEPEAN K2M-7J3

Your attention is requested pursuant to: Act: TSSA | Regulation: 217/01

Licence #	Expiry	Registration #	Expiry	Certificate #	Expiry
007662572					

Order #	Section	You are hereby instructed to correct the following infraction(s)	Compliance Date
3	6.2.3	**At every facility there shall be a sign installed, clearly visible to all persons, that sets forth the types of portable containers acceptable for the filling of gasoline.** HR 01	MARCH 25
4	5.1.5	AT EACH SELF SERVE FACILITY THERE SHALL BE INSTALLED A MEANS OF TWO WAY COMMUNICATION BETWEEN THE SELF SERVE ATTENDANT AND EACH DISPENSING LOCATION HR 02	

IMPORTANT **THE BACK OF THIS FORM MUST BE FILLED IN AND RETURNED OR ADDITIONAL CHARGES MAY APPLY !**

Received By: (print)	Inspector: (print) DAVE NORMAN
Position:	Signature:
Signature:	Inspector's Badge #: 254

FS 09221(09/98)

Page 2 of 2

Head Office

Technical Standards and Safety Authority

Inspector's Instructions/Orders Part B

Report No. E053093

Issued under Ontario's **Energy Act** and **Gasoline Handling Act**

Date: 2002 02 25 (Y M D)

Location Address (No RR's): 1660 MERIVALE RD NEPEAN

Issued To: 1414806 ONTARIO INC

Position:

Mailing Address: 1660 MERIVALE RD NEPEAN K7M 7J3

Your attention is requested pursuant to: Act: TSSA Regulation: 217/01

Licence #	Expiry	Registration #	Expiry	Certificate #	Expiry
0076621572					

Order #	Section	You are hereby instructed to correct the following infraction(s)	Compliance Date
1	6.2.1	**At every dispensing facility there shall be installed visible to all persons as they approach the dispensing location signage which shall [a] be not less than 20 by 28 centimeters and display either (1) the words in black letters not less than 25 mm in height on a yellow background "No Smoking Within 3 Meters- Turn ignition Off", or (2) the international "No Smoking- Ignition Off" symbols in red and black at least 10 centimeters in diameter on a white background.**	MARCH 25 2003
2	5.1.6	**AT EACH SELF-SERVE DISPENSER THERE SHALL BE INSTALLED A LEGIBLE SIGN VISIBLE TO ALL PERSONS USING THE DISPENSER BEARING THE WORDS** **WARNING** **TO AVOID SPILLAGE EASE UP ON THE NOZZLE TRIGGER WHEN FILLING THE TOP PORTION OF THE TANK**	

MAR 27 2002

TECHNICAL STANDARDS & SAFETY AUTHORITY RECEIVED MAR 27 2002 FUELS SAFETY CORPORATE SERVICES DIVISION

IMPORTANT **THE BACK OF THIS FORM MUST BE FILLED IN AND RETURNED OR ADDITIONAL CHARGES MAY APPLY !**

Received By: (print)	Inspector: (print) DAVE NORMAN
Position:	Signature:
Signature:	Inspector's Badge #: 254

FS 09221(09/98)

Important - See Reverse

Client

Important Notice

When you have completed the work ordered by the inspector, **this original form must be returned to**:

Technical Standards and Safety Authority
4th Floor, West tower
3300 Bloor Street West
Toronto ON M8X 2X4

Telephone: (416) 325-9221
Fax: (416) 326-1662

Inspector's orders/instructions are issued under the authority of Ontario's **Energy Act** and **Gasoline Handling Act**. Anyone who fails to carry out an inspector's order/instruction is guilty of an offence. Conviction as an individual carries fines up to $25,000, or a prison term of up to one year, or both. Conviction as a corporation carries fines up to $100,000. **Gasoline Handling Act, 18 (1c & 2); Energy Act, 27 (D).**

You may appeal an inspector's order/instruction, but the order/instruction remains in effect during the appeal process. Appeals may be made to the Technical Standards and Safety Authority at the address shown above. **Gasoline Handling Act 15 (5); Energy Act 8 (8).**

The following instructions under Inspector's Report # E053093 have been complied with:

Instruction #	Compliance Date	Comments
1	March 19/02	Completed
2	March 19/02	Completed

Signature

Date

FS 08221 (09/98)

Technical Standards and Safety Authority

Inspector's Instructions/Orders Part B

Report No. E053093

Issued under Ontario's **Energy Act** and **Gasoline Handling Act**

Date: 2002 02 25 (Y M D)

Location Address (No RR's)
1660 MERIVALE RD NEPEAN

Issued To | Position

Mailing Address
1414806 ONTARIO INC 1660 MERIVALE RD NEPEAN K2M-1J3

Your attention is requested pursuant to: Act: TSSA Regulation: 217/01

Licence #	Expiry	Registration #	Expiry	Certificate #	Expiry
0076621572					

Order #	Section	You are hereby instructed to correct the following infraction(s)	Compliance Date
3	6.2.3	**At every facility there shall be a sign installed, clearly visible to all persons, that sets forth the types of portable containers acceptable for the filling of gasoline.**	MARCH 25
4	5.1.5	AT EACH SELF SERVE FACILITY THERE SHALL BE INSTALLED A MEANS OF TWO WAY COMMUNICATION BETWEEN THE SELF SERVE ATTENDANT AND EACH DISPENSING LOCATION	

IMPORTANT **THE BACK OF THIS FORM MUST BE FILLED IN AND RETURNED OR ADDITIONAL CHARGES MAY APPLY !**

Received By: (print)	Inspector: (print) DAVE NORMAN
Position:	Signature:
Signature:	Inspector's Badge #: 254

FS 09221(09/98)

Important - See Reverse

Client

Important Notice

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You may appeal an inspector's order/instruction, but the order/instruction remains in effect during the appeal process. Appeals may be made to the Technical Standards and Safety Authority at the address shown above. **Gasoline Handling Act 15 (5); Energy Act 8 (8).**

The following instructions under Inspector's Report # E053093 have been complied with:

Instruction #	Compliance Date	Comments
#3	March 19/02	Completed
#4	March 21/02	Completed

Signature

Date

FS 09221 (09/98)

Technical Standards and Safety Authority

Inspector's Report / Rapport de l'inspecteur(trice) Part A/Partie A

Issued under **Ontario's Energy Act** and/or **Gasoline Handling Act**
Délivré en vertu de **Loi sur les hydrocarbures** ou de la **Loi sur la manutention de l'essence** de l'Ontario

Report No / N° de rapport: E- 009063

Location Inspected / Lieu inspecté	Owner's Name / Nom du/de la propriétaire
~~SHELL~~ ESSO	990846 ONT LTD (2)
Address / Adresse: 1660 MERIVALE RD	Address / Adresse: SAME
City/town / Ville: NEPEAN	City/town / Ville
Postal Code / Code postal: K7M 7J3 — Tel. No. / N° de tél.	Postal Code / Code postal — Tel. No. / N° de tél.
Operator's Name / Nom de la personne responsable: ROB HOGGELET	Fuel Supplier / Fournisseur de combustible: SHELL — City / Ville: OTTAWA
Licence No / N° de permis: 00764 28465	

MAR 24 1998 DATA ENTERED

Contractor / Entrepreneur — Registration # / N° d'inscription

OPERATION/ACTIVITÉ	SUB TYPE/SOUS TYPE	LOC TYPE/ TYPE DE LIEU	POP DENS/ DENS. DE POP.	FUEL/COMBUSTIBLE	CLASS/CATÉGORIE	REASON/RAISON	TRIGGER/ MOTIVÉ PAR:
11		02	01	GAS	03	26	01

ACTION / MESURES PRISES	ACT/LOI	REG/RÈGLEMENT	DURATION/DURÉE	BILLABLE/ À FACTURER	TRAVEL/VOYAGE	BILL FACTURER Y/N O/N	
	G.H.	521/93	2.75	1.25	1.5	Y/2	

DAMAGE /DOMMAGES	OCC RATE/ GRAV. DE L'ACC.	CAUSE/CAUSE	CON FACT/ FACT. CONTR.	OCC DATE/ DATE DE L'ACC.	OCC TIME/ HEURE DE L'ACC.	MANDATED/ MANDAT Y/N O/N	
						/	

FIELD 1/DOMAINE 1	CALL/INTERVENTION	CONSULT Y/N CONSULT. O/N	SITE REM Y/N REMÉDIER O/N			COMPLETED? Y/N TERMINÉE? O/N
	01	N	N			/

Comments/Commentaires: SITE OK AT THIS TIME

Equipment/Appliance/Component / Matériel/Appareil/Composant

Type/Type	Code/Code
Description/Description	
Manufacturer/Fabricant	
Model/Modèle	Serial No/ N° de serie
Material/Matériel	
Corrosion Protection/Protection contre la corrosion	
Fuel Input Rating/Débit de combustible	
Capacity/Capacité	
Installation Date/Date d'installation	
Manufacture Date/Date de fabrication	
Supply Pressure/ Pression d'alimentation	Manifold Pressure/ Pression d'admission

Equipment/Appliance/Component / Matériel/Appareil/Composant

Type/Type	Code/Code
Description/Description	
Manufacturer/Fabricant	
Model/Modèle	Serial No/ N° de serie
Material/Matériel	
Corrosion Protection/Protection contre la corrosion	
Fuel Input Rating/Débit de combustible	
Capacity/Capacité	
Installation Date/Date d'installation	
Manufacture Date/Date de fabrication	
Supply Pressure/ Pression d'alimentation	Manifold Pressure/ Pression d'admission

TECHNICAL STANDARDS & SAFETY AUTHORITY APPROVED MAR 2 0 1998 FIELD SAFETY PRIVATE SERVICES DIVISION

Client's Signature/Signature du client/de la cliente	Inspector's Name/Nom de l'inspecteur(trice)	Badge No / N° d'insigne: 186
X		Date of Inspection/ Date d'inspection — Y/A M/M D/J: 98 03 12

FS 09181 (05/97)

Head Office

Ontario

Ministry of Consumer and Commercial Relations / Ministère de la Consommation et du Commerce

Technical Standards Division / Division des normes techniques

Inspection and Enforcement Branch / Direction de l'inspection et de l'application des mesures législatives

Inspector's Report / Rapport de l'inspecteur/inspectrice
Part A/Partie A

Report #/N° de rapport : D- 14199

DATA ENTERED

Location Inspected/Lieu inspecté	Owner's Name / Nom du/de la propriétaire
ESSO 1660 MERIVALE RD K7M 7J3	990846 ONT. INC. ROB HOSSELET
Address/Adresse: 1660 MERIVALE RD.	Address/Adresse: SAME
City/town/Ville: NEPEAN	City/town/Ville: SAME
Postal Code/Code postal: K7M 7J3 — Tel.No./N° de tél.: 226-2207	Postal Code/Code postal: SAME — Tel.No. /N° de tél.
Operator's Name/Nom de la personne responsable: ROB HOSSELET	Fuel Supplier/Fournisseur de combustible: ESSO - QUEENSWAY — City/Ville: OTTAWA
Licence #/N° de permis: 7642 8465	

Contractor/Entrepreneur — Registration #/N° d'inscription

OPERATION/ACTIVITÉ	SUB TYPE/ SOUS-TYPE	LOC TYPE/ TYPE DE LIEU	POP DENS/ DENS. DE PGP.	FUEL/ COMBUSTIBLE	CLASS/ CATÉGORIE	REASON/ RAISON	TRIGGER/ MOTIVÉ PAR :
11	/	02	01	GAS	03	26	01

ACTION/ MESURES PRISES	ACT/LOI	REG/RÈGLEMENT	DURATION/ DURÉE	BILLABLE/ À FACTURER	TRAVEL/ DÉPLACEMENT	BILL FACTURER Y/N (O/N)	
01	G.H.	521/93	3	2	.5	Y	

DAMAGE/ DOMMAGES	OCC RATE/ GRAV. DE L'ACC.	CAUSE/CAUSE	CON FACT/ FACT. CONTR.	OCC DATE/ DATE DE L'ACC.	OCC TIME/ HEURE DE L'ACC.	MANDATED Y/N MANDAT (O/N)	
						Y	

FIELD 1/ DOMAINE 1	CALL/ INTERVENTION	CONSULT Y/N CONSULT. (O/N)	SITE REM Y/N REMÉDIER (O/N)				F/U REQ'D? Y/N SUIVI REQUIS? (O/N)
		N	N				N

Comments/Remarques

Equipment/Appliance/Component / Matériel/Appareil/Composant

Type/Type	Code/Code
Description/Description	
Manufacturer/Fabricant	
Model/Modèle	Serial #/N° de série
Material/Matériel	
Corrosion Protection/Protection contre la corrosion	
Fuel Input Rating/Débit de combustible	
Capacity/Capacité	
Installation Date/Date d'installation	
Manufacture Date/Date de fabrication	
Supply Pressure/ Pression d'alimentation	Manifold Pressure/ Pression d'admission

Equipment/Appliance/Component / Matériel/Appareil/Composant

Type/Type	Code/Code
Description/Description	
Manufacturer/Fabricant	
Model/Modèle	Serial #/N° de série
Material/Matériel	
Corrosion Protection/Protection contre la corrosion	
Fuel Input Rating/Débit de combustible	
Capacity/Capacité	
Installation Date/Date d'installation	
Manufacture Date/Date de fabrication	
Supply Pressure/ Pression d'alimentation	Manifold Pressure/ Pression d'admission

RECEIVED
MAR 9 1995
Technical Standards Division

Client's Signature / Signature du client/de la cliente	Inspector's Name / Nom de l'inspecteur/inspectrice	Badge #/N° d'insigne
	LES MISKIW	151
		Date of Inspection/ Date de l'inspection — Y/A M/M D/J: 95 03 02

09181(10/94)

Head Office

Ontario

Ministry of Consumer and Commercial Relations / Ministère de la Consommation et du Commerce

Technical Standards Division / Division des normes techniques

Inspection and Enforcement Branch / Direction de l'inspection et de l'application des mesures législatives

Inspector's Instructions/Orders
Directives et ordres de l'Inspecteur/inspectrice
Part B/Partie B

Report #/N° de rapport : D-14199

00426947

Date : 95 (Y/A) 03 (M/M) 02 (D/J)

Location Address (No RR's)
Adresse du lieu inspecté (pas de RR) ESSO 1660 MERIVALE RD. K7M 7J3 NEPEAN

Issued To/Délivré à: ROB HOSSELET

Position/Fonction: OPERATOR

Mailing Address/Adresse postale: SAME

Your attention is required pursuant to: G.H.
Ces ordres ou directives vous sont donnés en vertu :

Act / de la Loi: 521/93

Regulation / du Règlement:

Licence # / N° de permis	Expiry/Expiration	Registration # / N° d' inscription	Expiry/Expiration	Certificate # / N° de certificat	Expiry/Expiration
7642846 5	95/09/30				

CALL/INTERVENTION	ACTION/MESURES PRISES	DURATION/DURÉE	BILLABLE/À FACTURER	TRAVEL/DÉPLACEMENT	BILL Y/N / FACTURER (O/N)

Order #/ N° de l'ordre	Section/ Article	You are hereby instructed to correct the following infraction(s)/ Vous devez rectifier l'infraction ou les infractions suivantes.	Compliance Date/ Date limite d'exécution
#1	40 (C)	RECONCILE APPARANT LOSSES OF PRODUCT (regular)	MAR 20/95
#2	(40)(41)	ENSURE ALL EMPLOYEES ARE TRAINED IN EMERGENCY PROCEDURES & MAINTAIN SIGNED RECORD BY EACH EMPLOYEE	MAR 20/95
#3	68	REMOVE ALL OBSTRUCTIONS AROUND ATTENDENTS CONSOLE SO FULL VIEW OF DISPENSERS IS MAINTAINED	MAR 20/95
#4	77	SUBMIT LAST TEST DATE OF LEAK DETECTION SYSTEM ON SUBMERSIBLE PUMP.	MAR 20/95
#5	ACT 15(2) b)	SUBMIT FOLLOWING INFO ON TANKS 1) YEAR OF INSTALLATION 2) CONTRUCTION (TYPE) 3) HOW PROTECTED & LAST TEST DATE IF CATHODICALLY PROTECTED	MAR 20/95

RECEIVED
MAR 9 1995
Technical Standards Division

Received By: (print) / Reçu par : (en lettres moulées) ROB HOSSELET	Inspector: (print) / Inspecteur(trice) : (en lettres moulées) LES ARSKEW
Position:/Fonction : OPERATOR	Signature :
Signature :	Inspector's Badge#: / N° d'insigne de l'inspecteur(trice) : 151

Page 1 of/de 1

09221(10/94)

Head Office

Ontario

Ministry of Consumer and Commercial Relations
Ministère de la Consommation et du Commerce

Technical Standards Division
Division des normes techniques

Inspection and Enforcement Branch
Direction de l'inspection et de l'application des mesures législatives

MINISTRY OF CONSUMER AND COMMERCIAL RELATIONS FUELS SAFETY BRANCH JUL 07 1995

RECEIVED MAY 18 1995 Technical Standards Division

Inspector's Report
Rapport de l'inspecteur/inspectrice
Part C/Partie C

Report #/ N° de rapport : D-14199

(26)

LIC# 76428465

Date : 95 (Y/A) 05 (M/M) 08 (D/J)

Location Address/Adresse du lieu inspecté

ESSO - 1660 MERIVALE RD. NEPEAN K7M 7J3
ROB HOSSELET (OPERATOR)

Comments/Remarques

- FOLLOW UP VISIT RE: ALLEGED LOSSES OF PRODUCT ACCORDING TO DIP RECORDS EXAMINED
- COULD POSSIBLY BE TEMP COMPENSATION PROBLEM?
- HOWEVER LOSSES HAVE BEEN consistent
- PHOTOCOPIED DIP RECORDS FOR SURVEY RE: TEMP COMPENSATION
- REMINDED OPERATOR TO COMPLY WITH INSTRUCTION A.S.A.P.

ACTION/ MESURES PRISES	DURATION/DURÉE	BILLABLE/ À FACTURER	CALL/ INTERVENTION	TRAVEL/ DÉPLACEMENT			F/U REQUIRED/ SUIVI REQUIS?
	1.5	1.0	02	.5			Y
DAMAGE/ DOMMAGES	**OCC RATE/ GRAV. DE L'ACC.**	**CAUSE/CAUSE**	**CON FACT/ FACT. CONT.**	**OCC DATE/ DATE DE L'ACC.**	**OCC TIME/ HEURE DE L'ACC.**	**FIELD 1/ DOMAINE 1**	**MANDATED Y/N MANDAT (O/N)**
							Y

Client's Signature/Signature du client/de la cliente: [signature]

Inspector's Name/Nom de l'inspecteur/inspectrice: LES MISKIN

Badge#/N° d'insigne: 151

09180 (10/94)

Page 1 of/de 1

Head Office

Ontario

Ministry of Consumer and Commercial Relations / Ministère de la Consommation et du Commerce

Technical Standards Division / Division des normes techniques

Inspection and Enforcement Branch / Direction de l'inspection et de l'application des mesures législatives

Inspector's Report
Rapport de l'inspecteur/inspectrice
Part C/Partie C

Report #/ N° de rapport : D -14199

Date : 95 06 21 (Y/A M/M D/J)

Location Address/Adresse du lieu inspecté

ESSO - 1660 MERIVALE RD. NEPEAN K7J 7S3

ROB HOSSELET (OPERATOR)

Comments/Remarques

FOLLOW UP TO SEE IF INSTRUCTIONS COMPLIED WITH

→ PLEASE NOTE ALL INSTRUCTIONS HAVE BEEN COMPLIED WITH.
PLEASE ADJUST RECORDS TO REFLECT THIS.

RECEIVED
JUL 04 1995
Technical Standards Division

FUELS SAFETY BRANCH
SEP 29 1995
DATA ENTERED

ACTION/ MESURES PRISES	DURATION/DURÉE	BILLABLE/ À FACTURER	CALL/ INTERVENTION	TRAVEL/ DÉPLACEMENT			F/U REQUIRED/ SUIVI REQUIS?
	.5	0	02	.25			N
DAMAGE/ DOMMAGES	OCC RATE/ GRAV. DE L'ACC.	CAUSE/CAUSE	CON FACT/ FACT. CONT.	OCC DATE/ DATE DE L'ACC.	OCC TIME/ HEURE DE L'ACC.	FIELD 1/ DOMAINE 1	MANDATED Y/N MANDAT (O/N)
							Y

Client's Signature/Signature du client/de la cliente

Inspector's Name/Nom de l'inspecteur/inspectrice: LES MISKIN

Badge#/N° d'insigne: 162

09180 (10/94)

Page 1 of/de 1

Head Office

Ministry of Consumer and Commercial Relations
Ontario

Fuels Safety Branch

Incident Investigation Report

HEAD OFFICE USE ONLY	
Filing Date (Day / Month / Year)	H.O.File Number

Inspector's Name (please print)	Inspector's Location	Date of Investigation (Day / Month / Year)	Time of Investigation
D. H. MOLINEUX	OTTAWA	03 / 03 / 92	☐ a.m. ☒ p.m.

Location (where incident occurred)	Date of Incident (Day / Month / Year)	Time of Incident
1660 MERIVALE RD. NEPEAN	29 / 02 / 92	11:00 ☐ a.m. ☒ p.m.

Cause of Incident (✓) Check one

☐ Mechanical Failure ☐ Accidental ☐ Out of Domain, referred to:
☒ Lack of Maintenance ☐ Undetermined

Type of Incident (if more than one, note primary incident as 1, subsequent incident as 2, etc.)

☐ Asphyxiation ☐ Fire ☐ Explosion
☐ Carburetion ☒ Product Escape

Fuel Utilization (✓) Check one

☐ Residential (Single Family) ☐ Institutional
☐ Residential (Multi Family) ☐ Motor Vehicle
☒ Commercial ☐ Recreational Vehicle
☐ Industrial

Fuel Type (✓) Check one

☐ Natural Gas
☐ Oil
☐ Propane
☒ Gasoline

Fuel Supplier (name & address)

ESSO
1961 MERIVALE RD.
NEPEAN, ONT.

Owner (name & address)

SERVICAR LTD. (ESSO)
1660 MERIVALE RD.
NEPEAN, ONT.

Tenant (name & address, if different to property)

Equipment Involved

SELF SERVE SERVICE STATION

Estimated Value of Damage

$

Description of Damage

5 L SPILL AT FILL PIPE

Fatalities (name, address & age)

NONE

Personal Injuries (name, address, age & type of injury)

NONE

Synopsis

G.R.W. PETROLEUM WERE DELIVERING PRODUCT TO THE ESSO SELF SERVE AT 1660 MERIVALE RD. AT 11:00 P.M. ON FEB. 29/92. DRIVER DAN WHITMAN STATED THAT BLOWBACK AT THE FILL PIPE RESULTED IN AN ESTIMATED 5 L SPILL. HE SUSPECTS THE VENT IS PLUGGED CAUSING THE PRESSURE BUILD UP.

JOHN FERRIS OF ESSO HAS HIRED G.D. MAINTENANCE TO INVESTIGATE AND CORRECT THE PROBLEM. THE MINOR SPILL WAS CLEANED UP WITH ABSORBANT.

Signature of Inspector: D. H. Moleneux

09047(88)

HEAD OFFICE COPY

File Number D02-01-MERI

December 5, 2014

8331367 Canada Inc.
1660 Merivale Road
Ottawa ON
K2G 3K4
ATTN: Hassan Araji

Dear Mr. Araji:

Re: 1660 Merivale Road, Ottawa
Receipt Number: *0032893*

This will acknowledge receipt of your letter of December 5th, 2014 and payment of $170.00, confirming the zoning provisions for a propane cylinder cage at the above-mentioned property.

We wish to advise that this property is presently subject to the provisions of the City of Ottawa Consolidated Zoning By-law 2008-250, as amended, in a zone designated as AM (Arterial Mainstreet).

A propane cylinder cage would be permitted in the above-mentioned zone provided that they also meet the provisions for the Handling and Transfer of Propane and Natural Gas (Section 66):

(1) *Facilities relating to the handling and transfer of propane and natural gas, including tanks and associated compressors, pumps and other similar facilities must not be located in any required front, side, corner side or rear yard, nor closer than 30 metres to any lot line abutting a residential zone.*

(2) *Despite subsection (1), the minimum of 30 metres may be reduced to a minimum of 6 metres where it can be demonstrated that appropriate noise abatement measures have been undertaken to ensure that noise levels at the boundary of the residential zone do not create a nuisance for uses in that abutting residential zone.*

Ottawa

Residents > » By-laws, licenses and permits > » By-laws > » By-law index A-Z
> » City of Ottawa Zoning By-law
> » Provisions for the Handling and Transfer of Propane and Natural Gas (Sec. 66)

Provisions for the Handling and Transfer of Propane and Natural Gas (Sec. 66)

66. (1) Facilities relating to the handling and transfer of propane and natural gas, including tanks and associated compressors, pumps and other similar facilities must not be located in any required front, side, corner side or rear yard, nor closer than 30 metres to any lot line abutting a residential zone.

(2) Despite subsection (1), the minimum of 30 metres may be reduced to a minimum of 6 metres where it can be demonstrated that appropriate noise abatement measures have been undertaken to ensure that noise levels at the boundary of the residential zone do not create a nuisance for uses in that abutting residential zone.

‹ Permitted Projections into Required Yards (Sec. 65) up Residential use building setback from mineral aggregate zones (Sec. 67) ›

In This Section

Non-Conforming Right [illegible]
[illegible] Area and Gro[illegible] Sections
[illegible] By-law [illegible] solidation
[illegible]

2014-12-09 22:38 Marwan Araji 6132266472 >> 416 2314078 P 4/4

TECHNICAL STANDARDS and SAFETY AUTHORITY

www.tssa.org

14th Floor, Centre Tower
3300 Bloor Street West
Toronto, Ontario M8X 2X4
Ph - (416) 734-3300, Fax - (416) 231-1626
Toll - 1-877-682-8772

Fuel Safety Inspection Report

Technical Standards and Safety Act, 2000

1 *Report Number:* **FS-2009-0001284**
2 *File Number:* **000076649851**

3 Location Address	4 License/Serial Number	5 Job Type	6 Inspection Date
1660 MERIVALE RD NEPEAN, ON K2G 3K4 CA	**000076649851**	**New License/Modification Job (FS)**	**Mar 30, 2009**

7 *Facility Type*: **Cylinder Exchange**

8 *Client*
7095686 CANADA INC
1660 MERIVALE RD
OTTAWA, ON K2G 3K4
CA

The Facility/Equipment is inspected in accordance with Ontario's Technical Standards & Safety Act and the appropriate regulations and codes. When an Inspector's order is issued, time limits for compliance reflect the severity of the violation and serve to avoid disruption of service. In the interim period the recipient must ensure that additional precautions are taken for safe use.

INSPECTION NOTE: site in compliance

Inspection Activity - Time Allocation Detail

Date	Activity	Hours	Rate	Comments
Mar 30, 2009	Administration	0.50	Straight	
Mar 30, 2009	Inspection	1.00	Straight	
Mar 30, 2009	Travel	0.50	Straight	

13 Total Time	14 Travel Time	15 Billable Hours	16 Additional Charges
2	**0.5**	**0**	

Voluntary Compliance Option* - Eligible? ☐ Yes ☒ No *Please, refer to guidelines

I hereby confirm that all the Inspector's orders, appearing on this inspection report have been completed.

Print Name _____ *Client Signature* _____

David Norman — *Inspector*

(613) 284-8296 — *Inspector Fax Number*

As a not-for-profit regulatory authority, TSSA operates on a cost recovery basis.
An invoice will be issued for this activity.

Putting Public Safety First

(Note: This is not an invoice)

TECHNICAL STANDARDS and SAFETY AUTHORITY

www.tssa.org

14th Floor, Centre Tower
3300 Bloor Street West
Toronto, Ontario M8X 2X4
Ph - (416) 734-3300, Fax - (416) 231-1626
Toll - 1-877-682-8772

Fuel Safety Inspection Report

1 Report Number: FS 2004-001767

2 File Number: FS/INS2004-1767

3

Technical Standards and Safety Act, 2000

3 Location Address	4 License/Serial Number	5 Job Type	6 Inspection Date
1660 MERIVALE RD. **`NEPEAN (OTTAWA), ONTARIO K2G-3K4**		**Inspection (FS)**	**Oct 12, 2004**
	7 Facility Type		

8 Client	
6161278 CANADA INC. **Operating As VIEWMOUNT ESSO ON THE RUN** **1660 MERIVALE RD.** **`NEPEAN (OTTAWA), ONTARIO K2G-3K4**	**The Facility/Equipment is inspected in accordance with Ontario's Technical Standards & Safety Act and the appropriate regulations and codes. When an Inspector's order is issued, time limits for compliance reflect the severity of the violation and serve to avoid disruption of service. In the interim period the recipient must ensure that additional precautions are taken for safe use.**

INSPECTION NOTE: ON SITE TO INSPECT FACILITY ALL IN COMPLIANCE AT TIME OF INSPECTION RECEIVED APPLICATION AND CHEQUE # 0114 FOR $90.00 TSSA RECEIPT # A030712 PRE-LICENCE ISSUED

Cylinder Exchange

13 Total Time	14 Travel Time	15 Billable Hours	16 Additional Charges
1.5	0.5	1.5	

Voluntary Compliance Option* - Eligible? ☐ Yes ☒ No *Please, refer to guidelines

I hereby confirm that all the Inspector's orders, appearing on this inspection report have been completed.

Print Name _____ *Client Signature* _____

David Norman

Inspector

As a not-for-profit regulatory authority, TSSA operates on a cost recovery basis. An invoice will be issued for this activity.

Putting Public Safety First

(Note: This is not an invoice)

Ministry of Consumer and Commercial Relations
Ontario

Technical Standards Division

Fuels Safety Branch

MINISTRY OF CONSUMER AND COMMERCIAL RELATIONS
FUELS SAFETY BRANCH
MAY 10 1994
DATA ENTERED

Report # C- 008589

Inspector's Report A

Location Inspected: Esso S/Serve/Convenience Store	Owner's Name: Esso Petroleum
Location Address: 1660 Merivale Rd	Address: 605 Industrial Ave
City/town: Nepean. Postal Code:	Tel. No.: Ottawa.
Operator's Name: Regional Mgr. Mr D. Gage. Tel. No.	City/town: Postal Code:
Contractor:	Fuel Supplier:

OPERATION	SUB TYPE	LOC TYPE	POP DENS	FUEL	CLASS	REASON	TRIGGER
95	-	02	02	Prop	02	~~08~~ 27	03
ACTION	ACT	REG	DURATION	BILLABLE			
			2.0				
DAMAGE	OCC RATE	CAUSE	CON FACT	OCC DATE	OCC TIME		
FIELD 1	CALL	CONDUCTION					F/U REQ'D?
	01	1					

Equipment/Appliance/Component

Type	Code
Description	
Manufacturer	
Model	Serial #
Material	
Corrosion Protection	
Fuel Input Rating	
Capacity	
Installation Date	22 55
Manufacturer Date	
Supply Pressure	Manifold Pressure

Equipment/Appliance/Component

Type	Code
Description	
Manufacturer	
Model	Serial #
Material	
Corrosion Protection	
Fuel Input Rating	
Capacity	
Installation Date	
Manufacturer Date	
Supply Pressure	Manifold Pressure

Inspector's Name: R. Moore Ottawa — Badge # 23

09181(01/93)

Date of Inspection: 94-04-21

Head Office

Ministry of Consumer and Commercial Relations
Ontario

Technical Standards Division

Fuels Safety Branch

Inspector's Report C

Report #: C-008559.

Date: 94-04-21
yy/mm/dd

Address Esso S/Serve. Convenience Store / Gas Wash 1660 Merivale Rd. Nepean

Portable Propane Exchange Facilities.

As requested met Mr Doug Gage - Auto Mgr. Esso - and meeting on site re: portable propane cylinder cage location, & requirements applicable to other locations.

[signature]

27

Page 1 of 1

09180(01/93)

Head Office

APPENDIX 7
Previous characterization studies

GROUPE
C. LAGANIÈRE

183 Front Street East, Unit 302
Toronto, Ontario M5A 4N3
Canada
www.ghd.com

Your ref: CTP 1126
GHD Reference No: 12583574-LTR-5-Hunter

25 August 2022

Tara Hunter
Canadian Tire Corporation (CTC)
2180 Yonge Street
15th Floor South, PO Box 770, Station K
Toronto, Ontario
M4P 2V8

Soil and Groundwater Quality Investigation
1660 Merivale Road, Ottawa, Ontario (CTP 1126 – Merivale)

Dear Tara,

1. Introduction

On behalf of Canadian Tire Corporation (CTC), GHD completed a soil and groundwater quality investigation for the property known as CTP 1126 Merivale, located at 1660 Merivale Road in Ottawa, Ontario (hereafter referred to as Site or Property). A Site location map is presented as **Figure 1**, and a Site plan is presented on **Figure 2**.

It is GHD's understanding that the Site is currently owned by Harnois Energies (who recently purchased the Site from Imperial Oil Limited) and operates under a rebranding agreement with Canadian Tire. GHD understands that CTC's lease commenced on November 19, 2012, and expires in 2022.

The primary objective of the soil and groundwater quality investigation was to confirm Site conditions relative to the baseline conditions established by others prior to the commencement of the lease.

The environmental investigative activities undertaken were limited to the Site only (i.e., vicinity of the Canadian Tire retail gas bar).

2. Background

The Site is approximately 0.66 hectares (1.63 acres) in size and is currently used as a retail service station. Based on a review of the historical Site documentation provided by CTC (listed in **Attachment A**), the following presents a summary of the pertinent Site information:

– The Site was purchased by Imperial Oil in 1956 and first developed as a retail service station and automotive garage in approximately 1968. Properties surrounding the Site are generally used for residential, commercial, and institutional purposes.

- Various environmental investigations have been undertaken by others (Barenco (now exp) and more recently Golder Associates) on behalf of Imperial Oil to investigate conditions on Site and off Site.
- Baseline conditions were established on Site in 2011 by Barenco. At the time of a Phase I Environmental Site Assessment (ESA) completed in 2011, the Site was improved with a retail service station including a pump island, kiosk, a canopy, a car wash facility and four (4) underground storage tanks (USTs). The car wash facility was built circa 1980. The current and historical use of the Site for a retail service centre and service garage, potential importation of fill of unknown quality to the Site during the construction of the car wash, and the replacement/decommissioning of the previous service station and service garage were identified as potential areas of environmental concern for the Site. It is noted that the Site no longer has a service garage.
- Stratigraphy at the Site generally consists of sand and gravel fill to 1.2 metres below ground surface (mBGS), underlain by limestone bedrock, which was encountered at a depth ranging from 2.7 and 3.4 mBGS.
- The on-site monitoring wells are typically screened from 3 to 6 mBGS, generally in the bedrock. Groundwater has generally been found to range between 3 and 4 mBGS, within the bedrock. Groundwater flow direction has been found to be in a southwesterly direction.
- Two different configurations of USTs and pump islands have been operated at the Site from 1968 to 1987, and 1987 to present. A service garage was located on the Site from approximately 1968 to 1984. The locations of current and historic infrastructure are presented on **Figure 2**.
- In 2011, three (3) 25,000-litre and one (1) 45,600-litre fiberglass USTs were removed. Associated product piping and dispensers were not removed. Vapour readings in the vicinity of the USTs ranged from non-detectable to 5% of the lower explosion limit (LEL). Approximately 627 tonnes of soil were disposed off-Site, reportedly for geotechnical reasons. Sixteen confirmatory soil samples were collected from the excavations and analyzed for petroleum hydrocarbons (PHCs), BTEX[1], and lead. Seven soil samples were submitted for analysis of select polycyclic aromatic hydrocarbons (PAHs). All of the samples collected from the sidewalls of the excavation were below the 2011 Ministry of the Environment (MOE) Table 5 stratified standards[2]. Confirmatory samples were not collected from some sidewalls or the base of the excavation due to the presence of peastone or bedrock. The existing USTs were reportedly installed within the tank excavation of the former USTs.
- Several soil and groundwater investigations have been completed at the Site, primarily on-Site from 2011 to present, and off-Site from 2012 to present, consisting of the following investigative locations as shown on **Figure 2**:
  - Nine (9) on-Site monitoring wells (TH1 to TH7 and MW15-01 and MW15-02).
  - Nine (9) off-Site monitoring wells (TH8 to TH12[3], TH100 to TH103, and MW16-01).
- All analyzed soil parameters had concentrations below the 2011 MOE Table 3 and Table 5 stratified standards.
- Groundwater impacts were identified on Site and off Site. In 2015, a Contaminant Management Plan (CMP) was prepared by exp on behalf of Imperial Oil to address subsurface petroleum hydrocarbon impacts on Site. The CMP included monitoring of on-Site wells (TH1 to TH7) and off-Site monitors (TH8, TH9, TH10 (MW16-01), TH11, TH12) and sampling for BTEX, PHCs, and lead on an annual basis. The CMP indicated that up to three additional test holes (TH100 to TH102) were planned to be installed to further delineate off Site groundwater impacts to the north (upgradient) and east (cross-gradient) of the

[1] Benzene, Toluene, Ethylbenzene, and Xylenes

[2] Ministry of the Environment and Climate Change, "*Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act",* dated April 15, 2011.

[3] Off-Site monitoring well TH10 was destroyed and subsequently decommissioned in 2016. MW16-01 was reinstalled in the location of TH10.

Site. Up to two additional test holes were planned to be installed on the Site, south of TH7 (downgradient) to further delineate the on-Site impacts (MW15-01 and MW15-02).

- Based on a Technical Standards and Safety Authority (TSSA) report, in 2021, Golder completed a soil vapour and groundwater sampling event. Samples were collected from fifteen (15) on-Site and off-Site monitoring wells (TH2, TH3, TH5, TH6, TH7, TH8, TH9, TH11, TH12, TH100, TH101, TH102, MW15-01, MW15-02, MW16-01) and submitted for laboratory analysis of BTEX, PHCs, and lead. Groundwater impacts were identified on Site and off Site. The Golder report was not provided to GHD for review.
- Golder also completed an additional subsurface investigation program in November/December 2021. Two (2) monitoring wells (MW21-01 and MW21-02) were installed west of TH1 to a maximum depth of approximately 6.2 mBGS and three (3) soil vapour probes (SV21-01 to SV21-03) were installed at the west, east, and south of Site boundaries. However, the results of any sampling activities and Site plan were not provided.
- Current and/or historical groundwater exceedances at the Site above the 2011 MOE Table 3 generic standards are summarized below:
  - TH3 (On-Site) – PHC F1 and PHC F2
  - TH4 (On-Site) – Benzene, Ethylbenzene, Xylenes, Hexane, PHC F1 and PHC F2
  - TH5 (On-Site) – Benzene, Ethylbenzene, Xylenes, Hexane, and PHC F1 to F4 fractions, lead
  - TH7 (On-Site) – PHC F1 and PHC F2
  - MW15-02 (On-Site) – PHC F1 and PHC F2
  - TH8 (Off-Site) – PHC F3 and PHC F4
  - TH9 (Off-Site) – Benzene, PHC F1, PHC F2, and PHC F3.
  - TH10 (Off-Site) (now destroyed/decommissioned) – PHC F1 and PHC F2
  - MW16-01 (Off-Site – replacement for TH10) – PHC F1 to F4 fractions
  - TH11 (Off-Site) – PHC F1, PHC F2, and hexane
  - TH12 (Off-Site) – PHC F1, PHC F2, and hexane
  - TH100 (Off-Site) – PHC F3 and PHC F4
  - TH101 (Off-Site) – PHC F1, PHC F2, and hexane
  - TH102 (Off-Site) – PHC F2
- A Screening Level Risk Assessment (SLRA) was undertaken to evaluate the potential risks posed by the groundwater impacts present within the municipal right-of-way to the east of the Site (Merivale Road). Based on the findings of the SLRA, the impacts present were not considered to represent a risk to human health.
- In 2017, the CMP was updated to include sampling of off-Site wells MW16-01, TH8, TH9, TH11, TH12, TH100 to TH102 for PHCs, BTEX and lead on an annual basis. The CMP indicated that the off-Site groundwater impacts at TH8, MW16-01 and TH100 have been delineated to the north and northeast. Off-Site impacts at TH9, TH11, TH12, TH101 and TH102 were evaluated as part of the SLRA and the petroleum related parameters exceeding the applicable 2011 MOE Table 3 generic standards were considered to not pose a risk to human receptors. Due to the direction of groundwater flow toward the property at 1660 Merivale Road, the exceedances noted in the right-of-way were considered upgradient/cross gradient from the property and no further investigation of these exceedances was proposed.
- Figures summarizing the investigative locations by others and the analytical results (where available up to 2016) have been provided in **Attachment A** for reference.

– The analytical results for CMP monitoring between 2018 and present have not been made available to CTC at this time, however a letter from the TSSA dated April 11, 2022, provided information regarding sampling undertaken in 2021. A summary of the salient findings is provided below.
    - Groundwater sampling was completed at both on and off-site monitoring wells by Golder on July 13 and 14, 2021.
    - Less than 1 millimetre of LPH was observed in monitoring wells TH1 and TH4.
    - PHC F1- F4 impact to groundwater was identified at on-Site monitoring wells TH3 and TH5 and several off Site wells. TH1 and TH4 were not sampled.
– Based on a review of the on-Site analytical results between 2011 and 2016 (refer to **Attachment A**), the concentrations of petroleum related parameters have generally been decreasing or fluctuating over time at locations where impacts have been identified between 2011 and 2016.

In summary, based on a review the historical soil and groundwater analytical results, impacts have been identified at the following locations:

Location	Soil	Groundwater
MW15-02	None	PHC F1 (2015 – 2016) PHC F2 (2015 – 2016)
TH1	None	PHC F4 (2016)
TH3	None	PHC F1 (2011 – 2013) PHC F2 (2011 – 2021)
TH4	None	PHC F1 (2011 – 2016) PHC F2 (2011 – 2016) Benzene (2011, 2014) Ethylbenzene (2011) Xylenes (2011 – 2013) n-Hexane (2011)
TH5	None	PHC F1 (2011 – 2021) PHC F2 (2011 – 2021) PHC F3 (2011 – 2013, 2016, 2021) PHC F4 (2011 – 2013, 2016, 2021) Benzene (2011 - 2014) Ethylbenzene (2011) Xylenes (2011) n-Hexane (2011) Lead (2021)
TH7	None	PHC F1 (2014 – 2015) PHC F2 (2013 – 2015)
TH8 (off site)	None	PHC F3 (2021) PHC F4 (2021)
TH9 (off site)		PHC F1 (2014 – 2017) PHC F2 (2014 – 2017) PHC F3 (2014, 2021) PHC F4 (2021)
TH10 (off site)	None	PHC F1 (2013) PHC F2 (2013)

Location	Soil	Groundwater
TH11 (off site)	None	PHC F1 (2013 – 2016) PHC F2 (2013 – 2016, 2021) PHC F3 (2015 – 2016, 2021) PHC F4 (2015 – 2016, 2021)
TH12 (off site)	None	PHC F1 (2013 – 2017, 2021) PHC F2 (2013 – 2017, 2021) PHC F3 (2015 – 2017) PHC F4 (2016)
TH100 (off site)	None	PHC F3 (2021) PHC F4 (2021)
TH101 (off site)	None	PHC F1 (2014 – 2017, 2021) PHC F2 (2014 – 2017, 2021)
TH102 (off site)	None	PHC F1 (2015, 2017) PHC F2 (2014 – 2017)
MW16-01 (off site)	None	PHC F1 (2017) PHC F2 (2017) PHC F3 (2021[4]) PHC F4 (2021)

The historical investigative locations are presented on **Figure 2** and the historical analytical results are summarized on figures presented in **Attachment A**.

3. Scope of Work

The following provides an overview of the scope of work completed by GHD:

– Development of a Site-specific Health and Safety Plan (HASP).
– Completion of a well inventory at the Site to determine the condition of the existing monitoring wells[5].
– Collection of static groundwater level measurements from the existing monitoring wells.
– Sampling of seven (7) existing groundwater monitoring wells on Site (TH2 to TH7, and MW15-02).
– Completion of public and private utility locates.
– Oversight of the advancement of seven (7) boreholes (BH1-22 to BH7-22), one of which was instrumented as a monitoring well (BH1-22/MW1-22).
– Soil screening and collection of soil samples for laboratory analysis of the contaminants of potential concern (PHCs and BTEX).
– Collection of one (1) groundwater sample from newly installed BH1-22/MW1-22.

Details of the above noted activities carried out by GHD are provided in the following sections.

[4] Analytical data is not available for 2021. Reported above MOE Table 3 standards in a TSSA letter dated April 11, 2022.
[5] During GHD's monitoring well inventory TH1 was found to be damaged and could not be measured or sampled. MW15-01 could not be found.

4. Field Activities

4.1 Preparation

Prior to initiating on-Site activities, GHD completed the following:

– Prepared a Site-specific Health and Safety Plan (HASP) for use during field activities. The HASP identified potential physical and chemical hazards, personal protective equipment to be used, and health and safety monitoring requirements. The HASP also identified local and project-specific contacts, including the local hospital, in case of emergency.

– Prior to groundwater monitoring and sampling, GHD completed a well inventory at the Site on June 14, 2022 to determine the condition of the existing monitoring wells and determine if they were suitable for sample collection. The findings of the well inventory are presented in Section 4.2. GHD also reviewed Site conditions, drill rig access, etc. in preparation for the drilling activities.

– Prior to initiating drilling activities, all applicable utility companies (gas, telephone, hydro, water, and sewers) were contacted to demarcate the locations of their respective underground utilities. GHD also arranged for a private utility locating contractor (USL-1) to demarcate any on-Site utilities within the proposed work area on June 23, 2022. The utility locates package (public and private) is provided in **Attachment B**.

4.2 Groundwater Monitoring & Sampling

Based on the findings of the monitoring well inventory, existing monitoring wells TH2 to TH7 and MW15-02 were found in good condition and were considered suitable for sample collection. TH1 had a damaged screen and MW15-01 could not be found and therefore samples could not be collected from these wells.

The groundwater level measurements of the existing monitoring wells were collected using a calibrated oil/water interface probe on June 15, 2022. The groundwater table ranged in depth from 2.01 mBTOR at TH3 to 4.45 mBTOR at TH5. The top of riser elevation of each of the existing monitoring wells was surveyed for vertical control with respect to a storm sewer catch basin (located northwest of the car wash was used as a benchmark), with an assumed elevation of 100 metres above Site datum (mASD). The top of riser reference elevations, as well as the groundwater level measurements are presented on **Table 1**. Groundwater elevation contours for June 15, 2022, are presented on **Figure 3**. Based on the groundwater contours, groundwater flow across the Site is generally in a southerly direction.

Groundwater sampling of the existing on-Site wells was completed on June 15 and 16, 2022. A groundwater sample was collected from the newly installed monitoring well (BH1-22/MW1-22) on July 7, 2022. Samples were collected in accordance with the following protocol:

– The monitoring wells were purged and sampled using low-flow techniques. Field measurements of pH, temperature, conductivity, turbidity, oxidation reduction potential (ORP), and dissolved oxygen (DO) were collected to ensure chemical equilibrium had been achieved. Purging continued until field parameters stabilized and consistent readings were obtained and/or the well went dry. A summary of the field parameters measured during groundwater purging are presented in **Table 2**.

– Groundwater samples were placed into laboratory-supplied containers specific to the analytical parameters, labelled and transported in a cooler containing ice to a Standards Council of Canada certified laboratory (Bureau Veritas) for analysis of one or more of the following parameters: petroleum hydrocarbons (PHC) fractions F_1 to F_4 and benzene, toluene, ethylbenzene and xylenes (BTEX).

A Quality Assurance/Quality Control (QA/QC) program was implemented to ensure quality data was generated. In general, one QA/QC sample was submitted for analysis for every ten samples collected. The groundwater

QA/QC program included the collection/submission of one (1) groundwater trip blank and one (1) field duplicate groundwater sample. A sample identification key is presented in **Table 3**.

Purge waters were temporarily containerized in a 205-litre PVC drum in a designated storage area on Site. Arrangements are being made for off-Site disposal in the near future.

4.3 Borehole Advancement & Monitoring Well Installation

On June 28, 2022, seven (7) boreholes (BH1-22/MW1-22 to BH7-22) were advanced on Site by a Ministry of the Environment, Conservation and Parks (MECP) licensed well contractor (Strata Drilling Group) retained by GHD. The locations of the boreholes were selected to generally coincide with those established during the 2011 baseline investigation and subsequent groundwater monitoring locations (TH1 to TH7). The investigative locations are presented on **Figure 2**

The boreholes were advanced using a track mounted Geoprobe 7822DT drilling rig equipped with direct push samplers. The boreholes were advanced to a maximum depth of 3.66 mBGS with exception to BH1-22/MW1-22 which was advanced to a depth of 5.49 mBGS to facilitate the installation of a monitoring well.

Borehole BH1-22 was instrumented as a monitoring well with a 50 millimetre (mm) diameter, 1.52-metre long, No. 10 slot, Schedule 40 polyvinyl chloride (PVC) screen and completed with a PVC riser pipe and expandable cap. The monitoring well was screened in the bedrock between 4.11 to 5.64 mBGS. A silica sand pack was placed in the annular space between the PVC screen/riser pipe and the borehole to approximately 0.3 metres above the top of the well screen. A bentonite seal was installed in the remaining borehole annulus above the sand pack. A protective flushmount casing with a concrete collar was placed around each well upon completion. The monitoring well completion details are presented in **Table 4**. The remaining boreholes were backfilled with bentonite chips up to the surface and finished with concrete and/or cold patch at ground surface. The stratigraphy and instrumentation logs, along with the MECP well record are provided in **Attachment C**.

All soil cuttings generated during the drilling activities were temporarily containerized in 205-litre drums in a designated storage area on Site for future disposal.

4.4 Soil Screening and Sampling

Soil samples were collected from the drilled borehole using the direct push method and dual tube liners. In general, soil samples were collected continuously to the termination depth of the boreholes in 0.6 metres intervals. All sampling equipment was decontaminated using Alconox cleaning solution and a deionized water spray between each sample location and depth.

Soil samples collected from the boreholes were logged in the field detailing geologic conditions encountered, soil classification, stratigraphy, and relative moisture content. Soil samples were also screened in the field for evidence of impact based on visual and olfactory observations as well as undifferentiated volatile organic compound (VOC) vapour readings, as measured by a calibrated photoionization detector (PID). The PID readings as well as the logged soil information are summarized on the stratigraphic and instrumentation logs provided in **Attachment D**.

One or more soil samples were collected from each borehole location for laboratory analysis. Soil samples were generally submitted from the depths similar to those of the 2011 baseline investigation. Soil samples selected for chemical analysis were placed into laboratory-supplied containers specific to the analytical parameters, labelled and transported in a cooler containing ice to a Standards Council of Canada certified laboratory (Bureau Veritas) for analysis of one or more of the following parameters: PHC fractions F_1 to F_4 and BTEX. One composite soil sample was collected from the drill soil cuttings for Toxicity Characteristic Leaching Procedure (TCLP) analysis of VOCs, metals and benzo(a)pyrene for waste characterization.

The soil QA/QC program included the collection/submission of one (1) field duplicate soil sample. The field duplicate sample was one of two samples taken from the same media (i.e., soil) at the same location and time

following the same sampling procedures. The field duplicate sample was used to validate field sampling protocol and laboratory analysis procedures. A sample identification key is presented in **Table 3**.

5. Physical Conditions

5.1 Geology

Boreholes were advanced to a maximum depth of approximately 3.66 mBGS with exception to BH1-22/MW1-22 which was advanced to a depth of 5.49 mBGS. The following subsurface materials and geologic deposits were encountered during the environmental investigation (from ground surface):

- **Pavement and Granular Base** – Surficial pavement was observed at BH1-22/MW1-22 to BH5-22 investigative locations, with a thickness of approximately 100 millimetres (mm). A granular base consisting of crushed gravel and sand was encountered underlying the pavement, with a thickness varying between approximately 230 mm and 910 mm.
- **Fill** – Fill materials were encountered below the granular at all of the investigative locations except BH4-22, extending to depths ranging from approximately 0.91 mBGS to 3.05 mBGS. The fill materials were found to consist of sand, gravel, or silty clay. Silty clay was encountered at BH6-22 from ground surface to top of bedrock (3.35 mBGS).
- **Native Silt/Clay/Sand** – Native deposits of silt, clay, or sand were encountered underlying the fill materials extending to the top of bedrock (2.29 to 3.35 mBGS). The native soils were brown to grey. At BH7-22 native silty clay extended from surface to top of bedrock (2.29 mBGS).
- **Bedrock –** Limestone bedrock was encountered underlying the overburden at surface depths ranging from 2.29 mBGS to 3.35 mBGS. BH1-22/MW1-22 was terminated in the bedrock at a depth of 5.64 mBGS.

Detailed descriptions of the geologic deposits encountered at each borehole location are presented on the stratigraphic logs provided in **Attachment D**.

5.2 Field Screening

As mentioned above, soil samples were screened in the field for evidence of impact based on visual and olfactory observations as well as undifferentiated VOC vapour readings, as measured by a calibrated PID. The highest PID reading was 1.5 parts per million (ppm) measured at borehole BH5-22 (between 2.4 to 3.0 mBGS). No petroleum hydrocarbon odours were noted at any of the borehole locations during drilling activities. The PID readings are provided on the stratigraphic and instrumentation logs provided in **Attachment C**.

During groundwater sampling, a strong petroleum hydrocarbon odour and visible sheen were noted at monitoring wells TH4 and TH5. Measurable LNAPL was not encountered.

6. Analytical Results

6.1 Regulatory Standard

The soil and groundwater analytical results were assessed to the generic standards provided in the MECP document entitled, "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act", dated April 15, 2011, for a non-potable groundwater condition (Table 3) for an industrial/commercial/community property use and medium to fine textured soils. The standards selected are

consistent with the assessment standards applied during the previous subsurface investigations undertaken on Site by others.

6.2 Quality Assurance/Quality Control

GHD collected field duplicate samples and submitted a trip-blank sample for laboratory analysis. BV completed an independent QA/QC program as part of the laboratory submissions. BV's QA/AC program consisted of laboratory duplicates, a matrix quality control spike, a spiked quality control blank, a method quality control blank, and reporting of surrogate percent recoveries.

Based on a review of the analytical results for GHD's QA/QC samples and the results presented in Section 6.3 and 6.4, the analytical data is considered acceptable for use.

6.3 Soil Analytical Results

The soil analytical results are presented in **Table 5** and the laboratory certificates of analysis are provided in **Attachment E**. Based on the soil analytical results, all analyzed PHC and BTEX parameters had concentrations below the MOE Table 3 standards.

A representative soil sample was collected during the drilling activities for TCLP analysis to characterize the soils for off-Site disposal at a MECP-approved waste disposal facility. The results of the TCLP analysis indicate that the soils would be classified as non-hazardous solid waste if disposed of off-Site at a MECP-approved waste disposal facility. The TCLP analytical results are provided in **Table 6** and the laboratory certificate of analysis is provided in **Attachment D.**

Based on the results of this investigation, there is no evidence that the soil conditions are substantially different than the 2011 baseline conditions with respect to the contaminants of concern (PHCs/BTEX).

6.4 Groundwater Analytical Results

The groundwater analytical results are presented in **Table 7** and **Figure 4** and the laboratory certificates of analysis are provided in **Attachment D**.

Based on the groundwater analytical results, all analyzed parameters were detected below the 2011 MOE Table 3 standards for medium to fine textured soils with the exception of PHC F_1, PHC F_2, and/or total xylenes at TH4 and TH5. TH4 and TH5 are located to the east and south of the existing pump island. Impacts to groundwater were previously identified at TH4 and TH5 in the 2011 baseline investigation and subsequent sampling events on one or more occasion.

There is no evidence that the groundwater conditions on-Site are substantially different than the baseline conditions established in 2011 and subsequent sampling events undertaken by others with respect to the contaminants of concern (PHCs/BTEX). The available historical results are presented in **Attachment A**.

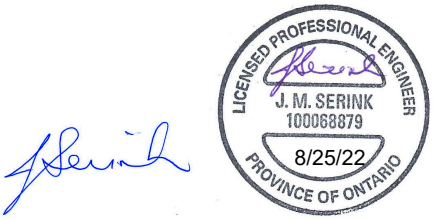
7. Conclusions

Based on the results of the Soil and Groundwater Quality Investigation, there is no evidence of PHC or BTEX impacts to soil on Site at the locations investigated. Impacts to groundwater were identified on Site to the east and south of the existing pump island (TH4 and TH5). However, impacts to groundwater were previously identified in this area in the 2011 baseline investigation and subsequent sampling events on one or more occasion. There is no evidence that the groundwater conditions on-Site are substantially different than the baseline conditions established in 2011 and subsequent sampling events undertaken by others with respect to the contaminants of concern (PHCs/BTEX).

We trust this meets your needs at this time. Should you have any questions regarding the above, please do not hesitate to contact our office.

Regards,

GHD



Peter Do, B. Eng.

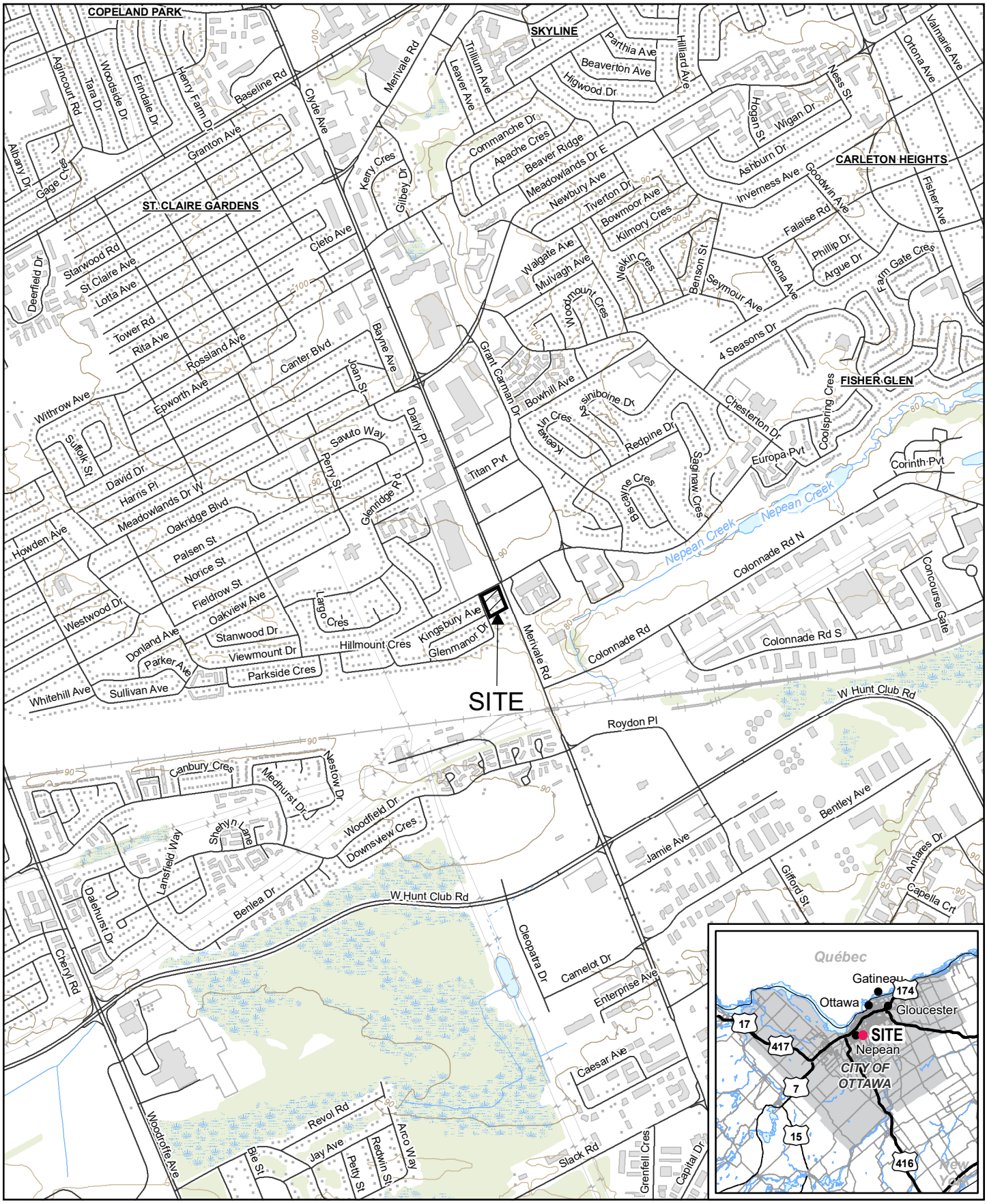
Julia Serink, P. Eng.

PD/ps/LTR-5-Hunter

Encl.

c.c. Mike Evans, GHD

Figures



Paper Size ANSI A

0 130 260 390 520

Metres

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 1983 UTM Zone 18N

N

GHD

CANADIAN TIRE CORPORATION
1660 MERIVALE ROAD,
NEPEAN, ONTARIO (CTP 1126)
SOIL AND GROUNDWATER QUALITY INVESTIGATION

SITE LOCATION MAP

Project No. **12583574**
Revision No. **-**
Date **Aug 5, 2022**

FIGURE 1

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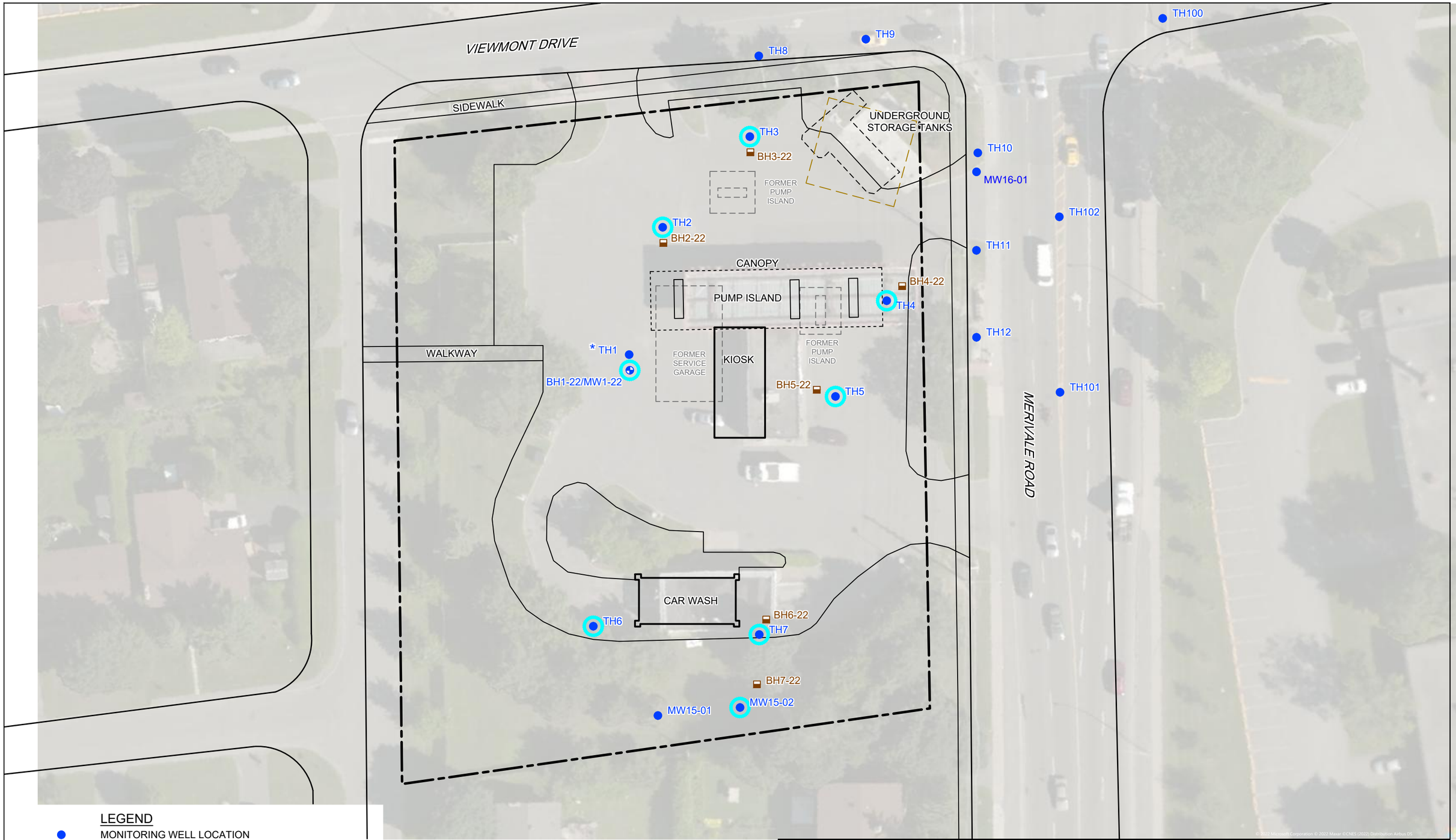
Data source: MNRF NRVIS, 2018. Produced by GHD under licence from Ontario Ministry of Natural Resources and Forestry. © Queen's Printer 2022.



LEGEND

- MONITORING WELL LOCATION
- MONITORING WELL LOCATION (GHD, 2022)
- BOREHOLE LOCATION (GHD, 2022)
- * MONITORING WELL DAMAGED
- LIMIT OF 2011 SOIL EXCAVATION
- GROUNDWATER SAMPLING LOCATION (GHD, 2022)

0 5 10 15m

1:500

Coordinate System:
UTM ZONE 18, NAD83
METRES

N

GHD

CANADIAN TIRE CORPORATION
1660 MERIVALE ROAD,
NEPEAN, ONTARIO (CTP 1126)
SOIL AND GROUNDWATER QUALITY INVESTIGATION

SITE PLAN AND INVESTIGATIVE LOCATIONS

Project No. **12583574**
Date **August 2022**

FIGURE 2

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Plot Date: 16 August 2022 4:55 PM



LEGEND

- MONITORING WELL LOCATION
- MONITORING WELL LOCATION (GHD, 2022)
- BOREHOLE LOCATION (GHD, 2022)
- * MONITORING WELL DAMAGED
- LIMIT OF 2011 SOIL EXCAVATION
- GROUNDWATER FLOW DIRECTION
- 96.00 GROUNDWATER CONTOUR (mASD)
- (96.14) GROUNDWATER ELEVATION (mASD)
- mASD METRES ABOVE SITE DATUM

0 5 10 15m

1:500

Coordinate System:
UTM ZONE 18, NAD83
METRES

N

GHD

CANADIAN TIRE CORPORATION
1660 MERIVALE ROAD,
NEPEAN, ONTARIO (CTP 1126)
SOIL AND GROUNDWATER QUALITY INVESTIGATION

GROUNDWATER ELEVATION CONTOURS
JUNE 15, 2022

Project No. **12583574**
Date **August 2022**

FIGURE 3

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VIEWMONT DRIVE

SIDEWALK

MERVALE ROAD

WALKWAY

UNDERGROUND STORAGE TANKS

FORMER PUMP ISLAND

CANOPY

PUMP ISLAND

FORMER SERVICE GARAGE

KIOSK

FORMER PUMP ISLAND

CAR WASH

TH1 *

BH1-22/MW1-22

TH2

BH2-22

TH3

BH3-22

TH4

BH4-22

TH5

BH5-22

TH6

TH7

BH6-22

BH7-22

MW15-01

MW15-02

TH8

TH9

TH10

MW16-01

TH11

TH12

TH100

TH101

TH102

TH3	06/15/2022
Benzene	17
PHC F1 (C6-C10)	560
PHC F1 (C6-C10)-BTEX	520
PHC F2 (C10-C16)	130
Xylenes (total)	0.46

TH2	06/15/2022
Benzene	ND(0.20)
PHC F1 (C6-C10)	ND(25)
PHC F1 (C6-C10)-BTEX	ND(25)
PHC F2 (C10-C16)	ND(100)
Xylenes (total)	ND(0.40)

MW1-22	07/07/2022
Benzene	ND(0.20)
PHC F1 (C6-C10)	ND(25)
PHC F1 (C6-C10)-BTEX	ND(25)
PHC F2 (C10-C16)	ND(100)
Xylenes (total)	ND(0.40)

TH4	06/16/2022
Benzene	380
PHC F1 (C6-C10)	17000
PHC F1 (C6-C10)-BTEX	8900
PHC F2 (C10-C16)	2500
Xylenes (total)	5900

TH5	06/15/2022
Benzene	190
PHC F1 (C6-C10)	7600
PHC F1 (C6-C10)-BTEX	4900
PHC F2 (C10-C16)	3500
Xylenes (total)	1700

TH6	06/15/2022
Benzene	ND(0.20)/ND(0.20)
PHC F1 (C6-C10)	ND(25)/ND(25)
PHC F1 (C6-C10)-BTEX	ND(25)/ND(25)
PHC F2 (C10-C16)	ND(100)/ND(100)
Xylenes (total)	ND(0.40)/ND(0.40)

MW15-02	06/15/2022
Benzene	ND(0.20)
PHC F1 (C6-C10)	ND(25)
PHC F1 (C6-C10)-BTEX	ND(25)
PHC F2 (C10-C16)	ND(100)
Xylenes (total)	ND(0.40)

TH7	06/15/2022
Benzene	7.3
PHC F1 (C6-C10)	45
PHC F1 (C6-C10)-BTEX	38
PHC F2 (C10-C16)	ND(100)
Xylenes (total)	ND(0.40)

LEGEND

- MONITORING WELL LOCATION
- MONITORING WELL LOCATION (GHD, 2022)
- BOREHOLE LOCATION (GHD, 2022)
- * MONITORING WELL DAMAGED
- LIMIT OF 2011 SOIL EXCAVATION
- HISTORICAL GROUNDWATER CONCENTRATION ABOVE MOE STANDARD ON ONE OR MORE OCCASION (PRE 2022)
- CONCENTRATION BELOW MOE TABLE 3 STANDARDS (GHD, 2022)
- CONCENTRATION ABOVE MOE TABLE 3 STANDARDS (GHD, 2022)
- CONCENTRATION ABOVE MOE TABLE 3 STANDARDS (GHD, 2022)
- ug/L MICROGRAMS PER LITRE
- ND (25) NOT DETECTED
- ND(25)/ND(25) PARENT RESULT/DUPLICATE RESULT

NOTE:
(1) Ontario Ministry of the Environment (MOE), "Soil, Ground Water and Sediment Standards for Use XV.1 of the Environmental Protection Act," April 15, 2011, Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition for All Types of Property Uses and Medium to Fine Textured Soils

TH7	06/15/2022
Benzene	7.3
PHC F1 (C6-C10)	45
PHC F1 (C6-C10)-BTEX	38
PHC F2 (C10-C16)	ND(100)
Xylenes (total)	ND(0.40)

SAMPLE LOCATION
SAMPLE DATE
RESULT (ug/L)
PARAMETER

PARAMETER	Table 3 Standard (1) (ug/L)
Benzene	430
PHC F1 (C6-C10)	750
PHC F1 (C6-C10)-BTEX	750
PHC F2 (C10-C16)	150
Xylenes (total)	4200

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1:500
Coordinate System:
UTM ZONE 18, NAD83
METRES

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GHD

CANADIAN TIRE CORPORATION
1660 MERIVALE ROAD,
NEPEAN, ONTARIO (CTP 1126)
SOIL AND GROUNDWATER QUALITY INVESTIGATION

SUMMARY OF GROUNDWATER ANALYTICAL RESULTS

Project No. 12583574
Date August 2022

FIGURE 4

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Tables

Table 1

Groundwater Elevations
Soil and Groundwater Quality Investigation
1660 Merivale Road, Ottawa, Ontario (CTP 1126)
Canadian Tire Corporation

Well No.	Top of Riser Elevation (mASD)	Groundwater Elevations						Screened Interval[1] (mBGS)		
		June 15, 2022		June 29, 2022		July 7, 2022				
		(mBTOR)	(mASD)	(mBTOR)	(mASD)	(mBTOR)	(mASD)			
TH1[2]	100.400	Dry	-	-	-	-	-	2.60	-	5.65
TH2	100.431	3.21	97.221	-	-	-	-	3.20	-	4.65
TH3	100.638	2.01	98.628	-	-	-	-	3.20	-	4.65
TH4	100.151	2.98	97.171	-	-	-	-	3.20	-	4.85
TH5	100.064	4.44	95.624	-	-	-	-	3.50	-	5.00
TH6	100.120	3.44	96.680	-	-	-	-	3.60	-	5.20
TH7	100.897	4.58	96.317	-	-	-	-	4.40	-	5.80
MW15-02	98.365	2.23	96.135	-	-	-	-	2.70	-	4.90
BH1-22/MW1-22[3]	100.48	-	-	3.68	96.80	3.80	96.68	4.11	-	5.64

Notes:

mASD	metres Above Site Datum.
mBGS	metres Below Ground Surface.
mBTOR	metres Below Top of Riser.
-	not measured
	Top of riser elevation was surveyed with respect to a storm sewer catch basin located northwest of the car wash, with an assumed elevation of 100 metres above Site datum (mASD).
(1)	Stratigraphic logs produced by Barenco in 2011 were used to source screened interval data for the pre-existing monitoring wells with exception to MW1-22/BH1-22 which was installed by GHD in 2022.
(2)	Well found to be damaged
(3)	Replacement well for TH1

Table 2

Well Development and Purging Details
Soil and Groundwater Quality Investigation
1660 Merivale Road, Ottawa, Ontario (CTP 1126)
Canadian Tire Corporation

Location	Date	Time (min)	Pumping Rate (mL/min)	Depth to Water (mBTOR)	Volume Purged (L)	pH	Temperature (°C)	Conductivity (mS/cm)	ORP (mV)	Turbidity (NTU)	DO (mg/L)	Odour	Comments
TH1	June 15, 2022				--							--	Dry well
TH2	June 15, 2022	9:50	100	3.21	0.5	7.45	17.16	3.51	-138	554	8.17		
		9:55	100	3.21	1.0	7.63	17.30	3.46	-105	673	7.94		
		10:00	100	3.21	1.5	7.81	17.50	3.42	-103	1000+	8.15		
		10:05	100	3.21	2.0	7.91	17.52	3.29	-107	327	8.00		Grey
		10:10	100	3.21	2.5	7.91	17.99	3.26	-106	128	7.68		
		10:15	100	3.21	3.0	7.87	18.06	3.35	-104	79.4	7.98		
		10:20	100	3.21	3.5	7.77	17.94	3.38	-97	61.5	7.59		
TH3	June 15, 2022	10:50	100	2.01	0.5	7.78	20.12	2.43	-138	25.1	7.00		
		10:55	100	2.01	1.0	8.03	17.88	2.42	-152	6.7	7.4		
		11:00	100	2.01	1.5	7.98	17.06	2.43	-149	5.2	7.61	--	Clear
		11:05	100	2.01	2.0	7.61	16.67	2.43	-169	3.5	7.65		
		11:10	100	2.01	2.5	7.65	16.50	2.43	-172	2.1	7.56		
TH4	June 15, 2022				5.0							--	Purged dry at ~5 litres
	June 16, 2022	6:35	100	2.98	0.5	8.36	16.52	5.24	-120	1000+	11.38		
		6:40	100	2.98	1.0	7.97	15.72	5.25	-132	927	9.46		
		6:45	100	2.98	1.5	7.85	16.33	5.15	-134	528	8.43		
		6:50	100	2.98	2.0	7.83	15.55	5.23	-135	268	8.36	Strong PHC Odour	Black with visible sheen
		6:55	100	2.98	2.5	7.71	15.19	5.16	-150	189	8.23		
		7:00	100	2.98	3.0	7.63	14.98	5.02	-166	154	8.12		
		7:05	100	2.98	3.5	7.63	15.07	4.94	-173	124	7.98		
TH5	June 15, 2022	13:00	100	2.77	0.5	7.63	21.62	4.70	-122	1000+	6.56		
		13:05	100	2.77	1.0	7.81	17.49	4.81	-97	1000+	7.54		
		13:10	100	2.77	1.5	7.72	17.97	4.66	-97	958	6.90		
		13:15	100	2.77	2.0	7.75	17.09	4.21	-108	349	7.19		
		13:20	100	2.77	2.5	7.57	16.83	3.89	-114	270	7.19	Strong PHC Odour	Black with visible sheen
		13:25	100	2.77	3.0	7.81	17.01	3.38	-106	347	7.21		
		13:30	100	2.77	3.5	7.60	16.78	3.39	-105	271	7.16		
		13:35	100	2.77	4.0	7.69	16.90	3.42	-111	281	7.11		
TH6	June 15, 2022	7:35	100	3.44	0.5	7.59	14.21	2.77	-23	354	7.62		
		7:40	100	3.44	1.0	7.28	13.28	2.71	-9	860	7.94		
		7:45	100	3.44	1.5	7.27	13.75	2.63	45	107	7.65		
		7:50	100	3.44	2.0	7.25	13.30	2.69	50	33.1	7.91	--	Initially cloudy, cleared after fourth reading
		7:55	100	3.44	2.5	7.21	13.29	2.76	24	20.7	7.83		
		8:00	100	3.44	3.0	7.16	13.35	2.82	21	18.0	7.84		

Table 2

Well Development and Purging Details
Soil and Groundwater Quality Investigation
1660 Merivale Road, Ottawa, Ontario (CTP 1126)
Canadian Tire Corporation

Location	Date	Time (min)	Pumping Rate (mL/min)	Depth to Water (mBTOR)	Volume Purged (L)	pH	Temperature (°C)	Conductivity (mS/cm)	ORP (mV)	Turbidity (NTU)	DO (mg/L)	Odour	Comments
TH7	June 15, 2022	6:25	100	4.58	0.5	5.35	13.68	3.85	-63	2.8	7.97		
		6:30	100	4.58	1.0	6.48	13.04	3.87	-150	1.8	7.92		
		6:35	100	4.58	1.5	6.66	13.00	3.77	-148	0.8	7.43	--	Clear
		6:40	100	4.58	2.0	6.71	12.88	3.73	-139	0.0	7.71		
		6:45	100	4.58	2.5	6.72	12.65	3.68	-139	0.0	7.84		
MW15-02	June 15, 2022	8:40	100	2.23	0.5	7.69	15.13	2.64	16	154.0	7.57		
		8:45	100	2.23	1.0	7.39	14.16	2.80	-4	70.2	7.70		
		8:50	100	2.23	1.5	7.22	13.66	2.90	-11	49.0	7.77	--	Red in colour
		8:55	100	2.23	2.0	7.18	13.29	3.03	-16	32.1	7.83		
		9:00	100	2.23	2.5	7.22	13.31	3.08	-18	23.5	7.55		
BH1-22/MW1-22	June 29, 2022				2.0							--	Purged dry at 2 litres
	July 7, 2022	0	100	-	0.5	6.01	19.67	3.18	-	960.0	-		
		5	100	-	1.0	7.45	16.01	7.3	-	1000+	-		
		10	100	-	1.5	7.34	15.57	7.46	-	1000+	-	--	Grey in colour
		15	100	-	2.0	7.19	14.58	6.66	-	1000+	-		
		20	100	-	2.0	7.08	14.20	6.52	-	1000+	-		

Notes:

min	Minutes	ORP	Oxidation-Reduction Potential
mBTOR	metres below top of riser	DO	Dissolved Oxygen
L	Litres	mV	Millivolts
mL	Millilitres	mg	Milligram
°C	degrees Celsius	NTU	Nephelometric Turbidity Unit
mS/cm	miliSiemens per centimetre		
-	Not measured		

Table 3

Sample Identification Key and Analytical Parameter List
Soil and Groundwater Quality Investigation
1660 Merivale Road, Ottawa, Ontario (CTP 1126)
Canadian Tire Corporation

Sample Location	Sample Identification	Sample Date	Sample Matrix	Field Duplicate	Sample Depth (m BGS)			Laboratory Analysis	
								PHC F1-F4/BTEX	TCLP Package
Soil									
BH1-22/MW1-22	S-12583574-062822-NG-CTP1126-BH1-22-1	6/28/2022	Soil		1.2	--	1.8	x	
BH1-22	S-12583574-062822-NG-CTP1126-BH1-22-2	6/28/2022	Soil		2.4	--	3.0	x	
BH2-22	S-12583574-062822-NG-CTP1126-BH2-22-1	6/28/2022	Soil		0.6	--	1.2	x	
BH2-22	S-12583574-062822-NG-CTP1126-BH2-22-2	6/28/2022	Soil		2.4	--	2.6	x	
BH3-22	S-12583574-062822-NG-CTP1126-BH3-22-1	6/28/2022	Soil		1.2	--	1.8	x	
BH3-22	S-12583574-062822-NG-CTP1126-BH3-22-2	6/28/2022	Soil	X	1.2	--	1.8	x	
BH3-22	S-12583574-062822-NG-CTP1126-BH3-22-3	6/28/2022	Soil		2.4	--	2.6	x	
BH4-22	S-12583574-062822-NG-CTP1126-BH4-22-1	6/28/2022	Soil		1.2	--	1.8	x	
BH4-22	S-12583574-062822-NG-CTP1126-BH4-22-2	6/28/2022	Soil		2.4	--	2.6	x	
BH5-22	S-12583574-062822-NG-CTP1126-BH5-22-1	6/28/2022	Soil		1.8	--	2.4	x	
BH5-22	S-12583574-062822-NG-CTP1126-BH5-22-2	6/28/2022	Soil		2.4	--	3.0	x	
BH5-22	S-12583574-062822-NG-CTP1126-TCLP	6/28/2022	Soil		2.4	--	3.0		x
BH6-22	S-12583574-062822-NG-CTP1126-BH6-22-1	6/28/2022	Soil		1.8	--	2.4	x	
BH6-22	S-12583574-062822-NG-CTP1126-BH6-22-2	6/28/2022	Soil		3.0	--	3.4	x	
BH7-22	S-12583574-062822-NG-CTP1126-BH7-22-1	6/28/2022	Soil		0.0	--	0.6	x	
BH7-22	S-12583574-062822-NG-CTP1126-BH7-22-2	6/28/2022	Soil		1.2	--	1.8	x	
Groundwater									
TH2	GW-12583574-150622-DA-005	6/15/2022	Groundwater		NA	--	NA	x	
TH3	GW-12583574-150622-DA-006	6/15/2022	Groundwater		NA	--	NA	x	
TH4	GW-12583574-160622-DA-008	6/16/2022	Groundwater		NA	--	NA	x	
TH5	GW-12583574-150622-DA-007	6/15/2022	Groundwater		NA	--	NA	x	
TH6	GW-12583574-150622-DA-002	6/15/2022	Groundwater		NA	--	NA	x	
TH6	GW-12583574-150622-DA-003	6/15/2022	Groundwater	X	NA	--	NA	x	
TH7	GW-12583574-150622-DA-001	6/15/2022	Groundwater		NA	--	NA	x	
MW15-02	GW-12583574-150622-DA-004	6/15/2022	Groundwater		NA	--	NA	x	
BH1-22/MW1-22	GW-12583574-070722-NG-CTP1126-MW1-22	7/7/2022	Groundwater		NA	--	NA	x	
Trip Blank	C2A2062-SJT408-01	6/15/2022	Trip Blank		NA		NA	PHC F1 / BTEX ONLY	

Notes:

NA	Not Applicable
mBGS	metres Below Ground Surface
PHC F1-F4	Petroleum Hydrocarbon Fractions F1 to F4
BTEX	Benzene, Toluene, Ethylbenzene and Xylenes
TCLP	Toxicity Characteristic Leaching Procedure

Monitoring Well Completion Details
Soil and Groundwater Quality Investigation
1660 Merivale Road, Ottawa, Ontario (CTP 1126)
Canadian Tire Corporation

Location	Completion Date	Top of Riser Elevation (mASD)	Total Depth Drilled (mBGS)	Screened Interval (mBGS)	Sand Pack Interval (mBGS)	Screened Geologic Material
MW1-22/BH1-22	6/28/2022	100.48	5.64	4.11 - 5.64	3.96 - 5.64	Bedrock

Notes:

mASD metres Above Site Datum
mBGS metres Below Ground Surface

Top of riser elevation was surveyed with respect to a storm sewer catch basin located northwest of the car wash, with an assumed elevation of 100 metres above Site datum (mASD).

Table 5

Summary of Soil Analytical Results
Soil and Groundwater Quality Investigation
1660 Merivale Road, Ottawa, Ontario (CTP 1126)
Canadian Tire Corporation

	Sample Location:		**BH1-22/MW1-22**	**BH1-22/MW1-22**	**BH2-22**	**BH2-22**
	Sample Identification:		**S-12583574-062822-NG-CTP1126-BH1-22-1**	**S-12583574-062822-NG-CTP1126-BH1-22-2**	**S-12583574-062822-NG-CTP1126-BH2-22-1**	**S-12583574-062822-NG-CTP1126-BH2-22-2**
	Sample Date:		**06/28/2022**	**06/28/2022**	**06/28/2022**	**06/28/2022**
	Sample Depth:		**1.20-1.80**	**2.40-3.00**	**0.60-1.20**	**2.40-2.60**
	Lab COA:		**C2I1892**	**C2I1892**	**C2I1892**	**C2I1892**
Parameter	**Units**	**MOE Table 3 Standards[(1)]**				
Volatiles						
Benzene	ug/g	0.4	ND(0.020)	ND(0.020)	ND(0.020)	ND(0.020)
Ethylbenzene	ug/g	19	ND(0.020)	ND(0.020)	ND(0.020)	ND(0.020)
m&p-Xylenes	ug/g	NV	ND(0.040)	ND(0.040)	ND(0.040)	ND(0.040)
o-Xylene	ug/g	NV	ND(0.020)	ND(0.020)	ND(0.020)	ND(0.020)
Toluene	ug/g	78	ND(0.020)	ND(0.020)	ND(0.020)	ND(0.020)
Xylenes (total)	ug/g	30	ND(0.040)	ND(0.040)	ND(0.040)	ND(0.040)
Petroleum Hydrocarbons						
Petroleum hydrocarbons F1 (C6-C10)	ug/g	65	ND(10)	ND(10)	ND(10)	ND(10)
Petroleum hydrocarbons F1 (C6-C10) - less BTEX	ug/g	65	ND(10)	ND(10)	ND(10)	ND(10)
Petroleum hydrocarbons F2 (C10-C16)	ug/g	250	ND(10)	ND(10)	ND(10)	ND(10)
Petroleum hydrocarbons F3 (C16-C34)	ug/g	2500	ND(50)	ND(50)	ND(50)	ND(50)
Petroleum hydrocarbons F4 (C34-C50)	ug/g	6600	ND(50)	ND(50)	ND(50)	ND(50)
General Chemistry						
Moisture	%	-	20	16	12	22

Notes:

(1) Ontario Ministry of the Environment (MOE), Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011. Table 3: Full Depth Generic Site Condition Standards in a Non Potable Ground Water Condition for Industrial/Commercial/Community Property Use and Fine Textured Soils.

ug/g micrograms per gram

NV No Value

% Percent

ND(0.020) Not detected at the associated reporting limit.

- Not analyzed

Table 5

Summary of Soil Analytical Results
Soil and Groundwater Quality Investigation
1660 Merivale Road, Ottawa, Ontario (CTP 1126)
Canadian Tire Corporation

		Sample Location:	**BH3-22**	**BH3-22**	**BH3-22**	**BH4-22**
		Sample Identification:	**S-12583574-062822-NG-CTP1126-BH3-22-1**	**S-12583574-062822-NG-CTP1126-BH3-22-2**	**S-12583574-062822-NG-CTP1126-BH3-22-3**	**S-12583574-062822-NG-CTP1126-BH4-22-1**
		Sample Date:	**06/28/2022**	**06/28/2022**	**06/28/2022**	**06/28/2022**
		Sample Depth:	**1.20-1.80**	**1.20-1.80**	**2.40-2.60**	**1.20-1.80**
		Lab COA:	**C2I1892**	**C2I1892**	**C2I1892**	**C2I1892**
				Duplicate		
Parameter	**Units**	**MOE Table 3 Standards[(1)]**				
Volatiles						
Benzene	ug/g	0.4	ND(0.020)	ND(0.040)	ND(0.020)	ND(0.020)
Ethylbenzene	ug/g	19	ND(0.020)	ND(0.040)	ND(0.020)	ND(0.020)
m&p-Xylenes	ug/g	NV	ND(0.040)	ND(0.080)	ND(0.040)	ND(0.040)
o-Xylene	ug/g	NV	ND(0.020)	ND(0.040)	ND(0.020)	ND(0.020)
Toluene	ug/g	78	ND(0.020)	ND(0.040)	ND(0.020)	ND(0.020)
Xylenes (total)	ug/g	30	ND(0.040)	ND(0.080)	ND(0.040)	ND(0.040)
Petroleum Hydrocarbons						
Petroleum hydrocarbons F1 (C6-C10)	ug/g	65	ND(10)	ND(20)	ND(10)	ND(10)
Petroleum hydrocarbons F1 (C6-C10) - less BTEX	ug/g	65	ND(10)	ND(20)	ND(10)	ND(10)
Petroleum hydrocarbons F2 (C10-C16)	ug/g	250	ND(10)	ND(10)	ND(10)	ND(10)
Petroleum hydrocarbons F3 (C16-C34)	ug/g	2500	ND(50)	ND(50)	ND(50)	ND(50)
Petroleum hydrocarbons F4 (C34-C50)	ug/g	6600	ND(50)	ND(50)	ND(50)	62
General Chemistry						
Moisture	%	-	17	19	28	22

Notes:

(1) Ontario Ministry of the Environment (MOE), Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011. Table 3: Full Depth Generic Site Condition Standards in a Non Potable Ground Water Condition for Industrial/Commercial/Community Property Use and Fine Textured Soils.

ug/g micrograms per gram

NV No Value

% Percent

ND(0.020) Not detected at the associated reporting limit.

\- Not analyzed

Table 5

Summary of Soil Analytical Results
Soil and Groundwater Quality Investigation
1660 Merivale Road, Ottawa, Ontario (CTP 1126)
Canadian Tire Corporation

		Sample Location:	**BH4-22**	**BH5-22**	**BH5-22**	**BH6-22**
		Sample Identification:	**S-12583574-062822-NG-CTP1126-BH4-22-2**	**S-12583574-062822-NG-CTP1126-BH5-22-1**	**S-12583574-062822-NG-CTP1126-BH5-22-2**	**S-12583574-062822-NG-CTP1126-BH6-22-1**
		Sample Date:	**06/28/2022**	**06/28/2022**	**06/28/2022**	**06/28/2022**
		Sample Depth:	**2.40-2.60**	**1.80-2.40**	**2.40-3.00**	**1.80-2.40**
		Lab COA:	**C2I1892**	**C2I1892**	**C2I1892**	**C2I1892**
Parameter	**Units**	**MOE Table 3 Standards[(1)]**				
Volatiles						
Benzene	ug/g	0.4	ND(0.020)	ND(0.020)	ND(0.020)	ND(0.020)
Ethylbenzene	ug/g	19	ND(0.020)	ND(0.020)	0.091	ND(0.020)
m&p-Xylenes	ug/g	NV	ND(0.040)	ND(0.040)	0.084	ND(0.040)
o-Xylene	ug/g	NV	ND(0.020)	ND(0.020)	ND(0.020)	ND(0.020)
Toluene	ug/g	78	ND(0.020)	ND(0.020)	ND(0.020)	ND(0.020)
Xylenes (total)	ug/g	30	ND(0.040)	ND(0.040)	0.084	ND(0.040)
Petroleum Hydrocarbons						
Petroleum hydrocarbons F1 (C6-C10)	ug/g	65	ND(10)	ND(10)	ND(10)	ND(10)
Petroleum hydrocarbons F1 (C6-C10) - less BTEX	ug/g	65	ND(10)	ND(10)	ND(10)	ND(10)
Petroleum hydrocarbons F2 (C10-C16)	ug/g	250	ND(10)	ND(10)	ND(10)	ND(10)
Petroleum hydrocarbons F3 (C16-C34)	ug/g	2500	ND(50)	87	ND(50)	ND(50)
Petroleum hydrocarbons F4 (C34-C50)	ug/g	6600	ND(50)	87	ND(50)	ND(50)
General Chemistry						
Moisture	%	-	11	16	13	23

Notes:

(1) Ontario Ministry of the Environment (MOE), Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011.
Table 3: Full Depth Generic Site Condition Standards in a Non Potable Ground Water Condition for Industrial/Commercial/Community Property Use and Fine Textured Soils.

ug/g micrograms per gram
NV No Value
% Percent
ND(0.020) Not detected at the associated reporting limit.
- Not analyzed

Table 5

Summary of Soil Analytical Results
Soil and Groundwater Quality Investigation
1660 Merivale Road, Ottawa, Ontario (CTP 1126)
Canadian Tire Corporation

		Sample Location:	**BH6-22**	**BH7-22**	**BH7-22**
		Sample Identification:	**S-12583574-062822-NG-CTP1126-BH6-22-2**	**S-12583574-062822-NG-CTP1126-BH7-22-1**	**S-12583574-062822-NG-CTP1126-BH7-22-2**
		Sample Date:	**06/28/2022**	**06/28/2022**	**06/28/2022**
		Sample Depth:	**3.00-3.35**	**0.00-0.60**	**1.20-1.80**
		Lab COA:	**C2I1892**	**C2I1892**	**C2I1892**
Parameter	**Units**	**MOE Table 3 Standards[(1)]**			
Volatiles					
Benzene	ug/g	0.4	ND(0.020)	ND(0.020)	ND(0.040)
Ethylbenzene	ug/g	19	ND(0.020)	ND(0.020)	ND(0.040)
m&p-Xylenes	ug/g	NV	ND(0.040)	ND(0.040)	ND(0.080)
o-Xylene	ug/g	NV	ND(0.020)	ND(0.020)	ND(0.040)
Toluene	ug/g	78	ND(0.020)	ND(0.020)	ND(0.040)
Xylenes (total)	ug/g	30	ND(0.040)	ND(0.040)	ND(0.080)
Petroleum Hydrocarbons					
Petroleum hydrocarbons F1 (C6-C10)	ug/g	65	ND(10)	ND(10)	ND(20)
Petroleum hydrocarbons F1 (C6-C10) - less BTEX	ug/g	65	ND(10)	ND(10)	ND(20)
Petroleum hydrocarbons F2 (C10-C16)	ug/g	250	ND(10)	ND(10)	ND(10)
Petroleum hydrocarbons F3 (C16-C34)	ug/g	2500	ND(50)	ND(50)	ND(50)
Petroleum hydrocarbons F4 (C34-C50)	ug/g	6600	ND(50)	ND(50)	ND(50)
General Chemistry					
Moisture	%	-	19	21	19

Notes:

(1) Ontario Ministry of the Environment (MOE), Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011.
Table 3: Full Depth Generic Site Condition Standards in a Non Potable Ground Water Condition for Industrial/Commercial/Community Property Use and Fine Textured Soils.

ug/g micrograms per gram
NV No Value
% Percent
ND(0.020) Not detected at the associated reporting limit.
- Not analyzed

Table 6

TCLP Analytical Results Summary
Soil and Groundwater Quality Investigation
1660 Merivale Road, Ottawa, Ontario (CTP 1126)
Canadian Tire Corporation

		Sample Location:	**BH5-22**
		Sample Identification:	**S-12583574-062822-NG-CTP1126-TCLP**
		Sample Date:	**06/28/2022**
		Sample Depth:	**2.40-3.00**
		Lab COA:	**C2I1892**
Parameters	**Units**	**Ontario Regulation 347 Criteria(1)**	
Volatiles			
1,1-Dichloroethene	mg/L	1.4	ND(0.020)
1,2-Dichlorobenzene	mg/L	20	ND(0.050)
1,2-Dichloroethane	mg/L	0.5	ND(0.050)
1,4-Dichlorobenzene	mg/L	0.5	ND(0.050)
2-Butanone (Methyl ethyl ketone) (MEK)	mg/L	200	ND(1.0)
Benzene	mg/L	0.5	ND(0.020)
Carbon tetrachloride	mg/L	0.5	ND(0.020)
Chlorobenzene	mg/L	8	ND(0.020)
Chloroform (Trichloromethane)	mg/L	10	ND(0.020)
Methylene chloride	mg/L	5	ND(0.20)
Tetrachloroethene	mg/L	3	ND(0.020)
Trichloroethene	mg/L	5	ND(0.020)
Vinyl chloride	mg/L	0.2	ND(0.020)
Wet weight	none		23
PAHs			
Benzo(a)pyrene	mg/L	0.001	ND(0.0001)
Metals			
Arsenic	mg/L	2.5	ND(0.2)
Barium	mg/L	100	0.6
Boron	mg/L	500	0.2
Cadmium	mg/L	0.5	ND(0.05)
Chromium	mg/L	5	ND(0.1)
Lead	mg/L	5	ND(0.1)
Mercury	mg/L	0.1	ND(0.001)
Selenium	mg/L	1	ND(0.1)
Silver	mg/L	5	ND(0.01)
Uranium	mg/L	10	ND(0.01)
General Chemistry			
Cyanide, weak acid dissociable	mg/L	20	ND(0.010)
Fluoride	mg/L	150	ND(0.10)
Ignitability	none	-	NF/NI
Initial pH	s.u.	-	8.65
Final pH	s.u.	-	4.97
Nitrate (as N)	mg/L	-	ND(1.0)
Nitrite (as N)	mg/L	-	ND(0.10)
Nitrite/Nitrate	mg/L	1000.00	ND(1.0)
Percent solids, vol.	%	-	100

Notes:

(1)	Environmental Protection Act, Waste Management Regulation 347, as amended by O. Reg. 558, Schedule 4, 1990.
ug/g	microgram per gram
mS/cm	milliSiemens per centimetre
mg/L	millgram per litres
%	percent
s.u.	standard units
ND(0.050)	Not detected above laboratory detection limited indicated in brackets
-	Not Analyzed/No Standard
NI/NF	Not ignitable/Not flammable

Table 7

Summary of Groundwater Analytical Results
Soil and Groundwater Quality Investigation
1660 Merivale Road, Ottawa, Ontario (CTP 1126)
Canadian Tire Corporation

		Sample Location:	**MW1-22**	**MW15-02**	**TH2**	**TH3**	**TH4**
		Sample Identification:	**GW-12583574-070722-NG-CTP1126-MW1-22**	**GW-12583574-150622-DA-004**	**GW-12583574-150622-DA-005**	**GW-12583574-150622-DA-006**	**GW-12583574-160622-DA-008**
		Sample Date:	**07/07/2022**	**06/15/2022**	**06/15/2022**	**06/15/2022**	**06/16/2022**
		Lab COA:	**C2I9496**	**C2G7508**	**C2G7508**	**C2G7508**	**C2G8874**
Parameters	**Units**	**MOE Table 3 Standards[(1)]**					
Volatiles							
Benzene	ug/L	430	ND(0.20)	ND(0.20)	ND(0.20)	17	380
Ethylbenzene	ug/L	2300	ND(0.20)	ND(0.20)	ND(0.20)	21	2300
m&p-Xylenes	ug/L	NV	ND(0.40)	ND(0.40)	ND(0.40)	0.46	5800
o-Xylene	ug/L	NV	ND(0.20)	ND(0.20)	ND(0.20)	ND(0.20)	61
Toluene	ug/L	18000	ND(0.20)	ND(0.20)	ND(0.20)	ND(0.20)	37
Xylenes (total)	ug/L	4200	ND(0.40)	ND(0.40)	ND(0.40)	0.46	**5900**
Petroleum Hydrocarbons							
Petroleum hydrocarbons F1 (C6-C10)	ug/L	750	ND(25)	ND(25)	ND(25)	560	**17000**
Petroleum hydrocarbons F1 (C6-C10) - less BTEX	ug/L	750	ND(25)	ND(25)	ND(25)	520	**8900**
Petroleum hydrocarbons F2 (C10-C16)	ug/L	150	ND(100)	ND(100)	ND(100)	130	**2500**
Petroleum hydrocarbons F3 (C16-C34)	ug/L	500	ND(200)	ND(200)	ND(200)	ND(200)	250
Petroleum hydrocarbons F4 (C34-C50)	ug/L	500	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)

Footnotes:

(1) Ontario Ministry of the Environment (MOE), Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011.
Table 3: Full Depth Generic Site Condition Standards in a Non Potable Ground Water Condition for All Property Uses and Fine Textured Soils.

ug/L micrograms per litres
ND(0.020) Not detected at the associated reporting limit.
- Not analyzed
NV no value

Table 7

Summary of Groundwater Analytical Results
Soil and Groundwater Quality Investigation
1660 Merivale Road, Ottawa, Ontario (CTP 1126)
Canadian Tire Corporation

		Sample Location:	**TH5**	**TH6**	**TH6**	**TH7**	**TRIPBLANK**
		Sample Identification:	**GW-12583574-150622-DA-007**	**GW-12583574-150622-DA-002**	**GW-12583574-150622-DA-003**	**GW-12583574-150622-DA-001**	**C2A2062-SJT408-01**
		Sample Date:	**06/15/2022**	**06/15/2022**	**06/15/2022**	**06/15/2022**	**06/15/2022**
		Lab COA:	**C2G7508**	**C2G7508**	**C2G7508**	**C2G7508**	**C2G7508**
					Duplicate		
Parameters	**Units**	**MOE Table 3 Standards[(1)]**					
Volatiles							
Benzene	ug/L	430	190	ND(0.20)	ND(0.20)	7.3	ND(0.20)
Ethylbenzene	ug/L	2300	820	ND(0.20)	ND(0.20)	0.49	ND(0.20)
m&p-Xylenes	ug/L	NV	1700	ND(0.40)	ND(0.40)	ND(0.40)	ND(0.40)
o-Xylene	ug/L	NV	65	ND(0.20)	ND(0.20)	ND(0.20)	ND(0.20)
Toluene	ug/L	18000	23	ND(0.20)	ND(0.20)	ND(0.20)	ND(0.20)
Xylenes (total)	ug/L	4200	1700	ND(0.40)	ND(0.40)	ND(0.40)	ND(0.40)
Petroleum Hydrocarbons							
Petroleum hydrocarbons F1 (C6-C10)	ug/L	750	**7600**	ND(25)	ND(25)	45	ND(25)
Petroleum hydrocarbons F1 (C6-C10) - less BTEX	ug/L	750	**4900**	ND(25)	ND(25)	38	ND(25)
Petroleum hydrocarbons F2 (C10-C16)	ug/L	150	**3500**	ND(100)	ND(100)	ND(100)	-
Petroleum hydrocarbons F3 (C16-C34)	ug/L	500	280	ND(200)	ND(200)	ND(200)	-
Petroleum hydrocarbons F4 (C34-C50)	ug/L	500	ND(200)	ND(200)	ND(200)	ND(200)	-

Footnotes:

(1) Ontario Ministry of the Environment (MOE), Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011.
Table 3: Full Depth Generic Site Condition Standards in a Non Potable Ground Water Condition for All Property Uses and Fine Textured Soils.

ug/L micrograms per litres
ND(0.020) Not detected at the associated reporting limit.
- Not analyzed
NV no value

Attachments

Attachment A

Historical Analytical Results

Attachment A – List of Documentation Provided by CTC

CTP 1126 – 1660 Merivale Road, Ottawa, Ontario

- Baseline Environmental Assessment, 1660 Merivale Road, Ottawa, Ontario, prepared by Barenco Inc., dated December 5, 2011, CTREL Filename: 2011-05-12-Phase II Baseline - 1660 Merivale Rd, Ottawa.
- Phase I Environmental Assessment, 1660 Merivale Road, Ottawa, Ontario, prepared by Barenco Inc., dated November 9, 2011, Filename: 2011-09-11-PhI - 1660 Merivale Rd, Ottawa.
- Phase II Environmental Assessment, 1660 Merivale Road, Ottawa, Ontario, prepared by Barenco Inc., dated September 14, 2011, Filename: 2011-09-14-Phase II - 1660 Merivale Rd, Ottawa.
- Geotechnical Investigation, prepared by exp, dated September 12, 2011, Filename: 2011-12-09-Geotech - 1660 Merivale Rd, Ottawa.
- Tank Replacement Program, 1660 Merivale Road, Ottawa, Ontario, prepared by Barenco Inc., dated December 23, 2011, Filename: 2011-12-23-Tank Replacement - 1660 Merivale Rd, Ottawa.
- Phase II Environmental Site Assessment, Adjacent to 1660 Merivale Road, Ottawa, Ontario, prepared by exp, dated December 5, 2013, Filename: 2013-05-12-Phase II - Adjacent to 1660 Merivale Rd, Ottawa.
- 2014 Ground Water Monitoring and Sampling Program Report letter, 1660 Merivale Road, Ottawa, Ontario, prepared by exp, dated October 8, 2014, Filename: 2014-10-08-GW Monitoring and Sampling Report-1660 Merivale Road, Ottawa.
- Supplemental Phase II Environmental Site Assessment, Adjacent to 1660 Merivale Road, Ottawa, ON, prepared by exp Energy Services Ltd., dated November 20, 2014, Filename: 2014-11-20-Supp PhII - Adjacent to 1660 Merivale Rd, Ottawa.
- Interim Contaminant Management Plan letter, 1660 Merivale Road, Ottawa, ON, prepared by exp Energy Services Ltd., dated April 2, 2015.
- Contaminant Management Plan letter, Adjacent to 1660 Merivale Road, Ottawa, ON, prepared by Golder Associates, dated May 19, 2017.
- 2015 Supplemental Subsurface, Groundwater Monitoring and Sampling Investigation, 1660 Merivale Road, Ottawa, Ontario SAP No. 88001627, prepared by Golder Associates, dated May 6, 2016, Filename: 2016-05-06-On-Site-1660 Merivale Road Ph II.
- Screening Level Risk Assessment letter, Right-of-Way Adjacent to 1660 Merivale Road, Ottawa, ON (SAP NO. 88001627), prepared by Golder Associates, dated May 3, 2016, Filename: 2016-05-CSA Adj to 1660 Merivale Rd_3May2016.
- 2015 Groundwater Monitoring and Sampling Report letter, Adjacent to 1660 Merivale Road, Ottawa, ON (SAP NO. 88001627), prepared by Golder Associates, dated, May 6, 2016, Filename: 2016-05-Off-Site-1660 Merivale Road.
- 2016 Groundwater Monitoring and Sampling Report letter, Adjacent to 1660 Merivale Road, Ottawa, ON (SAP NO. 88001627), prepared by Golder Associates, dated November 21, 2016, Filename: 2016-10-26-Off-Site-1660 Merivale Road.
- 2016 Groundwater Monitoring and Sampling Report letter, Former Imperial Oil Retail Fuel Outlet, 1660 Merivale Road, Ottawa, Ontario, prepared by Golder Associates, dated January 31, 2017, Filename: 2016-On-Site 1660 Merivale Road IM Report.

- 2017 Groundwater Monitoring and Sampling Report letter, Adjacent to 1660 Merivale Road, Ottawa, ON, prepared by Golder Associates, dated August 11, 2017, Filename: 2017-Off-Site-1660 Merivale Road.
- Groundwater Monitoring Program – 1660 Merivale Road, Ottawa, Ontario, TSSA Service Request # 791084, prepared by Technical Standards and Safety Authority, dated April 11, 2022, Filename: TSSA Letter_2021 CMP Report and Action Plan

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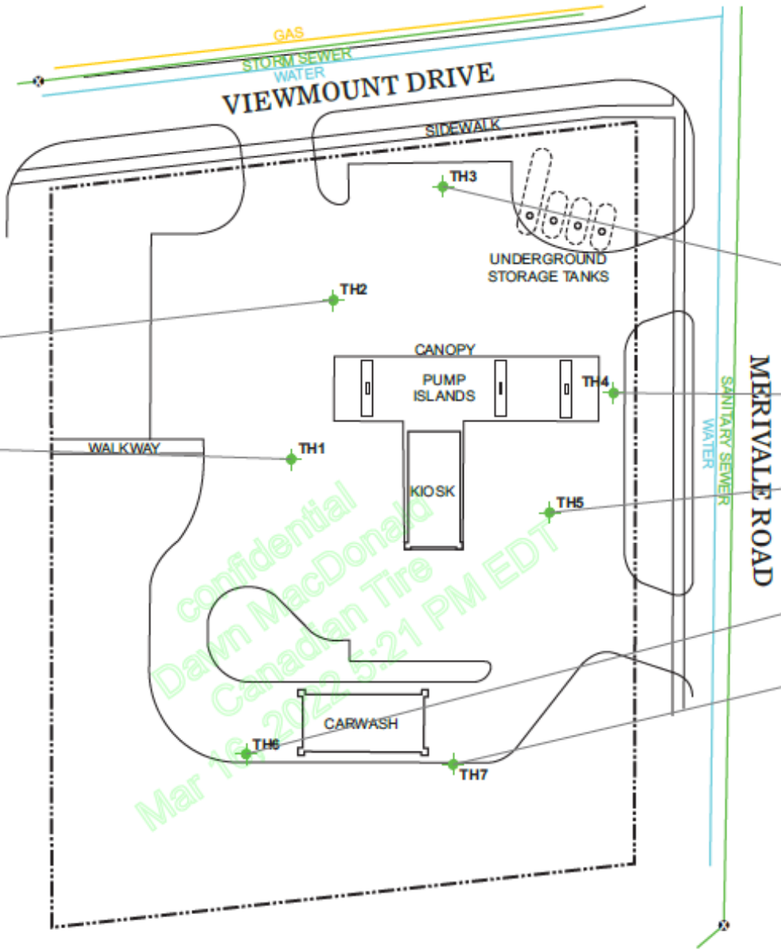

TH2										AUG23/11
DEPTH(m)	B	T	E	X	H	F1	F2	F3	F4	Pb
2.3-2.9	0.02	ND	0.29	ND	ND	ND	ND	ND	ND	12

TH1										AUG23/11
DEPTH(m)	B	T	E	X	H	F1	F2	F3	F4	Pb
3.0-3.7	ND	0.13	ND	ND	ND	ND	ND	ND	ND	7

TH3										AUG23/11
DEPTH(m)	B	T	E	X	H	F1	F2	F3	F4	Pb
2.3-2.9	ND	ND	ND	ND	ND	ND	ND	ND	ND	7
2.3-2.9(DUP)	ND	ND	ND	ND	ND	ND	ND	ND	ND	8

TH4										AUG24/11
DEPTH(m)	B	T	E	X	H	F1	F2	F3	F4	Pb
2.4-3.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	4

TH5										AUG24/11
DEPTH(m)	B	T	E	X	H	F1	F2	F3	F4	Pb
2.3-2.9	ND	ND	0.05	ND	ND	ND	ND	ND	ND	7
2.3-2.9(DUP)	ND	ND	0.06	ND	ND	ND	ND	ND	ND	7

TH6										OCT18/11
DEPTH(mbgs)	B	T	E	X	H	F1	F2	F3	F4	Pb
4.3-4.9	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.1

TH7										OCT19/11
DEPTH(mbgs)	B	T	E	X	H	F1	F2	F3	F4	Pb
2.1-2.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.8
3.4-4.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	8.0
3.4-4.0(DUP)	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.5

SCALE:

0 15 30m
(APPROXIMATE)

BARENCO

DRAWN BY	CHECKED BY
C.N.	D.K.S.

SOURCE:

BASED ON 'SITE PLAN' BY IMPERIAL OIL A0765 DATED JAN. 16, 1984 AND FIELD OBSERVATIONS BY BARENCO STAFF

LEGEND:

PROPERTY BOUNDARY
MANHOLE
TEST HOLE WITH MONITOR

LOCATION WHERE ALL SOIL SAMPLES MEET **REG 153/04 (2011) TABLE 3** STANDARDS FOR ALL PARAMETERS THAT WERE ANALYSED SHOWN AS GREEN

LOCATION WHERE AT LEAST ONE SOIL SAMPLE EXCEEDS **REG 153/04 (2011) TABLE 3** STANDARDS FOR AT LEAST ONE PARAMETER SHOWN AS RED

EXCEEDANCES OF **REG 153/04 (2011) TABLE 3** STANDARDS SHOWN IN TEXT AS **RED BOLD**

ALL ANALYTICAL RESULTS ARE IN µg/g DRY WEIGHT BASIS
'DEPTH(mbgs)' MEANS DEPTH IN METRES BELOW GROUND SURFACE
'ND' MEANS NOT DETECTED
'RDL' MEANS LABORATORY REPORTING DETECTION LIMIT

* STANDARDS SHOWN ARE FOR AN INDUSTRIAL/COMMERCIAL/COMMUNITY PROPERTY USE AND MEDIUM AND FINE TEXTURED SOILS IN A NON-POTABLE GROUND WATER CONDITION

PARAMETER	ABBREVIATION	153/04 (2011) TABLE 3 STANDARDS*	RDL
BENZENE	B	0.4	0.02
TOLUENE	T	19	0.02
ETHYLBENZENE	E	78	0.02
XYLENES	X	30	0.04
n-HEXANE	H	88	0.5
F1 (C_6-C_{10}) - BTEX	F1	65	10
F2 (C_{10}-C_{16})	F2	250	10
F3 (C_{16}-C_{34})	F3	2500	10
F4 (C_{34}-C_{50})	F4	6600	10

SOIL ANALYTICAL RESULTS

FIGURE 3

IMPERIAL OIL
1660 MERIVALE ROAD
OTTAWA, ONTARIO

BARENCO JOB #: 11010 | DATE: MARCH 2012

11010-SOIL RESULTS-MAR12

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MW15-01										Date Sampled - September 09/15
Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	H	Pb
0.30	<0.020	<0.020	<0.020	<0.040	<10	<10	<50	<50	<0.50	24
1.80	<0.020	<0.020	<0.020	<0.040	<10	<10	<50	<50	<0.50	5.6

MW15-02										Date Sampled - September 09/15
Depth (mbgs)	B	T	E	X	F1	F2	F3	F4	H	Pb
0.20	<0.020	<0.020	<0.020	<0.040	<10	<10	<50	<50	<0.50	33
1.60	<0.020	<0.020	<0.020	<0.040	<10	<10	<50	<50	<0.50	5.7

ONTARIO STANDARDS

PARAMETERS	B	T	E	X	F1	F2	F3	F4	H	Pb
CRITERIA[a]	0.4	78	19	30	65	250	2,500	6,600	88	120
RDL	0.020	0.020	0.020	0.040	10	10	50	50	0.50	5.0

LEGEND

PROPERTY BOUNDARY

BOREHOLE LOCATION COMPLETED AS A MONITORING WELL

LIST OF APPLICABLE ABBREVIATIONS

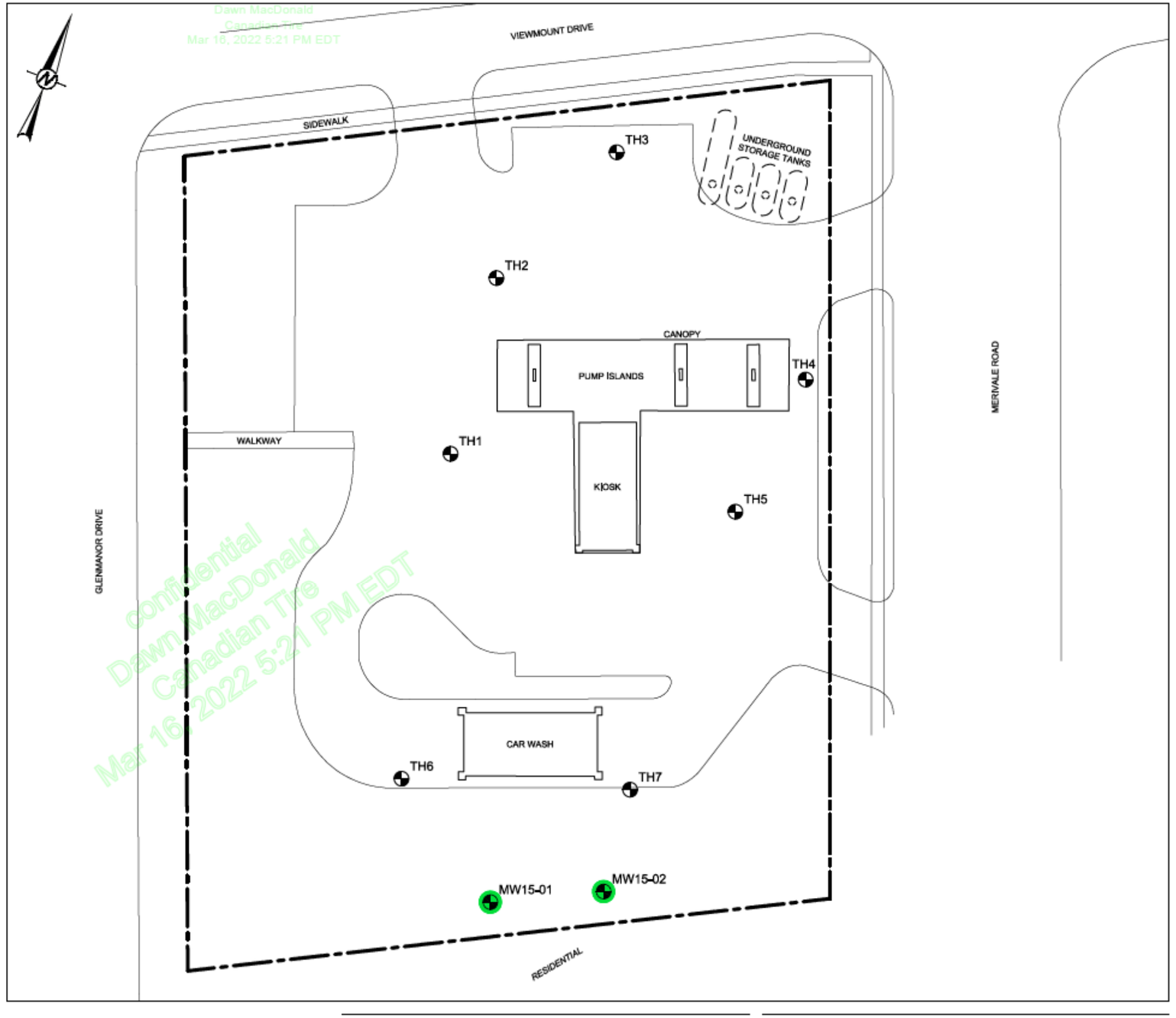
(a)	O.REG 153 (2011) TABLE 3 FULL DEPTH GENERIC SITE CONDITION STANDARDS FOR INDUSTRIAL/COMMERICAL/COMMUNITY PROPERTY USE FOR MEDIUM AND FINE TEXTURED SOIL IN A NON-POTABLE GROUNDWATER CONDITION.		
<	LESS THAN	HA	n-HEXANE
µg/g	MICROGRAMS PER GRAM	mbgs	METRES BELOW GROUND SURFACE
B	BENZENE	O.REG	ONTARIO REGULATION
T	TOLUENE	Pb	LEAD
E	ETHYLBENZENE	RDL	REPORTABLE DETECTION LIMIT
X	XYLENES		
F1	PETROLEUM HYDROCARBON FRACTION 1 (C_6-C_{10}) MINUS BTEX		
F2	PETROLEUM HYDROCARBON FRACTION 2 (C_{10}-C_{16})		
F3	PETROLEUM HYDROCARBON FRACTION 3 (C_{16}-C_{34})		
F4	PETROLEUM HYDROCARBON FRACTION 4 (C_{34}-C_{50})		

NOTES

1. LOCATIONS WHERE ALL SOIL SAMPLES MEET APPLICABLE STANDARDS FOR ALL PARAMETERS ANALYZED SHOWN IN GREEN.
2. LOCATIONS WHERE AT LEAST ONE SOIL SAMPLE EXCEEDS APPLICABLE STANDARDS FOR AT LEAST ONE OF THE PARAMETERS ANALYZED SHOWN IN RED.
3. EXCEEDANCES OF APPLICABLE CRITERIA IN TEXT ARE SHOWN IN RED.
4. ALL RESULTS IN µg/g.

REFERENCE

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No.: 11010-SITE PLAN ONSITE-JUN14; SCALE: UNKNOWN; DATE: JUNE 2014.



0 10 20
1:500 METRES

CLIENT
IMPERIAL OIL LIMITED

CONSULTANT
Golder Associates

YYYY-MM-DD	2016-05-04
DESIGNED	BMcParlan
PREPARED	SStoddart
REVIEWED	BMcParlan
APPROVED	SCarrelas

PROJECT
RETAIL FUEL OUTLET
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
SOIL ANALYTICAL RESULTS - BTEX, PHC FRACTIONS F1-F4, n-HEXANE AND LEAD

PROJECT NO.	CONTROL	REV.	FIGURE
1536518	1155-HS-0006	0	6

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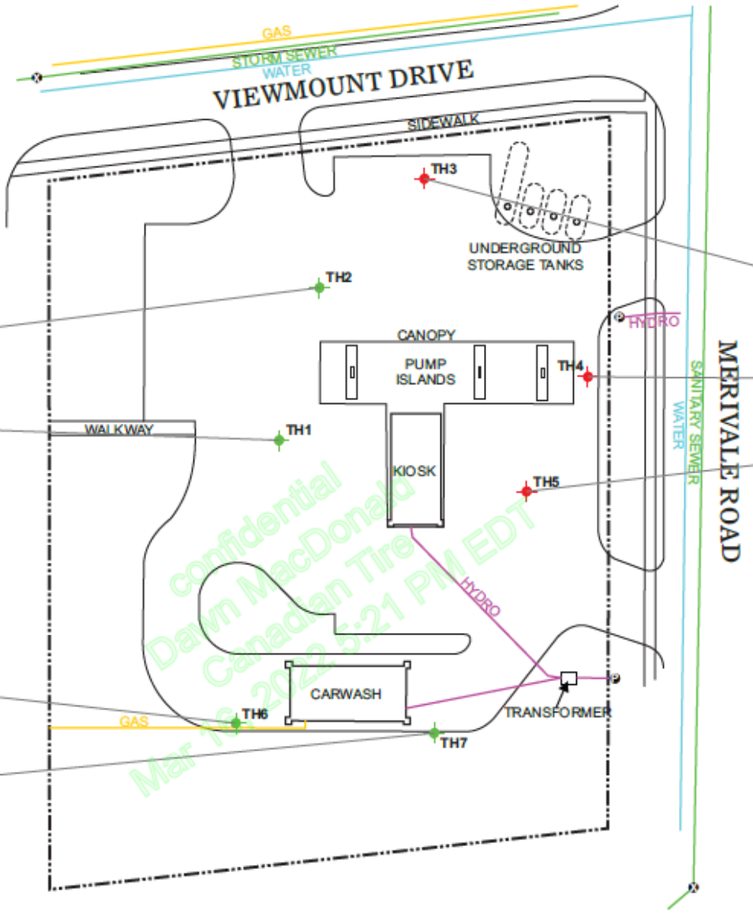
Canadian Tire
Mar 16, 2022 5:21 PM EDT



TH2 SCREEN INTERVAL = 3.2-4.7mbgs

DATE	B	T	E	X	H(n)	F1	F2	F3	F4	Pb
AUG31/11	0.77	ND	1.3	0.48	ND	ND	ND	ND	ND	ND

TH1 SCREEN INTERVAL = 2.6-5.6mbgs

DATE	B	T	E	X	H(n)	F1	F2	F3	F4	Pb
AUG31/11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

TH6 SCREEN INTERVAL = 4.4-5.8mbgs

DATE	B	T	E	X	H	F1	F2	F3	F4	Pb
OCT20/11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
OCT20/11(DUP)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

TH7 SCREEN INTERVAL = 4.4-5.8mbgs

DATE	B	T	E	X	H	F1	F2	F3	F4	Pb
NOV14/11	31	5.4	160	340	ND(30)	430	ND	ND	ND	ND

TH3 SCREEN INTERVAL = 3.2-4.7mbgs

DATE	B	T	E	X	H(n)	F1	F2	F3	F4	Pb
AUG31/11	27	2.4	79	150	20	**1100**	**430**	ND	130	3.8
AUG31/11(DUP)	23	2.1	69	130	17	**1100**	**380**	ND	110	3.9

TH4 SCREEN INTERVAL = 3.4-4.9mbgs

DATE	B	T	E	X	H(n)	F1	F2	F3	F4	Pb
AUG31/11	**610**	610	**3400**	**19000**	**540**	**26000**	**17000**	360	170	2.6

TH5 SCREEN INTERVAL = 3.5-5.0mbgs

DATE	B	T	E	X	H(n)	F1	F2	F3	F4	Pb
AUG31/11	**750**	140	**3000**	**13000**	**1400**	**35000**	**20000**	**690**	**620**	5.5

SCALE: 0 15 30m (APPROXIMATE)

SOURCE: BASED ON 'SITE PLAN' BY IMPERIAL OIL A0765 DATED JAN. 16, 1984, LOCATES BY PROMARK TELECON ON OCT. 13, 2011, AND FIELD OBSERVATIONS BY BARENCO STAFF

NOTE: LOCATIONS OF UTILITIES ARE APPROXIMATE

LEGEND:
- PROPERTY BOUNDARY
- MANHOLE
- UTILITY POLE
- TEST HOLE WITH MONITOR

MONITOR LOCATION WHERE GROUND WATER SAMPLE MEETS **REG153/04 (2011) TABLE 3** STANDARDS FOR ALL PARAMETERS THAT WERE ANALYSED SHOWN AS GREEN

MONITOR LOCATION WHERE GROUND WATER SAMPLE EXCEEDS **REG153/04 (2011) TABLE 3** STANDARDS FOR AT LEAST ONE PARAMETER SHOWN AS RED

MONITOR LOCATION WHERE NO GROUND WATER SAMPLE WAS SUBMITTED SHOWN AS BLACK

EXCEEDANCES OF **REG153/04 (2011) TABLE 3** STANDARDS SHOWN IN TEXT AS **RED BOLD**
ALL ANALYTICAL RESULTS ARE IN µg/L
'DEPTH(mbgs)' MEANS DEPTH IN METRES BELOW GROUND SURFACE
'ND' MEANS NOT DETECTED
'RDL' MEANS LABORATORY REPORTING DETECTION LIMIT (EXCEPT WHERE INDICATED IN BRACKETS)

*STANDARDS SHOWN ARE FOR AN INDUSTRIAL/COMMERCIAL/COMMUNITY PROPERTY USE AND MEDIUM AND FINE TEXTURED SOILS IN A NON-POTABLE GROUND WATER CONDITION

PARAMETER	ABBREVIATION	153/04 (2011) TABLE 3 STANDARDS*	RDL (OR AS SHOWN)
BENZENE	B	430	0.20
TOLUENE	T	18000	0.20
ETHYLBENZENE	E	2300	0.20
XYLENES	X	4200	0.40
n-HEXANE	H	520	5.0
F1 (C_6-C_{10}) - BTEX	F1	750	25
F2 (C_{10}-C_{16})	F2	150	100
F3 (C_{16}-C_{34})	F3	500	100
F4 (C_{34}-C_{50})	F4	500	100
LEAD	Pb	25	0.5

GROUND WATER ANALYTICAL RESULTS

FIGURE 4

IMPERIAL OIL
1660 MERIVALE ROAD
OTTAWA, ONTARIO

BARENCO | DRAWN BY: C.D. | CHECKED BY: D.K.S.

BARENCO JOB #: 11010 | DATE: SEPTEMBER 2011

11010-GW RESULTS-NOV11

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TH1 — Screen Interval: 2.6 to 5.6 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-11	<0.20	<0.20	<0.20	<0.40	<25	<100	<100	<100	<5.0	<0.50
13-Jun-13	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	0.53
26-Aug-14	<0.20	0.75	<0.20	1.2	<25	<100	<200	<200	<5.0	<0.50
17-Nov-15	<0.20	0.27	0.28	<0.40	<25	<100	<200	<200	<5.0	<0.50
10-Aug-16	<0.20	<0.20	<0.20	<0.40	<25	<100	300	1,200[RH]	<5.0	<0.50
5-Dec-16	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50

TH2 — Screen Interval: 3.2 to 4.7 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-11	0.77	<0.20	1.3	0.48	<25	<100	<100	<100	<5.0	<0.50
13-Jun-13	0.62	<0.20	2.2	<0.40	<25	<100	<200	<200	<5.0	<0.50
27-Aug-14	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
17-Nov-15	<0.20	0.29	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
9-Aug-16	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50

TH3 — Screen Interval: 3.2 to 4.7 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-11	27	2.4	79	150	1100	430	<100	130	20	3.8
31-Aug-11 (DUP)	23	2.1	69	130	1100	380	<100	110	17	3.9
13-Jun-13	11	0.61	66	85	900	350	<200	<200	<5.0	3.1
26-Aug-14	14	0.28	19	5.2	520	180	<200	<200	<5.0	2.2
28-Oct-15	25	<0.20	15	0.89	450	<100	<100	<200	<5.0	2.0
10-Aug-16	42	<0.20	26	1.5	560	110	<200	<200	<5.0	0.98

TH4 — Screen Interval: 3.4 to 4.9 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-11	610	610	3,400	19,000	26,000	17,000	360	170	540	2.6
13-Jun-13	200	35	1200	4,300	6,200	19,000	580	430	<100	5.8
26-Aug-14	500	37	1400	2600	4,700	1400	<200	<200	58	3.0
26-Aug-14 (DUP)	540	40	1600	2700	400	1400	<200	<200	62	1.9
17-Nov-15	180	18	560	930	1,900	940	240	230	<100	3.1
10-Aug-16 (DUP A)	190	9.7	490	1,400	1,600	400	210	<200	31	1.7
10-Aug-16	210	11	550	1,500	1,800	370	<200	<200	27	1.1

TH5 — Screen Interval: 3.5 to 5.0 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-11	750	140	3,000	13,000	85,000	20,000	690	620	1,400	5.5
13-Jun-13	530	44	1600	3800	9,900	160,000	12,000	6,800	<100	8.3
13-Jun-13 (DUP)	550	44	1600	3800	9,200	110,000	7,000	4,300	<100	8
27-Aug-14	450	46	1600	3100	11,000	2,800	<200	<200	210	4.1
17-Nov-15	360	26	930	1,300	3,300	2,900	320	240	<100	3.7
10-Aug-16	420	43	1,500	3,700	13,000	11,000	1,100	810	240	0.81

TH6 — Screen Interval: 3.6 to 5.1 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
20-Oct-11	<0.20	<0.20	<0.20	<0.40	<25	<100	<100	<100	<5.0	<0.50
20-Oct-11 (DUP)	<0.20	<0.20	<0.20	<0.40	<25	<100	<100	<100	<5.0	<0.50
13-Jun-13	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	0.6
27-Aug-14	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
28-Oct-15	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
9-Aug-16	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50

TH7 — Screen Interval: 4.4 to 5.8 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
14-Nov-11	31	5.4	160	340	430	<100	<100	<100	<30	<0.5
13-Jun-13	37	2.8	140	130	550	460	<200	<200	<5.0	3.2
27-Aug-14	150	18	610	730	1,900	540	<200	<200	22	2.1
28-Oct-15	93	8.4	270	300	1,000	280	<200	<200	<5.0	1.2
9-Aug-16	62	5.8	120	140	500	150	<200	<200	<5.0	<0.50

MW15-01 — Screen Interval: 3.0 to 6.0 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
17-Nov-15	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
9-Aug-16	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50

MW15-02 — Screen Interval: 2.7 to 4.9 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
17-Nov-15	44	5.9	180	170	2,300	750	<200	<200	35	2.2
9-Aug-16	78	4.7	73	25	800	450	<200	<200	5.5	<0.50

ONTARIO STANDARDS

PARAMETERS	B	T	E	X	F1	F2	F3	F4	HA	Pb
STANDARDS[a]	430	18,000	2,300	4,200	750[NV]	150	500	500	520	25
RDL	0.20	0.20	0.20	0.40	25	100	200	200	10	0.50

(a) O.REG 153 (2011) TABLE 3 FULL DEPTH GENERIC SITE CONDITION STANDARDS FOR ALL TYPES OF PROPERTY USE FOR GROUNDWATER IN MEDIUM AND FINE TEXTURED SOIL IN IN A NON-POTABLE GROUND WATER CONDITION.

LEGEND

PROPERTY BOUNDARY

BOREHOLE LOCATION COMPLETED AS A MONITORING WELL

LIST OF APPLICABLE ABBREVIATIONS

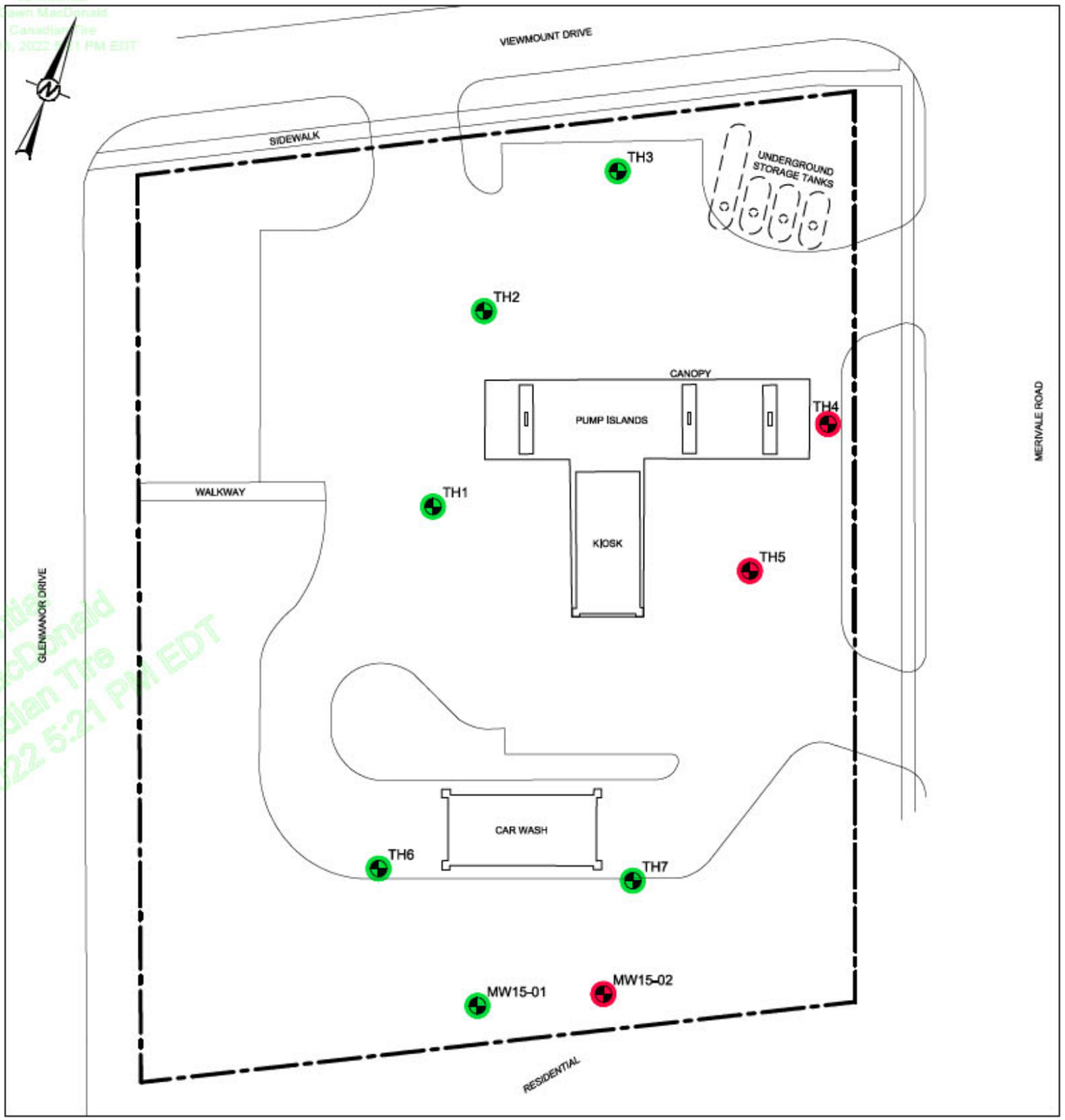
<	LESS THAN
µg/L	MICROGRAMS PER LITRE
B	BENZENE
T	TOLUENE
E	ETHYLBENZENE
X	XYLENES
DUP	DUPLICATE FIELD SAMPLE
F1	PETROLEUM HYDROCARBON FRACTION 1 (C_6-C_{10}) MINUS BTEX
F2	PETROLEUM HYDROCARBON FRACTION 2 (C_{10}-C_{16})
F3	PETROLEUM HYDROCARBON FRACTION 3 (C_{16}-C_{34})
F4	PETROLEUM HYDROCARBON FRACTION 4 (C_{34}-C_{50})
HA	n-HEXANE
mbgs	METRES BELOW GROUND SURFACE
Pb	LEAD
O.REG	ONTARIO REGULATION
RDL	REPORTABLE DETECTION LIMIT

NOTES

1. LOCATIONS WHERE MOST RECENT GROUNDWATER SAMPLE MEETS APPLICABLE STANDARDS FOR ALL PARAMETERS ANALYZED SHOWN IN GREEN.
2. LOCATIONS WHERE MOST RECENT GROUNDWATER SAMPLE EXCEEDS APPLICABLE STANDARDS FOR AT LEAST ONE OF THE PARAMETERS ANALYZED SHOWN IN RED.
3. EXCEEDANCES OF APPLICABLE STANDARDS IN TEXT ARE SHOWN IN RED.
4. LOCATION WHERE NO SAMPLES WERE TAKEN IN THE MOST RECENT SAMPLING EVENT SHOWN IN BLACK.
5. ALL RESULTS IN µg/L.

REFERENCE

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No.: 11010-SITE PLAN ONSITE-JUN14; SCALE: UNKNOWN; DATE: JUNE 2014.



0 10 20
1:500 METRES

CLIENT
IMPERIAL OIL LIMITED

CONSULTANT
Golder Associates

YYYY-MM-DD	2017-01-31
DESIGNED	BMcParlan
PREPARED	AMehdiou
REVIEWED	LBurger
APPROVED	SCarrelas

PROJECT
ACTIVE RETAIL OUTLET
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
GROUNDWATER ANALYTICAL RESULTS - BTEX, PHC FRACTIONS F1 - F4, n-HEXANE AND LEAD

PROJECT NO.	PHASE-TASK	REV.	FIGURE
1544125	1155-2016	1	5

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B

confidential Dawn MacDonald Canadian Tire Mar 16, 2022 5:21 PM EDT

TH8											Screen Interval: 3.3 to 4.9 mbgs
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
13-Jun-13	3.9	<0.20	4.1	0.61	48	<100	<200	<200	<0.5	1.1
27-Oct-15	4.4	<0.20	0.51	0.41	<25	<100	<200	<200	<5.0	0.82
10-Aug-16	3.0	<0.20	0.66	<0.40	70	<100	<200	<200	<5.0	0.77

TH9											Screen Interval: 3.4 to 4.9 mbgs
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
06-Oct-14	31	3	230	290	1,000	570	610	420	15	1.1
27-Oct-15	51	7.2	390	350	2,500	1,100	220	360	35	2.6
10-Aug-16	23	1.8	250	70	1,600	350	<200	<200	11	1.1
20-Jun-17	36	5.5	460	370	4,200	1,200	<200	<200	NA	2.3

TH10											Screen Interval: 3.3 to 4.9 mbgs
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
11-Jun-13	73	58	52	200	1,400	560	<200	<200	35	1.2
TH10 decomissioned August 24, 2016											

TH11											Screen Interval: 3.3 to 4.9 mbgs
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
11-Jun-13	370	34	2,200	3,400	11,000	1,400	<200	<200	130	2.6
28-Oct-15	96	8.1	710	120	4,400	2,500	1,300	820	72	4.6
11-Aug-16	100	6.3	590	160	5,000	6,700	2,200	1,300	37	6.0
11-Aug-16 DUP	110	7.1	610	170	4,900	7,100	2,400	1,400	43	3.3

TH12											Screen Interval: 3.3 to 4.9 mbgs
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
11-Jun-13	380	35	2,300	3,500	11,000	3,100	<200	<200	<100	6.8
11-Jun-13 DUP	360	34	2,300	3,500	11,000	2,800	<200	<200	<100	6.9
28-Oct-15	95	14	620	400	4,500	1,600	540	320	140	4.5
11-Aug-16	130	17	1,100	630	6,800	1,800	900	510	120	2.1
20-Jun-17	160	11	1,200	170	7,300	2,800	750	460	NA	3.8
20-Jun-17 DUP	150	11	1,200	160	7,300	2,600	700	430	NA	4.5

TH100											Screen Interval: 3.0 to 4.9 mbgs
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
06-Oct-14	<0.20	<0.20	0.31	0.91	<25	<100	<200	<200	<5.0	<0.50
27-Oct-15	<0.20	<0.20	0.94	1.1	<25	<100	<200	<200	<5.0	<0.50
27-Oct-15 DUP	<0.20	<0.20	0.24	<0.40	<25	<100	<200	<200	<5.0	<0.50
10-Aug-16	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
20-Jun-17	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	NA	<0.50

TH101											Screen Interval: 3.0 to 4.9 mbgs
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
06-Oct-14	85	12	580	500	4,100	830	<200	<200	44	2.9
06-Oct-14 DUP	84	12	580	510	4,100	910	<200	<200	54	4.2
28-Oct-15	110	16	740	590	3,400	830	<200	<200	64	4.6
11-Aug-16	49	8.6	580	390	2,200	590	<200	<200	23	0.63
20-Jun-17	76	14	870	410	4,800	1,100	<200	<200	NA	0.84

TH102											Screen Interval: 3.0 to 4.9 mbgs
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
06-Oct-14	0.72	0.52	16	42	360	360	<200	<200	7.2	3.9
28-Oct-15	42	1.6	100	140	970	350	<200	<200	23	1.5
11-Aug-16	8.3	<0.20	33	21	510	180	<200	<200	18	1.4
20-Jun-17	19	3.1	190	120	1,800	500	<200	<200	NA	<0.50

MW16-01											Screen Interval: 3.3 - 4.8 mbgs
Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-16	18	3.8	41	59	250	<100	<200	<200	NA	0.53
21-Jun-17	46	3.7	170	79	820	260	<200	<200	NA	1.2

ONTARIO STANDARDS

PARAMETERS	B	T	E	X	F1	F2	F3	F4	HA	Pb
CRITERIA[a]	430	18,000	2,300	4,200	750[b]	150	500	500	520	25
RDL	0.20	0.20	0.20	0.40	130	100	200	200	10	0.50
UNITS	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L

(a) O.REG 153 (2011) TABLE 3 FULL DEPTH GENERIC SITE CONDITION STANDARDS FOR ALL TYPES OF PROPERTY USE FOR GROUNDWATER IN MEDIUM AND FINE TEXTURED SOIL IN IN A NON-POTABLE GROUNDWATER CONDITION.

(b) F1 FRACTION DOES NOT INCLUDE BTEX; HOWEVER, THE PROPONENT HAS THE CHOICE AS TO WHETHER OR NOT TO SUBTRACT BTEX FROM THE ANALYTICAL RESULT.

LEGEND

PROPERTY BOUNDARY

BOREHOLE LOCATION COMPLETED AS A MONITORING WELL

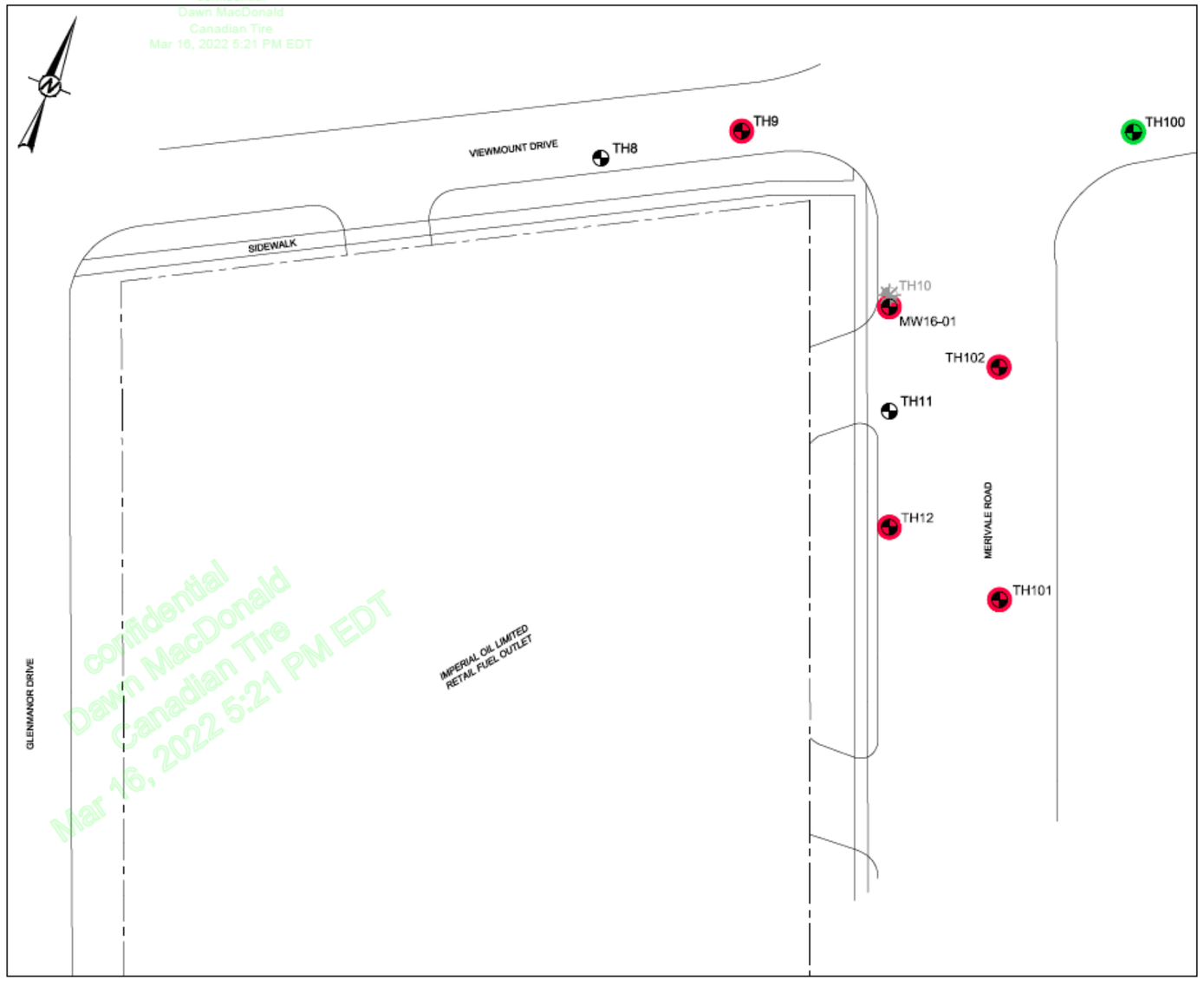
BOREHOLE LOCATION COMPLETED AS A MONITORING WELL (DECOMMISSIONED)

LIST OF APPLICABLE ABBREVIATIONS

>	GREATER THAN
<	LESS THAN
µg/L	MICROGRAMS PER LITRE
B	BENZENE
T	TOLUENE
E	ETHYLBENZENE
X	XYLENES
F1	PETROLEUM HYDROCARBON FRACTION 1 (C_6-C_{10}) LESS BTEX
F2	PETROLEUM HYDROCARBON FRACTION 2 (C_{10}-C_{16})
F3	PETROLEUM HYDROCARBON FRACTION 3 (C_{16}-C_{21})
F4	PETROLEUM HYDROCARBON FRACTION 4 (C_{21}-C_{32})
HA	n-HEXANE
mbgs	METRES BELOW GROUND SURFACE
NA	NOT AVAILABLE
Pb	LEAD
RDL	REPORTABLE DETECTION LIMIT

NOTES

1. LOCATIONS WHERE CURRENT GROUNDWATER SAMPLE MEETS APPLICABLE GUIDELINES/STANDARDS FOR ALL PARAMETERS ANALYZED SHOWN IN GREEN.
2. LOCATIONS WHERE CURRENT GROUNDWATER SAMPLE EXCEEDS APPLICABLE GUIDELINES/STANDARDS FOR AT LEAST ONE OF THE PARAMETERS ANALYZED SHOWN IN RED.
3. EXCEEDANCES OF APPLICABLE GUIDELINES/STANDARDS IN TEXT ARE SHOWN IN RED.
4. LOCATION WHERE NO SAMPLES WERE TAKEN IN THE CURRENT SAMPLING EVENT SHOWN IN BLACK.



REFERENCE

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No.: 11010-SITE PLAN OFFSITE-OCT14; SCALE: UNKNOWN; DATE: OCTOBER 2014.

CLIENT
IMPERIAL OIL LIMITED

CONSULTANT
Golder Associates

YYYY-MM-DD	2017-08-09
DESIGNED	ALynn
PREPARED	JHennin
REVIEWED	ISosney
APPROVED	RMungal

PROJECT
ADJACENT TO
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
GROUNDWATER ANALYTICAL RESULTS - BTEX AND PHC FRACTIONS F1 - F4 AND LEAD

PROJECT NO.	PHASE-TASK	REV.	FIGURE
1669090	1155-2016B	0	4

confidential
Dawn MacDonald
Canadian Tire
Mar 16, 2022 5:21 PM EDT

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B

Attachment B

Utility Locates

UNDERGROUND SERVICE LOCATORS - PRIVATE UTILITY REPORT DATE: JUNE 23/22

ONE-CALL SYSTEMS INC.
1704 CARLING AVENUE
OTTAWA, ON K2A 1C7

CELL (613) 857-7227
PHONE (613) 226-8750
FAX (613) 226-8677

CUSTOMER: GHD

REQUESTED BY: MIKE EVANS

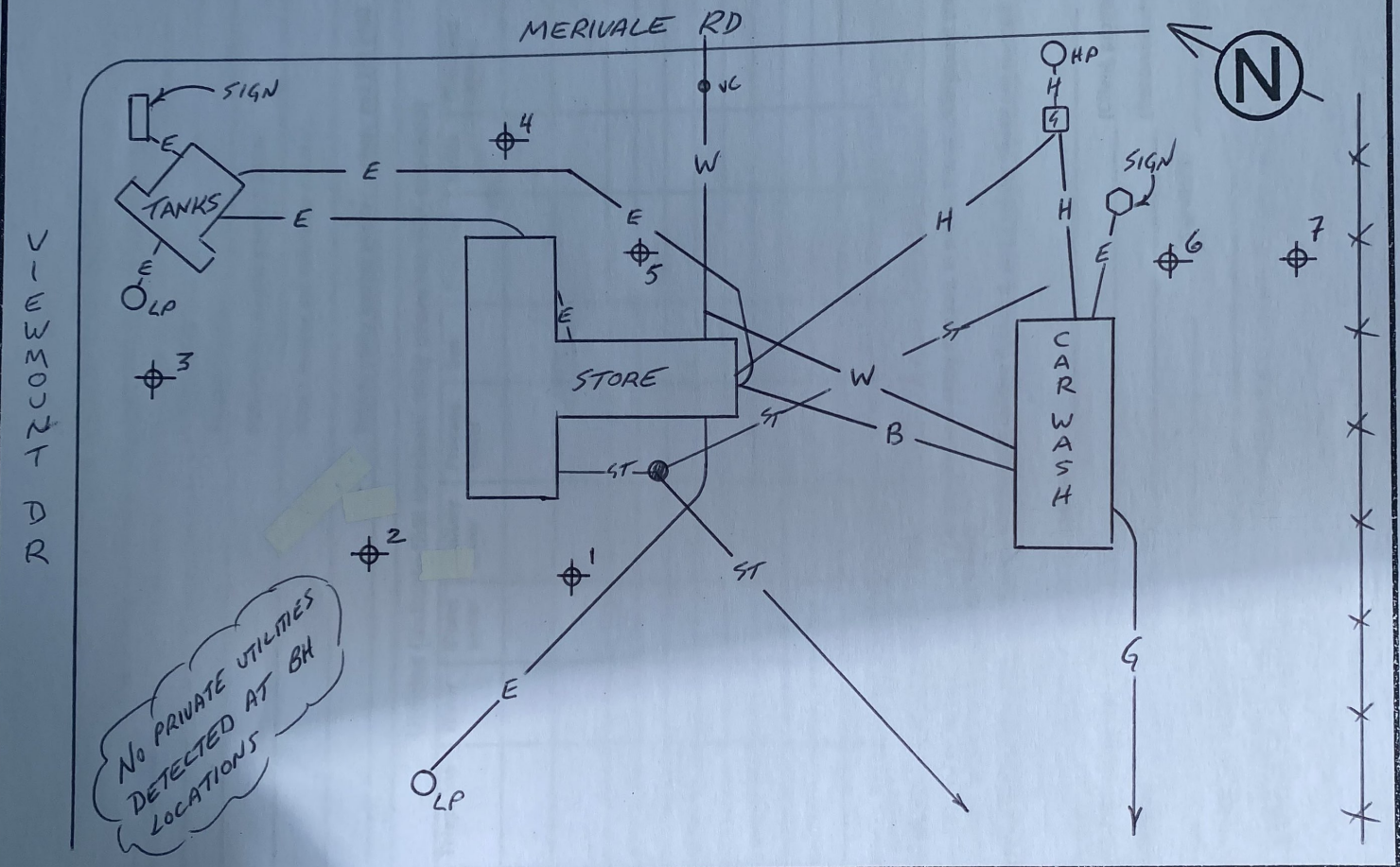
LOCATION OF WORK: 1660 MERIVALE RD

LIMITS OF WORK: BORE HOLES

HYDRO	-- H --	CABLE T.V.	-- T.V. --	STEAM	-- STEAM --
GAS	-- G --	SANITARY	-- SAN --	ELECTRICAL	-- E --
BELL	-- B --	STORM	-- ST --	COMMUNICATIONS	-- COM --
UNIDENTIFIED CABLE	-- UC --	FIBER OPTIC	-- FOC --	OTHER: FENCE	-X-X-
WATER	-- W --	LAMP POST	-- LP --		

LOCATES ONLY APPLICABLE TO INFO ABOVE - LOCATES VOID AFTER 60 DAYS!

SKETCH NOT TO SCALE



- USL-1 as a Private utility locator, is not permitted to locate Publicly owned utilities. In some cases, Public utilities may be noted on a sketch, but are FOR REFERENCE ONLY, and under no circumstances shall be used for excavation purposes. It is the contractor's responsibility to verify any Public utilities noted on the USL-1 sketch by referring to the Public utility locate sheets for physical LOCATION AND ACCURACY. USL-1 DOES NOT ASSUME LIABILITY FOR PUBLIC LOCATE INNACCURACIES.
- If the proposed work area is on Private property, it does NOT mean that all buried utilities are Private. Regardless of when you are digging, and what the proposed depth of excavation is, it is the law to notify Ontario One Call (or Info-Excavation in Quebec) to obtain Public utility locates.

COMMENTS: FUEL TANKS AND PRODUCT PIPES NOT LOCATED

THIS SKETCH IS NOT A PUBLIC UTILITY LOCATE/DOCUMENT. PUBLIC UTILITIES SHOWN ARE FOR REFERENCE ONLY. REFER TO USL-1 DISCLAIMER - FORM 101. CONTRACTOR IS RESPONSIBLE TO ENSURE THEY HAVE PUBLIC UTILITY LOCATES BEFORE COMMENCING WORK.

LOCATORS NAME: DAN SPARLING

SIGNATURE:

LOCATE RECEIVED AND REVIEWED BY

Print Name _____ Signature _____

CAUTION: HAND DIG WITHIN 1.5 METERS OF MARKINGS

Kathleen Schaller

From: solutions@on1call.com
Sent: Saturday, May 28, 2022 8:03 AM
To: Kathleen Schaller
Subject: Request 20222225211

LOCATE REQUEST CONFIRMATION

REQUEST #:	REQUEST PRIORITY:	REQUEST TYPE:	WORK TO BEGIN DATE:
20222225211	**STANDARD**	**REGULAR**	**06/07/2022**
Update of Request #	**Project #:**	**Call Date: 05/28/2022 08:01:50 AM**	**Transmit Date: 05/28/2022 08:01:50 AM**

REQUESTOR'S CONTACT INFORMATION	
Contractor ID: 342460 **Contact Name:** KATHLEEN SCHALLER **Company Name:** GHD LIMITED **Address:** 400- 179 COLONNADE ROAD, OTTAWA, ON, K2E 7J4 **Email:** Kathleen.Schaller@ghd.com **Primary Phone #:** (613) 402-6545 **Cell Phone #:**	**Contact Name:** **Contact #:**

DIG INFORMATION		
Region/County: OTTAWA **Community:** **City:** OTTAWA **Address:** 1660, MERIVALE RD **Intersecting Street 1:** VIEWMOUNT DR **Intersecting Street 2:** COLONNADE RD	**Work Done for:** OTHER **Reason for Work:** DRILLING **Dig Method:** Machine Dig **Depth:** More than 15 Feet	**Pre-Marked:** Area Not Pre-Marked **Property Type:** Private Property **Site Meeting:** No **Work End Date:**

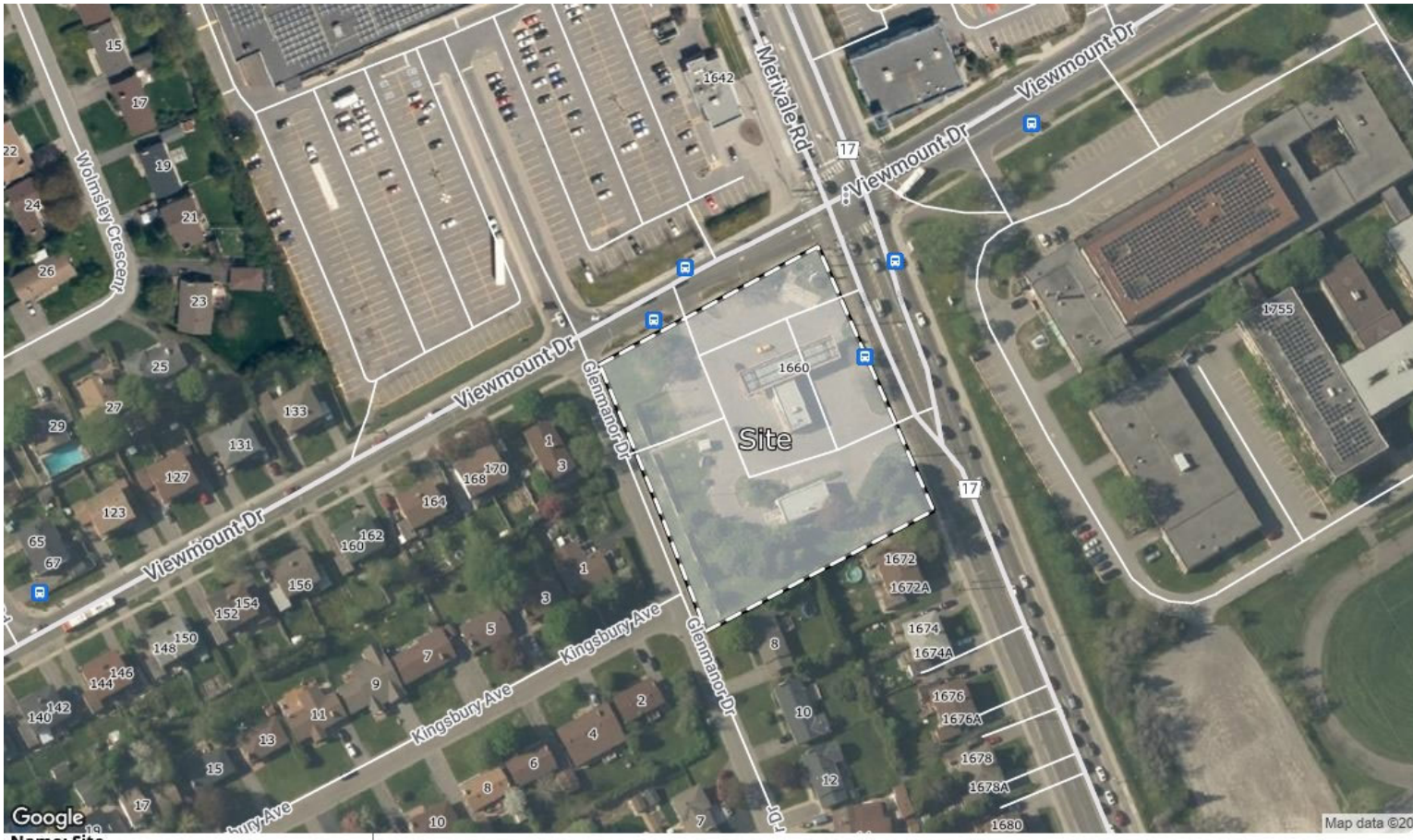
ADDITIONAL INFORMATION	QUALIFYING INFORMATION
DRILLING WILL BE OCCURRING ON THE PROPERTY ONLY AROUND THE PUMPS AND FUEL TANKS. BOREHOLE LOCATIONS WILL BE DETERMINED BASED ON FINDINGS;	

THEREFORE, BOREHOLES CANNOT BE MARKED. DRILLING WILL NOT OCCUR OUTSIDE THE SITE BOUNDARIES.	

MEMBERS NOTIFIED: The following owners of underground infrastructure in the area of your excavation site have been notified.

Member Name	Station Code	Initial Status
PROMARK FOR ENBRIDGE GAS (ENOE01)	ENOE01	Notification sent
CITY OF OTTAWA WATER/SEWER (OTWAWS01)	OTWAWS01	Notification sent
BLACK AND MC DONALD FOR CITY OF OTTAWA STREET LIGHTS (OTWASL01)	OTWASL01	Notification sent
HYDRO OTTAWA (HOT1)	HOT1	Notification sent
CLI FOR ROGERS (ROGOTT01)	ROGOTT01	Notification sent
CITY OF OTTAWA TRAFFIC SIGNALS (OTWATS01)	OTWATS01	Notification sent
CLI FOR TELUS (TELOE01)	TELOE01	Notification sent
PROMARK FOR BELL CANADA (BCOE01)	BCOE01	Notification sent

MAP SELECTION: Map Selection provided by the excavator through Ontario One Call's map tool or through agent interpretation by ph



Name: Site

Area: 7363.57sq. m

IMPORTANT INFORMATION: Please read.

Defining "NC" - Non-Compliant

- Non-compliant members have not met their obligations under section 5 of the Ontario Underground Infrastructure Notification Act. ON1Call has notified these members to ensure they are aware of your excavation. In this circumstance, should the member not respond, the excavator should contact the member directly to obtain their locates or request a status. ON1Call will not be provided with a locate status from the member regarding this request and therefore, cannot provide further information at this time. For locate status contact information please refer to our website.

You have a valid locate when...

- You have reviewed your locate request information for accuracy. UPDATE your request IMMEDIATELY if changes are needed and obtain a corrected locate request confirmation.

NOTE: Intersecting streets are often suggested by Ontario One Call's system, in some circumstances they may not reflect the closest intersecting streets to your excavation. You can change the intersecting streets before submitting the request by going through the "Review" page of your locate request, and editing any inaccurate information. Intersecting streets are for reference only, and unless you change the streets manually, you will not be asked to correct them if they are chosen by the system. If you don't agree with a street name, make sure to edit the request before you submit it, if you found a mistake after submitting the request, update your requests immediately on the web portal.

- You have obtained locates or clearances from all ON1Call members listed in this request before beginning your dig.

You've met your obligations when...

- You respect the marks and instructions provided by the locators and dig with care; the marks and locator instructions MUST MATCH. You must wait for responses from all members notified on your locate request before beginning to dig..
- You have obtained any necessary permits from the municipality in which you are digging.
- You have made Ontario One Call aware if you have come across any new or unlisted infrastructure in the public right of way AND stopped digging to prevent damages while we review.
- You have arranged for locates for your private lines on your private property - where applicable.

What does "Cleared" mean in the "Initial Status" section?

1. The information that you have provided about your dig will not affect that member's underground infrastructure and they have provided you with a
clearance, if anything about your excavation changes, please ensure that you update your request immediately.

What are the images under "Map Selection"?

1. A drawing created by an excavator directly within Ontario One Call's Web request tool, this is expected to be an accurate rendition of the dig site, and it is the excavator's responsibility to ensure the location matches the information they provide under the 'Dig Location'; section OR;

2. A drawing created by an Ontario One Call agent, this drawing is based on a verbal description by phone of the area by the excavator. Agents may create drawings that are larger than the proposed dig to minimize risk of interpretation. It is the excavator's responsibility to review these map selections for accuracy. Changes can be made by the excavator through the Web request tool, to learn how visit www.ontarioonecall.ca.

3. All drawings dictate which members are notified.

Kathleen Schaller

From: Barabas, Karoly <karoly.barabas@ottawa.ca>
Sent: Sunday, May 29, 2022 8:15 PM
To: Kathleen Schaller
Subject: 20222225211

You don't often get email from karoly.barabas@ottawa.ca. Learn why this is important

20222225211

This Ontario One Ticket is **Clear of Underground City of Ottawa / Ville d'Ottawa Traffic Lights Infrastucture in Proposed Work Area **

"Locates are Valide for 90 Days"

Ce billet Ontario One est ** **libre** de toute infrastructure souterraine de la ville d'Ottawa pour les feux de signalisation dans la zone de travail proposée **

"Les habitants sont valides pendant 90 jours"

Charly (Karoly) Barabas
City of Ottawa
Traffic U/G Utilities Investigator
Cell: (613)868-3850
Email: Karoly.barabas@ottawa.ca
Mon-Fri 7h00 to 15h30

'

This e-mail originates from the City of Ottawa e-mail system. Any distribution, use or copying of this e-mail or the information it contains by other than the intended recipient(s) is unauthorized. Thank you.

Le présent courriel a été expédié par le système de courriels de la Ville d'Ottawa. Toute distribution, utilisation ou reproduction du courriel ou des renseignements qui s'y trouvent par une personne autre que son destinataire prévu est interdite. Je vous remercie de votre collaboration.

'

Service Request Details

Service Request 1540427 **Lagan Case ID:** 202222252111

Source: Contractor **Created By:** Ga Maxpusr
Priority: **Reported By:**
Status: RESOLVED **Initiated:** 2022-May-28 8:04 AM

Location Information

Address: 1660 MERIVALE RD **Range:** **Unit:**
Between Streets: VIEWMOUNT DR / COLONNADE RD **Municipality:** NE
Description:

The work area is clear with the exception of a storm sewer in/near your work area - Attached are maps showing the work area and surrounding water and sewer assets. Water mains are in blue, storm sewers in green and sanitary sewers in red. Please proceed with the work cautiously and if questions arise regarding the location of City infrastructure, call the office to schedule specific work areas marked. To have specific work areas marked please call 48 hours in advance of planned work to arrange a site meet. The office contact number is 613-580-2424 ext. 22336.

Street Range:1660-
Street:MERIVALE RD
Intersect 1:VIEWMOUNT DR
Intersect 2:COLONNADE RD
Door Numbers:-
Municipality:

Requestor Information

Name: KATHLEEN SCHALLER **Phones**
Address: 400- 179 COLONNADE ROAD **Res:** **Cell:**
City: OTTAWA **Bus:** 6134026545 **Ext:**
Postal Code: K2E 7J4 **Unit:** **Fax:**

Call Back & Other Assignments

Responsibilities

Service Request	Work Order #	Work Order

Request Details

Start Date: **Appointment Time:** **Service:** ESD
Finish Date: 2022-Jun-08 **Classification:** LOCATES - PROVIDE
Amount Charge to Customer: **Category:**

Structures

Structure ID	District	Description	Location	Qualifier	Unit
S1432500000		Water Service	1660 MERIVALE RD VIEWMOUNT DR		

Service Request Details

LP : LOCATES - PROVIDE

Attribute Description	Values	Comments
ON1CALL LOCATE ADDRESS	Street Range:1660- | Street:MERIVALE RD | Intersect 1:VIEWMOUNT DR | Intersect 2:COLONNADE RD | Door Numbers:- | Municipality:	
IF THERE IS AN ADDRESS NUMBEI		
ARE YOU A HOMEOWNER, CONTRA	BUSINESS	
WHO ARE YOU WORKING FOR?	OTHER	
WHAT IS THE CALLER'S TITLE?		
WHAT IS YOUR COMPANY NAME?	GHD LIMITED	
PLEASE PROVIDE A CONTACT PHONE NUMBER	6134026545	
PLEASE PROVIDE AN ALTERNATE (		
PLEASE PROVIDE CONTACT PHONE INFORMATION FOR PERSON ON SITE		
PLEASE PROVIDE AN EMAIL ADDRI	Kathleen.Schaller@ghd.com	
WHAT TYPE OF WORK ARE YOU DOING?	DRILLING	
WHERE ARE YOU WORKING ON THE PROPERTY?	DRILLING WILL BE OCCURRING ON THE PROPERTY ONLY AROUND THE PUMPS AND FUEL TANKS. BOREHOLE LOCATIONS WILL BE DETERMINED BASED ON FINDINGS; THEREFORE, BOREHOLES CANNOT BE MARKED. DRILLING WILL NOT OCCUR OUTSIDE THE SITE BOUNDARIES.	
HOW DEEP ARE YOU DIGGING/ EXCAVATING?	999.000300	
WHAT IS THE UNIT OF MEASURE Y	METERS	
ARE YOU DIGGING BY HAND OR B'	[Machine Dig]	
WILL THERE BE DIRECTIONAL DRI		
IS THE AREA MARKED OUT?	[Area Not Pre-Marked]	
IS A SITE MEETING REQUIRED?	NO	
EXTRA MARKING INSTRUCTIONS?		
EXCAVATION ON PUBLIC PROPERT	[Private Property]	
WHAT DATE IS THE WORK STARTI	2022-06-07	
OTHER AGENCIES ALSO NOTIFIED	BCOE01; TELOE01; OTWATS01; ROGOTT01; HOT1; OTWASL01; OTWAWS01; ENOE01;	
WHAT TYPE OF REQUEST, IF NOT (		
IF NOT ORIGINAL, THE PREVIOUS		
NUMBER OF NOTIFIED STREET SEGMENTS	2	
PERMIT NUMBER		
PROJECT NUMBER		
DEPTH OPTIONS	More than 15 Feet	
ALTERNATE CONTACT TYPE		
WHAT SIDE OF THE STREET ARE YOU DIGGING ON?		
ARE YOU DIGGING OUTSIDE OF THE PROPERTY LINES OF THE CIVIC PROVIDED?		
FURTHER COMMENTS:		

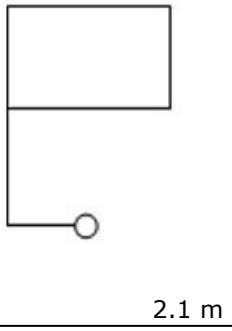
Service Request Details

Structure S1432500000

Address: 1660 MERIVALE RD
Between Streets: VIEWMOUNT DR / COLONNADE RD
Qualifier:
Unit:
Dist:
City: NE
Ward: Ward 8
Block:

Sketch Information

Looking:	unknown	North Degree:	
Facing:	front of	The:	building
Start at the:	left corner	Move straight out:	27.4 m
Then go:	right	For:	2.1 m
Other Structure:		ID:	
Drawing Code:			



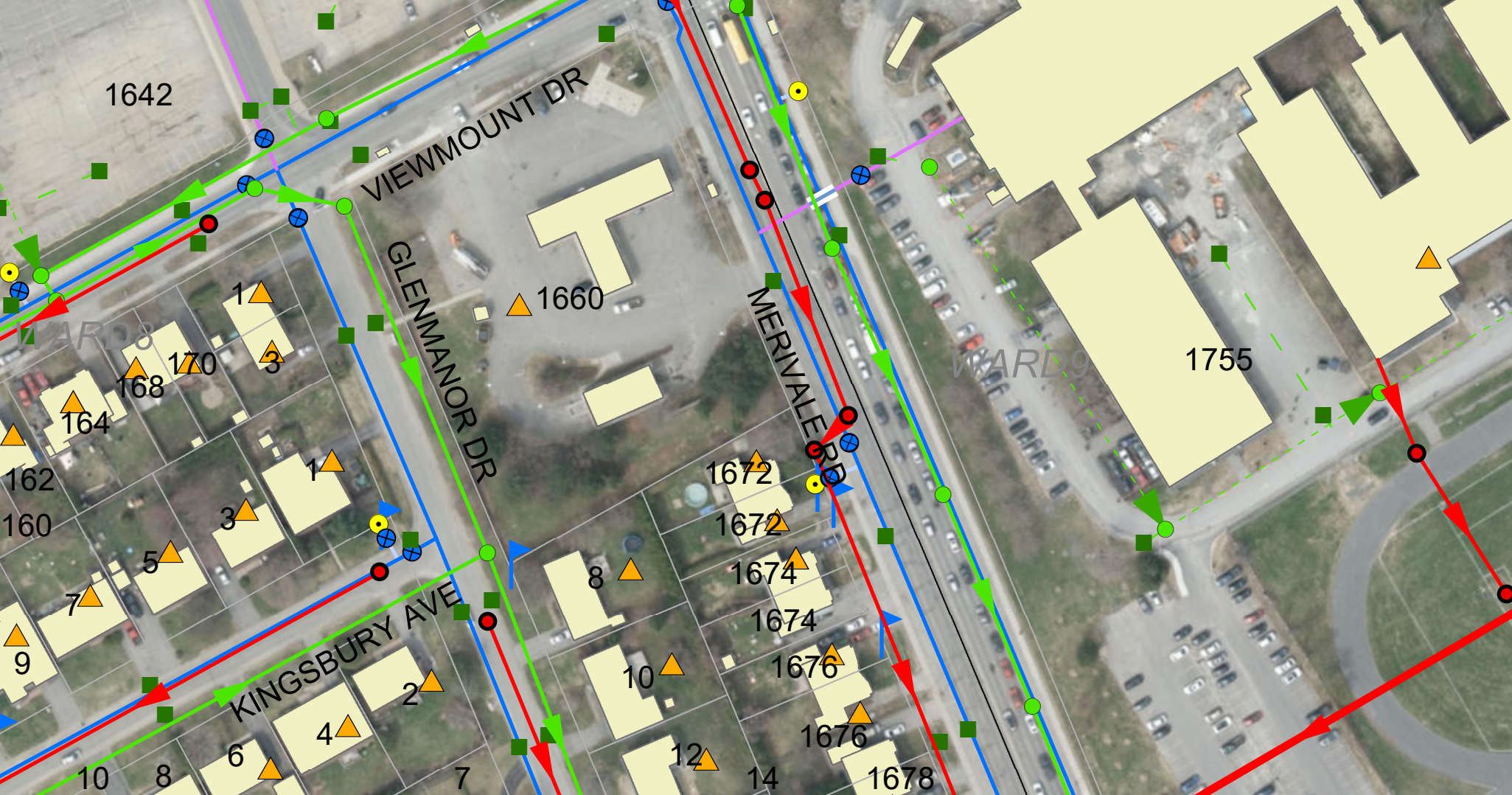
OPERATING
Ownership: PUBLIC
Frost Warning:
Order No.
Continuity?
Install Date:
Condo Corp No.
Condition Rating:

Service Characteristics

Located On:	Depth(m)	Diameter(mm)	Material
Public(At Main)	0	25	CO
Private(At Post)	0		

Insulation Type
Bedding
Length
CP Type
Soil
Backfill
CP Install Date
Joint Type
Surface

COMMENTS


1642
VIEWMOUNT DR
GLENMANOR DR
MERIVALE RD
1660
WARD8
WARD9
1755
1
170
168
3
164
162
160
1
3
5
7
9
KINGSBURY AVE
2
4
6
10
8
7
8
10
12
14
1672
1672
1674
1674
1676
1676
1678

DISCLAIMER

The excavator must have a copy of this locate on the job site during excavation.

Locate area: The excavator must not work outside the area indicated in the location of work or located area in the diagram without an updated locate. Stakes or markings may disappear or be displaced. If any delays occur in acting on the stakeout information, or if markings become unclear, a new locate must be obtained.

Locating the plant: The plant location information provided is only an estimate. Depth of underground plant varies and the exact location must be determined by hand digging prior to excavation with mechanical equipment.

Warning: Do not use mechanical equipment within one (1) metre of the estimated location of the water or sewer plant. If the plant is larger than 406mm, mechanical equipment must not be used within three (3) meters.

Digging around exposed plants: Must do any further excavation within 0.3 metres of an exposed water or sewer plant by hand.

Contractors are to perform all work in accordance with applicable City of Ottawa By-laws and any applicable federal and provincial legislation or regulations, including but not limited to the *Public Utilities Act, R.S.O. 1990, c. P.52, s. 56(1)*; *Ontario Regulation 210/01 under the Technical Safety Standards Act, 2000 , S.O. 2000 c. 16*; *Ontario Regulation 213/91 under the Occupational Health and Safety Act, R.S.O. 1990, c. O.1.*

AVIS DE NON-RESPONSABILITÉ

L'opérateur de l'excavatrice doit avoir en sa possession ce rapport de localisation pendant l'excavation.

Zone de localisation : l'opérateur de l'excavatrice ne doit pas creuser en dehors de la zone indiquée sur l'ordre de travail ni à l'extérieur de la zone indiquée sur le diagramme, à moins d'avoir en sa possession un rapport de localisation actualisé. Les piquets ou les marques peuvent disparaître ou être déplacés. S'il y a un retard à intervenir sur la base des données de surveillance ou si le marquage devient imprécis, il faut obtenir un nouveau rapport de localisation.

Déterminer l'emplacement des conduites : les renseignements sur l'emplacement des conduites sont approximatifs. Pour déterminer l'emplacement et la profondeur, on doit creuser manuellement avant d'utiliser une excavatrice.

Avertissement : n'utilisez pas d'équipement mécanique [excavatrice] à moins d'un [1] mètre de l'emplacement supposé de la conduite d'eau ou d'égout. Si la conduite compte plus de 406 mm de diamètre, aucun équipement mécanique ne doit être utilisé à moins [3] de trois mètres de celle-ci.

Creuser autour des conduites exposées : toute excavation à moins de 0,3 m d'une conduite d'eau ou d'égout doit se faire manuellement.

Les entrepreneurs doivent exécuter tous les travaux conformément aux règlements de la Ville d'Ottawa et aux lois et règlements fédéraux ou provinciaux applicables, y compris, mais sans s'y limiter, la *Loi sur les services publics, L.R.O. 1990, chap. P.52, art. 56[1]*; le *Règlement 210/01 de l'Ontario* en vertu de la *Loi de 2000 sur les normes techniques et la sécurité, L.O. 2000, chap. 16*; et le *Règlement 213/91 de l'Ontario* en vertu de la *Loi sur la santé et la sécurité au travail L.R.O. 1990, chap. O.1.*

2020

Dear Excavator,

Re: Marking Preservation

Your City of Ottawa Water & Sewer locate request has been completed based on the information you provided Ontario One Call. The locate is valid for 60 days from the date indicated on the City of Ottawa Locate Report – Water and Sewer Utilities. Please be aware it's the requestors responsibility to contact Ontario One Call for a new locate if any changes are known, suspected or for a relocate if excavation continues beyond 60 days.

The City of Ottawa expects excavators to protect and preserve the paint marks and flags placed at the time of the original locate ticket. If markings are removed due to weather or excavation work, the excavator is expected to recreate the markings based on the tie-in measurements provided on the original locate ticket report. Valid locate documentation is always required to be on site.

This is in accordance with the below section from the Canadian Common Ground Alliance Best Practices handbook version 3.0 – October 2018 (p. 55)

4-16: Marking Preservation Practice Statement: *The excavator, where practical, protects and preserves the staking, marking, or other designations for underground facilities until no longer required for proper and safe excavation. The excavator stops excavating and notifies the notification service for re-marks if any facility mark is removed or no longer visible.*

If an excavator would like the City of Ottawa to refresh the markings, please contact Ontario One Call to request a Remark and reference the original locate ticket number.

Thank you,

City of Ottawa, Water and Sewer Locates

Promark telecon

Location of underground infrastructures

Primary Locate Sheet

Request #20222225211

OTTLocateFollowup@Promark-Telecon.ca

Phone: 613-723-9888 Toll Free: 1-800-371-8866

NORMAL

UTILITIES LOCATED:	Revised Excavation Date	Excavation Date	Status
■ BELL ■ GAS ■ HYDRO OTTAWA ☐ ZAYO ☐ BELL 360 ☐ VIDEOTRON ☐ BIRCH HILL ☐ HYDRO ONE	N/A (mm/dd/yyyy)	6/7/2022 12:00:01 AM (mm/dd/yyyy)	INQUIRY — Homeowner ☐ Contractor ■ Project ☐

Requested by:	Company:	Phone:	Fax/email:
KATHLEEN SCHALLER	GHD LIMITED	(613)-402-6545 ext.	kathleen.schaller@ghd.com

Appt Date:	Received Date:	Locate Address:	
mm/dd/yyyy	5/28/2022 8:01:00 AM (mm/dd/yyyy)	1660, MERIVALE RD	1st Inter VIEWMOUNT DR — 2nd Inter COLONNADE RD

Type of work: DRILLING

City: OTTAWA

Caller's Remarks:
PROPERTY TYPE: PRIVATE PROPERTY
SITE MEETING: NO
DRILLING WILL BE OCCURRING ON THE PROPERTY ONLY AROUND THE PUMPS AND FUEL TANKS. BOREHOLE LOCATIONS WILL BE DETERMINED BASED ON FINDINGS; THEREFORE, BOREHOLES CANNOT BE MARKED. DRILLING WILL NOT OCCUR OUTSIDE THE SITE BOUNDARIES.

MAP REF.: 613 727-K2G, 45.34338608, -75.73033928, PROMARK FOR ENBRIDGE GAS (ENOE01) ENOE01 NOTIFICATION SENT, CITY OF OTTAWA WATER/SEWER (OTWAWS01) OTWAWS01 NOTIFICATION SENT, BLACK AND MC DONALD FOR CITY OF OTTAWA STREET LIGHTS (OTWASL01) OTWASL01 NOTIFICATION SENT, HYDRO OTTAWA (HOT1) HOT1 NOTIFICATION SENT, CLI FOR ROGERS (ROGOTT01) ROGOTT01 NOTIFICATION SENT, CITY OF OTTAWA

BELL MARK | CLEAR	GAS MARK | CLEAR	HYDRO OTTAWA MARK | CLEAR	FIBRENOIRE MARK | CLEAR	ZAYO MARK | CLEAR	HYDRO ONE MARK | CLEAR	BELL 360 MARK | CLEAR	BIRCHHILL MARK | CLEAR	VIDEOTRON MARK | CLEAR
1	1	1	N/A	N/A	N/A	N/A	N/A	N/A

LOCATED AREA: EXCAVATOR SHALL NOT WORK OUTSIDE LOCATED AREA WITHOUT OBTAINING ANOTHER LOCATE.

Records Reference: ■ GMobile ■ LAC Multiviewer

■ FRA# **#CPU02295** **PTOCPU2295**

Field Notes, As-Laids, Service Sketches:

6-368-134, 6-383-113, 6N1358-2, 6-374-20

Locator Remarks: ****PAINTED IN THE RAIN****

☐ Third Party Notification

*****Danger - Do Not Proceed*****
Buried high voltages cables located within the area. You must send Locate through hydroottawa.com/locates
If you have questions about the online form, please call 613-738-6418. For urgent matters involving power outages and after hours emergencies, call 613-738-6404

Apply Sticker Here if Required

Excavator shall notify & receive a clearance from utility prior to excavation for the following: Telecon ☐ High Priority Cable ☐ Central Office Vicinity

GAS MATERIAL TYPE: ☐ Steel (ST) ● Plastic (PE) ☐ Copper (CP)

Method of Field Marking: ■ Paint ☐ Stakes ■ Flags ☐ Offset Flags ☐ Other

Colour Indicator: Telecom = Orange Gas = Yellow Traffic / Hydro = Red Sewer = Green Water = Blue

Caution: Bell and 360 locates are valid for the life of the excavation. For utility specific details, see attached document(s). Hydro One – Hydro Ottawa – Enbridge Gas – Lakefront Utilities – Elexicon Energy locates are valid for 60 days. Unless otherwise indicated, all other utility locates are VOID after 30 days.

Caution: Any changes to location or nature of work will require a new locate. The excavator must not work outside the located area without obtaining a new locate. Privately owned services within the located area have not been marked – check with service / property owner. For all locate requests including remarks, contact Ontario One Call at **1-800-400-2255** or online at **www.on1call.com** ALL MEASUREMENTS ARE TAKEN WITH MEASURING WHEEL

Locator Name: **E. DENNY**	Start Time: **10:30**	☐ Mark & Fax ☐ Left on Site ■ Emailed
ID #: **EMP011178**	End Time : **12:00**	Print: N/A
Date **06/09/2022**	Total Hours: **1.5 HOURS**	Signature: N/A

A copy of this Primary Locate Sheet and Auxiliary Locate Sheet(s) must be on site and in the hands of the machine operator during work operations. If sketch and markings do not coincide, the Excavator must obtain a new locate.

This form revised Sept 2021

Promark telecon
Location of underground infrastructure

Auxiliary Locate Sheet

Fax: 613-723-9277
Toll free: 1-800-371-8866
Email

UTILITIES ☐ BELL ■ GAS ☐ HYDRO OTTAWA ☐ VIDEOTRON
LOCATED: ☐ BIRCH HILL ☐ HYDRO ONE ☐ ZAYO ☐ BELL 360

Date Located: mm/dd/yyyy **06/08/2022**

Request # 20222225211

Number of Services marked: (Specify building/house numbers) **(1) - 1660 MERIVALE ROAD**

LOCATED AREA: EXCAVATOR SHALL NOT WORK OUTSIDE THE LOCATED AREA WITHOUT OBTAINING ANOTHER LOCATE

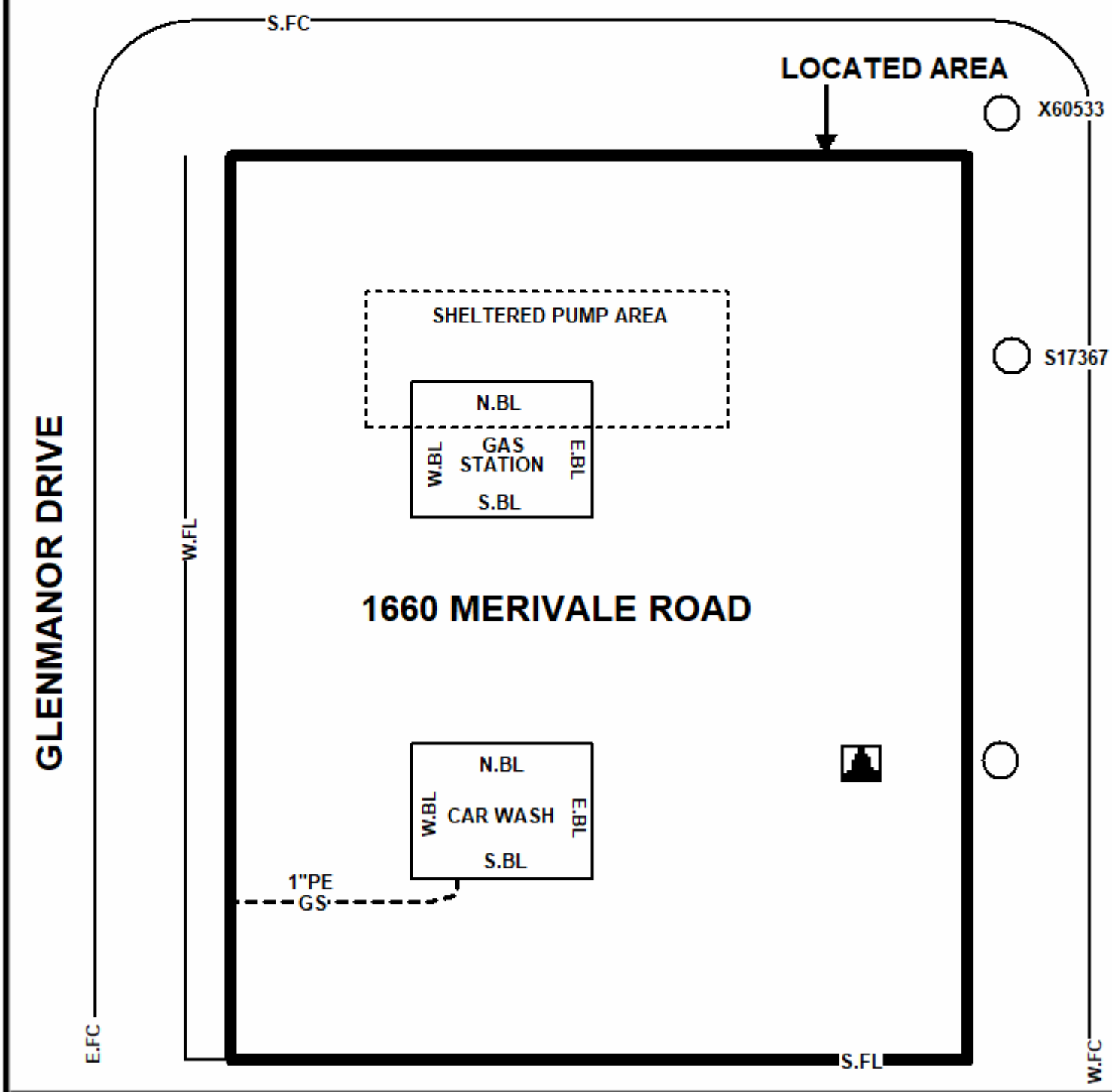
FROM: **8.0m S OF S.FC OF VIEWMOUNT DRIVE**
FROM: **1.0m E OF W.FL OF 1660 MERIVALE ROAD**
TO: **S.FL OF 1660 MERIVALE ROAD**
TO: **7.0m W OF W.FC OF MERIVALE ROAD**

Legend

Building Line	—BL—
Fence Line	—FL—
Face Of Curb	—FC—
Concrete Edge	—CE—
Asphalt Edge	—AE—
Driveway	DW
Sidewalk	SW
Railway	
Catch Basin	CB
Manhole	M/H
Hydrant	
Water Valve	WV
Gas Valve	
Street Light	
Pole	
Hydro Pole	X
Pedestal	
Flush To Grade Pedestal	FTG
Transformer	
End Cap	
Buried Cable	---B---
Conduit	---C---
Buried Service Wire	--BSW--
Fibre Optic Cable	---FO---
Bell Hydro Service	---BH---
Gas Main	---GM---
Gas Service	---GS---
Hydro Ottawa	---H---
Hydro One Primary	---HP---
Hydro One Secondary	---HS---
Measure	→ ←
Tree Line	---TL---

N

CAUTION: Hand dig within 1 M as measured horizontally from the field markings to avoid damaging the underground utilities. If you damage the plant, you may be held liable.
If you damage underground plant, contact the facility owner immediately.
Depth varies and MUST be verified by hand digging or vacuum excavation.
LOCATED AREA HAS BEEN ALTERED AS PER: SKETCH FROM KATHLEEN



THIS FORM VALID ONLY WITH Primary Locate Form. This sketch is not to scale.
Any privately owned services within the located area have not been marked- check with service/property owner.

A copy of this Auxiliary Locate Sheet(s) and the Primary Locate Sheet must be on site and in the hands of the machine operator during work operations. If sketch and markings do not coincide, the Excavator must obtain a new locate.

Promark telecon
Location of underground infrastructure

Auxiliary Locate Sheet

Fax: 613-723-9277
Toll free: 1-800-371-8866
Email

UTILITIES ■ BELL ☐ GAS ☐ HYDRO OTTAWA ☐ VIDEOTRON
LOCATED: ☐ BIRCH HILL ☐ HYDRO ONE ☐ ZAYO ☐ BELL 360

Date Located: mm/dd/yyyy **06/08/2022**

Request # 20222225211

Number of Services marked: (Specify building/house numbers) **N/A**

LOCATED AREA: EXCAVATOR SHALL NOT WORK OUTSIDE THE LOCATED AREA WITHOUT OBTAINING ANOTHER LOCATE

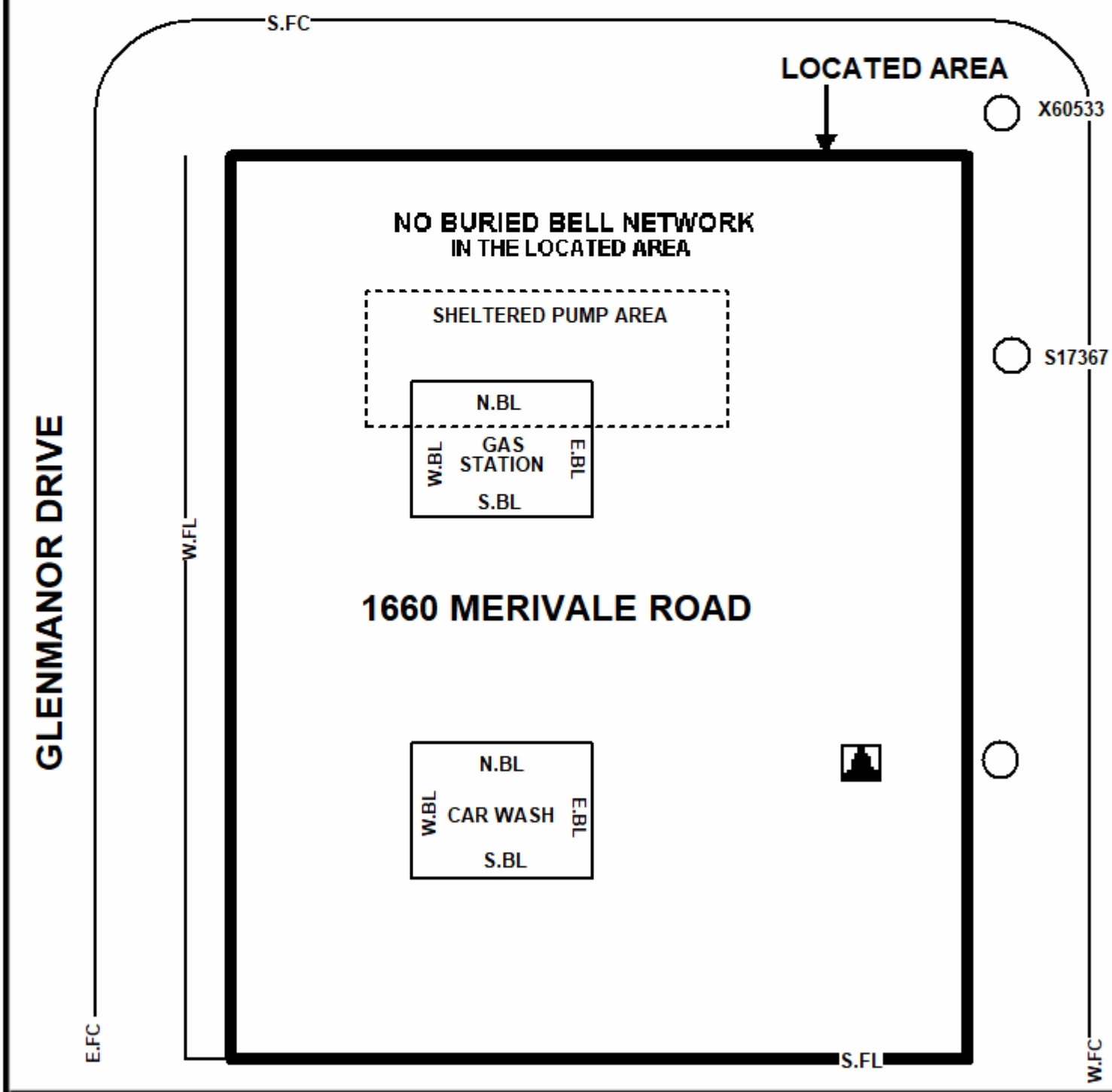
FROM: **8.0m S OF S.FC OF VIEWMOUNT DRIVE**
FROM: **1.0m E OF W.FL OF 1660 MERIVALE ROAD**
TO: **S.FL OF 1660 MERIVALE ROAD**
TO: **7.0m W OF W.FC OF MERIVALE ROAD**

Legend

Building Line	—BL—
Fence Line	—FL—
Face Of Curb	—FC—
Concrete Edge	—CE—
Asphalt Edge	—AE—
Driveway	DW
Sidewalk	SW
Railway	
Catch Basin	CB
Manhole	M/H
Hydrant	
Water Valve	WV
Gas Valve	
Street Light	
Pole	
Hydro Pole	X
Pedestal	
Flush To Grade Pedestal	FTG
Transformer	
End Cap	
Buried Cable	---B---
Conduit	---C---
Buried Service Wire	--BSW--
Fibre Optic Cable	---FO---
Bell Hydro Service	---BH---
Gas Main	---GM---
Gas Service	---GS---
Hydro Ottawa	---H---
Hydro One Primary	---HP---
Hydro One Secondary	---HS---
Measure	→ ←
Tree Line	---TL---

N

CAUTION: Hand dig within 1 M as measured horizontally from the field markings to avoid damaging the underground utilities. If you damage the plant, you may be held liable.
If you damage underground plant, contact the facility owner immediately.
Depth varies and MUST be verified by hand digging or vacuum excavation.
LOCATED AREA HAS BEEN ALTERED AS PER: SKETCH FROM KATHLEEN



THIS FORM VALID ONLY WITH Primary Locate Form. This sketch is not to scale.
Any privately owned services within the located area have not been marked- check with service/property owner.

A copy of this Auxiliary Locate Sheet(s) and the Primary Locate Sheet must be on site and in the hands of the machine operator during work operations. If sketch and markings do not coincide, the Excavator must obtain a new locate.

Promark telecon
Locates of underground infrastructures

Auxiliary Locate Sheet

Union Gas Emergency #
1-877-969-0999

Fax: 613-723-9277
Toll free: 1-800-371-8866
Email

UTILITIES ☐ BELL ☐ GAS ■ HYDRO OTTAWA ☐ VIDEOTRON
LOCATED: ☐ BIRCH HILL ☐ HYDRO ONE ☐ ZAYO ☐ BELL 360

Date Located: mm/dd/yyyy 06/08/2022

Request # 20222225211

Number of Services marked: (Specify building/house numbers) N/A

LOCATED AREA: EXCAVATOR SHALL NOT WORK OUTSIDE THE LOCATED AREA WITHOUT OBTAINING ANOTHER LOCATE.

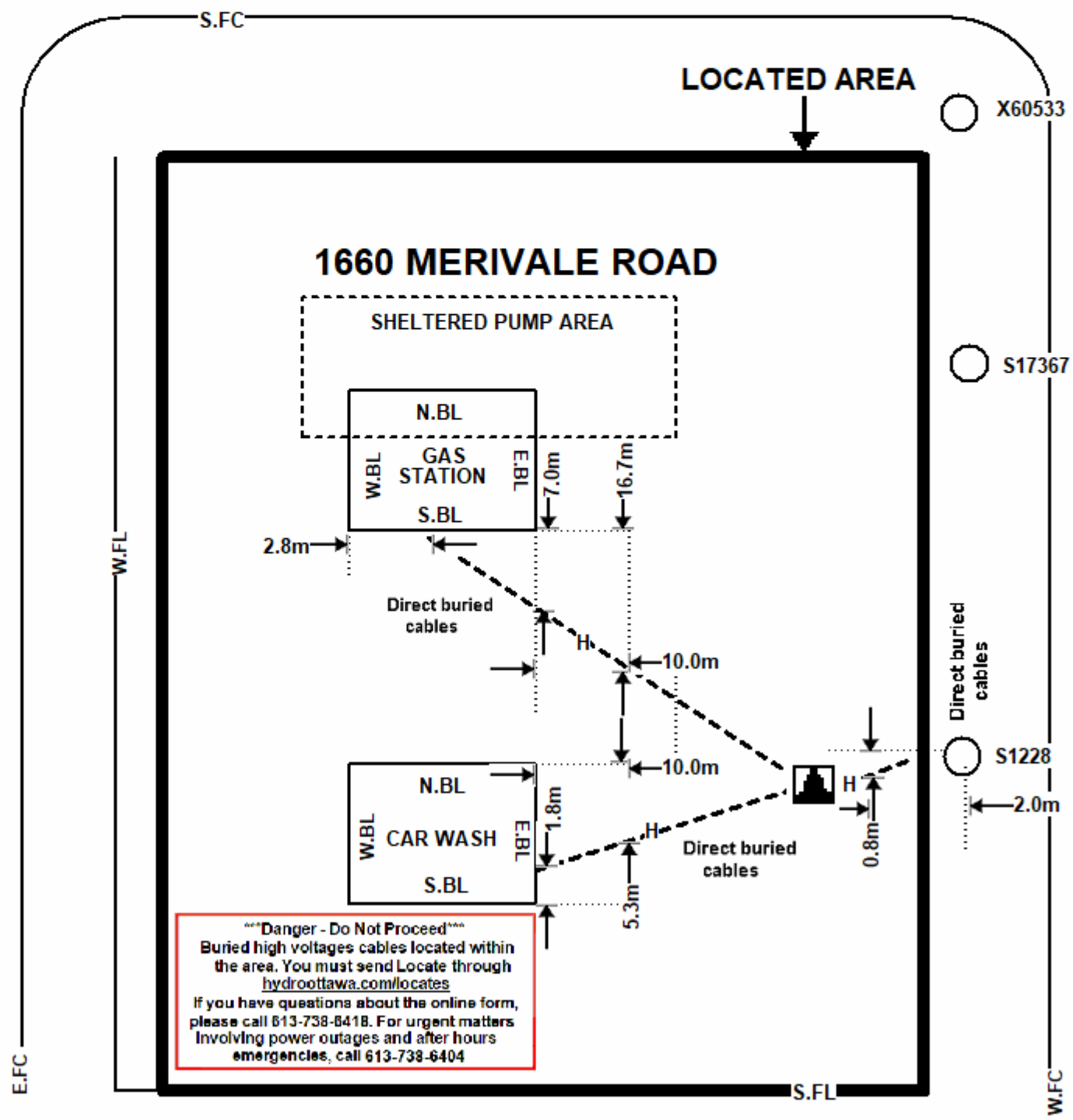
FROM: 8.0m S OF S.FC OF VIEWMOUNT DRIVE
TO: S.FL OF 1660 MERIVALE ROAD
FROM: 1.0m E OF W.FL OF 1660 MERIVALE ROAD
TO: 7.0m W OF W.FC OF MERIVALE ROAD

Legend

Building Line	—BL—
Fence Line	—FL—
Face Of Curb	—FC—
Concrete Edge	—CE—
Asphalt Edge	—AE—
Driveway	DW
Sidewalk	SW
Railway	
Catch Basin	CB
Manhole	M/H
Hydrant	
Water Valve	wv
Gas Valve	
Street Light	
Pole	
Hydro Pole	X
Pedestal	
Flush To Grade Pedestal	FTG
Transformer	
End Cap	
Buried Cable	---B---
Conduit	---C---
Buried Service Wire	--BSW--
Fibre Optic Cable	---FO---
Bell Hydro Service	---BH---
Gas Main	---GM---
Gas Service	---GS---
Hydro Ottawa	---H---
Hydro One Primary	---HP---
Hydro One Secondary	---HS---
Measure	→ ←
Tree Line	---TL---

N

CAUTION: Hand dig within 1.5M as measured horizontally from the field markings to avoid damaging the underground utilities. If you damage the plant, you may be held liable.
If you damage underground plant, contact the facility owner immediately.
Depth varies and MUST be verified by hand digging or vacuum excavation.
LOCATED AREA HAS BEEN ALTERED AS PER: SKETCH FROM KATHLEEN



THIS FORM VALID ONLY WITH Primary Locate Form. This sketch is not to scale.
Any privately owned services within the located area have not been marked- check with service/property owner.

A copy of this Auxiliary Locate Sheet(s) and the Primary Locate Sheet must be on site and in the hands of the machine operator during work operations. If sketch and markings do not coincide, the Excavator must obtain a new locate.

Promark telecon
Location of underground infrastructures

Primary Locate Sheet

Request #20222225211

OTTLocateFollowup@Promark-Telecon.ca

Phone: 613-723-9888 Toll Free: 1-800-371-8866

NORMAL

Utilities Located:	Revised Excavation Date	Excavation Date	Status
☐ Bell ☐ Gas ☐ Hydro Ottawa ☐ 360 ☐ Videotron ☐ Lakefront ☐ Elexicon ☐ Hydro One	mm/dd/yyyy	2022-06-07 mm/dd/yyyy	INQUIRY Homeowner ☐ Contractor ☐ Project ☐

Requested by:	Company:	Phone:	Fax/email:
KATHLEEN SCHALLER	GHD LIMITED	(613)-402-6545 ext.	kathleen.schaller@ghd.com

Appt Date:	Received Date:	Locate Address:
mm/dd/yyyy	2022-05-28 8:01:00 AM mm/dd/yyyy	1660, MERIVALE RD 1st Inter VIEWMOUNT DR 2nd Inter COLONNADE RD

Type of work:	City:
DRILLING	OTTAWA

Caller's Remarks:
PROPERTY TYPE: PRIVATE PROPERTY
SITE MEETING: NO
DRILLING WILL BE OCCURRING ON THE PROPERTY ONLY AROUND THE PUMPS AND FUEL TANKS. BOREHOLE LOCATIONS WILL BE DETERMINED BASED ON FINDINGS; THEREFORE, BOREHOLES CANNOT BE MARKED. DRILLING WILL NOT OCCUR OUTSIDE THE SITE BOUNDARIES.
MAP REF.: 613 727-K2G, 45.34339609, -75.73033928, PROMARK FOR ENBRIDGE GAS (ENOE01) ENOE01 NOTIFICATION SENT, CITY OF OTTAWA WATER/SEWER (OTWAWS01) OTWAWS01 NOTIFICATION SENT, BLACK AND MC DONALD FOR CITY OF OTTAWA STREET LIGHTS (OTWASL01) OTWASL01

Bell Mark | Clear	Gas Mark | Clear	Hydro Ottawa Mark | Clear	Street Lighting Mark | Clear	Lakefront Mark | Clear	Hydro One Mark | Clear	Elexicon Mark | Clear	360 Mark | Clear	Videotron Mark | Clear

LOCATED AREA: EXCAVATOR SHALL NOT WORK OUTSIDE LOCATED AREA WITHOUT OBTAINING ANOTHER LOCATE.

Records Reference: ☐ GMobile ☐ LAC Multiviewer ☐ FRA #

Field Notes, As-Laids, Service Sketches:

Locator Remarks:

☐ Third Party Notification _____

Apply Sticker Here if Required

Excavator shall notify & receive a clearance from utility prior to excavation for the following: **Telecon** ☐ **High Priority Cable** ☐ **Central Office Vicinity**

GAS MATERIAL TYPE: ☐ **Steel (ST)** ☐ **Plastic (PE)** ☐ **Copper (CP)**

Method of Field Marking: ☐ **Paint** ☐ **Stakes** ☐ **Flags** ☐ **Offset Flags** ☐ **Other**

Colour Indicator: Telecom = Orange Gas = Yellow Traffic / Hydro = Red Sewer = Green Water = Blue

Caution: Bell and 360 locates are valid for the life of the excavation. For utility specific details, see attached document(s). Hydro One - Hydro Ottawa - Enbridge Gas - Lakefront Utilities - Elexicon Energy locates are valid for 60 days. Unless otherwise indicated, all other utility locates are VOID after 30 days.

Caution: Any changes to location or nature of work will require a new locate. The excavator must not work outside the located area without obtaining a new locate. Privately owned services within the located area have not been marked - check with service / property owner. For all locate requests including remarks, contact Ontario One Call at **1-800-400-2255** or online at **www.on1call.com**

Locator Name: DENNY EMMA-LEE	Start Time:	☐ Mark & Fax ☐ Left on Site ☐ Emailed
ID #: EMP011178	End Time :	Print:
Date	Total Hours:	Signature:

A copy of this Primary Locate Sheet and Auxiliary Locate Sheet(s) must be on site and in the hands of the machine operator during work operations. If sketch and markings do not coincide, the Excavator must obtain a new locate.

This form revised Sept 2021

April 06th, 2022

To all Excavators :

Bell locates are valid for the life of the excavation project and will not automatically be relocated every 90days.

Please note the following for the above apply:

A) Construction within the located area begins within 90 days of the "locate completed date" on the original ticket.

B) The construction company named on the locate remains active on the site.

Bell expects excavators will protect and preserve the paint marks put down on the original locate ticket. If markings are removed due to weather or excavation work, the excavator is expected to recreate the markings based on the tie-in measurements provided on the original locate ticket.

If an excavator would like their, markings freshened up, they can contact **Promark** (Bell Canada Locate Service Provider in this area) directly to arrange for them to place a fresh markings on the ground. **However, this will be at the excavator's expense.**

Promark can be reached at:

Toronto – 905-474-1114 toll free – 1-888-883-6273

Ottawa – 613-723-9888 toll free – 1-800-371-8866

The locate will be considered officially expired one day after the final day of construction.

Best regards

Kathleen Schaller

From: agt_comm@irth.com
Sent: Monday, May 30, 2022 11:03 AM
To: Kathleen Schaller
Subject: Ticket 20222225211 - ON Facility Locate Request: Results & Information
Attachments: 20222225211.PNG; 20222225211_GeoJSon_MapSelection_27052022_14344903.geojson

==========

To: GHD LIMITED Attn: KATHLEEN SCHALLER
Voice: 6134026545 Fax:
Re: ON Facility Locate Request: Results & Information

This is an important Safety Message from TELUS Communications Company regarding your Provincial One-Call Locate Request PLEASE REVIEW THIS ENTIRE MESSAGE! We are responding to your request to locate TELUS underground facilities in the specific area of excavation listed on this One-Call ticket.
Please note the life of all TELUS tickets in Ontario is 60 days from the completion of the request - Your locate request has been reviewed and its status is explained below*:

==========

Ticket: 20222225211
County: ONTARIO Place: OTTAWA
Address: 1660 MERIVALE RD

TELOE01:
The provincial one call ticket has been approved for work to begin, based on the information that was provided on the ticket as compared to the TELUS Underground Facility Records. Please see the following conditions and additional information to this response.*Please note* TELUS not required as there is no TELUS facilities in described dig area If you have any concerns regarding this ticket please reach out to our Screening Centre at 1-800-980-0030.

==========

If you have any questions or concerns regarding this response, please contact the Cable Locate Support Centre for Ontario by calling, 1-800-980-0030. We ask, that while excavating, you dig with caution. Thank You for using your local Dial / Click Before You Dig process!

==========

This message was generated by an automated system. Please do not reply to this email.

CONDITIONAL CLEARANCE

TICKET#: 20222225211
CLEARANCE#: A6750518
DATE: 05/28/2022

8200 Dixie Rd
East Bldg, 2nd Flr
Brampton, Ontario, L6T 0C1
Tel.: (855) 232-0342
Fax.: (905) 780-7379

ROGOTT01

Requested By: Company: GHD LIMITED

Contact name: KATHLEEN SCHALLER Ph:(613)-402-6545 ext. Fax:

Dig Site Location :

Municipality : OTTAWA Call Date: 05/28/2022

Address : 1660, MERIVALE RD Intersection : VIEWMOUNT DR

Remarks (Additional Dig Info)
-75.729658 45.343183 NB_SEGMENTS::2 BCOE01 TELOE01 OTWATS01 ROGOTT01 HOT1 OTWASL01 OTWAWS01 ENOE01

OTTAWA DRILLING WILL BE OCCURRING ON THE PROPERTY ONLY AROUND THE PUMPS AND FUEL TANKS. BOREHOLE LOCATIONS WILL BE DETERMINED BASED ON FINDINGS; THEREFORE, BOREHOLES CANNOT BE MARKED. DRILLING WILL NOT OCCUR OUTSIDE THE SITE BOUNDARIES. NO_PLAN::613 727

TOOLS_USED::[MACHINE DIG]
URO_PREMARKED_VALUES::[AREA NOT PRE-MARKED]
URO_PROPERTY_TYPES::[PRIVATE PROPERTY]
URO_SITE_MEETING::NO

CONDITIONS

If your clearance is conditional, conditions are listed below. Otherwise, you are all clear.

ALL WORK ON PRIVATE PROPERTY ONLY

ALL CLEAR HAS BEEN GIVEN FOR THE WORK AREA DESCRIBED ABOVE.

YOU WILL BE LIABLE FOR ANY DAMAGES TO ROGERS FACILITIES IF EXCAVATING / DIGGING PRIOR TO RECEIVING A COMPLETED LOCATE OR CLEARANCE NUMBER FROM ROGERS OR IT'S AGENTS.

PLEASE CALL ROGERS LOCATE SERVICES AT (844) 225-5550, IF THERE ARE ANY CHANGES TO THIS LOCATE REQUEST. LOCATES AND CLEARANCES ARE VALID FOR 90 DAYS ONLY.

CAUTION: Stakes and or markings may disappear or be displaced. Should the sketches and markings not coincide, a new stake out must be obtained.

FOR ALL CUT CABLES CALL
1-800-265-9501

Ontario One Call TF

City of Ottawa
Street Light Locate

Black&McDonald

NOTICE OF INTENT TO EXCAVATE

Header Code: STANDARD

Request Type: NORMAL

Ticket No: 20222225211

Original Call Date: 05/28/2022 8:02:02 AM

Work To Begin Date: 06/07/2022

Company: GHD LIMITED

Contact Name: KATHLEEN SCHALLER Pager:

Contact Phone: (613)-402-6545 ext. Cell:

Fax:

Alternate Contact: Alt. Phone:

Place: OTTAWA

Street: 1660 MERIVALE RD

Nearest Intersecting Street: VIEWMOUNT DR

Second Intersecting Street: COLONNADE RD

Subdivision: OTTAWA

Additional Dig Information:

DRILLING WILL BE OCCURRING ON THE PROPERTY ONLY AROUND THE PUMPS AND FUEL TANKS. BOREHOLE LOCATIONS WILL BE DETERMINED BASED ON FINDINGS; THEREFORE, BOREHOLES CANNOT BE MARKED. DRILLING WILL NOT OCCUR OUTSIDE THE SITE BOUNDARIES. NO_PLAN::613 727

WO/ JOB #:

Type Of Work: DRILLING

Remarks:

-75.729658 45.343183 NB_SEGMENTS::2 BCOE01 TELOE01 OTWATS01 ROGOTT01 HOT1 OTWASL01 OTWAWS01 ENOE01

Disclaimer

Warning!

The Excavator must have a copy of this locate on the job site during excavation.

Located Area: The Excavator must not work outside the area indicated, by the located area in the diagram, without a further locate completed by **Black & McDonald Limited.**

Locate the Plant: The plant location information provided is the best we have available, but constitutes only an estimate. Depth of underground plant varies and the exact location must be determined by hand digging prior to excavation with mechanical equipment.

Mechanical equipment must not be used within 1.0 meter of the estimated location of the plant.

Valid Documentation: This locate is valid only for the Agency accepting it. Other parties must obtain and accept their respective underground locate from **Ontario 1 Call.**

Excavator Alterations: Under no circumstance shall an Excavator touch or move an underground power cable. Arrangements must be made to have qualified personnel relocate any such cable.

Expose the plant: Once the plant has been located by hand digging, it must be exposed along its length adjacent to or in the immediate vicinity of the proposed excavation. For this purpose, mechanical equipment must not be used within 0.5 meters of the plant.

Digging around the Exposed Plant: When the plant has been exposed, any further excavation within 0.3 meters, must only be done by hand digging and not with mechanical equipment.

Support Requirements: If the underground plant is exposed over a distance of more than 1.25 meters, the Facility Owner must be notified. Underground plant must be supported at all times.

Private Cables: Please be advised that **Black & McDonald Limited** is not responsible for and does not locate private cables (e.g. parking lot lights and cables to O.C. Transpo signs/bus stops).

New Cables: Be aware that new cables could be installed at any time after the locate has been completed. It is the Excavator's responsibility to call for new locates if any changes are known or suspected.

Caution: The markings may disappear or be misplaced. Should sketch and markings not coincide, the Excavator must obtain a new locate. This is based on the information given at the time. Any changes to location or nature of work require a new locate. The Excavator must not work outside the indicated located area without a further locate. Privately owned services within the located area have not been marked- check with service/property owner.

Liability: Any person or Excavator who interferes with or damages any underground electrical cable without having obtained a valid locate/clearance from **Black & McDonald Limited**, shall be liable for all cost incurred during the repair of the cable as well as any resulting legal actions.

This locate has been given as accurately as possible, but no locate is guaranteed. Excavators must always dig with extreme caution to prevent the possibility of damaging electrical cables and endangering safety.

Locate is void after 90 days

For remarks contact **Ontario One Call** 1-800-400-2255 or www.on1call.com

PLEASE NOTE:

Locates Validity Change

As of February 1, 2022 all locate requests for the City of Ottawa Streetlights issued by Black and McDonald will now be Valid for 90 Days.

Please refer to the attached disclaimer for any questions or issues.

Attachment C

Stratigraphic and Instrumentation Logs and MECP Well Record

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Soil and Groundwater Quality Investigation - CTP 1126
HOLE DESIGNATION: BH1-22/MW1-22
PROJECT NUMBER: 12583574
DATE COMPLETED: June 28, 2022
CLIENT: Canadian Tire Corporation Limited
DRILLING METHOD: Direct Push/Coring
LOCATION: 1660 Merivale Road, Ottawa, Ontario
FIELD PERSONNEL: N. Gupta

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH BGS
	ASPHALT	0.09
	GRAVEL (FILL), poorly graded, trace sand and silt, loose, light grey, dry	
	SANDY CLAY (FILL), trace silt, trae gravel, dense, dark brown, moist	0.91
	- asphalt fragments at 1.83m BGS	
	GRAVEL (FILL), poorly graded, trace sand, silt, light grey	1.92
	CLAY (NATIVE), trace silt, dark brown, moist	2.13
	- sand, moist at 2.99m BGS - wet at 3.05m BGS	
	BEDROCK, limestone	3.35
	END OF BOREHOLE @ 5.64m BGS	5.64

MONITOR INSTALLATION: Bentonite; Sand Pack; Well Screen

WELL DETAILS
Screened interval:
4.11 to 5.64m BGS
Length: 1.52m
Diameter: 32mm
Slot Size: #10
Material: PVC
Sand Pack:
3.96 to 5.64m BGS
Material: Silica

SAMPLE NUMBER	INTERVAL	REC (%)	'N' Value	PID (ppm)
1		100		0.1
2		100		0.1
3		100		0.1
4		100		0.1
5		100		0.1
6		100		0.1

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS

File: \\GHDNET\GHD\CA\MISSISSAUGA\PROJECTS\662\12583574\TECH\CTP1126 NEPEAN\GINT\12583574-CTP1126.GPJ Library File: GHD_ENVIRO_V06.GLB Report: OVERBURDEN LOG Date: 8/16/22

STRATIGRAPHIC LOG
(OVERBURDEN)

PROJECT NAME: Soil and Groundwater Quality Investigation - CTP 1126
HOLE DESIGNATION: BH2-22
PROJECT NUMBER: 12583574
DATE COMPLETED: June 28, 2022
CLIENT: Canadian Tire Corporation Limited
DRILLING METHOD: Direct Push
LOCATION: 1660 Merivale Road, Ottawa, Ontario
FIELD PERSONNEL: N. Gupta

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH BGS	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' Value	SAMPLE PID (ppm)
0	ASPHALT	0.09					
	GRAVEL (FILL), trace silt, loose, light grey, dry		1		60		0.2
0.5							
1.0	SAND (FILL), trace clay, dense, dark brown	0.91	2		50		0.2
1.5	CLAY (NATIVE), trace sand, dense, dark brown, moist	1.49	3		100		0.1
	- grey brown, moist at 1.83m BGS						
2.0	- sand at 1.92m BGS		4		100		0.1
2.5	- wet at 2.53m BGS		5		25		0.2
	BEDROCK, limestone	2.59					
3.0	END OF BOREHOLE @ 3.05m BGS	3.05					
3.5							
4.0							
4.5							
5.0							
5.5							
6.0							
6.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (oval) GRAIN SIZE ANALYSIS (rectangle)

File: \\GHDNET\GHD\CA\MISSISSAUGA\PROJECTS\662\12583574\TECH\CTP1126 NEPEAN\GINT\12583574-CTP1126.GPJ Library File: GHD_ENVIRO_V06.GLB Report: OVERBURDEN LOG Date: 8/16/22

STRATIGRAPHIC LOG
(OVERBURDEN)

PROJECT NAME: Soil and Groundwater Quality Investigation - CTP 1126
HOLE DESIGNATION: BH3-22
PROJECT NUMBER: 12583574
DATE COMPLETED: June 28, 2022
CLIENT: Canadian Tire Corporation Limited
DRILLING METHOD: Direct Push
LOCATION: 1660 Merivale Road, Ottawa, Ontario
FIELD PERSONNEL: N. Gupta

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH BGS	SAMPLE NUMBER	SAMPLE INTERVAL	REC (%)	'N' Value	PID (ppm)
0	ASPHALT	0.09					
	GRAVEL (FILL), trace silt, loose, coarse grained, grey, dry		1		60		0.1
0.5							
	SAND (FILL), trace silt and clay, compact, brown, moist	0.70					
1.0			2		80		0.0
1.5			3		100		0.0
	CLAY (NATIVE), dense, dark brown, moist	1.58					
2.0			4		100		0.0
	- sand at 2.44m BGS						
2.5	- BEDROCK, limestone at 2.59m BGS	2.59	5		25		0.0
	END OF BOREHOLE @ 2.59m BGS						
3.0							
3.5							
4.0							
4.5							
5.0							
5.5							
6.0							
6.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (3, 5)

File: \\GHDNET\GHD\CA\MISSISSAUGA\PROJECTS\662\12583574\TECH\CTP1126 NEPEAN\GINT\12583574-CTP1126.GPJ Library File: GHD_ENVIRO_V06.GLB Report: OVERBURDEN LOG Date: 8/16/22

STRATIGRAPHIC LOG
(OVERBURDEN)

PROJECT NAME: Soil and Groundwater Quality Investigation - CTP 1126
HOLE DESIGNATION: BH4-22

PROJECT NUMBER: 12583574
DATE COMPLETED: June 28, 2022

CLIENT: Canadian Tire Corporation Limited
DRILLING METHOD: Direct Push

LOCATION: 1660 Merivale Road, Ottawa, Ontario
FIELD PERSONNEL: N. Gupta

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH BGS	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' Value	SAMPLE PID (ppm)
0	ASPHALT	0.09					
	GRAVEL (FILL), loose, coarse grained, grey, dry		1		100		0.0
0.5	SILTY CLAY (NATIVE), trace sand, compact, brown, dry	0.40					
1.0			2		100		0.0
1.5			3		100		0.1
	SAND, compact, medium grained, brown, moist	1.68					
2.0			4		100		0.1
2.5	CLAY, dense, dark grey/brown, moist	2.41	5		25		0.1
	- BEDROCK, limestone at 2.59m BGS	2.59					
	END OF BOREHOLE @ 2.59m BGS						
3.0							
3.5							
4.0							
4.5							
5.0							
5.5							
6.0							
6.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (5)

File: \\GHDNET\GHD\CA\MISSISSAUGA\PROJECTS\662\12583574\TECH\CTP1126 NEPEAN\GINT\12583574-CTP1126.GPJ Library File: GHD_ENVIRO_V06.GLB Report: OVERBURDEN LOG Date: 8/16/22

STRATIGRAPHIC LOG
(OVERBURDEN)

PROJECT NAME: Soil and Groundwater Quality Investigation - CTP 1126
HOLE DESIGNATION: BH5-22
PROJECT NUMBER: 12583574
DATE COMPLETED: June 28, 2022
CLIENT: Canadian Tire Corporation Limited
DRILLING METHOD: Direct Push
LOCATION: 1660 Merivale Road, Ottawa, Ontario
FIELD PERSONNEL: N. Gupta

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH BGS	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' Value	SAMPLE PID (ppm)
	ASPHALT	0.09					
	GRAVEL (FILL), silt, coarse grained, loose, grey, dry	0.23					
	SILTY CLAY (FILL), trace sand, dense, brown, moist		1		100		0.1
0.5							
1.0			2		100		0.0
1.5			3		100		0.1
	- gravel at 1.83m BGS						
2.0	- black staining at 1.92m BGS		4		100		0.6
2.5			5		100		1.5
3.0	- black staining, no odor at 2.99m BGS						
	- BEDROCK, limestone at 3.05m BGS	3.05					
	END OF BOREHOLE @ 3.05m BGS						
3.5							
4.0							
4.5							
5.0							
5.5							
6.0							
6.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (oval)

File: \\GHDNET\GHD\CA\MISSISSAUGA\PROJECTS\662\12583574\TECH\CTP1126 NEPEAN\GINT\12583574-CTP1126.GPJ Library File: GHD_ENVIRO_V06.GLB Report: OVERBURDEN LOG Date: 8/16/22

STRATIGRAPHIC LOG
(OVERBURDEN)

PROJECT NAME: Soil and Groundwater Quality Investigation - CTP 1126
HOLE DESIGNATION: BH6-22

PROJECT NUMBER: 12583574
DATE COMPLETED: June 28, 2022

CLIENT: Canadian Tire Corporation Limited
DRILLING METHOD: Direct Push

LOCATION: 1660 Merivale Road, Ottawa, Ontario
FIELD PERSONNEL: N. Gupta

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH BGS	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' Value	SAMPLE PID (ppm)
0.0	SILTY CLAY (FILL), sand, compact, firm, dark brown		1		100		0.0
0.5							
1.0			2		100		1.0
	- pebbles/large gravel at 1.22m BGS						
1.5			3		100		1.0
2.0			4		100		0.8
2.5			5		100		0.5
	- grey clay at 2.80m BGS						
3.0	- gravel at 3.05m BGS		6		50		0.8
	- BEDROCK, limestone at 3.35m BGS	3.35					
3.5	END OF BOREHOLE @ 3.35m BGS						
4.0							
4.5							
5.0							
5.5							
6.0							
6.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (4)

File: \\GHDNET\GHD\CA\MISSISSAUGA\PROJECTS\662\12583574\TECH\CTP1126 NEPEAN\GINT\12583574-CTP1126.GPJ Library File: GHD_ENVIRO_V06.GLB Report: OVERBURDEN LOG Date: 8/16/22

STRATIGRAPHIC LOG
(OVERBURDEN)

PROJECT NAME: Soil and Groundwater Quality Investigation - CTP 1126
HOLE DESIGNATION: BH7-22
PROJECT NUMBER: 12583574
DATE COMPLETED: June 28, 2022
CLIENT: Canadian Tire Corporation Limited
DRILLING METHOD: Direct Push
LOCATION: 1660 Merivale Road, Ottawa, Ontario
FIELD PERSONNEL: N. Gupta

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH BGS	SAMPLE NUMBER	SAMPLE INTERVAL	REC (%)	'N' Value	PID (ppm)
0	SILTY CLAY (NATVIE), dense/stiff, trace organics, dark brown		1		100		0.3
0.5	- no organics at 0.61m BGS						
1.0			2		100		0.1
1.5			3		100		0.2
2.0			4		100		0.1
2.29	- BEDROCK, limestone at 2.29m BGS	2.29					
2.5	END OF BOREHOLE @ 2.29m BGS						
3.0							
3.5							
4.0							
4.5							
5.0							
5.5							
6.0							
6.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (oval)

File: \\GHDNET\GHD\CA\MISSISSAUGA\PROJECTS\662\12583574\TECH\CTP1126 NEPEAN\GINT\12583574-CTP1126.GPJ Library File: GHD_ENVIRO_V06.GLB Report: OVERBURDEN LOG Date: 8/16/22

Ontario — Ministry of the Environment, Conservation and Parks

Well Record

Regulation 903 Ontario Water Resources Act

Well Tag#: A342665 (Below) — A342665

Measurements recorded in: ☐ Metric ☒ Imperial

5-29-29 Page ____ of ____

Well Owner's Information

First Name	Last Name/Organization	E-mail Address	Well Constructed by Well Owner
TARA HUNTER	CANADIAN TIRE CORPORATION (CTC)		☐

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
2180 YONGE ST. 15TH FLOOR SOUTH PO BOX 770 STATION K	TORONTO	ON	M4P2V8	

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
1660 Merivale Rd			

County/District/Municipality	City/Town/Village	Province	Postal Code
	Ottawa	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	18	442827	5021394		

Overburden and Bedrock Materials/Abandonment Sealing Record (see instructions on the back of this form)

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
BLK	Asphalt	Gravel	hard packed	0	0.5
GRY	Gravel	Med Sand	hard packed	0.5	2
BRN	Clay	Silt	soft	2	9
BRN	Med Sand	Silt, gravel	soft loose	9	11
GRY	Shale	Limestone	hard	11	19

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m^3/ft^3)
0	1	Concrete / flushmount	
1	7	Bensea l	
7	13	Time Release Bentonite	
13	19	Filter Sand	

Method of Construction

☐ Cable Tool ☒ Diamond
☐ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☐ Driving
☐ Boring ☐ Digging
☐ Air percussion
☒ Other, specify direct push

Well Use

☐ Public ☐ Commercial ☐ Not used
☐ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☒ Test Hole ☒ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ Other, specify

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
1.38	PVC	.14	0	14

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
1.66	PVC	10	14	19

Status of Well

☐ Water Supply
☐ Replacement Well
☒ Test Hole
☐ Recharge Well
☐ Dewatering Well
☒ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, specify
☐ Other, specify

Water Details

Water found at Depth (m/ft) ☐ Gas	Kind of Water: ☐ Fresh ☐ Untested ☐ Other, specify
Water found at Depth (m/ft) ☐ Gas	Kind of Water: ☐ Fresh ☐ Untested ☐ Other, specify
Water found at Depth (m/ft) ☐ Gas	Kind of Water: ☐ Fresh ☐ Untested ☐ Other, specify

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)
0	11	2.375
11	19	2.375

Results of Well Yield Testing

After test of well yield, water was:
☐ Clear and sand free
☐ Other, specify

If pumping discontinued, give reason:

Pump intake set at (m/ft)

Pumping rate (l/min / GPM)

Duration of pumping ____ hrs + ____ min

Final water level end of pumping (m/ft)

If flowing give rate (l/min/GPM)

Recommended pump depth (m/ft)

Recommended pump rate (l/min/GPM)

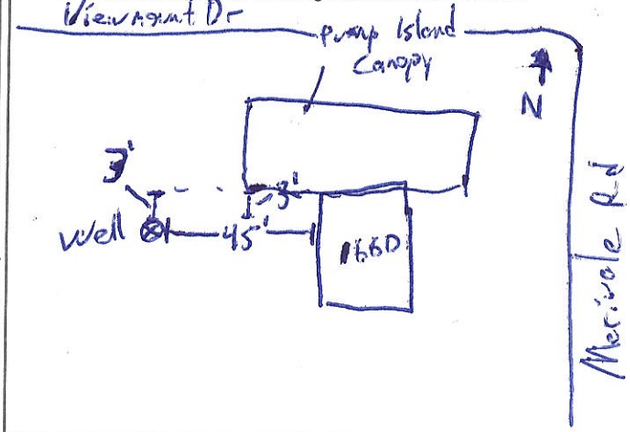
Well production (l/min/GPM)

Disinfected? ☐ Yes ☐ No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level				
1			1	
2			2	
3			3	
4			4	
5			5	
10			10	
15			15	
20			20	
25			25	
30			30	
40			40	
50			50	
60			60	

Map of Well Location

Please provide a map below following instructions on the back.



Comments: GHD General Contractors On Site

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Stratabor Drilling Group	7241

Business Address (Street Number/Name)	Municipality
129 Ringwood Dr	Stouffville

Province	Postal Code	Business E-mail Address
ON	L4A8L1	wrecords@stratasoil.com

Bus. Telephone No (inc. area code)	Name of Well Technician (Last Name, First Name)
9059407919	Beatty Brian

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
3616		2022 08 08

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☐ Yes ☐ No	Y Y Y Y M M D D	2022 06 28

Ministry Use Only

Audit No. Z385904

Received

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Ministry's Copy

Attachment D

Laboratory Certificates of Analysis

Your P.O. #: 735-003342
Your Project #: 12583574-E2
Your C.O.C. #: 883049-01-01

Attention: 12583574-SSOW-735-003342

GHD Limited
Waterloo- Canadian Tire Work
455 Phillip St
Waterloo, ON
CANADA N2L 3X2

Report Date: 2022/06/24
Report #: R7185184
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C2G7508
Received: 2022/06/16, 09:00

Sample Matrix: Water
Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Petroleum Hydro. CCME F1 & BTEX in Water (1)	6	N/A	2022/06/21	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydro. CCME F1 & BTEX in Water (1)	2	N/A	2022/06/22	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1, 2)	6	2022/06/23	2022/06/23	CAM SOP-00316	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1, 2)	1	2022/06/23	2022/06/24	CAM SOP-00316	CCME PHC-CWS m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Bureau Veritas Mississauga, 6740 Campobello Rd , Mississauga, ON, L5N 2L8
(2) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following “Alberta Environment’s Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003”. Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Your P.O. #: 735-003342
Your Project #: 12583574-E2
Your C.O.C. #: 883049-01-01

Attention: 12583574-SSOW-735-003342

GHD Limited
Waterloo- Canadian Tire Work
455 Phillip St
Waterloo, ON
CANADA N2L 3X2

Report Date: 2022/06/24
Report #: R7185184
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C2G7508
Received: 2022/06/16, 09:00

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Julie Clement, Technical Account Manager
Email: Julie.CLEMENT@bureauveritas.com
Phone# (613)868-6079
==========
This report has been generated and distributed using a secure automated process.
Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.

PETROLEUM HYDROCARBONS (CCME)

Bureau Veritas ID		SXU564		
Sampling Date		2022/06/15 14:00		
COC Number		883049-01-01		
	UNITS	**C2A2062-SJT408-01**	**RDL**	**QC Batch**
BTEX & F1 Hydrocarbons				
Benzene	ug/L	ND	0.20	8064950
Toluene	ug/L	ND	0.20	8064950
Ethylbenzene	ug/L	ND	0.20	8064950
o-Xylene	ug/L	ND	0.20	8064950
p+m-Xylene	ug/L	ND	0.40	8064950
Total Xylenes	ug/L	ND	0.40	8064950
F1 (C6-C10)	ug/L	ND	25	8064950
F1 (C6-C10) - BTEX	ug/L	ND	25	8064950
Surrogate Recovery (%)				
1,4-Difluorobenzene	%	101		8064950
4-Bromofluorobenzene	%	97		8064950
D10-o-Xylene	%	86		8064950
D4-1,2-Dichloroethane	%	99		8064950

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

O.REG 153 PHCS, BTEX/F1-F4 (WATER)

Bureau Veritas ID		SXU557	SXU558			SXU558		
Sampling Date		2022/06/15 06:45	2022/06/15 08:00			2022/06/15 08:00		
COC Number		883049-01-01	883049-01-01			883049-01-01		
	UNITS	GW-12583574-150622-DA-001	GW-12583574-150622-DA-002	RDL	QC Batch	GW-12583574-150622-DA-002 Lab-Dup	RDL	QC Batch
BTEX & F1 Hydrocarbons								
Benzene	ug/L	7.3	ND	0.20	8064950			
Toluene	ug/L	ND	ND	0.20	8064950			
Ethylbenzene	ug/L	0.49	ND	0.20	8064950			
o-Xylene	ug/L	ND	ND	0.20	8064950			
p+m-Xylene	ug/L	ND	ND	0.40	8064950			
Total Xylenes	ug/L	ND	ND	0.40	8064950			
F1 (C6-C10)	ug/L	45	ND	25	8064950			
F1 (C6-C10) - BTEX	ug/L	38	ND	25	8064950			
F2-F4 Hydrocarbons								
F2 (C10-C16 Hydrocarbons)	ug/L	ND	ND	100	8071184	ND	100	8071184
F3 (C16-C34 Hydrocarbons)	ug/L	ND	ND	200	8071184	ND	200	8071184
F4 (C34-C50 Hydrocarbons)	ug/L	ND	ND	200	8071184	ND	200	8071184
Reached Baseline at C50	ug/L	Yes	Yes		8071184	Yes		8071184
Surrogate Recovery (%)								
1,4-Difluorobenzene	%	100	98		8064950			
4-Bromofluorobenzene	%	97	99		8064950			
D10-o-Xylene	%	84	84		8064950			
D4-1,2-Dichloroethane	%	102	97		8064950			
o-Terphenyl	%	106	104		8071184	104		8071184

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

O.REG 153 PHCS, BTEX/F1-F4 (WATER)

Bureau Veritas ID		SXU559	SXU560	SXU561	SXU562		
Sampling Date		2022/06/15 08:15	2022/06/15 09:00	2022/06/15 10:20	2022/06/15 11:10		
COC Number		883049-01-01	883049-01-01	883049-01-01	883049-01-01		
	UNITS	GW-12583574-150622-DA-003	GW-12583574-150622-DA-004	GW-12583574-150622-DA-005	GW-12583574-150622-DA-006	RDL	QC Batch
BTEX & F1 Hydrocarbons							
Benzene	ug/L	ND	ND	ND	17	0.20	8064950
Toluene	ug/L	ND	ND	ND	ND	0.20	8064950
Ethylbenzene	ug/L	ND	ND	ND	21	0.20	8064950
o-Xylene	ug/L	ND	ND	ND	ND	0.20	8064950
p+m-Xylene	ug/L	ND	ND	ND	0.46	0.40	8064950
Total Xylenes	ug/L	ND	ND	ND	0.46	0.40	8064950
F1 (C6-C10)	ug/L	ND	ND	ND	560	25	8064950
F1 (C6-C10) - BTEX	ug/L	ND	ND	ND	520	25	8064950
F2-F4 Hydrocarbons							
F2 (C10-C16 Hydrocarbons)	ug/L	ND	ND	ND	130	100	8071184
F3 (C16-C34 Hydrocarbons)	ug/L	ND	ND	ND	ND	200	8071184
F4 (C34-C50 Hydrocarbons)	ug/L	ND	ND	ND	ND	200	8071184
Reached Baseline at C50	ug/L	Yes	Yes	Yes	Yes		8071184
Surrogate Recovery (%)							
1,4-Difluorobenzene	%	101	100	100	100		8064950
4-Bromofluorobenzene	%	97	97	97	98		8064950
D10-o-Xylene	%	86	83	83	84		8064950
D4-1,2-Dichloroethane	%	98	100	100	98		8064950
o-Terphenyl	%	103	104	104	104		8071184

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

O.REG 153 PHCS, BTEX/F1-F4 (WATER)

Bureau Veritas ID		SXU563			SXU563		
Sampling Date		2022/06/15 13:35			2022/06/15 13:35		
COC Number		883049-01-01			883049-01-01		
	UNITS	GW-12583574-150622 -DA-007	RDL	QC Batch	GW-12583574-150622 -DA-007 Lab-Dup	RDL	QC Batch
BTEX & F1 Hydrocarbons							
Benzene	ug/L	190	4.0	8064950			
Toluene	ug/L	23	4.0	8064950			
Ethylbenzene	ug/L	820	4.0	8064950			
o-Xylene	ug/L	65	4.0	8064950			
p+m-Xylene	ug/L	1700	8.0	8064950			
Total Xylenes	ug/L	1700	8.0	8064950			
F1 (C6-C10)	ug/L	7600	500	8064950			
F1 (C6-C10) - BTEX	ug/L	4900	500	8064950			
F2-F4 Hydrocarbons							
F2 (C10-C16 Hydrocarbons)	ug/L	3500	100	8071100	3300	100	8071100
F3 (C16-C34 Hydrocarbons)	ug/L	280	200	8071100	270	200	8071100
F4 (C34-C50 Hydrocarbons)	ug/L	ND	200	8071100	ND	200	8071100
Reached Baseline at C50	ug/L	Yes		8071100	Yes		8071100
Surrogate Recovery (%)							
1,4-Difluorobenzene	%	103		8064950			
4-Bromofluorobenzene	%	97		8064950			
D10-o-Xylene	%	89		8064950			
D4-1,2-Dichloroethane	%	93		8064950			
o-Terphenyl	%	103		8071100	98		8071100

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

TEST SUMMARY

Bureau Veritas ID: SXU557 **Collected:** 2022/06/15
Sample ID: GW-12583574-150622-DA-001 **Shipped:**
Matrix: Water **Received:** 2022/06/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	8064950	N/A	2022/06/21	Domnica Andronescu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	8071184	2022/06/23	2022/06/23	Austin (Guochen) Zhang

Bureau Veritas ID: SXU558 **Collected:** 2022/06/15
Sample ID: GW-12583574-150622-DA-002 **Shipped:**
Matrix: Water **Received:** 2022/06/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	8064950	N/A	2022/06/21	Domnica Andronescu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	8071184	2022/06/23	2022/06/23	Austin (Guochen) Zhang

Bureau Veritas ID: SXU558 Dup **Collected:** 2022/06/15
Sample ID: GW-12583574-150622-DA-002 **Shipped:**
Matrix: Water **Received:** 2022/06/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	8071184	2022/06/23	2022/06/23	Austin (Guochen) Zhang

Bureau Veritas ID: SXU559 **Collected:** 2022/06/15
Sample ID: GW-12583574-150622-DA-003 **Shipped:**
Matrix: Water **Received:** 2022/06/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	8064950	N/A	2022/06/21	Domnica Andronescu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	8071184	2022/06/23	2022/06/23	Austin (Guochen) Zhang

Bureau Veritas ID: SXU560 **Collected:** 2022/06/15
Sample ID: GW-12583574-150622-DA-004 **Shipped:**
Matrix: Water **Received:** 2022/06/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	8064950	N/A	2022/06/21	Domnica Andronescu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	8071184	2022/06/23	2022/06/23	Austin (Guochen) Zhang

Bureau Veritas ID: SXU561 **Collected:** 2022/06/15
Sample ID: GW-12583574-150622-DA-005 **Shipped:**
Matrix: Water **Received:** 2022/06/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	8064950	N/A	2022/06/21	Domnica Andronescu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	8071184	2022/06/23	2022/06/23	Austin (Guochen) Zhang

TEST SUMMARY

Bureau Veritas ID: SXU562 **Collected:** 2022/06/15
Sample ID: GW-12583574-150622-DA-006 **Shipped:**
Matrix: Water **Received:** 2022/06/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	8064950	N/A	2022/06/22	Domnica Andronescu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	8071184	2022/06/23	2022/06/23	Austin (Guochen) Zhang

Bureau Veritas ID: SXU563 **Collected:** 2022/06/15
Sample ID: GW-12583574-150622-DA-007 **Shipped:**
Matrix: Water **Received:** 2022/06/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	8064950	N/A	2022/06/22	Domnica Andronescu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	8071100	2022/06/23	2022/06/24	Austin (Guochen) Zhang

Bureau Veritas ID: SXU563 Dup **Collected:** 2022/06/15
Sample ID: GW-12583574-150622-DA-007 **Shipped:**
Matrix: Water **Received:** 2022/06/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	8071100	2022/06/23	2022/06/24	Austin (Guochen) Zhang

Bureau Veritas ID: SXU564 **Collected:** 2022/06/15
Sample ID: C2A2062-SJT408-01 **Shipped:**
Matrix: Water **Received:** 2022/06/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	8064950	N/A	2022/06/21	Domnica Andronescu

Bureau Veritas 100 – 36 Antares Dr. Nepean, ON, K2E 7W5 Phone: 613-274-0573 Website: www.bvna.com

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	2.7°C

Sample SXU563 [GW-12583574-150622-DA-007] : F1 BTEX analysis : Due to high concentration of target analytes, sample required dilution. Reporting limits were adjusted accordingly.

Results relate only to the items tested.

Bureau Veritas 100 – 36 Antares Dr. Nepean, ON, K2E 7W5 Phone: 613-274-0573 Website: www.bvna.com

QUALITY ASSURANCE REPORT

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
8064950	1,4-Difluorobenzene	2022/06/21	98	70 - 130	99	70 - 130	100	%		
8064950	4-Bromofluorobenzene	2022/06/21	98	70 - 130	97	70 - 130	97	%		
8064950	D10-o-Xylene	2022/06/21	91	70 - 130	90	70 - 130	88	%		
8064950	D4-1,2-Dichloroethane	2022/06/21	100	70 - 130	92	70 - 130	97	%		
8071100	o-Terphenyl	2022/06/23	107	60 - 130	109	60 - 130	109	%		
8071184	o-Terphenyl	2022/06/23	109 (3)	60 - 130	107	60 - 130	109	%		
8064950	Benzene	2022/06/21	85	50 - 140	83	50 - 140	ND, RDL=0.20	ug/L	NC (1)	30
8064950	Ethylbenzene	2022/06/21	86	50 - 140	88	50 - 140	ND, RDL=0.20	ug/L	NC (1)	30
8064950	F1 (C6-C10) - BTEX	2022/06/21					ND, RDL=25	ug/L	NC (1)	30
8064950	F1 (C6-C10)	2022/06/21	89	60 - 140	87	60 - 140	ND, RDL=25	ug/L	NC (1)	30
8064950	o-Xylene	2022/06/21	84	50 - 140	84	50 - 140	ND, RDL=0.20	ug/L	NC (1)	30
8064950	p+m-Xylene	2022/06/21	87	50 - 140	90	50 - 140	ND, RDL=0.40	ug/L	NC (1)	30
8064950	Toluene	2022/06/21	82	50 - 140	82	50 - 140	ND, RDL=0.20	ug/L	NC (1)	30
8064950	Total Xylenes	2022/06/21					ND, RDL=0.40	ug/L	NC (1)	30
8071100	F2 (C10-C16 Hydrocarbons)	2022/06/24	102	60 - 130	105	60 - 130	ND, RDL=100	ug/L	5.6 (2)	30
8071100	F3 (C16-C34 Hydrocarbons)	2022/06/24	106	60 - 130	110	60 - 130	ND, RDL=200	ug/L	4.0 (2)	30
8071100	F4 (C34-C50 Hydrocarbons)	2022/06/24	107	60 - 130	111	60 - 130	ND, RDL=200	ug/L	NC (2)	30
8071184	F2 (C10-C16 Hydrocarbons)	2022/06/23	103 (3)	60 - 130	100	60 - 130	ND, RDL=100	ug/L	NC (4)	30
8071184	F3 (C16-C34 Hydrocarbons)	2022/06/23	101 (3)	60 - 130	101	60 - 130	ND, RDL=200	ug/L	NC (4)	30

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
8071184	F4 (C34-C50 Hydrocarbons)	2022/06/23	100 (3)	60 - 130	98	60 - 130	ND, RDL=200	ug/L	NC (4)	30

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Duplicate Parent ID

(2) Duplicate Parent ID [SXU563-01]

(3) Matrix Spike Parent ID [SXU557-01]

(4) Duplicate Parent ID [SXU558-01]

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Cristina Carriere

Cristina Carriere, Senior Scientific Specialist

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Bureau Veritas 100 – 36 Antares Dr. Nepean, ON, K2E 7W5 Phone: 613-274-0573 Website: www.bvna.com

Bureau Veritas
6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel:(905) 817-5700 Toll-free:800-563-6266 Fax:(905) 817-5777 www.bvna.com

Page of

16-Jun-22 09:00
Julie Clement
C2G7508
KTN
ENV-1702
C#883049-01-01

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:	
Company Name:	#31726 GHD Limited	Company Name:		Quotation #:	B84601
Attention:	(AP-735)- Jennifer Balkwill	Attention:	12583574 Distribution List	P.O. #:	735-003342
Address:	455 Phillip St Waterloo ON N2L 3X2	Address:		Project:	12583574-E2
Tel:	(519) 884-0510 Fax: (519) 725-1394	Tel:	Fax:	Project Name:	
Email:	Invoicing-Canada@ghd.com; jennifer.balkwill@ghd.com	Email:		Site #:	
				Sampled By:	

Bottle Order #: 883049
Project Manager: Julie Clement

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BUREAU VERITAS DRINKING WATER CHAIN OF CUSTODY

Regulation 153 (2011): ☐ Table 1 ☐ Res/Park ☐ Medium/Fine ☐ Table 2 ☐ Ind/Comm ☐ Coarse ☐ Table 3 ☐ Agri/Other ☐ For RSC ☐ Table ___

Other Regulations: ☐ CCME ☐ Sanitary Sewer Bylaw ☐ Reg 558 ☐ Storm Sewer Bylaw ☐ MISA Municipality ☐ PWQO ☐ Reg 406 Table ☐ Other

Special Instructions

Include Criteria on Certificate of Analysis (Y/N)? ___

Field Filtered (please circle): Metals / Hg / Cr VI

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

Turnaround Time (TAT) Required:
Please provide advance notice for rush projects

Regular (Standard) TAT: ☒
(will be applied if Rush TAT is not specified)
Standard TAT = 5-7 Working days for most tests.
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission)
Date Required: ___ Time Required: ___ ☐
Rush Confirmation Number: ___ *(call lab for #)*

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	O Reg 153 PHCs, BTEX/F1-F4	Trip blank, BTEX/FI	# of Bottles	Comments
1		GW-12583574-150622-DA-001	22-06-15	06:45	Ground Water	X		4	
2		GW-12583574-150622-DA-002		08:00		X		4	
3		GW-12583574-150622-DA-003		08:15		X		4	
4		GW-12583574-150622-DA-004		09:00		X		4	
5		GW-12583574-150622-DA-005		10:20		X		4	
6		GW-12583574-150622-DA-006		11:10		X		4	
7		GW-12583574-150622-DA-007	↓	13:35	↓	X		4	
8		CZA2062-SJT408-01	22-06-15	14:00			X	2	
9									
10									ON Ice

RECEIVED IN OTTAWA

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted
Dathon Ash / Dathon Ash	22-06-15	17:00	2UJ TRINA	2022/06/16	0900	

Laboratory Use Only

Time Sensitive	Temperature (°C) on Recei	Custody Seal Present	Yes	No
	3, 3, 2	Intact	☑	

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/TERMS-AND-CONDITIONS.

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

** SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT WWW.BVNA.COM/RESOURCES/CHAIN-OF-CUSTODY-FORMS.

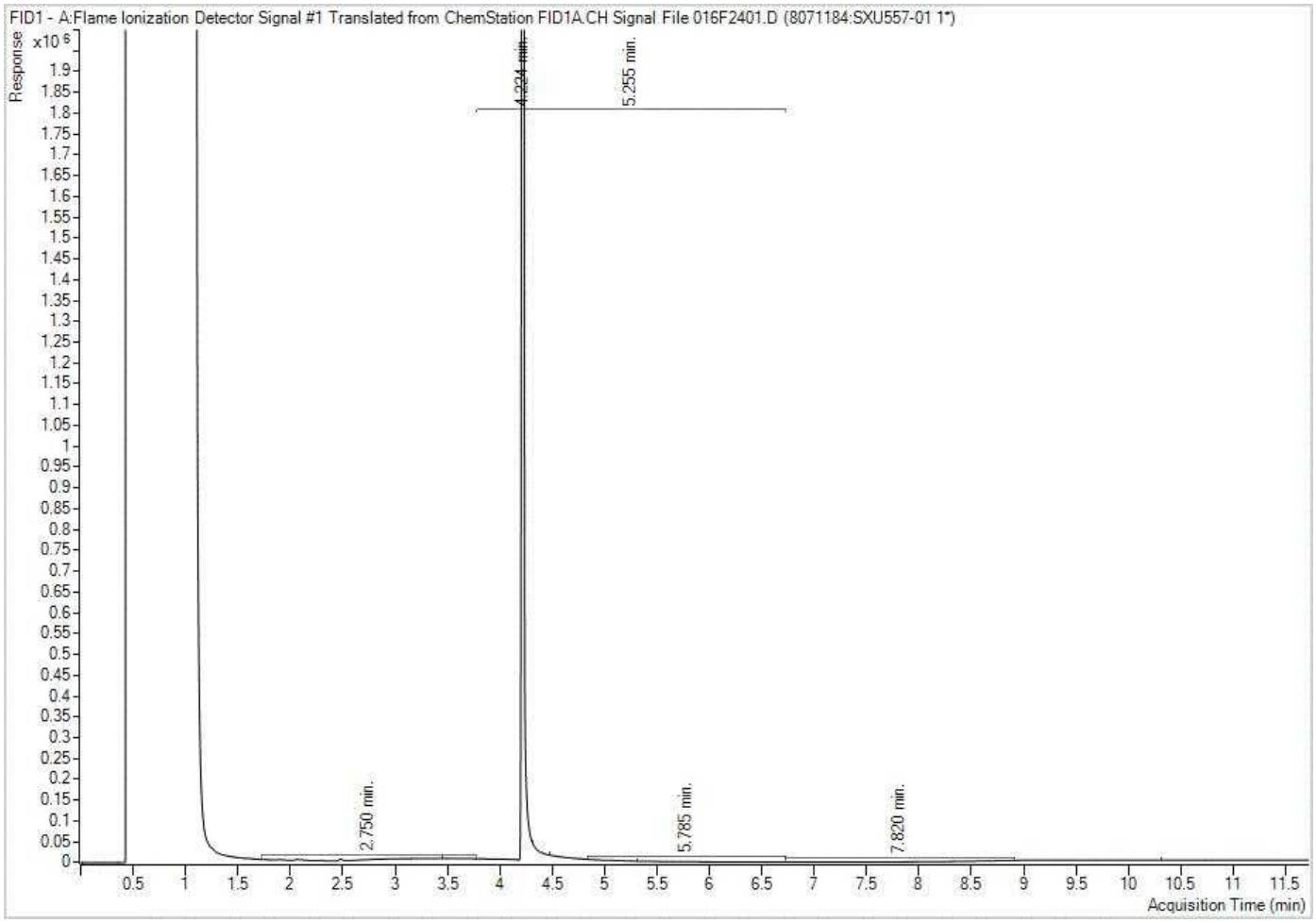
SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS

White: Bureau Veritas Yellow: Client

2120

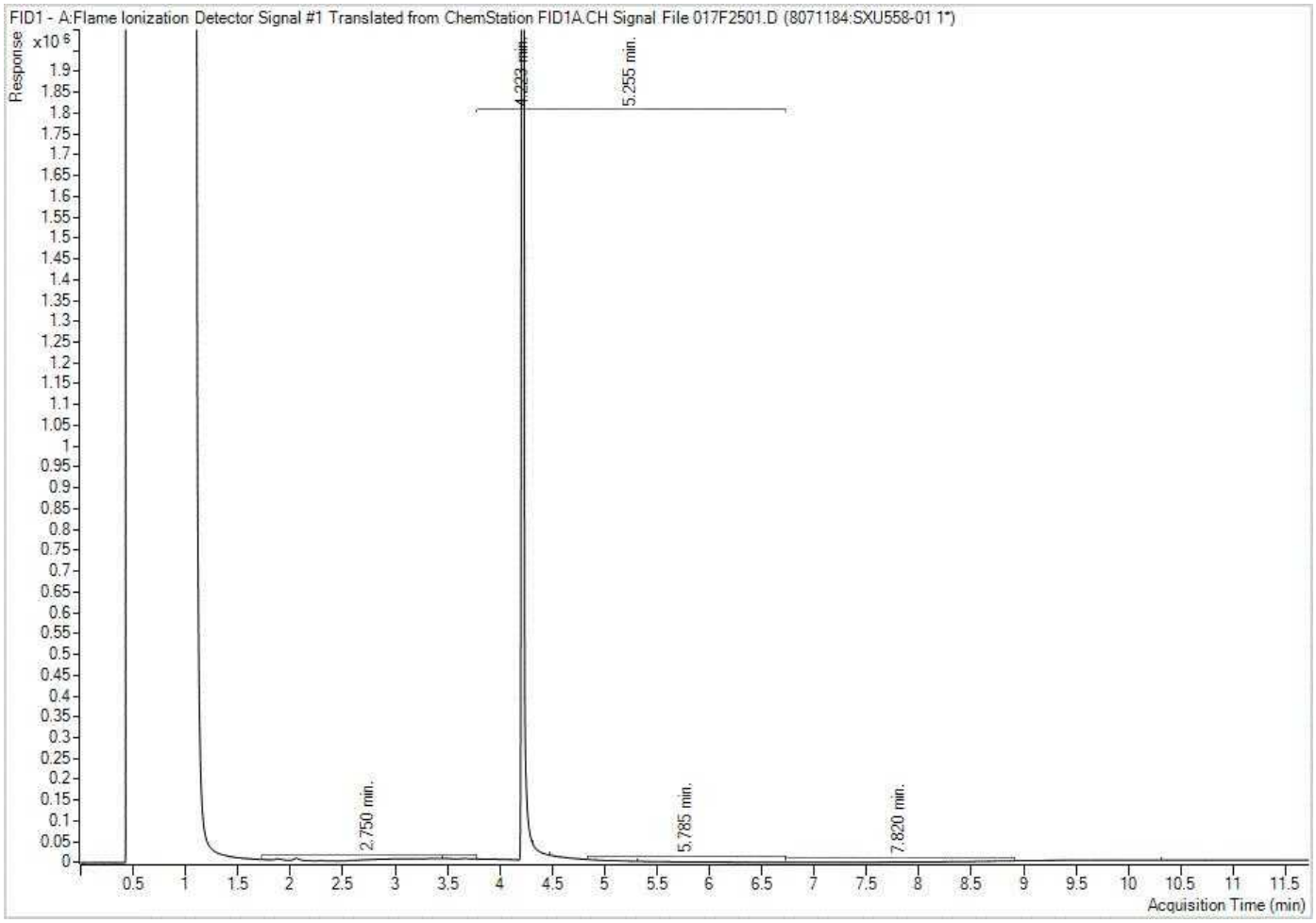
Bureau Veritas Canada (2019) Inc.

Petroleum Hydrocarbons F2-F4 in Water Chromatogram



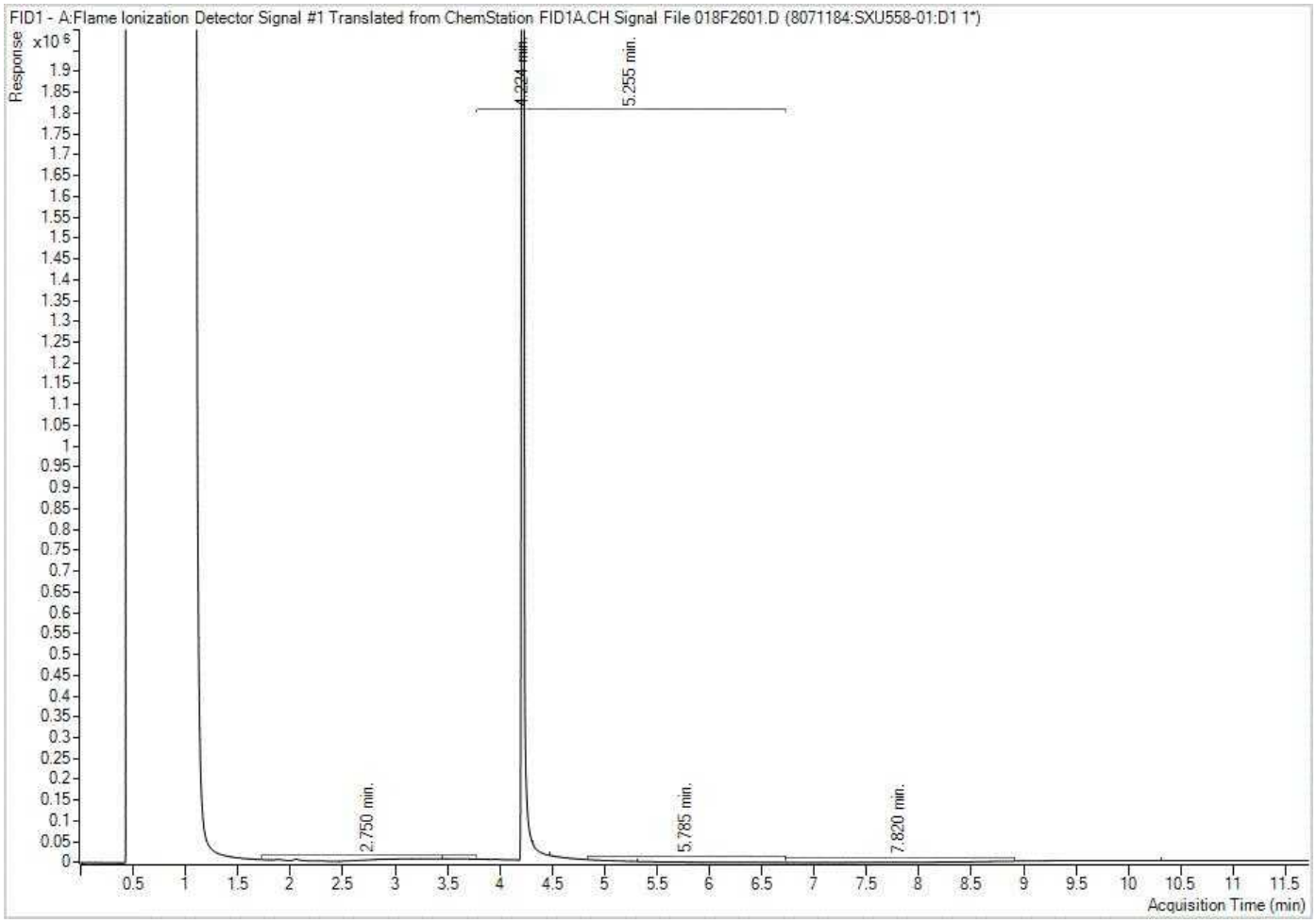
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Petroleum Hydrocarbons F2-F4 in Water Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Petroleum Hydrocarbons F2-F4 in Water Chromatogram

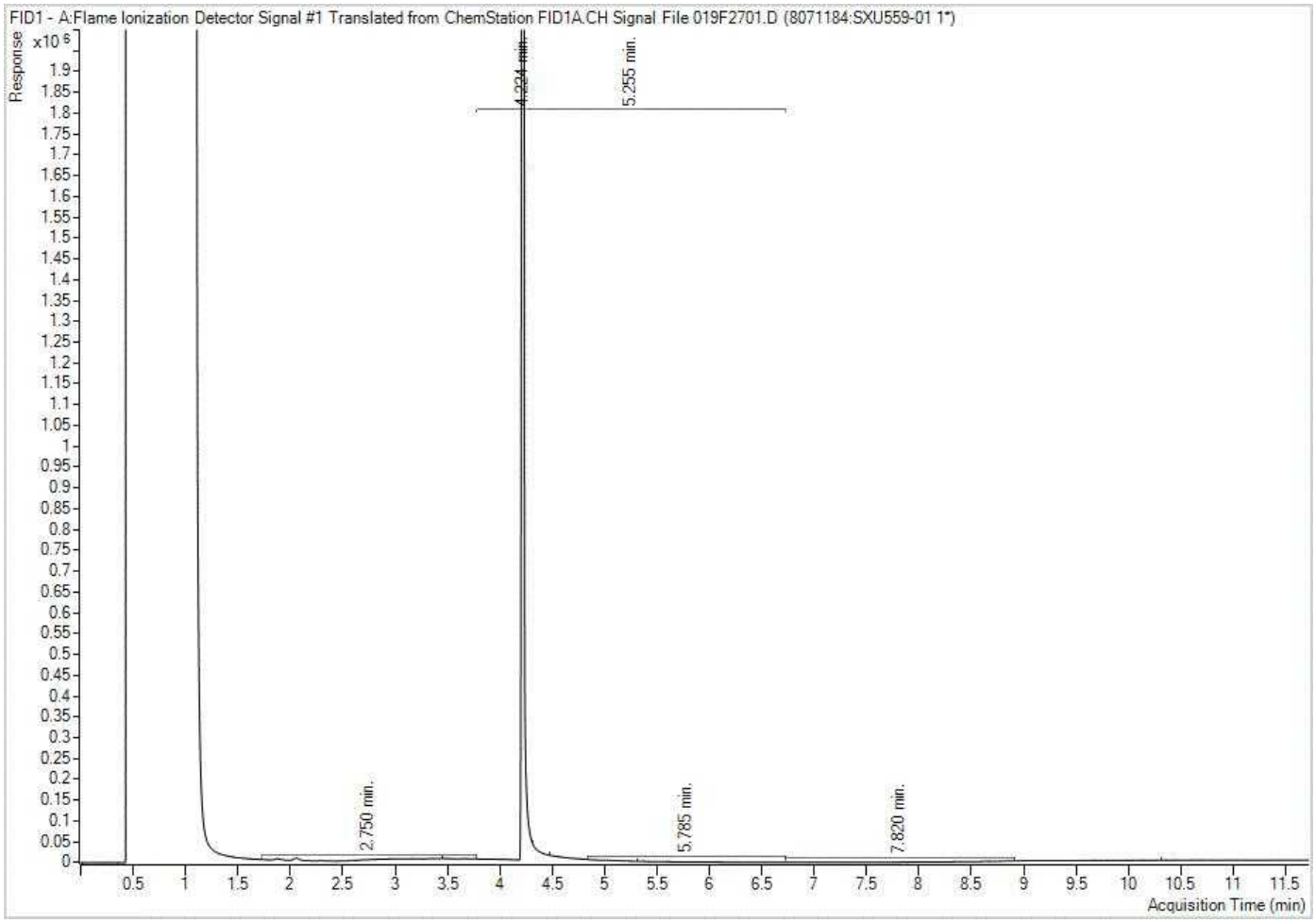


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Bureau Veritas Job #: C2G7508
Report Date: 2022/06/24
Bureau Veritas Sample: SXU559

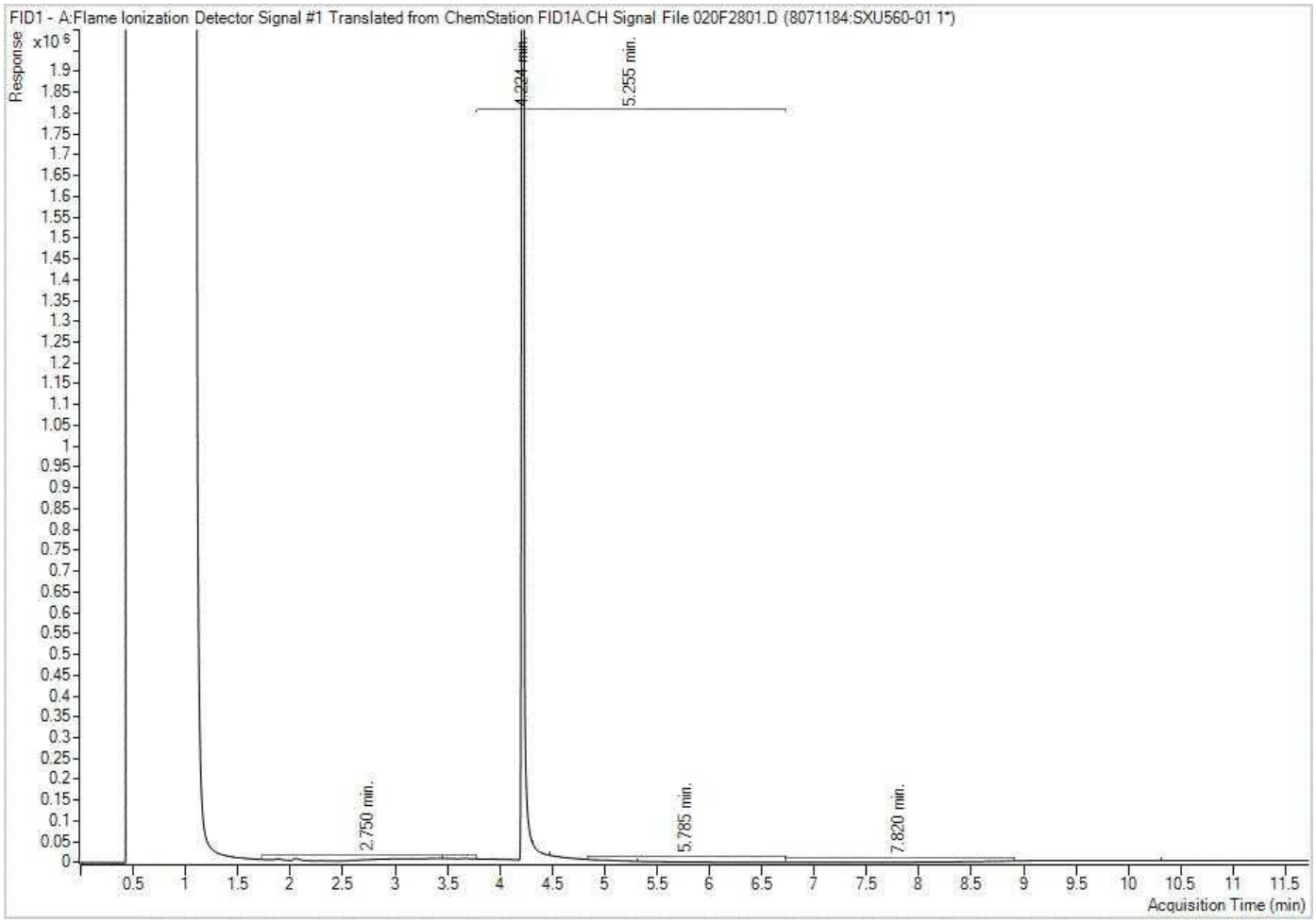
GHD Limited
Client Project #: 12583574-E2
Client ID: GW-12583574-150622-DA-003

Petroleum Hydrocarbons F2-F4 in Water Chromatogram



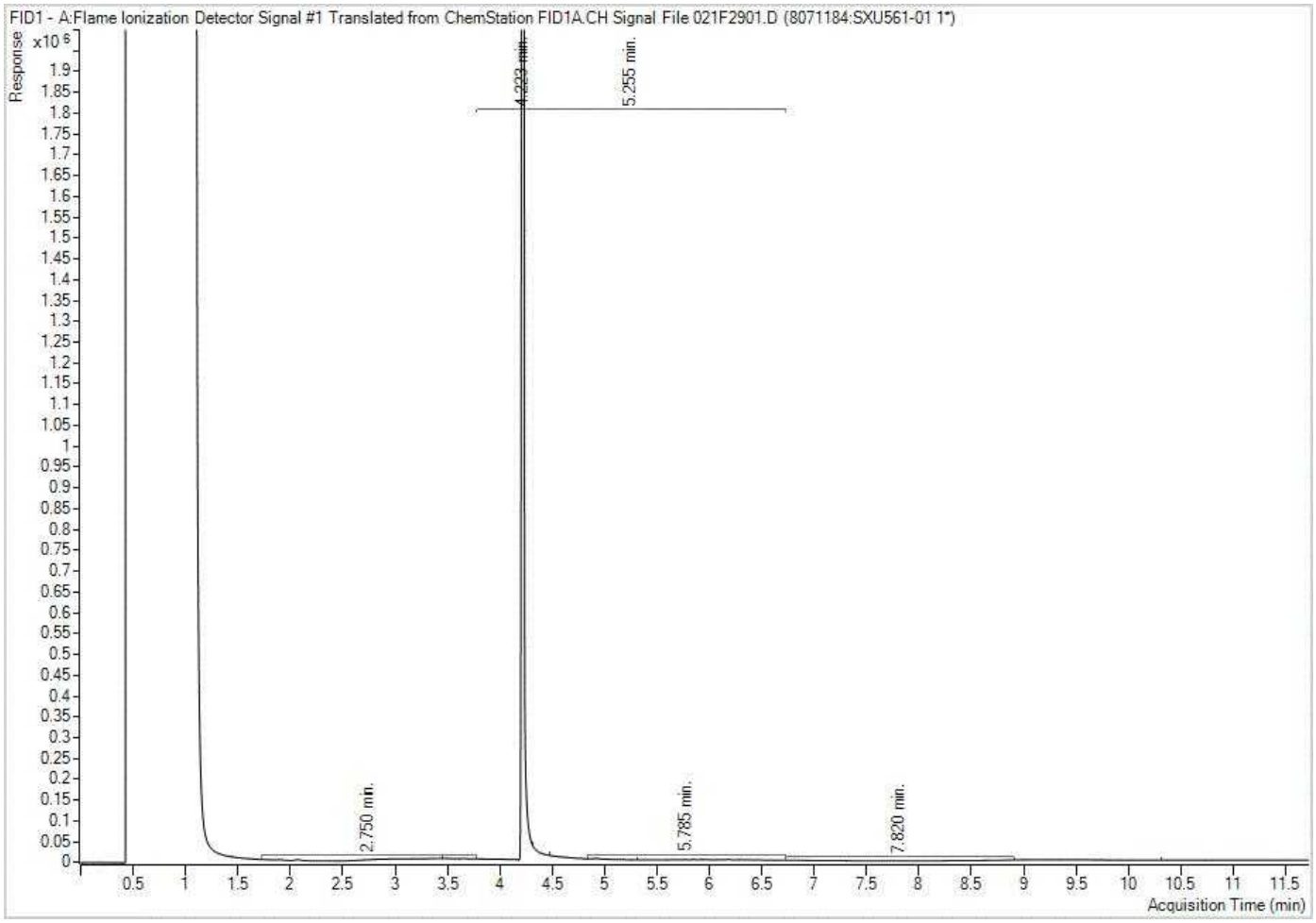
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Petroleum Hydrocarbons F2-F4 in Water Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Petroleum Hydrocarbons F2-F4 in Water Chromatogram

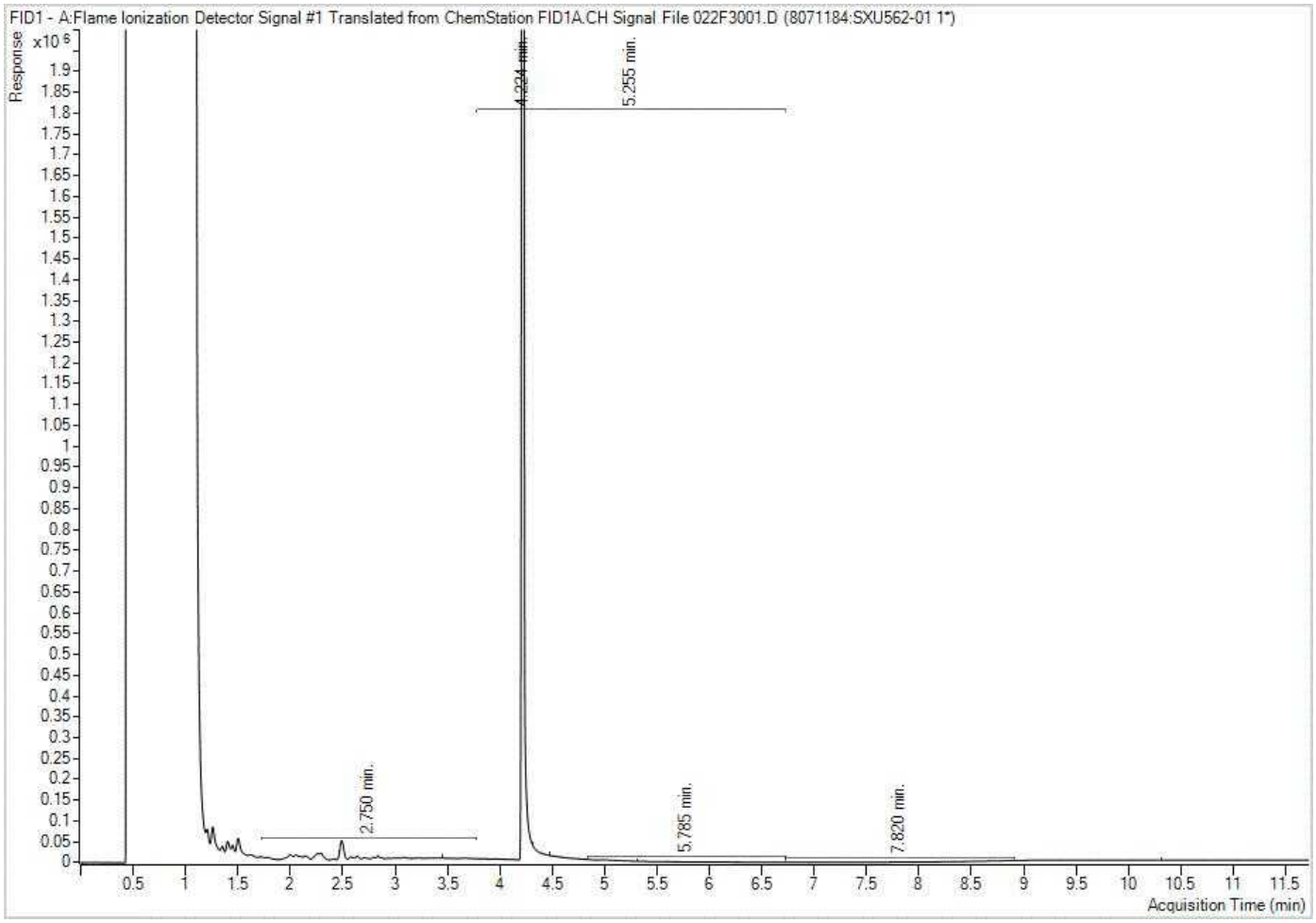


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Bureau Veritas Job #: C2G7508
Report Date: 2022/06/24
Bureau Veritas Sample: SXU562

GHD Limited
Client Project #: 12583574-E2
Client ID: GW-12583574-150622-DA-006

Petroleum Hydrocarbons F2-F4 in Water Chromatogram

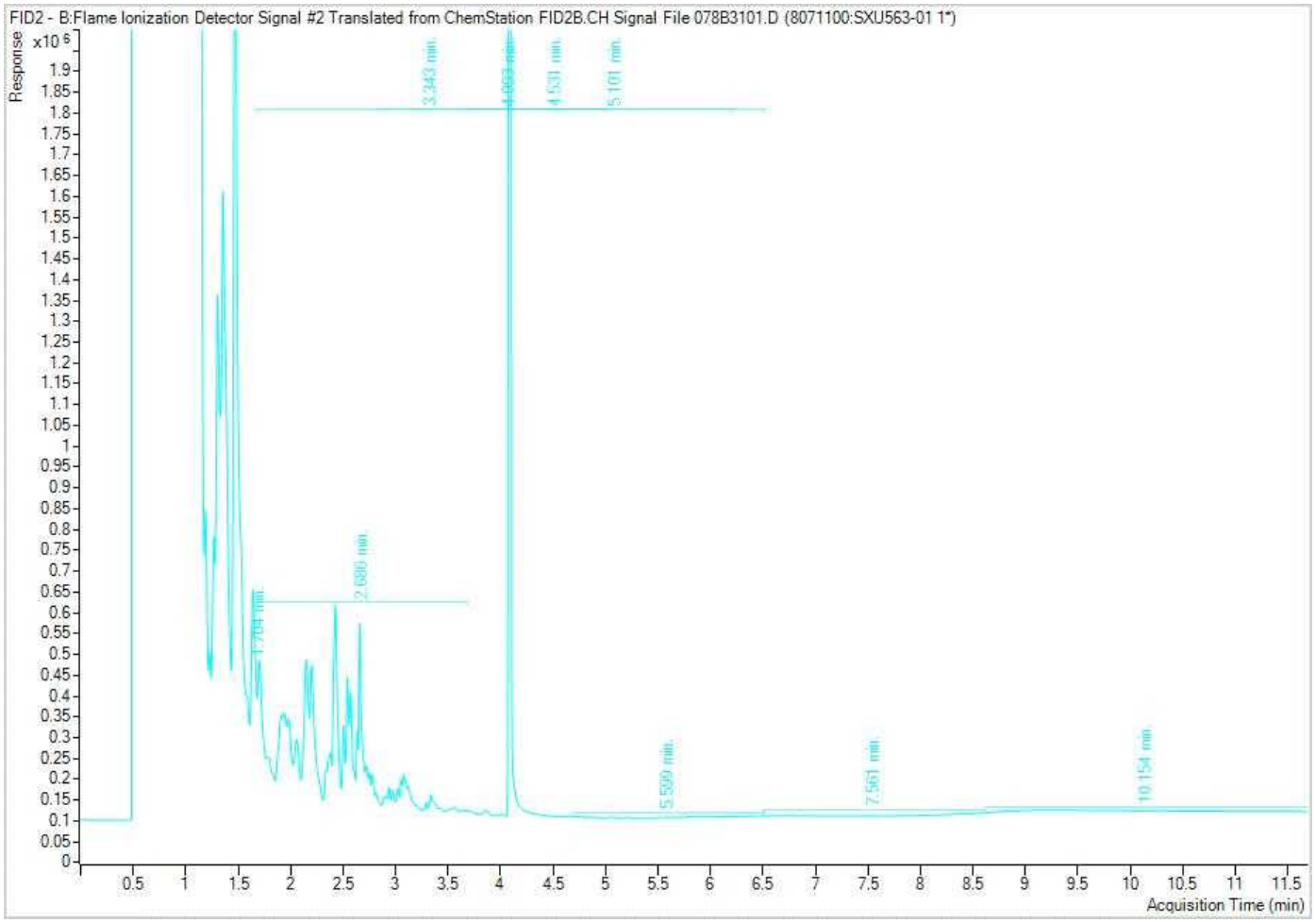


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Bureau Veritas Job #: C2G7508
Report Date: 2022/06/24
Bureau Veritas Sample: SXU563

GHD Limited
Client Project #: 12583574-E2
Client ID: GW-12583574-150622-DA-007

Petroleum Hydrocarbons F2-F4 in Water Chromatogram

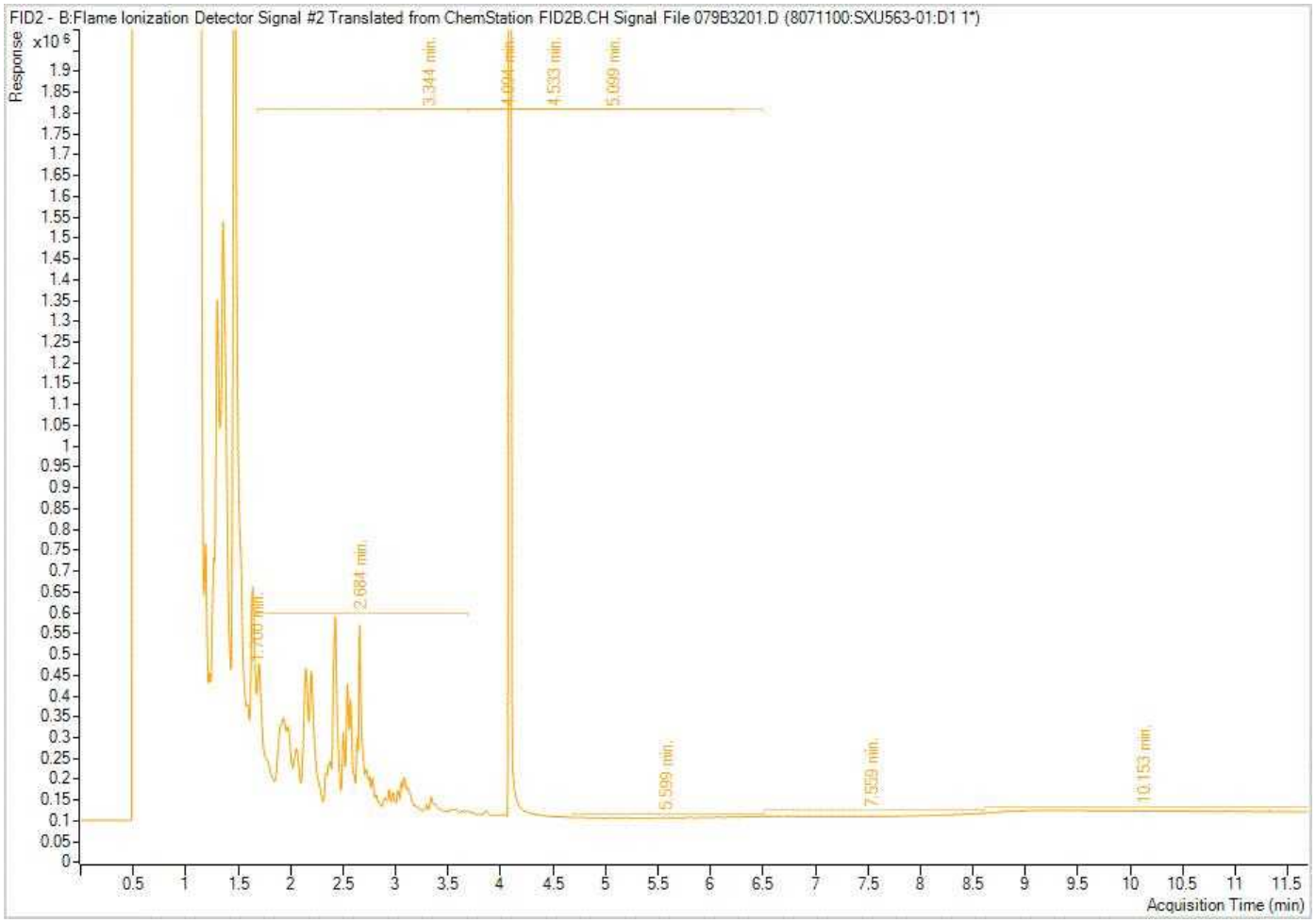


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Bureau Veritas Job #: C2G7508
Report Date: 2022/06/24
Bureau Veritas Sample: SXU563 Lab-Dup

GHD Limited
Client Project #: 12583574-E2
Client ID: GW-12583574-150622-DA-007

Petroleum Hydrocarbons F2-F4 in Water Chromatogram



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Your P.O. #: 735-003342
Your Project #: 12583574-E2
Your C.O.C. #: 883049-02-01

Attention: 12583574-SSOW-735-003342

GHD Limited
Waterloo- Canadian Tire Work
455 Phillip St
Waterloo, ON
CANADA N2L 3X2

Report Date: 2022/06/27
Report #: R7188058
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C2G8874
Received: 2022/06/17, 08:30

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Petroleum Hydro. CCME F1 & BTEX in Water (1)	1	N/A	2022/06/24	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1, 2)	1	2022/06/24	2022/06/24	CAM SOP-00316	CCME PHC-CWS m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Bureau Veritas Mississauga, 6740 Campobello Rd , Mississauga, ON, L5N 2L8
(2) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following “Alberta Environment’s Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003”. Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Your P.O. #: 735-003342
Your Project #: 12583574-E2
Your C.O.C. #: 883049-02-01

Attention: 12583574-SSOW-735-003342

GHD Limited
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455 Phillip St
Waterloo, ON
CANADA N2L 3X2

Report Date: 2022/06/27
Report #: R7188058
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C2G8874
Received: 2022/06/17, 08:30

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Julie Clement, Technical Account Manager
Email: Julie.CLEMENT@bureauveritas.com
Phone# (613)868-6079

==========

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Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.

GHD Limited
Client Project #: 12583574-E2
Your P.O. #: 735-003342
Sampler Initials: DA

O.REG 153 PHCS, BTEX/F1-F4 (WATER)

Bureau Veritas ID		SYC846		
Sampling Date		2022/06/16 07:05		
COC Number		883049-02-01		
	UNITS	GW-12583574-160622 -DA-008	RDL	QC Batch
BTEX & F1 Hydrocarbons				
Benzene	ug/L	380	4.0	8071563
Toluene	ug/L	37	4.0	8071563
Ethylbenzene	ug/L	2300	4.0	8071563
o-Xylene	ug/L	61	4.0	8071563
p+m-Xylene	ug/L	5800	8.0	8071563
Total Xylenes	ug/L	5900	8.0	8071563
F1 (C6-C10)	ug/L	17000	500	8071563
F1 (C6-C10) - BTEX	ug/L	8900	500	8071563
F2-F4 Hydrocarbons				
F2 (C10-C16 Hydrocarbons)	ug/L	2500	100	8072762
F3 (C16-C34 Hydrocarbons)	ug/L	250	200	8072762
F4 (C34-C50 Hydrocarbons)	ug/L	ND	200	8072762
Reached Baseline at C50	ug/L	Yes		8072762
Surrogate Recovery (%)				
1,4-Difluorobenzene	%	99		8071563
4-Bromofluorobenzene	%	102		8071563
D10-o-Xylene	%	92		8071563
D4-1,2-Dichloroethane	%	95		8071563
o-Terphenyl	%	104		8072762

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

Bureau Veritas Job #: C2G8874
Report Date: 2022/06/27

GHD Limited
Client Project #: 12583574-E2
Your P.O. #: 735-003342
Sampler Initials: DA

TEST SUMMARY

Bureau Veritas ID: SYC846
Sample ID: GW-12583574-160622-DA-008
Matrix: Water

Collected: 2022/06/16
Shipped:
Received: 2022/06/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	8071563	N/A	2022/06/24	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	8072762	2022/06/24	2022/06/24	Agnieszka Brzuzy-Snopko

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	3.0°C

Sample SYC846 [GW-12583574-160622-DA-008] : F1 BTEX analysis : Due to high concentration of target analytes, sample required dilution. Reporting limits were adjusted accordingly.

Results relate only to the items tested.

Bureau Veritas 100 – 36 Antares Dr. Nepean, ON, K2E 7W5 Phone: 613-274-0573 Website: www.bvna.com

QUALITY ASSURANCE REPORT

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
8071563	1,4-Difluorobenzene	2022/06/23	94	70 - 130	95	70 - 130	98	%		
8071563	4-Bromofluorobenzene	2022/06/23	103	70 - 130	101	70 - 130	97	%		
8071563	D10-o-Xylene	2022/06/23	101	70 - 130	99	70 - 130	86	%		
8071563	D4-1,2-Dichloroethane	2022/06/23	99	70 - 130	95	70 - 130	102	%		
8072762	o-Terphenyl	2022/06/24	109 (2)	60 - 130	105	60 - 130	105	%		
8071563	Benzene	2022/06/24	113	50 - 140	106	50 - 140	ND, RDL=0.20	ug/L	NC (1)	30
8071563	Ethylbenzene	2022/06/24	119	50 - 140	115	50 - 140	ND, RDL=0.20	ug/L	NC (1)	30
8071563	F1 (C6-C10) - BTEX	2022/06/24					ND, RDL=25	ug/L	NC (1)	30
8071563	F1 (C6-C10)	2022/06/24	130	60 - 140	124	60 - 140	ND, RDL=25	ug/L	NC (1)	30
8071563	o-Xylene	2022/06/24	115	50 - 140	110	50 - 140	ND, RDL=0.20	ug/L	NC (1)	30
8071563	p+m-Xylene	2022/06/24	115	50 - 140	112	50 - 140	ND, RDL=0.40	ug/L	NC (1)	30
8071563	Toluene	2022/06/24	112	50 - 140	107	50 - 140	ND, RDL=0.20	ug/L	NC (1)	30
8071563	Total Xylenes	2022/06/24					ND, RDL=0.40	ug/L	NC (1)	30
8072762	F2 (C10-C16 Hydrocarbons)	2022/06/24	NC (2)	60 - 130	98	60 - 130	ND, RDL=100	ug/L	NC (1)	30
8072762	F3 (C16-C34 Hydrocarbons)	2022/06/24	NC (2)	60 - 130	101	60 - 130	ND, RDL=200	ug/L	NC (1)	30
8072762	F4 (C34-C50 Hydrocarbons)	2022/06/24	105 (2)	60 - 130	99	60 - 130	ND, RDL=200	ug/L	NC (1)	30

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

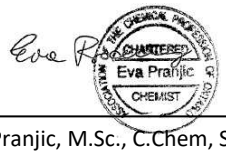
NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Duplicate Parent ID

(2) Matrix Spike Parent ID [SYC846-01]

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



Ewa Pranjic, M.Sc., C.Chem, Scientific Specialist

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Bureau Veritas 100 – 36 Antares Dr. Nepean, ON, K2E 7W5 Phone: 613-274-0573 Website: www.bvna.com

Bureau Veritas
6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel:(905) 817-5700 Toll-free:800-563-6266 Fax:(905) 817-5777 www.bvna.com

17-Jun-22 08:30
Julie Clement
C2G8874

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:	
Company Name:	#31726 GHD Limited	Company Name:		Quotation #:	B84601
Attention:	(AP-735)- Jennifer Balkwill	Attention:	12583574 Distribution List	P.O. #:	735-003342
Address:	455 Phillip St Waterloo ON N2L 3X2	Address:		Project:	12583574-E2
Tel:	(519) 884-0510 Fax: (519) 725-1394	Tel:	Fax:	Project Name:	
Email:	Invoicing-Canada@ghd.com; jennifer.balkwill@ghd.com	Email:		Site #:	
				Sampled By:	

Bottle Order #: 883049
Project Manager: Julie Clement
C#883049-02-01

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BUREAU VERITAS DRINKING WATER CHAIN OF CUSTODY

Regulation 153 (2011)
- ☐ Table 1 ☐ Res/Park ☐ Medium/Fine
- ☐ Table 2 ☐ Ind/Comm ☐ Coarse
- ☐ Table 3 ☐ Agri/Other ☐ For RSC
- ☐ Table ___

Other Regulations
- ☐ CCME ☐ Sanitary Sewer Bylaw
- ☐ Reg 558 ☐ Storm Sewer Bylaw
- ☐ MISA Municipality _____
- ☐ PWQO ☐ Reg 406 Table _____
- ☐ Other _____

Special Instructions

Include Criteria on Certificate of Analysis (Y/N)? _____

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

Turnaround Time (TAT) Required:
Please provide advance notice for rush projects

Regular (Standard) TAT: ☒
(will be applied if Rush TAT is not specified):
Standard TAT = 5-7 Working days for most tests.
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission)
Date Required: _____ Time Required: _____ ☐
Rush Confirmation Number: _____ *(call lab for #)*

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle): Metals / Hg / Cr VI	O.Reg 153 PHCs, BTEX/F1-F4	# of Bottles	Comments
1		GW-12583574-160622-DA-008	22-06-16	07:05	Ground Water		X	4	
2									
3									
4									
5									
6									
7									
8									
9									
10									RECEIVED IN OTTAWA

*RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted
Dathon Ash / Dathon Ash	22-06-16	19:00	Angelica Santiago	2022/06/17	0830	
			[illegible]	2022/06/18	0812B	

Laboratory Use Only

Time Sensitive	Temperature (°C) on Recei	Custody Seal	Yes	No
	3.4.2 ice	Present		
		Intact		

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/TERMS-AND-CONDITIONS.

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

** SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT WWW.BVNA.COM/RESOURCES/CHAIN-OF-CUSTODY-FORMS.

SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS

White: Bureau Veritas Yellow: Client

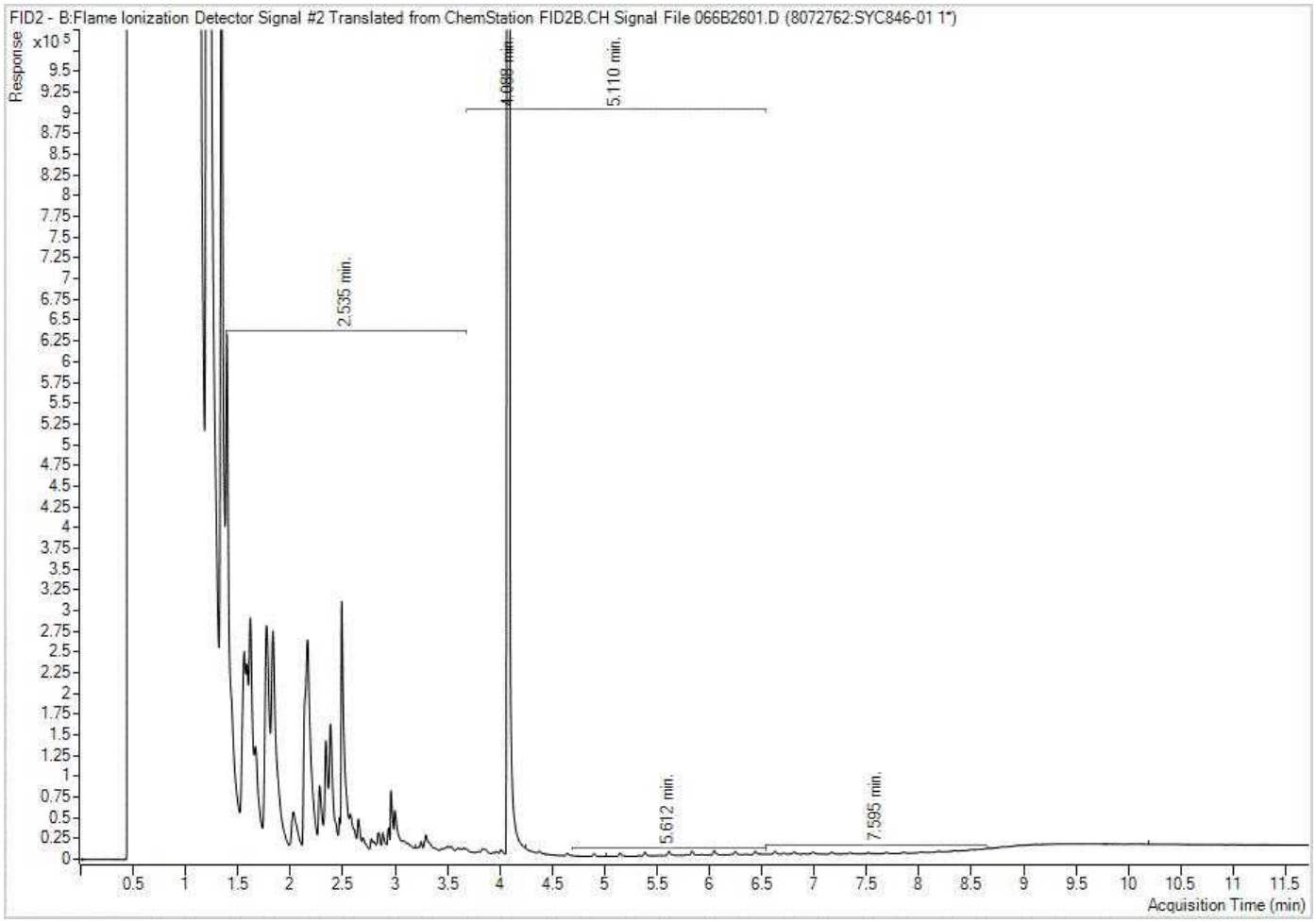
Bureau Veritas Canada (2019) Inc.

3/3/2

Bureau Veritas Job #: C2G8874
Report Date: 2022/06/27
Bureau Veritas Sample: SYC846

GHD Limited
Client Project #: 12583574-E2
Client ID: GW-12583574-160622-DA-008

Petroleum Hydrocarbons F2-F4 in Water Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Your P.O. #: 735-003342-1
Your Project #: 12583574-E1
Your C.O.C. #: 884491-01-01

Attention: 12583574-SSOW-735-003342-1

GHD Limited
Waterloo- Canadian Tire Work
455 Phillip St
Waterloo, ON
CANADA N2L 3X2

Report Date: 2022/07/08
Report #: R7202061
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C2I1892
Received: 2022/06/29, 08:45

Sample Matrix: Soil
Samples Received: 16

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Cyanide (WAD) in Leachates (1)	1	N/A	2022/07/06	CAM SOP-00457	OMOE 3015 m
Petroleum Hydro. CCME F1 & BTEX in Soil (1, 2)	15	N/A	2022/07/06	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Soil (1, 3)	9	2022/07/06	2022/07/06	CAM SOP-00316	CCME CWS m
Petroleum Hydrocarbons F2-F4 in Soil (1, 3)	6	2022/07/06	2022/07/07	CAM SOP-00316	CCME CWS m
Fluoride by ISE in Leachates (1)	1	2022/07/06	2022/07/06	CAM SOP-00449	SM 23 4500-F- C m
Total Metals in TCLP Leachate by ICPMS (1)	1	2022/07/06	2022/07/06	CAM SOP-00447	EPA 6020B m
Ignitability of a Sample (1)	1	2022/07/06	2022/07/06	CAM SOP-00432	EPA 1030 Rev. 1 m
Moisture (1)	15	N/A	2022/07/02	CAM SOP-00445	Carter 2nd ed 51.2 m
Nitrate& Nitrite as Nitrogen in Leachate (1)	1	N/A	2022/07/06	CAM SOP-00440	SM 23 4500-NO3I/NO2B
PAH Compounds in Leachate by GC/MS (SIM) (1)	1	2022/07/06	2022/07/06	CAM SOP-00318	EPA 8270D m
TCLP - % Solids (1)	1	2022/07/05	2022/07/06	CAM SOP-00401	EPA 1311 Update I m
TCLP - Extraction Fluid (1)	1	N/A	2022/07/06	CAM SOP-00401	EPA 1311 Update I m
TCLP - Initial and final pH (1)	1	N/A	2022/07/06	CAM SOP-00401	EPA 1311 Update I m
TCLP Zero Headspace Extraction (1)	1	2022/07/06	2022/07/07	CAM SOP-00430	EPA 1311 m
VOCs in ZHE Leachates (1)	1	2022/07/07	2022/07/07	CAM SOP-00228	EPA 8260C m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

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Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope

Your P.O. #: 735-003342-1
Your Project #: 12583574-E1
Your C.O.C. #: 884491-01-01

Attention: 12583574-SSOW-735-003342-1

GHD Limited
Waterloo- Canadian Tire Work
455 Phillip St
Waterloo, ON
CANADA N2L 3X2

Report Date: 2022/07/08
Report #: R7202061
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C2I1892
Received: 2022/06/29, 08:45

dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
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Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Bureau Veritas Mississauga, 6740 Campobello Rd , Mississauga, ON, L5N 2L8
(2) No lab extraction date is given for F1BTEX & VOC samples that are field preserved with methanol. Extraction date is the date sampled unless otherwise stated.
(3) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following "Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003". Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Julie Clement, Technical Account Manager
Email: Julie.CLEMENT@bureauveritas.com
Phone# (613)868-6079
==========
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Bureau Veritas Job #: C2I1892
Report Date: 2022/07/08

GHD Limited
Client Project #: 12583574-E1
Your P.O. #: 735-003342-1
Sampler Initials: NG

O.REG 153 PHCS, BTEX/F1-F4 (SOIL)

Bureau Veritas ID		TAX190	TAX191	TAX192		
Sampling Date		2022/06/28 10:00	2022/06/28 10:00	2022/06/28 11:00		
COC Number		884491-01-01	884491-01-01	884491-01-01		
	UNITS	S-12583574-062822-NG-CTP1126-BH1-22-1	S-12583574-062822-NG-CTP1126-BH1-22-2	S-12583574-062822-NG-CTP1126-BH2-22-1	RDL	QC Batch
Inorganics						
Moisture	%	20	16	12	1.0	8087089
BTEX & F1 Hydrocarbons						
Benzene	ug/g	ND	ND	ND	0.020	8092267
Toluene	ug/g	ND	ND	ND	0.020	8092267
Ethylbenzene	ug/g	ND	ND	ND	0.020	8092267
o-Xylene	ug/g	ND	ND	ND	0.020	8092267
p+m-Xylene	ug/g	ND	ND	ND	0.040	8092267
Total Xylenes	ug/g	ND	ND	ND	0.040	8092267
F1 (C6-C10)	ug/g	ND	ND	ND	10	8092267
F1 (C6-C10) - BTEX	ug/g	ND	ND	ND	10	8092267
F2-F4 Hydrocarbons						
F2 (C10-C16 Hydrocarbons)	ug/g	ND	ND	ND	10	8093455
F3 (C16-C34 Hydrocarbons)	ug/g	ND	ND	ND	50	8093455
F4 (C34-C50 Hydrocarbons)	ug/g	ND	ND	ND	50	8093455
Reached Baseline at C50	ug/g	Yes	Yes	Yes		8093455
Surrogate Recovery (%)						
1,4-Difluorobenzene	%	101	103	102		8092267
4-Bromofluorobenzene	%	95	93	93		8092267
D10-o-Xylene	%	96	100	99		8092267
D4-1,2-Dichloroethane	%	82	83	84		8092267
o-Terphenyl	%	92	94	95		8093455

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

O.REG 153 PHCS, BTEX/F1-F4 (SOIL)

Bureau Veritas ID		TAX193			TAX193		
Sampling Date		2022/06/28 11:00			2022/06/28 11:00		
COC Number		884491-01-01			884491-01-01		
	UNITS	S-12583574-062822-NG-CTP1126-BH2-22-2	RDL	QC Batch	S-12583574-062822-NG-CTP1126-BH2-22-2 Lab-Dup	RDL	QC Batch
Inorganics							
Moisture	%	22	1.0	8087087	22	1.0	8087087
BTEX & F1 Hydrocarbons							
Benzene	ug/g	ND	0.020	8092267			
Toluene	ug/g	ND	0.020	8092267			
Ethylbenzene	ug/g	ND	0.020	8092267			
o-Xylene	ug/g	ND	0.020	8092267			
p+m-Xylene	ug/g	ND	0.040	8092267			
Total Xylenes	ug/g	ND	0.040	8092267			
F1 (C6-C10)	ug/g	ND	10	8092267			
F1 (C6-C10) - BTEX	ug/g	ND	10	8092267			
F2-F4 Hydrocarbons							
F2 (C10-C16 Hydrocarbons)	ug/g	ND	10	8093455			
F3 (C16-C34 Hydrocarbons)	ug/g	ND	50	8093455			
F4 (C34-C50 Hydrocarbons)	ug/g	ND	50	8093455			
Reached Baseline at C50	ug/g	Yes		8093455			
Surrogate Recovery (%)							
1,4-Difluorobenzene	%	100		8092267			
4-Bromofluorobenzene	%	96		8092267			
D10-o-Xylene	%	85		8092267			
D4-1,2-Dichloroethane	%	84		8092267			
o-Terphenyl	%	95		8093455			

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

O.REG 153 PHCS, BTEX/F1-F4 (SOIL)

Bureau Veritas ID		TAX194			TAX194		
Sampling Date		2022/06/28 12:15			2022/06/28 12:15		
COC Number		884491-01-01			884491-01-01		
	UNITS	S-12583574-062822-NG-CTP1126-BH3-22-1	RDL	QC Batch	S-12583574-062822-NG-CTP1126-BH3-22-1 Lab-Dup	RDL	QC Batch
Inorganics							
Moisture	%	17	1.0	8087089			
BTEX & F1 Hydrocarbons							
Benzene	ug/g	ND	0.020	8092267			
Toluene	ug/g	ND	0.020	8092267			
Ethylbenzene	ug/g	ND	0.020	8092267			
o-Xylene	ug/g	ND	0.020	8092267			
p+m-Xylene	ug/g	ND	0.040	8092267			
Total Xylenes	ug/g	ND	0.040	8092267			
F1 (C6-C10)	ug/g	ND	10	8092267			
F1 (C6-C10) - BTEX	ug/g	ND	10	8092267			
F2-F4 Hydrocarbons							
F2 (C10-C16 Hydrocarbons)	ug/g	ND	10	8093455	ND	10	8093455
F3 (C16-C34 Hydrocarbons)	ug/g	ND	50	8093455	ND	50	8093455
F4 (C34-C50 Hydrocarbons)	ug/g	ND	50	8093455	ND	50	8093455
Reached Baseline at C50	ug/g	Yes		8093455	Yes		8093455
Surrogate Recovery (%)							
1,4-Difluorobenzene	%	99		8092267			
4-Bromofluorobenzene	%	95		8092267			
D10-o-Xylene	%	104		8092267			
D4-1,2-Dichloroethane	%	83		8092267			
o-Terphenyl	%	94		8093455	92		8093455

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

Bureau Veritas Job #: C2I1892
Report Date: 2022/07/08

GHD Limited
Client Project #: 12583574-E1
Your P.O. #: 735-003342-1
Sampler Initials: NG

O.REG 153 PHCS, BTEX/F1-F4 (SOIL)

Bureau Veritas ID		TAX195		TAX196	TAX197		
Sampling Date		2022/06/28 12:15		2022/06/28 12:15	2022/06/28 13:35		
COC Number		884491-01-01		884491-01-01	884491-01-01		
	UNITS	S-12583574-062822-NG-CTP1126-BH3-22-2	RDL	S-12583574-062822-NG-CTP1126-BH3-22-3	S-12583574-062822-NG-CTP1126-BH4-22-1	RDL	QC Batch
Inorganics							
Moisture	%	19	1.0	28	22	1.0	8087089
BTEX & F1 Hydrocarbons							
Benzene	ug/g	ND	0.040	ND	ND	0.020	8092267
Toluene	ug/g	ND	0.040	ND	ND	0.020	8092267
Ethylbenzene	ug/g	ND	0.040	ND	ND	0.020	8092267
o-Xylene	ug/g	ND	0.040	ND	ND	0.020	8092267
p+m-Xylene	ug/g	ND	0.080	ND	ND	0.040	8092267
Total Xylenes	ug/g	ND	0.080	ND	ND	0.040	8092267
F1 (C6-C10)	ug/g	ND	20	ND	ND	10	8092267
F1 (C6-C10) - BTEX	ug/g	ND	20	ND	ND	10	8092267
F2-F4 Hydrocarbons							
F2 (C10-C16 Hydrocarbons)	ug/g	ND	10	ND	ND	10	8093455
F3 (C16-C34 Hydrocarbons)	ug/g	ND	50	ND	ND	50	8093455
F4 (C34-C50 Hydrocarbons)	ug/g	ND	50	ND	62	50	8093455
Reached Baseline at C50	ug/g	Yes		Yes	Yes		8093455
Surrogate Recovery (%)							
1,4-Difluorobenzene	%	103		103	104		8092267
4-Bromofluorobenzene	%	94		93	93		8092267
D10-o-Xylene	%	98		102	107		8092267
D4-1,2-Dichloroethane	%	81		81	79		8092267
o-Terphenyl	%	96		92	98		8093455

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

O.REG 153 PHCS, BTEX/F1-F4 (SOIL)

Bureau Veritas ID		TAX198	TAX199	TAX200	TAX202		
Sampling Date		2022/06/28 13:35	2022/06/28 14:45	2022/06/28 14:45	2022/06/28 16:30		
COC Number		884491-01-01	884491-01-01	884491-01-01	884491-01-01		
	UNITS	S-12583574-062822-NG-CTP1126-BH4-22-2	S-12583574-062822-NG-CTP1126-BH5-22-1	S-12583574-062822-NG-CTP1126-BH5-22-2	S-12583574-062822-NG-CTP1126-BH6-22-1	RDL	QC Batch
Inorganics							
Moisture	%	11	16	13	23	1.0	8087089
BTEX & F1 Hydrocarbons							
Benzene	ug/g	ND	ND	ND	ND	0.020	8092267
Toluene	ug/g	ND	ND	ND	ND	0.020	8092267
Ethylbenzene	ug/g	ND	ND	0.091	ND	0.020	8092267
o-Xylene	ug/g	ND	ND	ND	ND	0.020	8092267
p+m-Xylene	ug/g	ND	ND	0.084	ND	0.040	8092267
Total Xylenes	ug/g	ND	ND	0.084	ND	0.040	8092267
F1 (C6-C10)	ug/g	ND	ND	ND	ND	10	8092267
F1 (C6-C10) - BTEX	ug/g	ND	ND	ND	ND	10	8092267
F2-F4 Hydrocarbons							
F2 (C10-C16 Hydrocarbons)	ug/g	ND	ND	ND	ND	10	8093455
F3 (C16-C34 Hydrocarbons)	ug/g	ND	87	ND	ND	50	8093455
F4 (C34-C50 Hydrocarbons)	ug/g	ND	87	ND	ND	50	8093455
Reached Baseline at C50	ug/g	Yes	Yes	Yes	Yes		8093455
Surrogate Recovery (%)							
1,4-Difluorobenzene	%	106	98	103	101		8092267
4-Bromofluorobenzene	%	92	95	93	95		8092267
D10-o-Xylene	%	101	100	103	101		8092267
D4-1,2-Dichloroethane	%	79	83	80	80		8092267
o-Terphenyl	%	95	94	93	92		8093455

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

O.REG 153 PHCS, BTEX/F1-F4 (SOIL)

Bureau Veritas ID		TAX203	TAX204		TAX205		
Sampling Date		2022/06/28 16:30	2022/06/28 17:15		2022/06/28 17:15		
COC Number		884491-01-01	884491-01-01		884491-01-01		
	UNITS	S-12583574-062822-NG-CTP1126-BH6-22-2	S-12583574-062822-NG-CTP1126-BH7-22-1	RDL	S-12583574-062822-NG-CTP1126-BH7-22-2	RDL	QC Batch
Inorganics							
Moisture	%	19	21	1.0	19	1.0	8087089
BTEX & F1 Hydrocarbons							
Benzene	ug/g	ND	ND	0.020	ND	0.040	8092267
Toluene	ug/g	ND	ND	0.020	ND	0.040	8092267
Ethylbenzene	ug/g	ND	ND	0.020	ND	0.040	8092267
o-Xylene	ug/g	ND	ND	0.020	ND	0.040	8092267
p+m-Xylene	ug/g	ND	ND	0.040	ND	0.080	8092267
Total Xylenes	ug/g	ND	ND	0.040	ND	0.080	8092267
F1 (C6-C10)	ug/g	ND	ND	10	ND	20	8092267
F1 (C6-C10) - BTEX	ug/g	ND	ND	10	ND	20	8092267
F2-F4 Hydrocarbons							
F2 (C10-C16 Hydrocarbons)	ug/g	ND	ND	10	ND	10	8093455
F3 (C16-C34 Hydrocarbons)	ug/g	ND	ND	50	ND	50	8093455
F4 (C34-C50 Hydrocarbons)	ug/g	ND	ND	50	ND	50	8093455
Reached Baseline at C50	ug/g	Yes	Yes		Yes		8093455
Surrogate Recovery (%)							
1,4-Difluorobenzene	%	99	101		103		8092267
4-Bromofluorobenzene	%	95	93		93		8092267
D10-o-Xylene	%	96	104		103		8092267
D4-1,2-Dichloroethane	%	82	82		82		8092267
o-Terphenyl	%	98	93		93		8093455

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

O.REG 558 TCLP BENZO(A)PYRENE

Bureau Veritas ID		TAX201		
Sampling Date		2022/06/28 14:45		
COC Number		884491-01-01		
	UNITS	S-12583574-062822-NG-CTP1126-TCLP	RDL	QC Batch
Polyaromatic Hydrocarbons				
Leachable Benzo(a)pyrene	ug/L	ND	0.10	8093085
Surrogate Recovery (%)				
Leachable D10-Anthracene	%	101		8093085
Leachable D14-Terphenyl (FS)	%	92		8093085
Leachable D8-Acenaphthylene	%	94		8093085

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

O.REG 558 TCLP INORGANICS PACKAGE (SOIL)

Bureau Veritas ID		TAX201		
Sampling Date		2022/06/28 14:45		
COC Number		884491-01-01		
	UNITS	S-12583574-062822-NG-CTP1126-TCLP	RDL	QC Batch
Inorganics				
Leachable Fluoride (F-)	mg/L	ND	0.10	8093070
Leachable WAD Cyanide (Free)	mg/L	ND	0.010	8093062
Leachable Nitrite (N)	mg/L	ND	0.10	8093064
Leachable Nitrate (N)	mg/L	ND	1.0	8093064
Leachable Nitrate + Nitrite (N)	mg/L	ND	1.0	8093064
Metals				
Leachable Arsenic (As)	mg/L	ND	0.2	8092908
Leachable Barium (Ba)	mg/L	0.6	0.2	8092908
Leachable Boron (B)	mg/L	0.2	0.1	8092908
Leachable Cadmium (Cd)	mg/L	ND	0.05	8092908
Leachable Chromium (Cr)	mg/L	ND	0.1	8092908
Leachable Lead (Pb)	mg/L	ND	0.1	8092908
Leachable Mercury (Hg)	mg/L	ND	0.001	8092908
Leachable Selenium (Se)	mg/L	ND	0.1	8092908
Leachable Silver (Ag)	mg/L	ND	0.01	8092908
Leachable Uranium (U)	mg/L	ND	0.01	8092908

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

GHD Limited
Client Project #: 12583574-E1
Your P.O. #: 735-003342-1
Sampler Initials: NG

TCLP LEACHATE PREPARATION (SOIL)

Bureau Veritas ID		TAX201	TAX201		
Sampling Date		2022/06/28 14:45	2022/06/28 14:45		
COC Number		884491-01-01	884491-01-01		
	UNITS	S-12583574-062822-NG-CTP1126-TCLP	S-12583574-062822-NG-CTP1126-TCLP Lab-Dup	RDL	QC Batch
Inorganics					
Final pH	pH	4.97	6.11		8090846
Initial pH	pH	8.65	8.65		8090846
TCLP - % Solids	%	100	100	0.2	8090843
TCLP Extraction Fluid	N/A	FLUID 1	FLUID 1		8090844

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

O.REG 558 TCLP VOCS BY HS (SOIL)

Bureau Veritas ID		TAX201		
Sampling Date		2022/06/28 14:45		
COC Number		884491-01-01		
	UNITS	S-12583574-062822-NG-CTP1126-TCLP	RDL	QC Batch
Charge/Prep Analysis				
Amount Extracted (Wet Weight) (g)	N/A	23	N/A	8092994
Volatile Organics				
Leachable Benzene	mg/L	ND	0.020	8095427
Leachable Carbon Tetrachloride	mg/L	ND	0.020	8095427
Leachable Chlorobenzene	mg/L	ND	0.020	8095427
Leachable Chloroform	mg/L	ND	0.020	8095427
Leachable 1,2-Dichlorobenzene	mg/L	ND	0.050	8095427
Leachable 1,4-Dichlorobenzene	mg/L	ND	0.050	8095427
Leachable 1,2-Dichloroethane	mg/L	ND	0.050	8095427
Leachable 1,1-Dichloroethylene	mg/L	ND	0.020	8095427
Leachable Methylene Chloride(Dichloromethane)	mg/L	ND	0.20	8095427
Leachable Methyl Ethyl Ketone (2-Butanone)	mg/L	ND	1.0	8095427
Leachable Tetrachloroethylene	mg/L	ND	0.020	8095427
Leachable Trichloroethylene	mg/L	ND	0.020	8095427
Leachable Vinyl Chloride	mg/L	ND	0.020	8095427
Surrogate Recovery (%)				
Leachable 4-Bromofluorobenzene	%	93		8095427
Leachable D4-1,2-Dichloroethane	%	107		8095427
Leachable D8-Toluene	%	94		8095427

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

MISCELLANEOUS (SOIL)

Bureau Veritas ID		TAX201	
Sampling Date		2022/06/28 14:45	
COC Number		884491-01-01	
	UNITS	S-12583574-062822-NG-CTP1126-TCLP	QC Batch
Inorganics			
Ignitability	N/A	NF/NI	8093611
QC Batch = Quality Control Batch			

TEST SUMMARY

Bureau Veritas ID: TAX190 **Collected:** 2022/06/28
Sample ID: S-12583574-062822-NG-CTP1126-BH1-22-1 **Shipped:**
Matrix: Soil **Received:** 2022/06/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	8092267	N/A	2022/07/06	Haibin Wu
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	8093455	2022/07/06	2022/07/06	Austin (Guochen) Zhang
Moisture	BAL	8087089	N/A	2022/07/02	Simrat Bhathal

Bureau Veritas ID: TAX191 **Collected:** 2022/06/28
Sample ID: S-12583574-062822-NG-CTP1126-BH1-22-2 **Shipped:**
Matrix: Soil **Received:** 2022/06/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	8092267	N/A	2022/07/06	Haibin Wu
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	8093455	2022/07/06	2022/07/06	Austin (Guochen) Zhang
Moisture	BAL	8087089	N/A	2022/07/02	Simrat Bhathal

Bureau Veritas ID: TAX192 **Collected:** 2022/06/28
Sample ID: S-12583574-062822-NG-CTP1126-BH2-22-1 **Shipped:**
Matrix: Soil **Received:** 2022/06/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	8092267	N/A	2022/07/06	Haibin Wu
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	8093455	2022/07/06	2022/07/06	Austin (Guochen) Zhang
Moisture	BAL	8087089	N/A	2022/07/02	Simrat Bhathal

Bureau Veritas ID: TAX193 **Collected:** 2022/06/28
Sample ID: S-12583574-062822-NG-CTP1126-BH2-22-2 **Shipped:**
Matrix: Soil **Received:** 2022/06/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	8092267	N/A	2022/07/06	Haibin Wu
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	8093455	2022/07/06	2022/07/06	Austin (Guochen) Zhang
Moisture	BAL	8087087	N/A	2022/07/02	Simrat Bhathal

Bureau Veritas ID: TAX193 Dup **Collected:** 2022/06/28
Sample ID: S-12583574-062822-NG-CTP1126-BH2-22-2 **Shipped:**
Matrix: Soil **Received:** 2022/06/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	8087087	N/A	2022/07/02	Simrat Bhathal

Bureau Veritas ID: TAX194 **Collected:** 2022/06/28
Sample ID: S-12583574-062822-NG-CTP1126-BH3-22-1 **Shipped:**
Matrix: Soil **Received:** 2022/06/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	8092267	N/A	2022/07/06	Haibin Wu
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	8093455	2022/07/06	2022/07/06	Austin (Guochen) Zhang
Moisture	BAL	8087089	N/A	2022/07/02	Simrat Bhathal

TEST SUMMARY

Bureau Veritas ID: TAX194 Dup
Sample ID: S-12583574-062822-NG-CTP1126-BH3-22-1
Matrix: Soil
Collected: 2022/06/28
Shipped:
Received: 2022/06/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	8093455	2022/07/06	2022/07/06	Austin (Guochen) Zhang

Bureau Veritas ID: TAX195
Sample ID: S-12583574-062822-NG-CTP1126-BH3-22-2
Matrix: Soil
Collected: 2022/06/28
Shipped:
Received: 2022/06/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	8092267	N/A	2022/07/06	Haibin Wu
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	8093455	2022/07/06	2022/07/06	Austin (Guochen) Zhang
Moisture	BAL	8087089	N/A	2022/07/02	Simrat Bhathal

Bureau Veritas ID: TAX196
Sample ID: S-12583574-062822-NG-CTP1126-BH3-22-3
Matrix: Soil
Collected: 2022/06/28
Shipped:
Received: 2022/06/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	8092267	N/A	2022/07/06	Haibin Wu
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	8093455	2022/07/06	2022/07/06	Austin (Guochen) Zhang
Moisture	BAL	8087089	N/A	2022/07/02	Simrat Bhathal

Bureau Veritas ID: TAX197
Sample ID: S-12583574-062822-NG-CTP1126-BH4-22-1
Matrix: Soil
Collected: 2022/06/28
Shipped:
Received: 2022/06/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	8092267	N/A	2022/07/06	Haibin Wu
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	8093455	2022/07/06	2022/07/06	Austin (Guochen) Zhang
Moisture	BAL	8087089	N/A	2022/07/02	Simrat Bhathal

Bureau Veritas ID: TAX198
Sample ID: S-12583574-062822-NG-CTP1126-BH4-22-2
Matrix: Soil
Collected: 2022/06/28
Shipped:
Received: 2022/06/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	8092267	N/A	2022/07/06	Haibin Wu
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	8093455	2022/07/06	2022/07/06	Austin (Guochen) Zhang
Moisture	BAL	8087089	N/A	2022/07/02	Simrat Bhathal

Bureau Veritas ID: TAX199
Sample ID: S-12583574-062822-NG-CTP1126-BH5-22-1
Matrix: Soil
Collected: 2022/06/28
Shipped:
Received: 2022/06/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	8092267	N/A	2022/07/06	Haibin Wu
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	8093455	2022/07/06	2022/07/07	Austin (Guochen) Zhang
Moisture	BAL	8087089	N/A	2022/07/02	Simrat Bhathal

TEST SUMMARY

Bureau Veritas ID: TAX200 **Collected:** 2022/06/28
Sample ID: S-12583574-062822-NG-CTP1126-BH5-22-2 **Shipped:**
Matrix: Soil **Received:** 2022/06/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	8092267	N/A	2022/07/06	Haibin Wu
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	8093455	2022/07/06	2022/07/07	Austin (Guochen) Zhang
Moisture	BAL	8087089	N/A	2022/07/02	Simrat Bhathal

Bureau Veritas ID: TAX201 **Collected:** 2022/06/28
Sample ID: S-12583574-062822-NG-CTP1126-TCLP **Shipped:**
Matrix: Soil **Received:** 2022/06/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Cyanide (WAD) in Leachates	SKAL/CN	8093062	N/A	2022/07/06	Prgya Panchal
Fluoride by ISE in Leachates	ISE	8093070	2022/07/06	2022/07/06	Surinder Rai
Total Metals in TCLP Leachate by ICPMS	ICP1/MS	8092908	2022/07/06	2022/07/06	Azita Fazaeli
Ignitability of a Sample	BAL	8093611	2022/07/06	2022/07/06	Min Yang
Nitrate& Nitrite as Nitrogen in Leachate	LACH	8093064	N/A	2022/07/06	Samuel Law
PAH Compounds in Leachate by GC/MS (SIM)	GC/MS	8093085	2022/07/06	2022/07/06	Mitesh Raj
TCLP - % Solids	BAL	8090843	2022/07/05	2022/07/06	Jian (Ken) Wang
TCLP - Extraction Fluid		8090844	N/A	2022/07/06	Jian (Ken) Wang
TCLP - Initial and final pH	PH	8090846	N/A	2022/07/06	Jian (Ken) Wang
TCLP Zero Headspace Extraction		8092994	2022/07/06	2022/07/07	Mohammed Abdul Nafay Shoeb
VOCs in ZHE Leachates	GC/MS	8095427	2022/07/07	2022/07/07	Manpreet Sarao

Bureau Veritas ID: TAX201 Dup **Collected:** 2022/06/28
Sample ID: S-12583574-062822-NG-CTP1126-TCLP **Shipped:**
Matrix: Soil **Received:** 2022/06/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
TCLP - % Solids	BAL	8090843	2022/07/05	2022/07/06	Jian (Ken) Wang
TCLP - Extraction Fluid		8090844	N/A	2022/07/06	Jian (Ken) Wang
TCLP - Initial and final pH	PH	8090846	N/A	2022/07/06	Jian (Ken) Wang

Bureau Veritas ID: TAX202 **Collected:** 2022/06/28
Sample ID: S-12583574-062822-NG-CTP1126-BH6-22-1 **Shipped:**
Matrix: Soil **Received:** 2022/06/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	8092267	N/A	2022/07/06	Haibin Wu
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	8093455	2022/07/06	2022/07/07	Austin (Guochen) Zhang
Moisture	BAL	8087089	N/A	2022/07/02	Simrat Bhathal

Bureau Veritas ID: TAX203 **Collected:** 2022/06/28
Sample ID: S-12583574-062822-NG-CTP1126-BH6-22-2 **Shipped:**
Matrix: Soil **Received:** 2022/06/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	8092267	N/A	2022/07/06	Haibin Wu
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	8093455	2022/07/06	2022/07/07	Austin (Guochen) Zhang

TEST SUMMARY

Bureau Veritas ID: TAX203 **Collected:** 2022/06/28
Sample ID: S-12583574-062822-NG-CTP1126-BH6-22-2 **Shipped:**
Matrix: Soil **Received:** 2022/06/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	8087089	N/A	2022/07/02	Simrat Bhathal

Bureau Veritas ID: TAX204 **Collected:** 2022/06/28
Sample ID: S-12583574-062822-NG-CTP1126-BH7-22-1 **Shipped:**
Matrix: Soil **Received:** 2022/06/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	8092267	N/A	2022/07/06	Haibin Wu
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	8093455	2022/07/06	2022/07/07	Austin (Guochen) Zhang
Moisture	BAL	8087089	N/A	2022/07/02	Simrat Bhathal

Bureau Veritas ID: TAX205 **Collected:** 2022/06/28
Sample ID: S-12583574-062822-NG-CTP1126-BH7-22-2 **Shipped:**
Matrix: Soil **Received:** 2022/06/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	8092267	N/A	2022/07/06	Haibin Wu
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	8093455	2022/07/06	2022/07/07	Austin (Guochen) Zhang
Moisture	BAL	8087089	N/A	2022/07/02	Simrat Bhathal

Bureau Veritas 100 – 36 Antares Dr. Nepean, ON, K2E 7W5 Phone: 613-274-0573 Website: www.bvna.com

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	2.7°C
Package 2	1.7°C

Sample TAX195 [S-12583574-062822-NG-CTP1126-BH3-22-2] : F1 BTEX analysis: Detection limits were adjusted for sample weight.

Sample TAX201 [S-12583574-062822-NG-CTP1126-TCLP] : NF/NI=Non Flammable and Non Ignitable

Sample TAX205 [S-12583574-062822-NG-CTP1126-BH7-22-2] : F1 BTEX analysis: Detection limits were adjusted for sample weight.

Results relate only to the items tested.

Bureau Veritas 100 – 36 Antares Dr. Nepean, ON, K2E 7W5 Phone: 613-274-0573 Website: www.bvna.com

QUALITY ASSURANCE REPORT

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		Leachate Blank	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	Value	UNITS
8092267	1,4-Difluorobenzene	2022/07/06	103	60 - 140	100	60 - 140	101	%				
8092267	4-Bromofluorobenzene	2022/07/06	93	60 - 140	94	60 - 140	94	%				
8092267	D10-o-Xylene	2022/07/06	103	60 - 140	91	60 - 140	95	%				
8092267	D4-1,2-Dichloroethane	2022/07/06	80	60 - 140	80	60 - 140	81	%				
8093085	Leachable D10-Anthracene	2022/07/06	103	50 - 130	97	50 - 130	102	%				
8093085	Leachable D14-Terphenyl (FS)	2022/07/06	93	50 - 130	86	50 - 130	92	%				
8093085	Leachable D8-Acenaphthylene	2022/07/06	99	50 - 130	90	50 - 130	95	%				
8093455	o-Terphenyl	2022/07/06	98 (3)	60 - 130	93	60 - 130	98	%				
8095427	Leachable 4-Bromofluorobenzene	2022/07/07	99	70 - 130	99	70 - 130	92	%				
8095427	Leachable D4-1,2-Dichloroethane	2022/07/07	100	70 - 130	104	70 - 130	103	%				
8095427	Leachable D8-Toluene	2022/07/07	104	70 - 130	101	70 - 130	95	%				
8087087	Moisture	2022/07/02							0.91 (1)	20		
8087089	Moisture	2022/07/02							6.8 (2)	20		
8092267	Benzene	2022/07/06	87	50 - 140	75	50 - 140	ND, RDL=0.020	ug/g	NC (2)	50		
8092267	Ethylbenzene	2022/07/06	97	50 - 140	85	50 - 140	ND, RDL=0.020	ug/g	NC (2)	50		
8092267	F1 (C6-C10) - BTEX	2022/07/06					ND, RDL=10	ug/g	NC (2)	30		
8092267	F1 (C6-C10)	2022/07/06	99	60 - 140	88	80 - 120	ND, RDL=10	ug/g	NC (2)	30		
8092267	o-Xylene	2022/07/06	93	50 - 140	81	50 - 140	ND, RDL=0.020	ug/g	NC (2)	50		
8092267	p+m-Xylene	2022/07/06	97	50 - 140	85	50 - 140	ND, RDL=0.040	ug/g	NC (2)	50		
8092267	Toluene	2022/07/06	91	50 - 140	79	50 - 140	ND, RDL=0.020	ug/g	NC (2)	50		
8092267	Total Xylenes	2022/07/06					ND, RDL=0.040	ug/g	NC (2)	50		
8092908	Leachable Arsenic (As)	2022/07/06	97	80 - 120	99	80 - 120	ND, RDL=0.2	mg/L	NC (2)	35	ND, RDL=0.2	mg/L
8092908	Leachable Barium (Ba)	2022/07/06	100	80 - 120	98	80 - 120	ND, RDL=0.2	mg/L	0.45 (2)	35	ND, RDL=0.2	mg/L
8092908	Leachable Boron (B)	2022/07/06	97	80 - 120	101	80 - 120	ND, RDL=0.1	mg/L	5.3 (2)	35	ND, RDL=0.1	mg/L
8092908	Leachable Cadmium (Cd)	2022/07/06	94	80 - 120	91	80 - 120	ND, RDL=0.05	mg/L	NC (2)	35	ND, RDL=0.05	mg/L
8092908	Leachable Chromium (Cr)	2022/07/06	95	80 - 120	95	80 - 120	ND, RDL=0.1	mg/L	NC (2)	35	ND, RDL=0.1	mg/L

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		Leachate Blank	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	Value	UNITS
8092908	Leachable Lead (Pb)	2022/07/06	90	80 - 120	93	80 - 120	ND, RDL=0.1	mg/L	NC (2)	35	ND, RDL=0.1	mg/L
8092908	Leachable Mercury (Hg)	2022/07/06	86	80 - 120	86	80 - 120	ND, RDL=0.001	mg/L	NC (2)	35	ND, RDL=0.001	mg/L
8092908	Leachable Selenium (Se)	2022/07/06	94	80 - 120	94	80 - 120	ND, RDL=0.1	mg/L	NC (2)	35	ND, RDL=0.1	mg/L
8092908	Leachable Silver (Ag)	2022/07/06	92	80 - 120	95	80 - 120	ND, RDL=0.01	mg/L	NC (2)	35	ND, RDL=0.01	mg/L
8092908	Leachable Uranium (U)	2022/07/06	98	80 - 120	98	80 - 120	ND, RDL=0.01	mg/L	NC (2)	35	ND, RDL=0.01	mg/L
8093062	Leachable WAD Cyanide (Free)	2022/07/06	84	80 - 120	94	80 - 120	ND, RDL=0.0020	mg/L	NC (2)	20	ND, RDL=0.010	mg/L
8093064	Leachable Nitrate (N)	2022/07/06	89	80 - 120	102	80 - 120	ND, RDL=1.0	mg/L	0.82 (2)	25	ND, RDL=1.0	mg/L
8093064	Leachable Nitrate + Nitrite (N)	2022/07/06	91	80 - 120	103	80 - 120	ND, RDL=1.0	mg/L	0.82 (2)	25	ND, RDL=1.0	mg/L
8093064	Leachable Nitrite (N)	2022/07/06	99	80 - 120	109	80 - 120	ND, RDL=0.10	mg/L	0.83 (2)	25	ND, RDL=0.10	mg/L
8093070	Leachable Fluoride (F-)	2022/07/06	95	80 - 120	100	80 - 120	ND, RDL=0.10	mg/L	7.2 (2)	25	ND, RDL=0.10	mg/L
8093085	Leachable Benzo(a)pyrene	2022/07/06	92	50 - 130	87	50 - 130	ND, RDL=0.10	ug/L	NC (2)	40		
8093455	F2 (C10-C16 Hydrocarbons)	2022/07/06	103 (3)	60 - 130	99	80 - 120	ND, RDL=10	ug/g	NC (4)	30		
8093455	F3 (C16-C34 Hydrocarbons)	2022/07/06	104 (3)	60 - 130	99	80 - 120	ND, RDL=50	ug/g	NC (4)	30		
8093455	F4 (C34-C50 Hydrocarbons)	2022/07/06	107 (3)	60 - 130	100	80 - 120	ND, RDL=50	ug/g	NC (4)	30		
8095427	Leachable 1,1-Dichloroethylene	2022/07/07	94	70 - 130	97	70 - 130	ND, RDL=0.020	mg/L	NC (2)	30		
8095427	Leachable 1,2-Dichlorobenzene	2022/07/07	88	70 - 130	92	70 - 130	ND, RDL=0.050	mg/L	NC (2)	30		
8095427	Leachable 1,2-Dichloroethane	2022/07/07	89	70 - 130	94	70 - 130	ND, RDL=0.050	mg/L	NC (2)	30		
8095427	Leachable 1,4-Dichlorobenzene	2022/07/07	100	70 - 130	105	70 - 130	ND, RDL=0.050	mg/L	NC (2)	30		
8095427	Leachable Benzene	2022/07/07	90	70 - 130	93	70 - 130	ND, RDL=0.020	mg/L	NC (2)	30		
8095427	Leachable Carbon Tetrachloride	2022/07/07	96	70 - 130	98	70 - 130	ND, RDL=0.020	mg/L	NC (2)	30		
8095427	Leachable Chlorobenzene	2022/07/07	92	70 - 130	95	70 - 130	ND, RDL=0.020	mg/L	NC (2)	30		
8095427	Leachable Chloroform	2022/07/07	96	70 - 130	99	70 - 130	ND, RDL=0.020	mg/L	NC (2)	30		
8095427	Leachable Methyl Ethyl Ketone (2-Butanone)	2022/07/07	98	60 - 140	107	60 - 140	ND, RDL=1.0	mg/L	NC (2)	30		

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		Leachate Blank	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	Value	UNITS
8095427	Leachable Methylene Chloride (Dichloromethane)	2022/07/07	99	70 - 130	104	70 - 130	ND, RDL=0.20	mg/L	NC (2)	30		
8095427	Leachable Tetrachloroethylene	2022/07/07	89	70 - 130	91	70 - 130	ND, RDL=0.020	mg/L	NC (2)	30		
8095427	Leachable Trichloroethylene	2022/07/07	98	70 - 130	102	70 - 130	ND, RDL=0.020	mg/L	NC (2)	30		
8095427	Leachable Vinyl Chloride	2022/07/07	84	70 - 130	88	70 - 130	ND, RDL=0.020	mg/L	NC (2)	30		

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Leachate Blank: A blank matrix containing all reagents used in the leaching procedure. Used to determine any process contamination.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Duplicate Parent ID [TAX193-01]

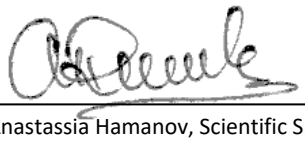
(2) Duplicate Parent ID

(3) Matrix Spike Parent ID [TAX194-01]

(4) Duplicate Parent ID [TAX194-01]

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



Anastassia Hamanov, Scientific Specialist

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Bureau Veritas 100 – 36 Antares Dr. Nepean, ON, K2E 7W5 Phone: 613-274-0573 Website: www.bvna.com

29-Jun-22 08:45
Julie Clement
C2I1892
J_L ENV-1133

Bureau Veritas
6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel:(905) 817-5700 Toll-free:800-563-6266 Fax:(905) 817-5777 www.bvna.com

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:			
Company Name:	#31726 GHD Limited	Company Name:	GHD Limited	Quotation #:	B84601	Bottle Order #:	884491
Attention:	(AP-735)- Jennifer Balkwill	Attention:	12583574 Distribution List	P.O. #:	735-003342-1		
Address:	455 Phillip St Waterloo ON N2L 3X2	Address:		Project:	12583574-E1	COC #:	Project Manager:
Tel:	(519) 884-0510 Fax: (519) 725-1394	Tel:	Fax:	Project Name:		C#884491-01-01	Julie Clement
Email:	Invoicing-Canada@ghd.com; jennifer.balkwill@ghd.com	Email:		Site #:			
				Sampled By:			

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BUREAU VERITAS DRINKING WATER CHAIN OF CUSTODY

Regulation 153 (2011)
☐ Table 1 ☐ Res/Park ☐ Medium/Fine
☐ Table 2 ☐ Ind/Comm ☐ Coarse
☐ Table 3 ☐ Agri/Other ☐ For RSC
☐ Table ___

Other Regulations
☐ CCME ☐ Sanitary Sewer Bylaw
☐ Reg 558. ☐ Storm Sewer Bylaw
☐ MISA Municipality ___
☐ PWQO ☐ Reg 406 Table ___
☐ Other ___

Special Instructions

Include Criteria on Certificate of Analysis (Y/N)? ___

Turnaround Time (TAT) Required:
Please provide advance notice for rush projects

Regular (Standard) TAT: ☐
(will be applied if Rush TAT is not specified)
Standard TAT = 5-7 Working days for most tests.
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission)
Date Required: ___ Time Required: ___ ☐
Rush Confirmation Number: ___ *(call lab for #)*

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle): Metals / Hg / Cr VI	O.Reg 153 PHCs, BTEX/F1-F4	Ignitability of a Sample	O.Reg 558 TCLP Inorganics Package	O.Reg 558 TCLP Benzo(a)pyrene	O.Reg 558 TCLP VOCs by HS	# of Bottles	Comments
1		S-12583574-062822-NG-CTP1126-BH1-22-1	28/6/22	10.00	SOIL		X					3	
2		S-12583574-062822-NG-CTP1126-BH1-22-2		10.00									
3		S-12583574-062822-NG-CTP1126-BH2-22-1		11.00									
4		S-12583574-062822-NG-CTP1126-BH2-22-2		11:00									
5		S-12583574-062822-NG-CTP1126-BH3-22-1		12:15									
6		S-12583574-062822-NG-CTP1126-BH3-22-2		12:15									
7		S-12583574-062822-NG-CTP1126-BH3-22-3		12:15									
8		S-12583574-062822-NG-CTP1126-BH4-22-1		13:35									
9		S-12583574-062822-NG-CTP1126-BH4-22-2		13.35									ON Ice
10		S-12583574-062822-NG-CTP1126-BH5-22-1		14.45									

RECEIVED IN OTTAWA

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted
Nidhi Gupta	22/06/28	5:50	[signature]	22/06/29	08:45	
			VI TRIM	2022/06/30	08:00	

Laboratory Use Only

Time Sensitive	Temperature (°C) on Recei	Custody Seal	Yes	No
	3.3.2 / 2.2.1	Present		
		Intact	✓	

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/TERMS-AND-CONDITIONS.

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

** SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT WWW.BVNA.COM/RESOURCES/CHAIN-OF-CUSTODY-FORMS.

SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS

White: Bureau Veritas Yellow: Client
ACTN

Bureau Veritas Canada (2019) Inc.

Bureau Veritas
6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel:(905) 817-5700 Toll-free:800-563-6266 Fax:(905) 817-5777 www.bvna.com

CHAIN OF CUSTODY RECORD

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name:	#31726 GHD Limited	Company Name:	GHD	Quotation #:	B84601	Bureau Veritas Job #:	Bottle Order #:
Attention:	(AP-735)- Jennifer Balkwill	Attention:	12583574 Distribution List	P.O. #:	735-003342-1		884491
Address:	455 Phillip St Waterloo ON N2L 3X2	Address:		Project:	12583574-E1	COC #:	Project Manager:
Tel:	(519) 884-0510 Fax: (519) 725-1394	Tel:	Fax:	Project Name:		C#884491-02-01	Julie Clement
Email:	Invoicing-Canada@ghd.com; jennifer.balkwill@ghd.com	Email:		Site #:			
				Sampled By:			

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BUREAU VERITAS DRINKING WATER CHAIN OF CUSTODY

Regulation 153 (2011): ☐ Table 1 ☐ Res/Park ☐ Medium/Fine; ☐ Table 2 ☐ Ind/Comm ☐ Coarse; ☐ Table 3 ☐ Agri/Other ☐ For RSC; ☐ Table ___

Other Regulations: ☐ CCME ☐ Sanitary Sewer Bylaw; ☐ Reg 558 ☐ Storm Sewer Bylaw; ☐ MISA Municipality ___; ☐ PWQO ☐ Reg 406 Table ___; ☐ Other ___

Special Instructions

Include Criteria on Certificate of Analysis (Y/N)? ___

Turnaround Time (TAT) Required:
Please provide advance notice for rush projects

Regular (Standard) TAT: ☐
(will be applied if Rush TAT is not specified):
Standard TAT = 5-7 Working days for most tests.
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission)
Date Required: ___ Time Required: ___ ☐
Rush Confirmation Number: ___ *(call lab for #)*

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle): Metals / Hg / Cr VI	ANALYSIS REQUESTED (PLEASE BE SPECIFIC): O.Reg 153 PHCs, BTEX/F1-F4	Ignitability of a Sample	O.Reg 558 TCLP Inorganics Package	O.Reg 558 TCLP Benzo(a)pyrene	O.Reg 558 TCLP VOCs by HS	# of Bottles	Comments
1		5-1258357-4-062822-NG-CTP1126-BH15-22-2	28/6/22	14:45	Soil		X					3	
2		5-1258357-4-062822-NG-CTP1126-BH TCLP		14:45				X	X	X	X	2	
3		5-1258357-4-062822-NG-CTP1126-BH6-22-1		16:30			X					3	
4		5-1258357-4-062822-NG-CTP1126-BH6-22-2		16:30									
5		5-1258357-4-062822-NG-CTP1126-BH7-22-1		17:15									
6		5-1258357-4-062822-NG-CTP1126-BH7-22-2		17:15									
7													
8													
9													
10													

RECEIVED IN OTTAWA

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted	Laboratory Use Only: Time Sensitive	Temperature (°C) on Recei	Custody Seal	Yes	No
N. Marie Campbell	22/06/28	5:50	See p 1						Present		
									Intact		

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/TERMS-AND-CONDITIONS.

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

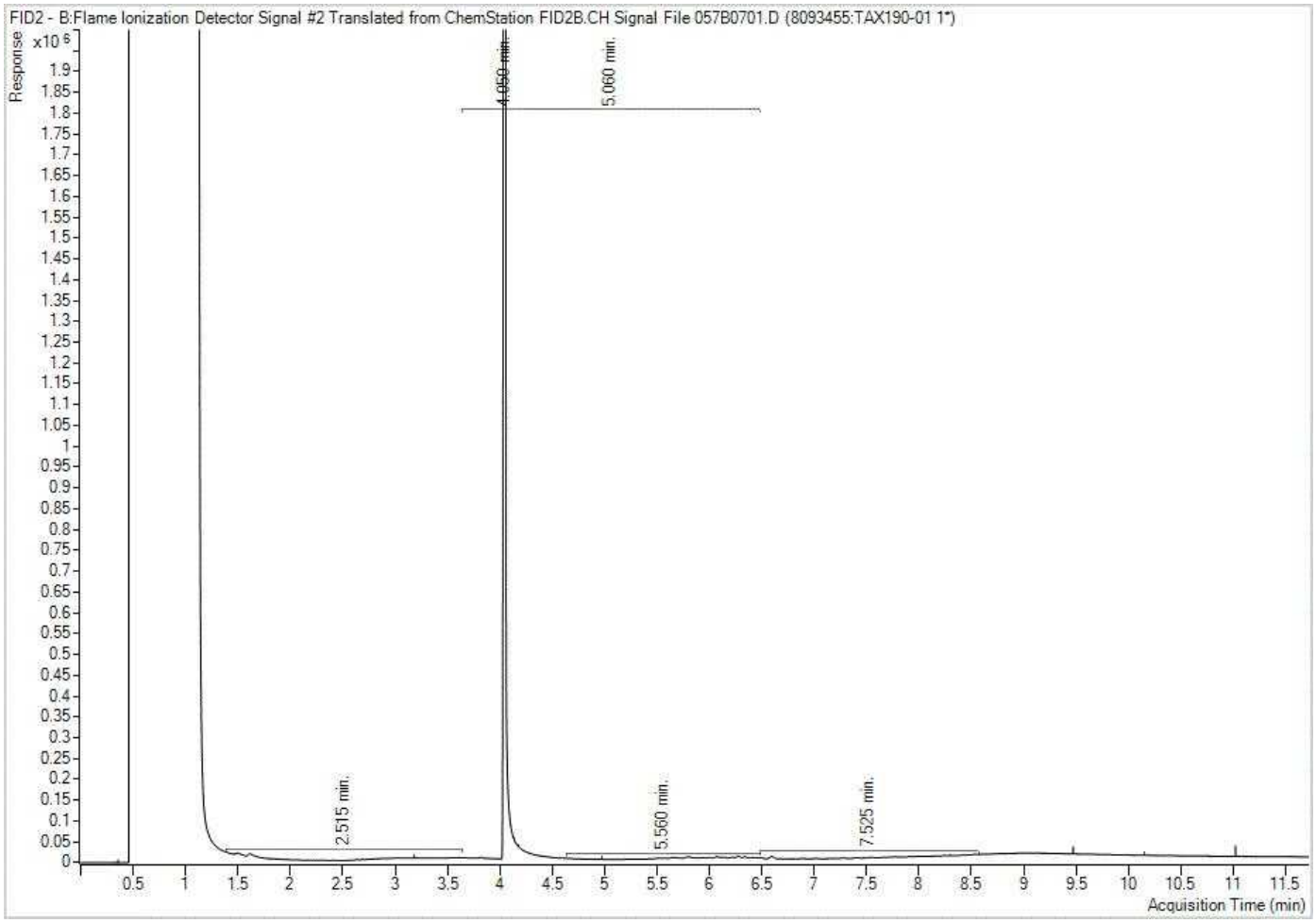
** SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT WWW.BVNA.COM/RESOURCES/CHAIN-OF-CUSTODY-FORMS.

SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS

White: Bureau Veritas Yellow: Client

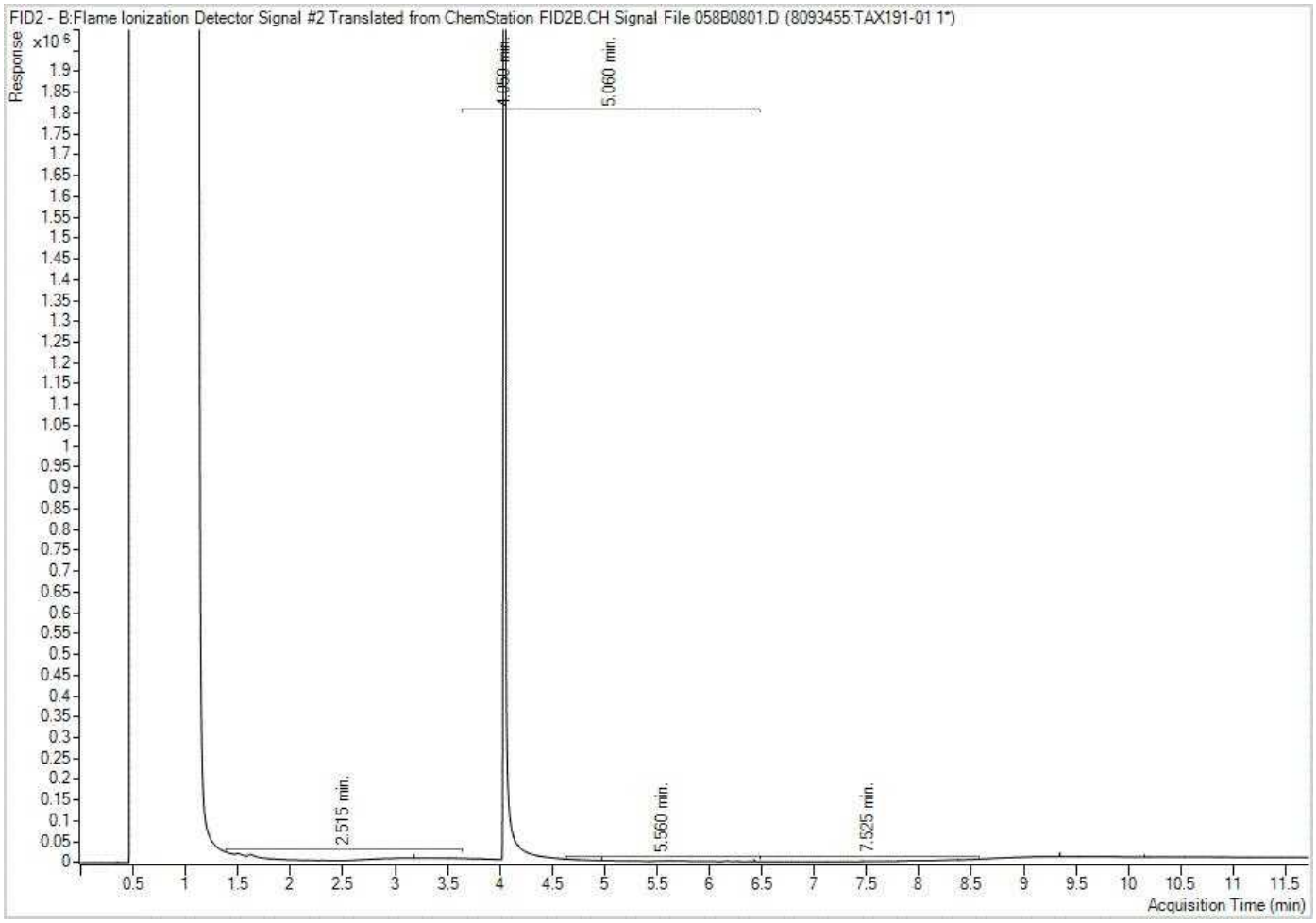
Bureau Veritas Canada (2019) Inc.

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



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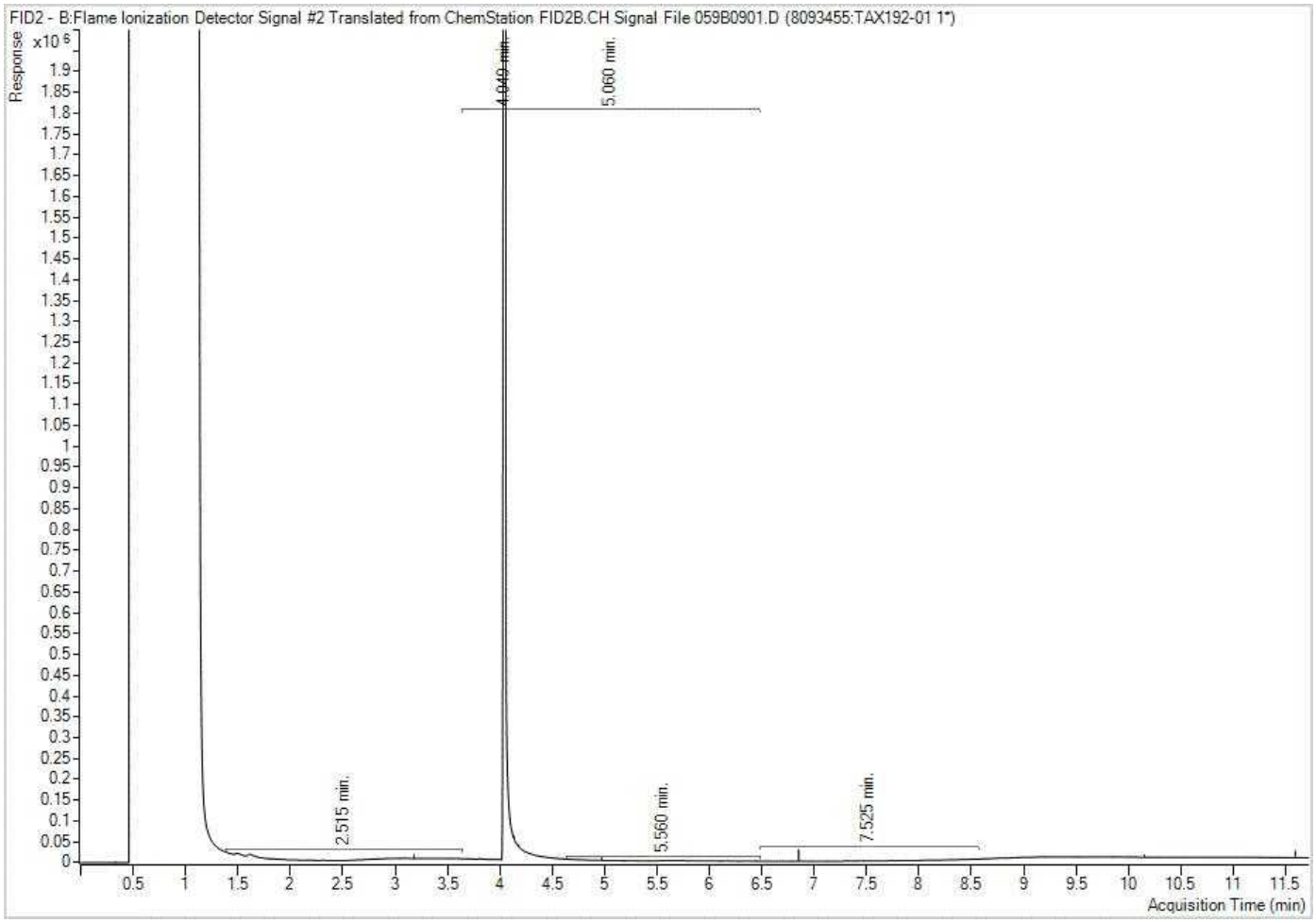
Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



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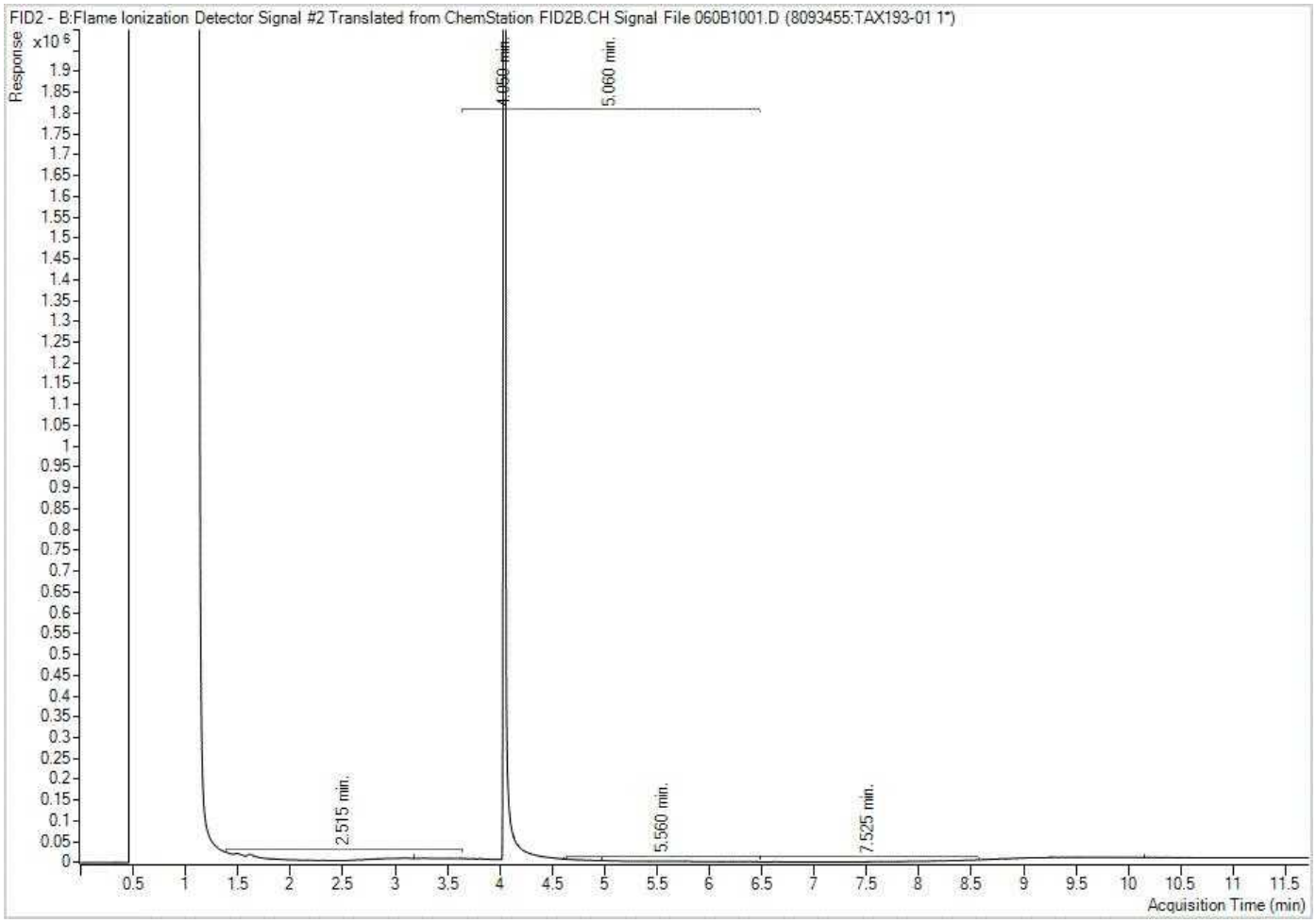
Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



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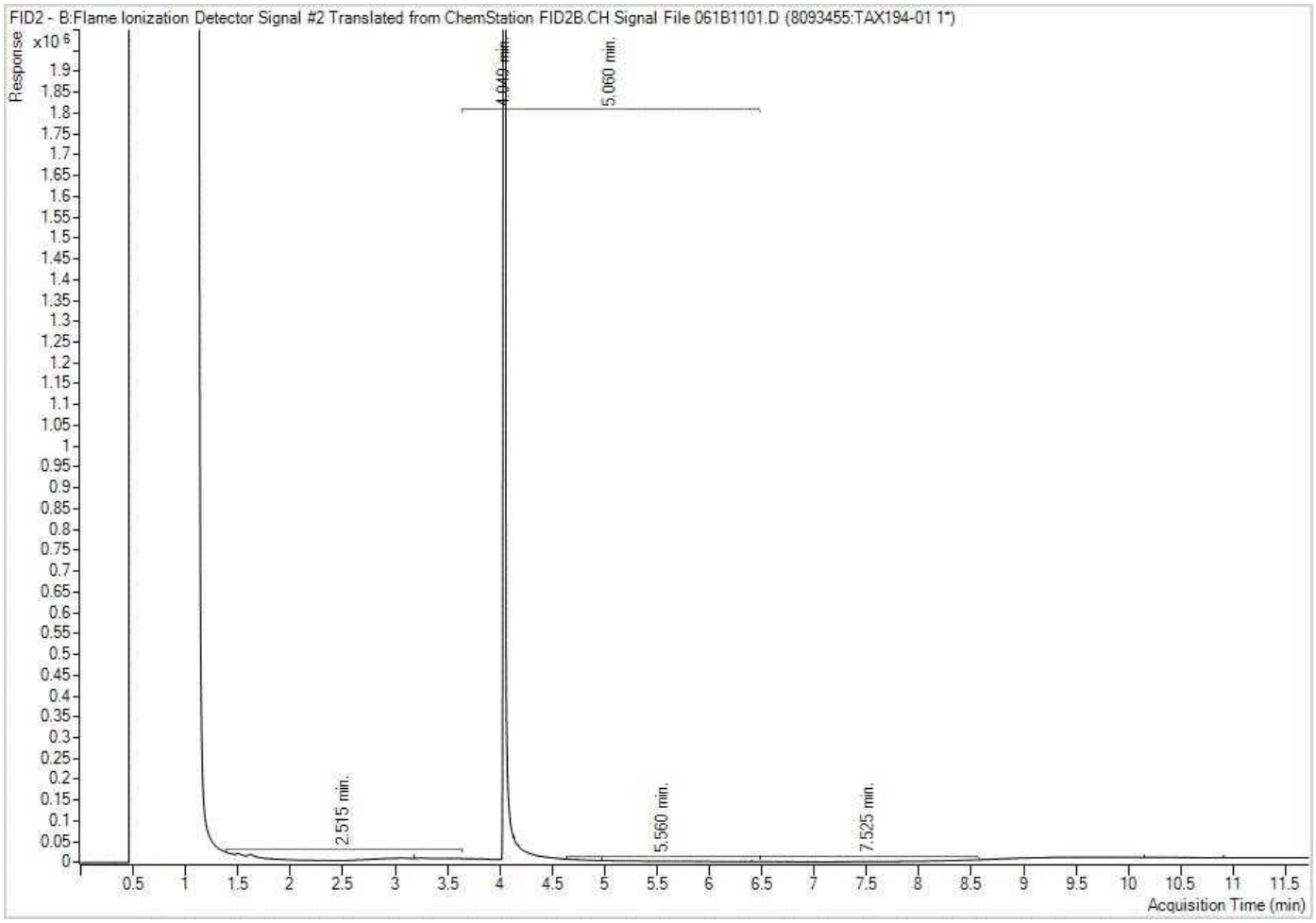

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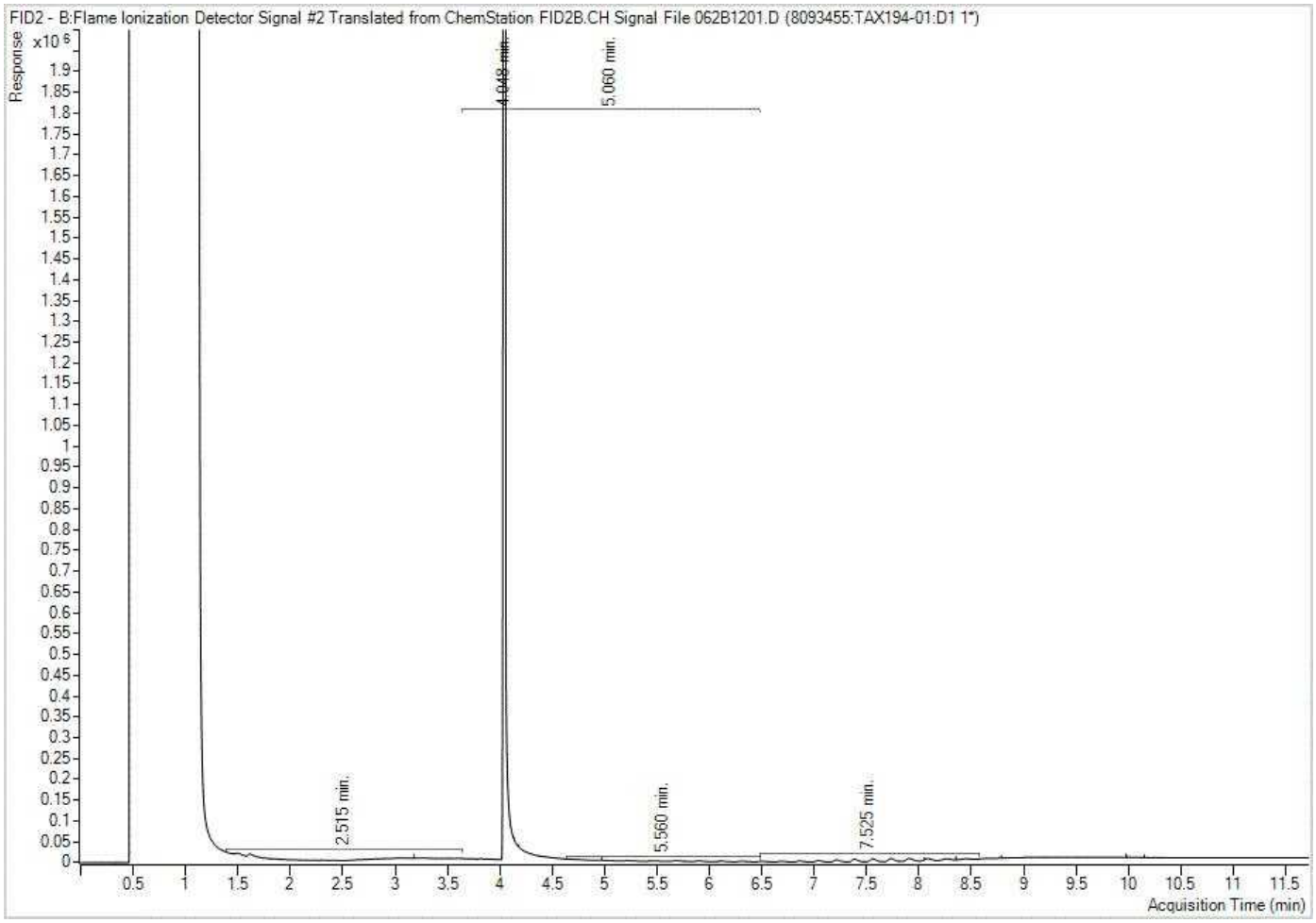
Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



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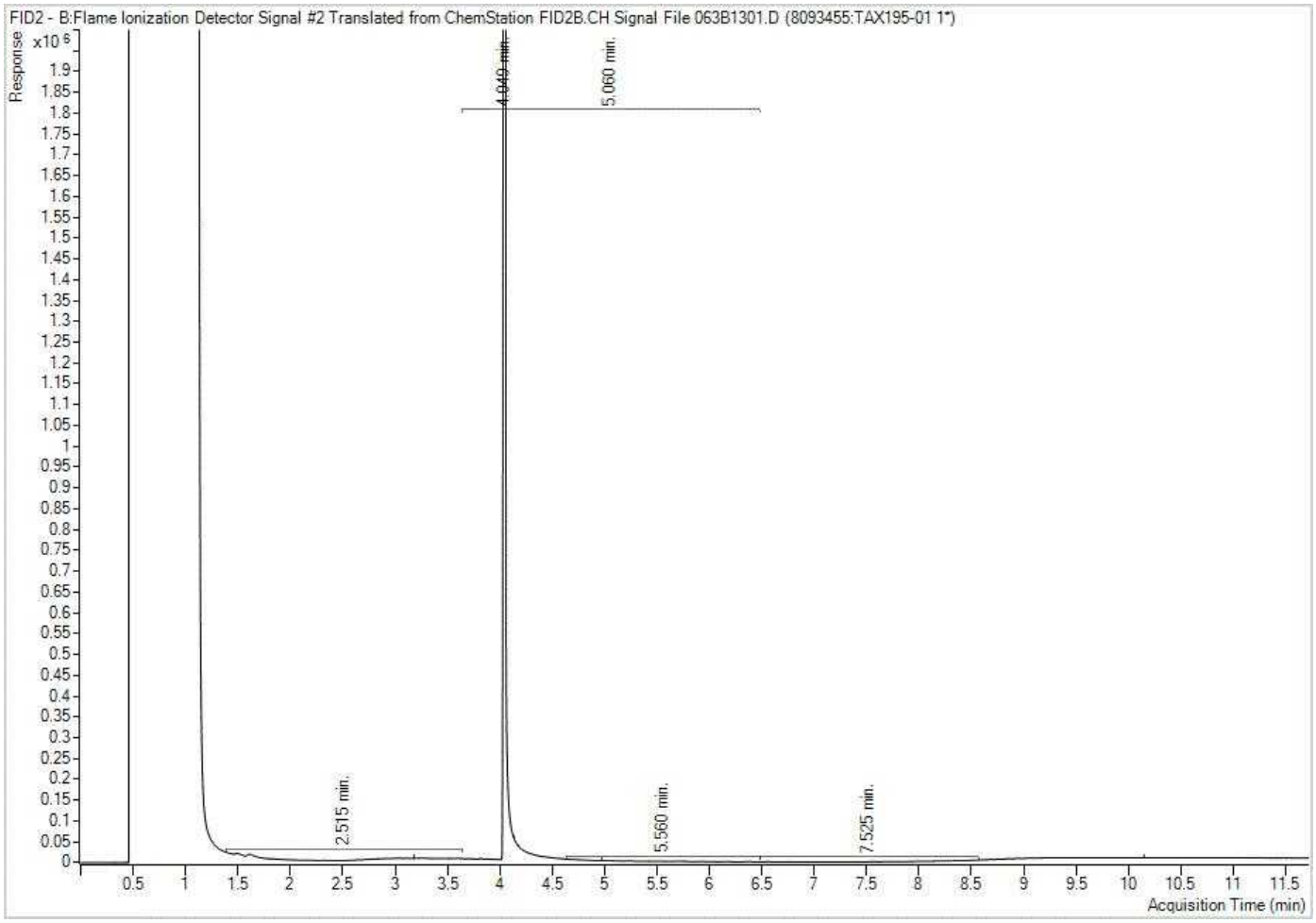

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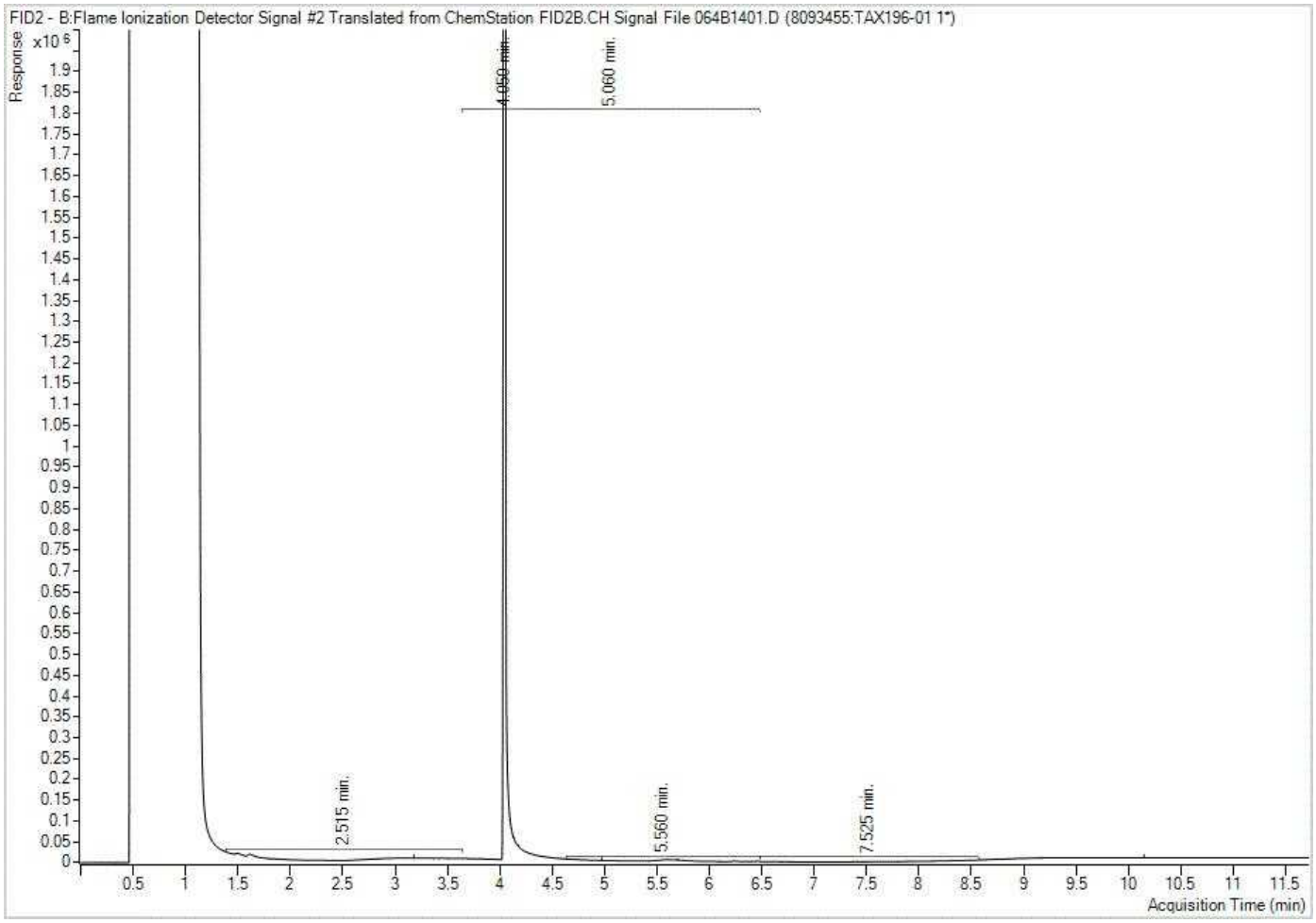

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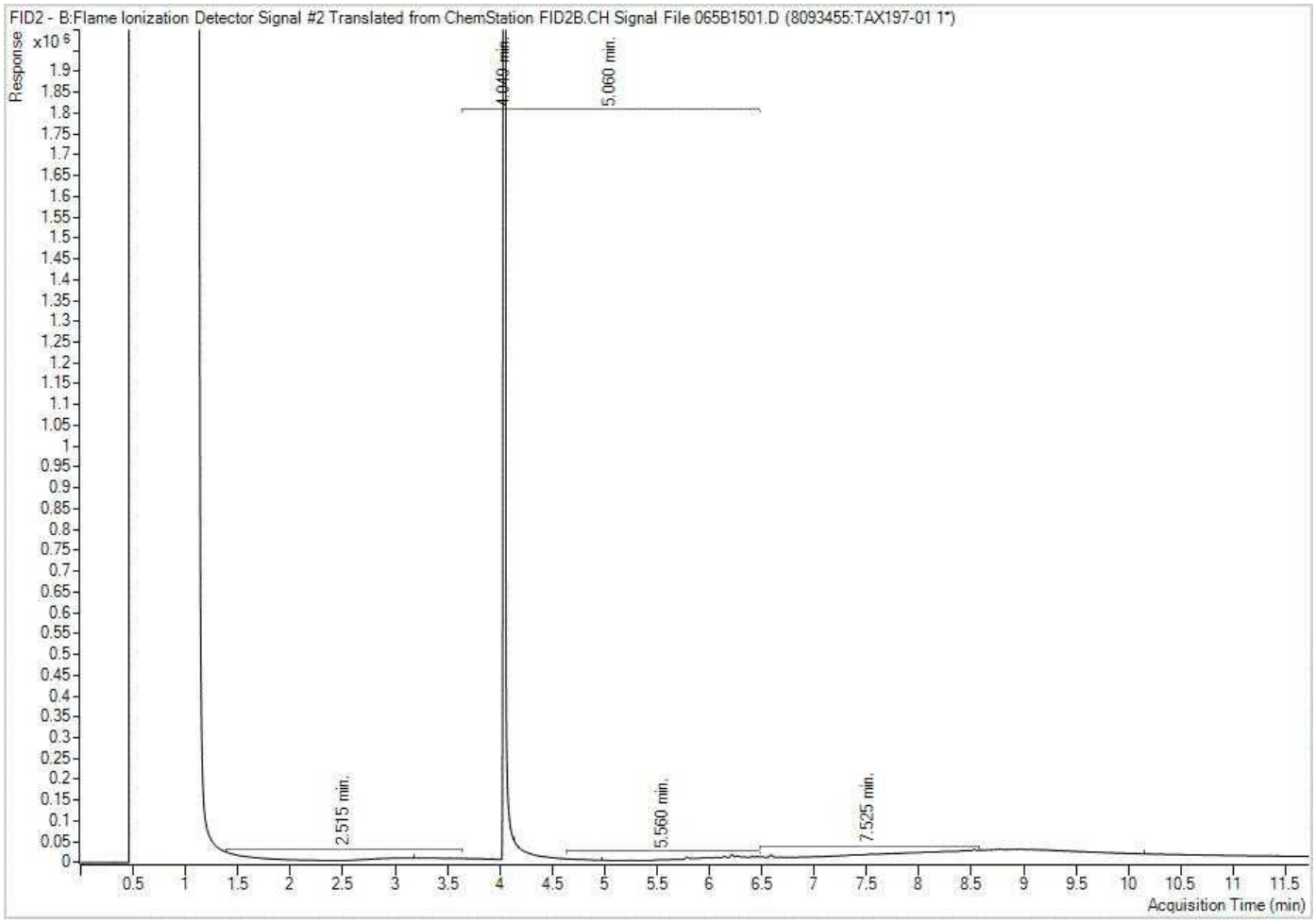

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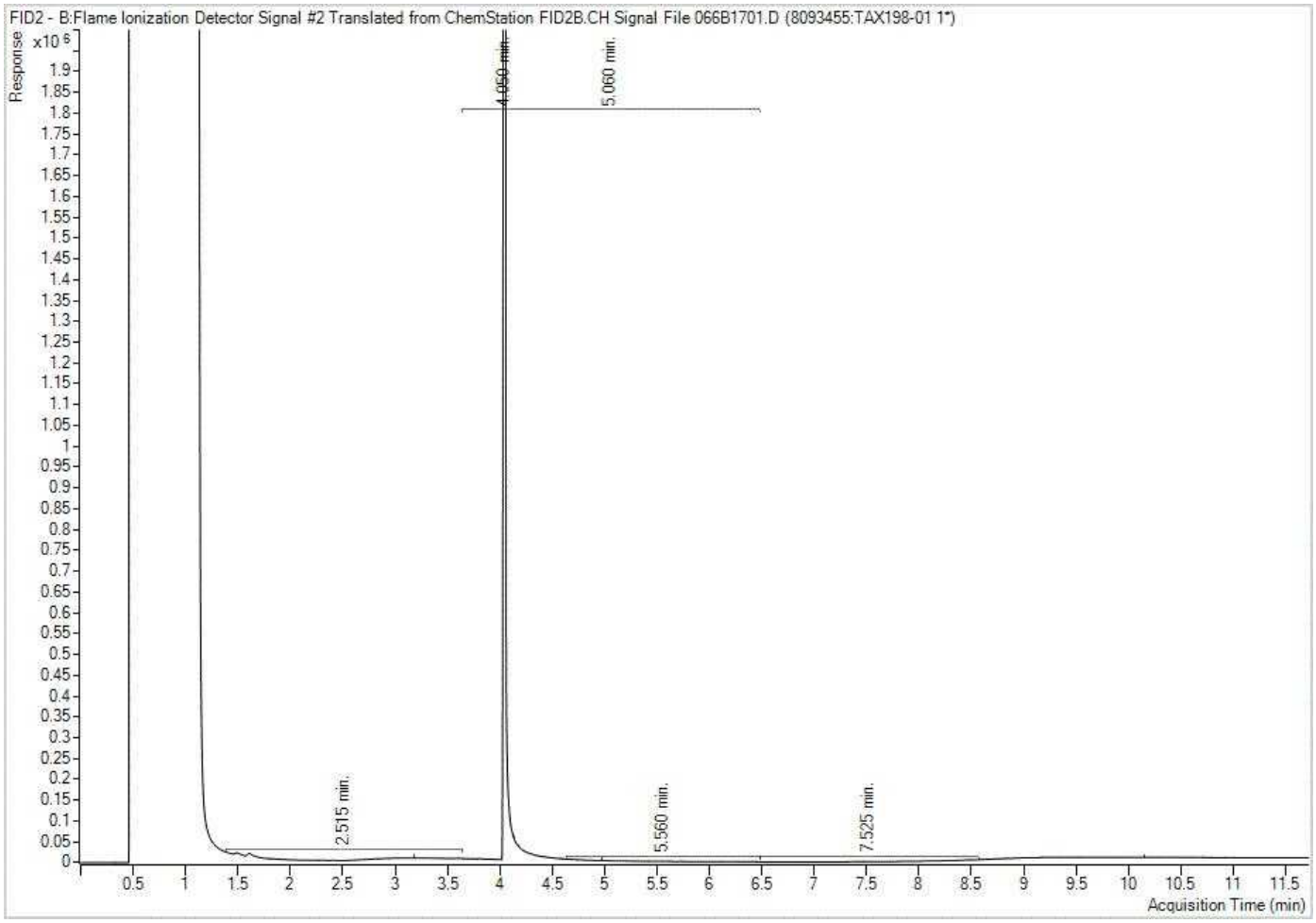

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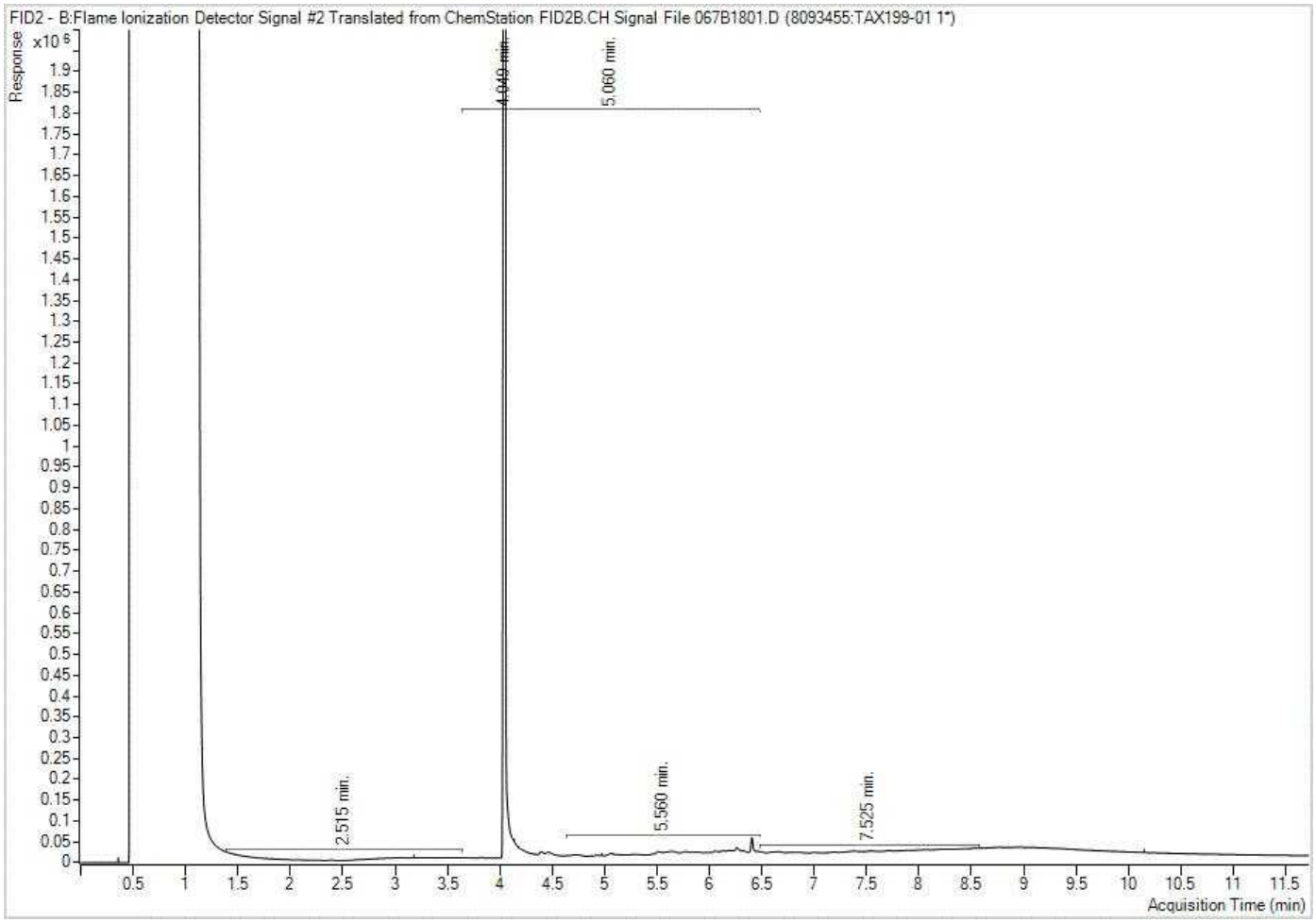

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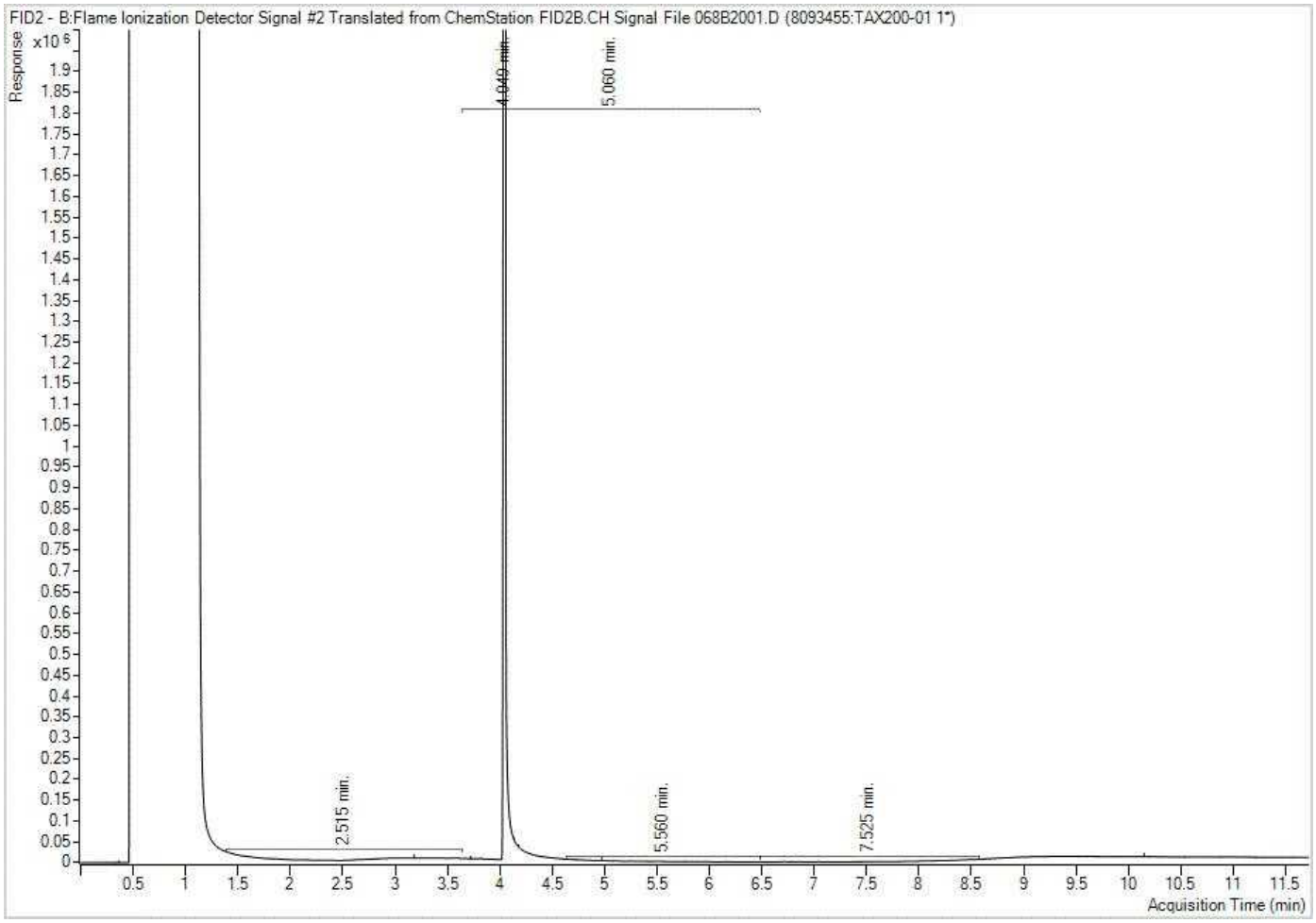

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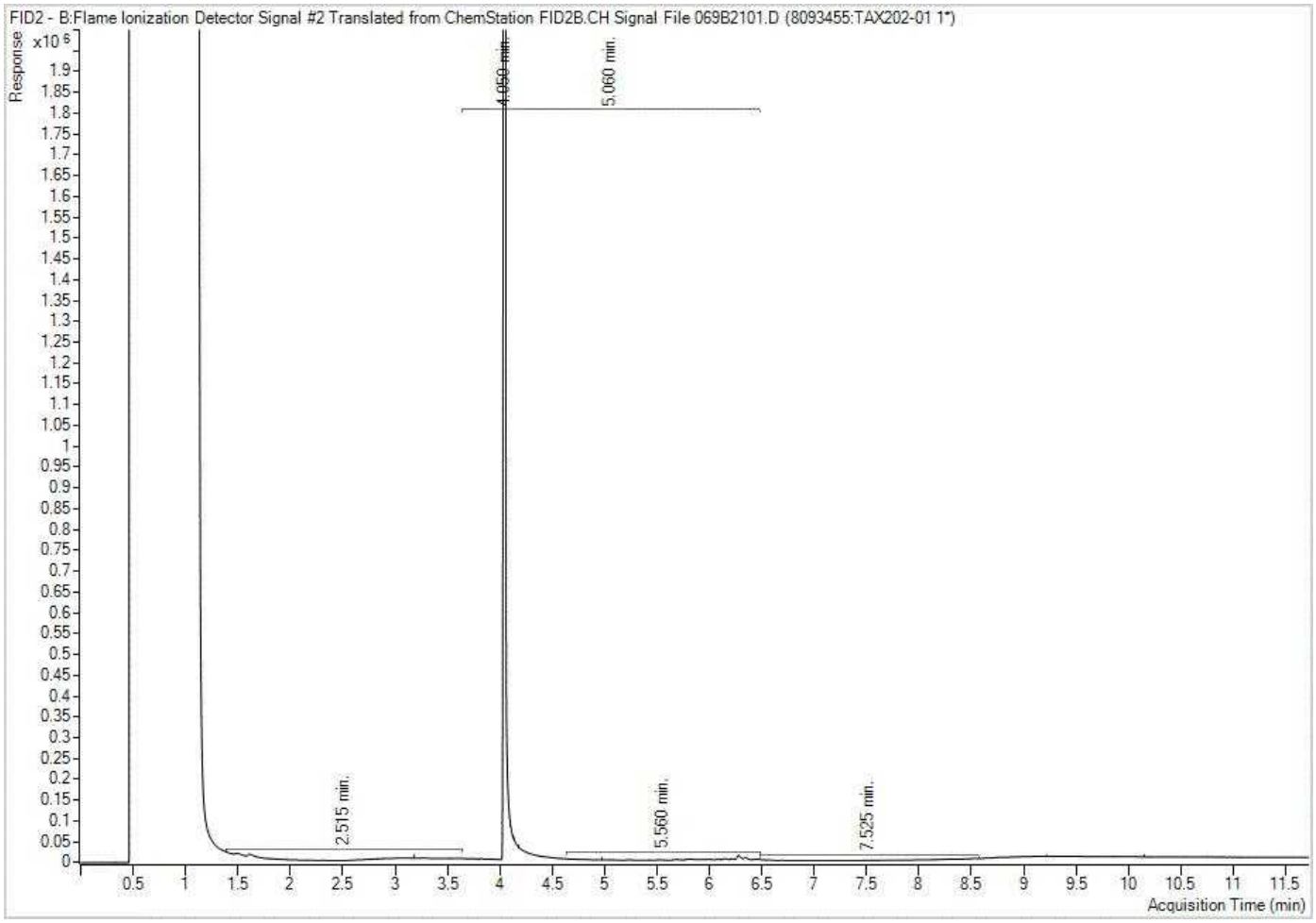

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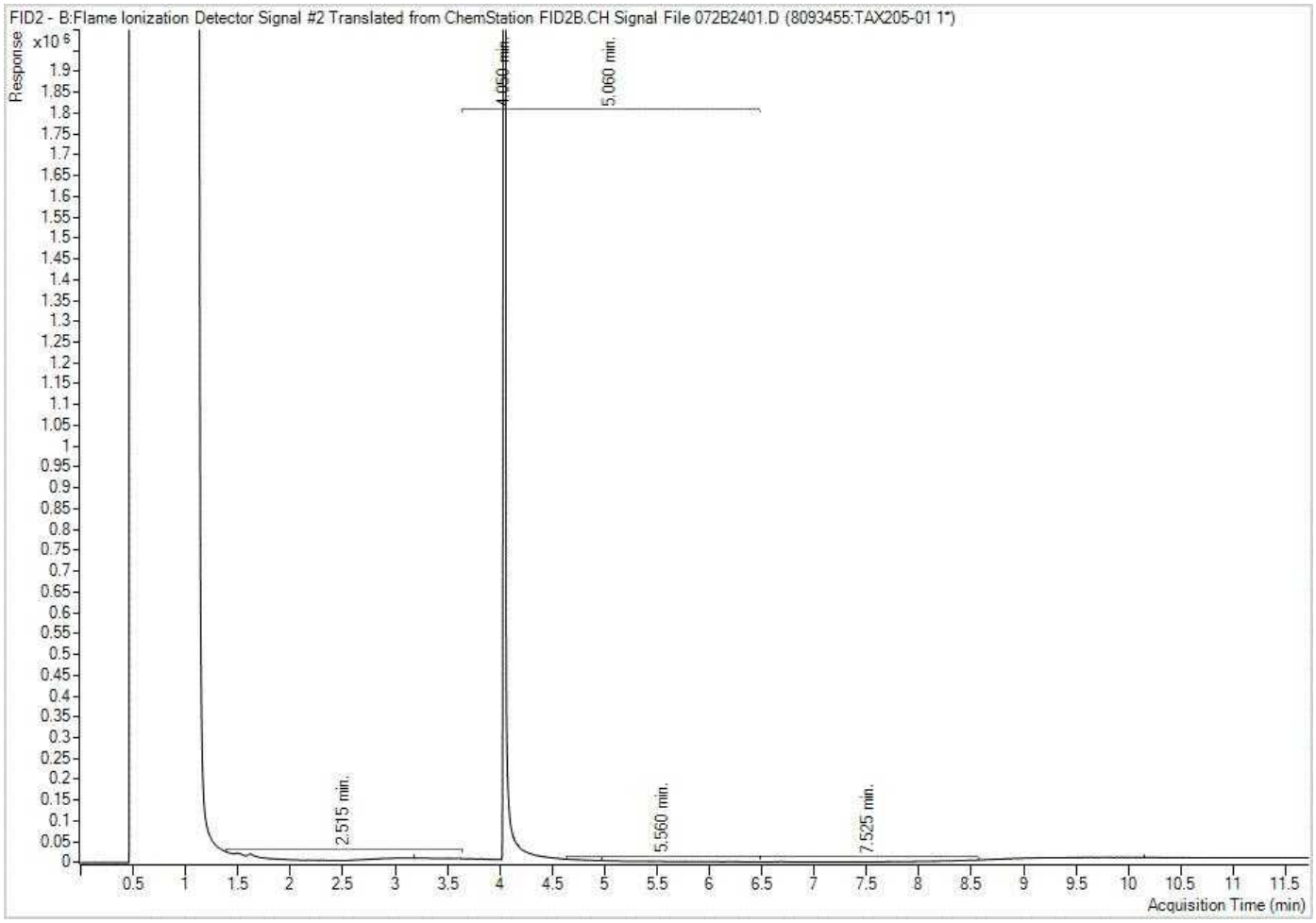
Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



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Your P.O. #: 735-003342-1
Your Project #: 12583574-E2
Site#: CTP1126
Site Location: CANADIAN TIRE NEPEAN
Your C.O.C. #: 884492-03-01

Attention: 12583574-SSOW-735-003342-1

GHD Limited
Waterloo- Canadian Tire Work
455 Phillip St
Waterloo, ON
CANADA N2L 3X2

Report Date: 2022/07/14
Report #: R7210178
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C2I9496
Received: 2022/07/07, 15:00

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Petroleum Hydro. CCME F1 & BTEX in Water (1)	1	N/A	2022/07/13	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1, 2)	1	2022/07/13	2022/07/14	CAM SOP-00316	CCME PHC-CWS m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Bureau Veritas Mississauga, 6740 Campobello Rd , Mississauga, ON, L5N 2L8
(2) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following “Alberta Environment’s Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003”. Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Your P.O. #: 735-003342-1
Your Project #: 12583574-E2
Site#: CTP1126
Site Location: CANADIAN TIRE NEPEAN
Your C.O.C. #: 884492-03-01

Attention: 12583574-SSOW-735-003342-1

GHD Limited
Waterloo- Canadian Tire Work
455 Phillip St
Waterloo, ON
CANADA N2L 3X2

Report Date: 2022/07/14
Report #: R7210178
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C2I9496
Received: 2022/07/07, 15:00

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Julie Clement, Technical Account Manager
Email: Julie.CLEMENT@bureauveritas.com
Phone# (613)868-6079

==========

This report has been generated and distributed using a secure automated process.
Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.

O.REG 153 PHCS, BTEX/F1-F4 (WATER)

Bureau Veritas ID		TCN997		
Sampling Date		2022/07/07 13:00		
COC Number		884492-03-01		
	UNITS	GW-12583574-070722-NG-CTP1126-MW1-22	RDL	QC Batch
BTEX & F1 Hydrocarbons				
Benzene	ug/L	ND	0.20	8105543
Toluene	ug/L	ND	0.20	8105543
Ethylbenzene	ug/L	ND	0.20	8105543
o-Xylene	ug/L	ND	0.20	8105543
p+m-Xylene	ug/L	ND	0.40	8105543
Total Xylenes	ug/L	ND	0.40	8105543
F1 (C6-C10)	ug/L	ND	25	8105543
F1 (C6-C10) - BTEX	ug/L	ND	25	8105543
F2-F4 Hydrocarbons				
F2 (C10-C16 Hydrocarbons)	ug/L	ND	100	8107327
F3 (C16-C34 Hydrocarbons)	ug/L	ND	200	8107327
F4 (C34-C50 Hydrocarbons)	ug/L	ND	200	8107327
Reached Baseline at C50	ug/L	Yes		8107327
Surrogate Recovery (%)				
1,4-Difluorobenzene	%	100		8105543
4-Bromofluorobenzene	%	98		8105543
D10-o-Xylene	%	98		8105543
D4-1,2-Dichloroethane	%	105		8105543
o-Terphenyl	%	101		8107327

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

Bureau Veritas Job #: C2I9496
Report Date: 2022/07/14

GHD Limited
Client Project #: 12583574-E2
Site Location: CANADIAN TIRE NEPEAN
Your P.O. #: 735-003342-1
Sampler Initials: NG

TEST SUMMARY

Bureau Veritas ID: TCN997
Sample ID: GW-12583574-070722-NG-CTP1126-MW1-22
Matrix: Water

Collected: 2022/07/07
Shipped:
Received: 2022/07/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	8105543	N/A	2022/07/13	Georgeta Rusu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	8107327	2022/07/13	2022/07/14	Austin (Guochen) Zhang

GHD Limited
Client Project #: 12583574-E2
Site Location: CANADIAN TIRE NEPEAN
Your P.O. #: 735-003342-1
Sampler Initials: NG

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	2.7°C

Results relate only to the items tested.

Bureau Veritas 100 – 36 Antares Dr. Nepean, ON, K2E 7W5 Phone: 613-274-0573 Website: www.bvna.com

Bureau Veritas Job #: C2I9496
Report Date: 2022/07/14

QUALITY ASSURANCE REPORT

GHD Limited
Client Project #: 12583574-E2
Site Location: CANADIAN TIRE NEPEAN
Your P.O. #: 735-003342-1
Sampler Initials: NG

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
8105543	1,4-Difluorobenzene	2022/07/13	100	70 - 130	99	70 - 130	100	%		
8105543	4-Bromofluorobenzene	2022/07/13	102	70 - 130	101	70 - 130	98	%		
8105543	D10-o-Xylene	2022/07/13	101	70 - 130	102	70 - 130	95	%		
8105543	D4-1,2-Dichloroethane	2022/07/13	103	70 - 130	100	70 - 130	106	%		
8107327	o-Terphenyl	2022/07/13	105	60 - 130	102	60 - 130	100	%		
8105543	Benzene	2022/07/13	99	50 - 140	96	50 - 140	ND, RDL=0.20	ug/L	NC (1)	30
8105543	Ethylbenzene	2022/07/13	104	50 - 140	103	50 - 140	ND, RDL=0.20	ug/L	NC (1)	30
8105543	F1 (C6-C10) - BTEX	2022/07/13					ND, RDL=25	ug/L	NC (1)	30
8105543	F1 (C6-C10)	2022/07/13	110	60 - 140	110	60 - 140	ND, RDL=25	ug/L	NC (1)	30
8105543	o-Xylene	2022/07/13	103	50 - 140	101	50 - 140	ND, RDL=0.20	ug/L	NC (1)	30
8105543	p+m-Xylene	2022/07/13	101	50 - 140	98	50 - 140	ND, RDL=0.40	ug/L	NC (1)	30
8105543	Toluene	2022/07/13	98	50 - 140	97	50 - 140	ND, RDL=0.20	ug/L	NC (1)	30
8105543	Total Xylenes	2022/07/13					ND, RDL=0.40	ug/L	NC (1)	30
8107327	F2 (C10-C16 Hydrocarbons)	2022/07/14	105	60 - 130	100	60 - 130	ND, RDL=100	ug/L	NC (1)	30
8107327	F3 (C16-C34 Hydrocarbons)	2022/07/14	103	60 - 130	101	60 - 130	ND, RDL=200	ug/L	3.4 (1)	30
8107327	F4 (C34-C50 Hydrocarbons)	2022/07/14	105	60 - 130	102	60 - 130	ND, RDL=200	ug/L	NC (1)	30

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

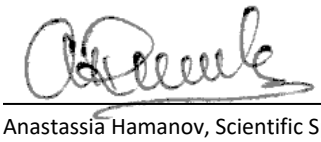
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Duplicate Parent ID

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



Anastassia Hamanov, Scientific Specialist

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Bureau Veritas 100 – 36 Antares Dr. Nepean, ON, K2E 7W5 Phone: 613-274-0573 Website: www.bvna.com

Bureau Veritas
6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel:(905) 817-5700 Toll-free:800-563-6266 Fax:(905) 817-5777 www.bvna.com

Page 1 of 1

CHAIN OF CUSTODY RECORD

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name:	#31726 GHD Limited	Company Name:	GHD Limited	Quotation #:	B84601	Bureau Veritas Job #:	Bottle Order #: 884492
Attention:	(AP-735)- Jennifer Balkwill	Attention:	12583574 Distribution List	P.O. #:	735-003342-1		
Address:	455 Phillip St Waterloo ON N2L 3X2	Address:	179 Colonnade Rds S	Project:	12583574-E2	COC #: C#884492-03-01	Project Manager: Julie Clement
Tel:	(519) 884-0510 Fax: (519) 725-1394	Tel:	Fax:	Project Name:	Guardian Tire Nepean		
Email:	Invoicing-Canada@ghd.com; jennifer.balkwill@ghd.com	Email:		Site #:	CTP1126		
				Sampled By:	N Gupta		

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BUREAU VERITAS DRINKING WATER CHAIN OF CUSTODY

Regulation 153 (2011)
☐ Table 1 ☐ Res/Park ☐ Medium/Fine
☐ Table 2 ☐ Ind/Comm ☐ Coarse
☐ Table 3 ☐ Agri/Other ☐ For RSC
☐ Table ___

Other Regulations
☐ CCME ☐ Sanitary Sewer Bylaw
☐ Reg 558. ☐ Storm Sewer Bylaw
☐ MISA Municipality ___
☐ PWQO ☐ Reg 406 Table ___
☐ Other ___

Special Instructions

Include Criteria on Certificate of Analysis (Y/N)? ___

Field Filtered (please circle): Metals / Hg / Cr VI

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	[redacted] PHCs, BTEX/F1-F4	Ignitability of a Sample	O.Reg 558 TCLP Inorganics Package	O.Reg 558 TCLP Benzo(a)pyrene	O.Reg 558 TCLP VOCs by HS	# of Bottles	Comments
1		GN-12583574-0707 22- NG-CTP1126-MW1-22	07/07/22	13:00	water	X					4	
2												
3												
4												
5												
6												
7												
8												
9												
10												

Turnaround Time (TAT) Required:
Please provide advance notice for rush projects

Regular (Standard) TAT: ☑
(will be applied if Rush TAT is not specified):
Standard TAT = 5-7 Working days for most tests.
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission)
Date Required: ___ Time Required: ___ ☐
Rush Confirmation Number: ___ *(call lab for #)*

07-Jul-22 15:00
Julie Clement
C2I9496
ASD ENV 623

RECEIVED IN OTTAWA

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted
Nidhi Gupta	22/7/7	14:30	Angelica Santiago 2 VI TRIP	2022/07/07 2022/07/08	15:00 08:00	

Laboratory Use Only

Time Sensitive	Temperature (°C) on Recei	Custody Seal	Yes	No
	4,2,2 ice	Present		
		Intact		

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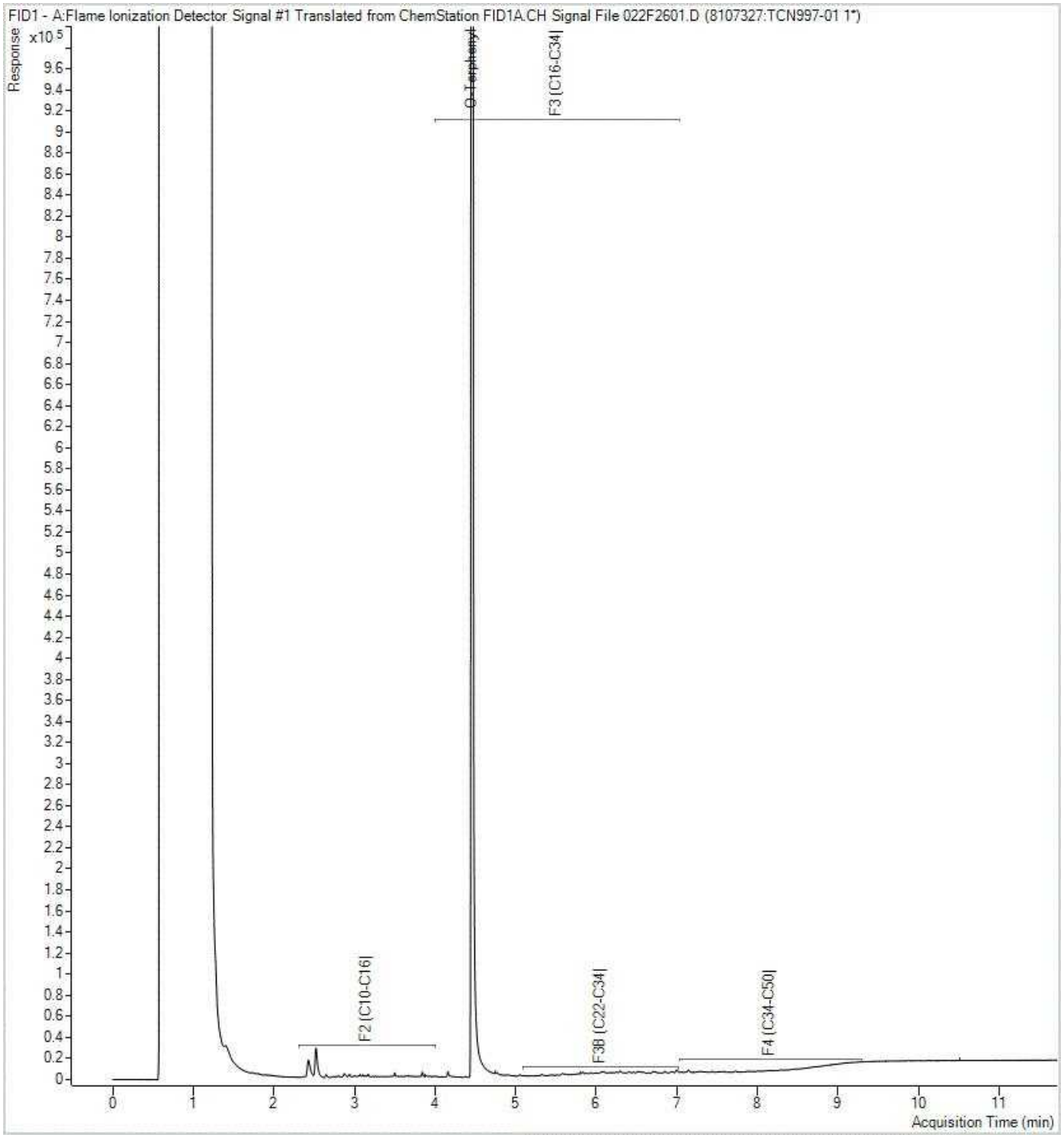
White: Bureau Veritas Yellow: Client
71914

Bureau Veritas Canada (2019) Inc.

Bureau Veritas Job #: C2I9496
Report Date: 2022/07/14
Bureau Veritas Sample: TCN997

GHD Limited
Client Project #: 12583574-E2
Project name: CANADIAN TIRE NEPEAN
Client ID: GW-12583574-070722-NG-CTP1126-MW1-22

Petroleum Hydrocarbons F2-F4 in Water Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

GROUPE
C. LAGANIÈRE

Rapport final

Services consultatifs de révision de rapports antérieurs d'évaluation environnementale



Propriété sise au 1660, route Merivale, (Napean), Ottawa, Ontario.

N/Réf. : HARNSITESP

Montréal-Est
Le vendredi 14 octobre 2022

HARNOIS Énergies
Att. : Monsieur Jean-Philippe Wilkins
Directeur, exploitation et développement immobilier
80, route 158
Saint-Thomas (QC)
JOK 3L0

TRANSMIS PAR COURRIEL :
jeanphilippewilkins@harnoisenergies.com

Objet : Service consultatif — Avis professionnel indépendant quant à la qualité environnementale du site et la conformité des études environnementales antérieures fournies par le client. Propriété sise au 1660, rue Merivale (Napean), Ottawa, Ontario

N/🗁 : HARNSITESP

Monsieur Wilkins,

Comme convenu, vous trouverez ci-après la lettre-rapport présentant l'avis professionnel de Groupe C. Laganière basé sur la révision des études environnementales complétées par différents consultants externes pour la propriété mentionnée en objet.

Cet exercice rigoureux de révision de rapports antérieurs a été réalisé en conformité avec le mandat cité dans l'offre de service datée du 25 août 2022 (réf : ODS 2022-226-SC – REV_08-2022_B), tel que vous l'avez signée le 30 août 2022.

1. MANDAT ET OBJECTIF

Le présent mandat consistait en une révision des études environnementales antérieures effectuées entre 2011 et 2022 par lesdites firmes externes, afin d'émettre une opinion professionnelle sur la pertinence et la conformité de leurs conclusions, de même qu'à émettre des recommandations, le cas échéant, en lien avec la qualité environnementale du site et les

exigences gouvernementales applicables. L'objectif était de valider si, pour seule la période d'opération du site par Canadian Tire Petroleum (CTP), une contamination a pu avoir eu lieu sur le site et y causer un préjudice environnemental. Pour y arriver, il fallait donc réviser le plus récent rapport (août 2022) en comparaison à celui de 2011, ce dernier étant le point de référence initial.

2. LIMITATIONS

Le processus de révision s'est fondé exclusivement sur les documents fournis par Harnois Énergies. Ces documents contiennent des limitations intrinsèques qui s'appliquent directement à la présente qui en dépend. Aucune inspection ou travail de caractérisation n'ont été réalisés sur le site par l'équipe de Groupe C. Laganière dans le cadre de ce mandat. Est également exclue du mandat toute considération portant sur une contamination issue d'autres activités que l'entreposage, l'utilisation et la distribution de produits pétroliers dans un contexte autre que l'activité commerciale d'une station-service el qu'entendu par la description des codes SCIAN (Système de classification des industries de l'Amérique du Nord, édition 2022)[1] 45711 ou 45721.

DESCRIPTION SOMMAIRE DU SITE ET DES ACTIVITÉS

Cette section présente la localisation du site de même que son usage actuel. La révision des rapports a permis de déterminer que la propriété est localisée au 1660, rue Merivale, Napean, Ottawa, Ontario et a une superficie totale de 6 623 m^2.

Le site est occupé par une station-service depuis 1968. Un bâtiment de service est présent au centre du terrain, avec les ilots de pompe juste au nord et les réservoirs souterrains dans le coin nord-est. Un lave-auto est présent dans la partie sud du terrain. Les bâtiments et ilots actuels ont été construits vers 1984 en remplacement d'un ancien bâtiment avec garage mécanique. Les réservoirs ont été remplacés en 1987 et en 2011, mais semblent toujours avoir été au même

[1] Le choix de cette codification sert à restreindre le type d'activité considérée qui est susceptible de contaminer les sols, les sédiments et les eaux souterraines. Cela n'a pas de lien avec la catégorie stations-service annoncée par le Règlement sur la protection et la réhabilitation des terrains de la législation québécoise.

endroit. L'emplacement des ilots de pompe a également été changé à cette époque. La station-service est exploitée par Canadian Tire Petroleum depuis 2011 (distributeur Esso/IOL).

Les coordonnées du centre du terrain à l'étude sont 45.343360 de latitude nord et -75.729596 de longitude ouest.

3. ÉVALUATIONS ENVIRONNEMENTALES DE SITE

Diverses études environnementales ont été réalisées sur ce site entre 2011 et 2022. Ces études ont été soumises à notre attention et un résumé est présenté comme suit :

3.1. Choix des critères de comparaison

Dans les études passées, tous les auteurs ont utilisé des critères de sols fins.

Les auteurs ont tous utilisé les critères de la table 3 correspondant à un dépôt meuble uniforme non mince et une utilisation non sensible de l'eau (eau souterraine non potable).

3.2. Études antérieures et résultats

Cette section présente les résultats des études et interventions passées sous forme de résumé en langage simple. La liste des études est également présentée sous forme de tableau à l'annexe A.

3.2.1. ÉES- Phase I– Barenco 2011.

Une ÉES – Phase 1 (N/Réf. : 11010) a été réalisée par la firme *Barenco Inc.* en octobre 2011 pour le compte de la compagnie *Imperial Oil*.

Cette étude a relevé la présence d'une station-service opérée par *Imperial Oil* (la Compagnie Impériale ltée.) sur le site depuis environ 1968. Le terrain appartenait à Imperial Oil depuis 1956.

En 2011, les installations étaient constituées d'un kiosque de service au centre du terrain (approximativement à l'emplacement d'un ancien garage mécanique), d'un abri attaché, de trois ilots de pompes et de quatre réservoirs souterrains d'essence en fibre de verre (trois de 22 700 L et un de 45 460 L) installés en 1987 dans le coin nord-est, ainsi que d'un lave-auto dans la partie sud. Les propriétés voisines sont à vocation résidentielle à l'ouest et au sud et commerciale au nord et à l'est.

La conclusion de ce rapport indique que des risques environnementaux ont été relevés en raison de l'activité de station-service sur le site. Plus précisément, les risques identifiés sont les réservoirs souterrains dans le coin nord-est, un ancien garage mécanique qui a opéré de 1968 à 1984 à l'ouest du kiosque actuel et la présence de remblai inconnu sur le site.

3.2.2. ÉES- Phase II – Barenco 2011

Une ÉES – Phase II (N/Réf. : *11010*) a été réalisée par la firme *Barenco inc.* en septembre 2011 pour le compte de la compagnie *Impérial Oil* pour diligence raisonnable avant le remplacement des réservoirs souterrains. Une analyse granulométrique des sols naturels a été faite par *EXP Associates Inc.* avec les sols prélevés lors de la caractérisation environnementale.

Lors de cette première caractérisation, cinq forages ont été réalisés jusqu'au roc, puis le roc en place a été carotté jusqu'à 5,8 m de profondeur et des puits d'observations ont été installés dans chaque forage. Les puits sont situés à l'ouest (TH1 et TH2) et à l'est (TH4 et TH5) des ilots de pompes, ainsi qu'à l'ouest des réservoirs souterrains (TH3).

Ces études ont déterminé que les sols naturels sur le site sont du till composé de silt sableux et argileux dont la conductivité hydraulique serait d'environ 10^{-5} cm/s. Le roc en place a été rencontré entre 2,7 et 3,4 m de profondeur.

Les analyses ont démontré l'absence de contamination dans les sols dans les cinq sondages réalisés.

L'eau souterraine dans les puits a été rencontrée entre 3,25 et 4,21 m de profondeur, généralement autour du niveau du sommet du roc. Aucune phase libre n'a été observée dans

les puits. L'écoulement souterrain se ferait vers le sud-ouest selon les élévations du niveau d'eau mesurées.

Les analyses de l'eau souterraine ont démontré la présence d'une contamination de l'eau souterraine dans trois des cinq puits (TH3, TH4 et TH5) pour les paramètres hydrocarbures pétroliers F1 à F4, Hexane (Ha) et BTEX.

En octobre 2011, deux autres forages ont été réalisés plus au sud, à l'ouest et à l'est du lave-auto et ont été converti en puits d'observations dans le roc. Aucune contamination n'a été mesurée dans les sols et l'eau souterraine à l'endroit de ces ouvrages.

3.2.3. Remplacement de réservoirs souterrains– Barenco 2011

Un programme de remplacement de réservoir a été réalisé en décembre 2011 pour le compte de la compagnie *Impérial Oil.* La station-service était opérée sous la bannière *ESSO.*

Les quatre réservoirs souterrains présents sur le site ont été vidés, nettoyés, démantelés puis retirés du site en octobre 2011. La tuyauterie souterraine les reliant aux ilots et aux tuyaux de ventilation a été laissée en place.

Le fond de l'excavation et une partie des parois étaient soit constitués de roc en place, soit de pierre concassée. Des échantillons ont été prélevés sur les parois de l'excavation où des sols étaient présents à neuf endroits sur chaque paroi. Des mesures en chantier ont été prises avec un détecteur de gaz. Quatorze échantillons de sols provenant des parois ont été soumis aux analyses. De faibles concentrations de BTEX ont été mesurées dans les sols de certains échantillons, mais aucun ne dépassait les critères applicables.

Quatre piles d'environ 50 tonnes chacune de déblais d'excavation pouvant être réutilisés ont été placées temporairement à proximité de l'excavation. Des sous-échantillons ont été prélevés dans chaque pile lors de leur entreposage. Deux des échantillons ont été soumis pour analyse en laboratoire et ont démontré l'absence de contamination dans ces sols. Un total de 627 t.m. de sols ne pouvant être utilisés comme matériaux de remblai ont été disposés hors-site.

Les nouveaux réservoirs ont été replacés dans l'excavation réalisée pour le retrait des anciens réservoirs. L'excavation a été remblayée avec la pierre concassée des déblais non contaminés et avec d'autres pierres concassées importées.

3.2.4. ÉES-Phase II– EXP 2013 - 2014

Une caractérisation environnementale des sols et de l'eau souterraine a été réalisée par EXP Energy Services Ltd (EXP) (anciennement Barenco Inc.) pour le compte de la compagnie *Imperial Oil*.

Cinq forages ont été réalisés dans les rues le long de la propriété au nord (Viewmount Drive) (TH8 et TH9) et à l'est (Merivale Road) (TH10 à TH12) afin de délimiter le panache d'eau souterraine contaminée.

Aucune contamination n'a été mesurée dans les sols. De la contamination en F1 et F2 a été mesurée dans l'eau souterraine pour les trois (3) puits situés le long de Merivale Road. Le niveau de l'eau souterraine se situe dans le roc qui a été rencontré à 2,44 m. Le sens d'écoulement de l'eau souterraine est vers le sud-ouest. Le puits TH9 était sec.

En 2014, EXP a procédé à une autre campagne de caractérisation dans les rues voisines, plus loin du site. Trois autres puits (TH100 à TH102) ont été installés plus à l'est et au nord-est. Aucune contamination n'a été mesurée dans les sols prélevés dans ces forages. L'eau souterraine était contaminée en F1 et F2 dans les deux puits installés à l'est des puits TH10 à TH12 dans la route Merivale, alors que celui au nord-est ne présentait pas de contamination. Le puits TH9 contenait de l'eau souterraine qui a été analysée. L'eau était contaminée en F1, F2 et F3 dans ce puits.

3.2.5. Suivi de l'eau souterraine– EXP 2014 et Golder 2015-2017

Des caractérisations de l'eau souterraine dans les puits sur le site et dans les rues ont été réalisées par *EXP* et *Golder* pour le compte de la compagnie *Imperial Oil*.

Des campagnes d'échantillonnages ont été réalisées en 2013 et 2014. Deux autres puits ont été installés en 2015 au sud et sud-ouest du puits TH7, près de la limite avec le voisin sud qui est résidentiel.

Aucune contamination de l'eau souterraine n'a été mesurée de 2011 à 2016 dans les puits TH1, TH2 et TH6, tous situés du côté ouest des installations. La contamination en F1 et F2 présente dans le puits TH3 montrait une diminution dans le temps jusqu'à respecter les critères en 2015. Les concentrations en BTEX, Ha, F1, F2 et F3 semblent également diminuer dans le puits TH4. Dans le puits TH5, les concentrations en BTEX, Ha et F1 ont diminué, mais celles en F2, F3 et F4 ont monté en 2013 avant de redescendre en 2014 et remonté en 2016. Finalement, les concentrations semblent avoir augmenté jusqu'en 2014 dans le puits TH7 qui présentait des dépassements en F1 et F2 pour ensuite redescendre sous les critères en 2016. Le puits MW15-02 installé en 2015 au sud du puits TH7 a montré une contamination en 2015, mais plus faible en 2016. La contamination semble donc migrée vers le sud.

Des suivis de l'eau souterraine ont également été réalisés jusqu'en 2017 dans les puits des rues environnantes. Une diminution des concentrations dans l'eau est notable dans la plupart des puits entre 2013 et 2015, mais une augmentation des concentrations a été notée dans plusieurs en 2016 et/ou 2017.

3.2.6. Plan de contrôle de la contamination / analyse de risque– EXP 2014 et Golder 2016

Un plan de contrôle de la contamination a été recommandé par *EXP* en 2014. Ce plan consistait à procéder à un suivi annuel de la présence de phase flottante, de l'analyse de l'eau souterraine.

Un plan de contrôle de la contamination a également été recommandé par *Golder* en 2016 pour la contamination de l'eau souterraine dans les rues environnantes. Ce plan consistait à procéder à un suivi annuel de la présence de phase flottante, de l'analyse de l'eau souterraine.

Une analyse du niveau de risque lié à la contamination de l'eau souterraine dans le roc a été réalisée par Golder en 2016. Cette analyse a démontré que la contamination de l'eau

souterraine dans le roc en place sous la rue ne représentait pas un risque pour la santé humaine ou des récepteurs écologiques.

3.2.7. Caractérisation des sols et de l'eau souterraine– GHD 2022

Une caractérisation des sols et de l'eau souterraine a été réalisée par GHD pour la compagnie Canadian Tire Corporation en aout 2022. Cette étude visait à comparer l'état de la contamination par rapport à celle présente en 2011, avant que CTP ne commence à opérer sur le site.

Pour ce faire, l'eau souterraine a été échantillonnée dans les puits existants sur le site et des forages ont été réalisés à côté des puits pour échantillonner les sols. L'un des puits n'était plus fonctionnel et a dû être refait.

Les concentrations mesurées dans les sols étaient toutes inférieures aux critères applicables selon la table 3 du MOE.

Les concentrations dans l'eau souterraine dans les puits TH1 à TH3, TH6, TH7 et MW15-02 étaient toutes inférieures aux critères applicables selon la table 3 du MOE. Des dépassements ont été mesurés en Xylènes (X), F1 et F2 dans les puits TH4 et TH5 situés à l'est et au sud des ilots de pompes.

4. DISCUSSION

4.1. Hydrogéologie et modèle conceptuel

Selon notre interprétation, la nappe d'eau souterraine se situe généralement dans le roc à une profondeur variant entre 2,3 m et 5,0 m sous la surface selon les saisons et l'emplacement sur le site. Le roc se situe généralement à une profondeur d'environ 3 m dans la partie nord du site, environ 5 m autour du lave-auto, soit le haut d'un talus et d'environ 2 m à la limite sud du site en bas de talus.

Les infrastructures actuelles et anciennes ont été remblayées avec des matériaux granulaires perméables et peuvent agir comme des zones de recharge pour le roc avec un apport de la surface et/ou des égouts.

Des nappes perchées peuvent être présentes dans les remblais ou au contact du roc. L'écoulement à cet endroit et dans les remblais est influencé par une conductivité accrue à l'interface du roc (voie de migration préférentielle) et selon l'arrangement des infrastructures souterraines. Le roc résiste à l'infiltration en comparaison au remblai. La nappe perchée peut disparaître selon les saisons (intermittente).

Selon les informations fournis lors du remplacement des réservoirs souterrains, ceux-ci sont placé directement sur le roc, entourés de pierre concassée. En cas d'évènements (fuite, déversement, bris, etc.) des contaminants en provenance des installations pétrolières devraient se disperser horizontalement à l'interface du roc d'une part et s'infiltrer dans le réseau de fissures du roc verticalement d'une autre part, mais plus lentement, jusqu'à l'eau souterraine. La contamination s'étendra ensuite sur la nappe et sera entraînée dans le sens d'écoulement de l'eau souterraine en solution.

La direction de l'écoulement régional s'effectue en direction sud-est vers la rivière Rideau, L'écoulement local semble généralement s'effectuer de manière radiale autour des infrastructures pétrolières et généralement vers le sud, le sud-ouest et le sud-est selon les relevés des différentes études. Les figures des études antérieures de GHD et Golder à l'annexe B, présentent la direction générale de l'écoulement mesurée au moment des relevés.

4.2. Choix des critères de comparaison

Le choix de la table de critères a été validé. Sur la base de l'analyse de l'ensemble de l'information, le site de Napean, utilisé à des fins commerciales, est en situation de sols majoritairement fins, de dépôt profond et l'eau souterraine n'est pas utilisée à des fins d'approvisionnement en eau potable. Sur cette base, l'utilisation des critères de la Table 3 est justifiée.

4.3. Évolution du niveau de contamination

Une comparaison a été faite entre la caractérisation des sols et des eaux souterraines en 2022 par rapport à celle faite en 2011 et dans les années subséquentes.

- Contamination dans les sols

Les résultats d'analyse obtenus sur les sols en 2022 ont montré des concentrations généralement non détectables. Seules les concentrations en BTEX et métaux, mesurées dans le forage BH-5-22, dépassaient légèrement la limite de détection. En 2011, seul l'éthylbenzène (E) présentait une concentration détectable. Les différences entre les deux sont cependant non significatives. La contamination en provenance de la base des infrastructures pétrolières a probablement pénétré directement le roc sans impacter les sols autour des infrastructures. Aucune nouvelle contamination des sols n'a été identifiée.

- Positionnement des ouvrages

Les forages et des puits sont généralement positionnés de manière à intercepter une éventuelle contamination en provenance des équipements. Un puits additionnel aurait été souhaité entre la fosse des réservoirs et l'ilot des pompes pour intercepter des indices de contamination en provenance de la fosse des réservoirs. Les infrastructures souterraines dans ce secteur limitent probablement l'emplacement possible d'un éventuel puits.

- Aménagement des puits

Selon les fiches de sondages montrant la stratigraphie des sols et du roc observés lors de l'installation des puits d'observations, ainsi que les détails d'installation des puits, la plupart des puits ont été installés avec un intervalle crépinée située dans le roc en place seulement. Les relevés des niveaux d'eau ont cependant montré dans certains cas que le niveau de l'eau souterraine était situé un peu au-dessus de l'intervalle crépinée. Aucune phase flottante n'a été observée dans puits, mais le niveau de l'eau souterraine dans les puits présentant de la contamination au-delà des critères était tous au-dessus du niveau de la crépine. Dans ces

conditions, une éventuelle phase flottante ne serait pas interceptée par le puits et ne pourrait donc pas être observée. Les données relatives à la phase flottante sont donc mises en doute.

- Méthode d'échantillonnage des eaux souterraines

Toutes les études indiquent que l'échantillonnage à faible débit a été utilisé pour l'échantillonnage de l'eau souterraine. Cette méthode d'échantillonnage est adaptée au type de contaminant présent sur le site.

- Sélection des paramètres analytiques

L'eau de plusieurs puits, généralement dans le secteur est du site et dans la rue, présente des dépassements des critères applicables en 2022. Le choix des paramètres analytiques de GHD qui correspond seulement aux benzène (B), xylènes (X) et F1-F2 ne couvre pas l'ensemble des paramètres problématiques préalablement identifiés. Des dépassements également mesurés occasionnellement en E, F3-F4 et Ha antérieurement au puits TH-5 n'ont pas été analysés en 2022.

- Contamination de l'eau souterraine

L'évolution des concentrations est présentée sous forme de graphiques normalisés à l'annexe C. La normalisation des concentrations correspond à diviser la concentration maximale obtenue pour un paramètre et un puits donné. Des histogrammes ont également été préparés pour représenter visuellement les paramètres les plus problématiques, soit les BTEX et les F1 et F2.

L'analyse des graphiques permet de montrer que la plupart des concentrations sont demeurées stables ou présentent une diminution par rapport aux concentrations mesurées dans les années précédentes.

- TH4 & TH5

  Les concentrations en B, X, F1, F2 analysées dans l'eau souterraine des puits TH4 et TH5 oscillent à la hausse et à la baisse durant la période d'occupation de CTP. Elles demeurent dans le même ordre de grandeur durant toute la période à l'exception d'une augmentation significative en F2 mesurée en 2013 dans les deux puits sans cependant augmentation des autres paramètres. Les concentrations mesurées en 2022 sont cependant inférieures aux concentrations initiales mesurées en 2011.

- TH7

  Une légère hausse suivie d'une baisse des concentrations a été constatée autour de 2014 dans le puits TH7. Le profil de la contamination est cependant resté le même.

- TH1

  Finalement, une concentration en F4 de 1200 ppm a été mesurée dans le puits TH1 en 2016, alors que ce paramètre a toujours été non détectable dans les autres campagnes d'échantillonnage. Selon les observations du laboratoire, une grande quantité de sédiments était présente dans l'échantillon. De plus, ce puits avait été échantillonné après le puits TH5 qui présentait une telle contamination. Ce puits a été rééchantillonné quelques semaines plus tard et les F4 étaient de nouveau non détectables. Il est possible que cette contamination origine d'une contamination croisée. Cette valeur est considérée comme une anomalie.

Les variations observées sont probablement dues aux changements du niveau de l'eau souterraine qui pourraient entrainer une solubilisation d'une contamination à la surface du roc. Selon les profils de contamination mesurés, cette contamination semble ancienne en raison du fractionnement observé.

De manière générale, la contamination mesurée dans l'eau souterraine semble provenir d'évènements antérieurs à l'occupation par CTP.

Les activités de CTP sur le site ne semblent pas avoir augmenté de manière significative la contamination dans l'eau souterraine par rapport au niveau initial de 2011. Les concentrations importantes mesurées en F2 au droit des puits TH4 et TH5 sont probablement reliées à une solubilisation de contaminant présents à l'interface du roc. Une nouvelle contamination aurait plutôt été associée à une augmentation simultanée des fractions plus légères. Cet évènement est donc associé à une contamination plus ancienne.

5. CONCLUSION ET RECOMMANDATIONS

5.1. Conclusion

La révision des études soumises indique que le terrain à l'étude a supporté deux générations de station-service avec des ilots de pompe à des endroits différents et un garage mécanique. Les installations actuelles sont présentes depuis les années 1980. Les réservoirs souterrains semblent toujours avoir été dans le coin nord-est du site.

La révision de ces rapports indique l'absence de contamination au niveau des sols. Les sols du site sont donc conformes aux critères applicables. De plus, aucune nouvelle contamination des sols sur le site n'a été identifiée.

Elle confirme toutefois qu'une contamination de l'eau souterraine persiste depuis au moins 2011, principalement dans le secteur des puits TH4 et TH5 situés à l'est et au sud des ilots de pompes. De 2011 à 2022, les concentrations semblent avoir diminuées de manière générale avec quelques augmentations sporadiques qui sont probablement reliées à la solubilisation d'une contamination ancienne lors de la fluctuation du niveau de la nappe.

Les données disponibles ne permettent pas de mettre en doute l'intégrité des équipements pétroliers.

Ainsi, il ne semble pas que l'opération par CTP ait augmenté significativement la contamination du site.

5.2. Recommendations

- Il est recommandé que des essais soient régulièrement réalisés sur les équipements pétroliers, notamment les ilots de pompes et la tuyauterie entre les réservoirs et les ilots, afin de valider leur intégrité et leur étanchéité si cette information n'est pas déjà disponible.

- Il est recommandé d'intégrer la surveillance des puits d'observation (reniflards) installés dans la fosse des réservoirs au programme de surveillance courant.

- Comme recommandation générale, le plan de contrôle de la contamination consistant en un suivi annuel des concentrations de contaminants dans l'eau souterraine et une vérification de phase flottante en place depuis 2014. Ceci devrait être poursuivi étant donné qu'il y a toujours présence d'une contamination dans l'eau souterraine. Les paramètres à analyser dans l'eau souterraine devraient minimalement inclure les BTEX, les F1 et les F2 dans tous les puits, ainsi que les F3, F4 et l'hexane dans les puits TH4 et TH5.

- L'aménagement de nouveaux puits avec l'espace crépiné chevauchant l'interface du roc et l'intervalle de fluctuation de la nappe phréatique est recommandé pour statuer sur la présence ou non de phase flottante. Ces puits pourraient être positionnés dans le secteur au sud-est des îlots où la contamination de l'eau souterraine est toujours présente.

- D'autres sondages pourraient également être réalisés à l'emplacement de l'ancien garage mécanique et des anciens îlots où de l'information est manquante pour établir le niveau de contamination global du site. Cette recommandation n'est pas nécessairement en lien avec l'occupation par CTP.

Lors de la cessation définitive des activités de la station-service, une caractérisation du terrain (Phase I et Phase II – sol et eau souterraine) selon les exigences de la Section IV.2.1 de la LQE, et l'attestation des rapports par un expert du MELCC seront obligatoires. Ceci inclura également l'inscription d'un avis de contamination sur le registre foncier (par le

propriétaire) selon l'article 31.58 de la section IV.2.1. de la LQE pour toute contamination excédant les valeurs limites de l'annexe I du RPRT (soit le niveau B du GI du MELCC).

Espérant le tout à votre entière satisfaction, nous vous prions d'agréer, Monsieur Wilkins, l'expression de nos sentiments les meilleurs.

Rédigé par :

Mathieu Bélisle, Ing., M.Sc.A.
Gestionnaire de projets
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Révisé et approuvé par :

Guylaine Lebel, ing., M. Ing., P.Eng.
Directrice – Projets majeurs & CEME
Experte inscrite à la liste du MELCC
Groupe C. Laganière (1995) inc.

6. RÉFÉRENCES

- ASSOCIATION OF PROFESSIONAL GEOSCIENTISTS OF ONTARIO - Guidance for Environmental Site Assessments under Ontario Regulation 153/04 (as amended) - April 2011

- INTERSTATE TECHNOLOGY REGULATORY COUNCIL - Technical and Regulatory Guidance: Protocol for Use of Five Passive Samplers to Sample for a Variety of Contaminants in Groundwater Prepared by The Interstate Technology & Regulatory Council Diffusion/Passive Sampler Team

- MINISTRY OF THE ENVIRONMENT, ONTARIO - Guide for Completing Phase Two Environmental Site Assessments under Ontario Regulation 153/04, June 2011

- MINISTRY OF THE ENVIRONMENT, ONTARIO - Soil, ground water and sediment standards for use under Part XV.1 of the Environmental Protection Act

- TANK SAFETY AND STANDARDS AUTHORITY – Environmental Management Protocol for Fuel Handling Sites in Ontario, TSSA: EMP-2012, August 2012

- *COMPOSITION DE L'ESSENCE :* Lignes directrices d'intervention lors de l'enlèvement de réservoirs souterrains ayant contenu des produits, pétroliers, Direction des politiques du secteur industriel, Service des lieux contaminés, Ministère de l'environnement et de la faune, Québec -1996.

- Quarterly Journal of Engineering Geology and Hydrogeology, Vol. 50, 2017, pp.333-346; Heavy hydrocarbon fate and transport in the Environment, Brown, D.M., Bonte, M., Gill, R., Dawick, J. and Boogaard, P.,J., Shell Global Solutions International, BV, Shell Health, Global Risk Sciences, Shell Int. B.V. Manchester UK, Hagues Netherlands.

- Études consultées: voir tableau 1 de l'annexe A

7. ANNEXES

- Annexe A / Tableau
  - Liste des études consultées dans le cadre de la rédaction de cet avis professionnel

- Annexe B / Figures
  - 1. Groundwater analytical results – BTEX, PHC, FRACTIONS F1 - F4, n-HEXANE LEAD, Golder, 2017
  - 2. Summary of groundwater analytical results, GHD, 2022
  - 3. Direction de l'eau souterraine

- Annexe C / Graphiques
  - Évolution de la contamination dans les puits.

TABLEAU 1 Études consultées pour établir le tableau 1

Numéro	Année	Firme	Sujet	Titre
1	2011	Barenco	Évaluation environnementale de site Phase I	Phase I Environmental Assessment, 1660 Merivale Road, Ottawa, Ontario. Prepared for Imperial Oil by Barenco Inc. November 9, 2011.
2	2011	Barenco	Évaluation environnementale de site Phase II	Phase II Environmental Assessment, 1660 Merivale Road, Ottawa, Ontario. Prepared for Imperial Oil by Barenco Inc. September 14, 2011.
3	2011	Barenco	Caractérisation comlémentaire	Baseline Environmental Assessment, 1660 Merivale Road, Ottawa, Ontario. Prepared for Imperial Oil by Barenco Inc. December 5, 2011.
4	2011	Barenco	Remplacement de réservoirs souterrains	Tank Remplacement Program, 1660 Merivale Road, Ottawa, Ontario. Prepared for Imperial Oil by Barenco Inc. December 23, 2011.
5	2013	EXP	Évaluation environnementale de site Phase II	Phase II Environmental Assessment, Adjacent to 1660 Merivale Road, Ottawa, Ontario. Prepared for Imperial Oil by EXP Energy Service Ltd. December 5, 2013.
6	2014	EXP	Suivi de l'eau souterraine	Ground Water Monitoring and Sampling Program Report, 1660 Merivale Road, Ottawa, Ontario. Prepared for Imperial Oil by EXP Energy Service Ltd. August, 2014.
7	2014	EXP	Caractérisation complémentaire	Supplemental Phase II Environmental Assessment, Adjacent to 1660 Merivale Road, Ottawa, Ontario. Prepared for Imperial Oil by EXP Energy Service Ltd. November 20, 2014.
8	2015	EXP	Plan de gestion de la contamination	Interim Contaminant Management Plan, 1660 Merivale Road, Ottawa, Ontario. Prepared for Imperial Oil by EXP Energy Services Ltd. April 2, 2015.
9	2016	Golder	Analyse de risque	Screening Level Risk Assessment, Right-of-way adjacent to 1660 Merivale Road, Ottawa, Ontario. Prepared for Imperial Oil by Golder Associates. May 3, 2016.
10	2016	Golder	Suivi de l'eau souterraine	2015 Groundwater Monitoring and Sampling Report, Adjacent to 1660 Merivale Road, Ottawa, Ontario. Prepared for Imperial Oil by Golder Associates. May 6, 2016.
11	2016	Golder	Caractérisation complémentaire et suivi de l'eau souterraine	2015 Supplemental Subsurface, Groundwater Monitoring and Sampling Investigation, 1660 Merivale Road, Ottawa, Ontario. Prepared for Imperial Oil by Golder Associates. May 6, 2016.
12	2016	Golder	Suivi de l'eau souterraine	2016 Groundwater Monitoring and Sampling Report, Adjacent to 1660 Merivale Road, Ottawa, Ontario. Prepared for Imperial Oil by Golder Associates. November 21, 2016.
13	2017	Golder	Suivi de l'eau souterraine	2016 Groundwater Monitoring and Sampling Report, Former Imperial Oil Retail Fuel Outlet, 1660 Merivale Road, Ottawa, Ontario. Prepared for Imperial Oil by Golder Associates. January 31, 2017.
14	2017	Golder	Plan de gestion de la contamination	Contaminant Management Plan, Adjacent to 1660 Merivale Road, Ottawa, Ontario. Prepared for Imperial Oil by EXP Energy Services Ltd. May 19, 2017.
15	2021	Golder	Suivi de l'eau souterraine	2017 Groundwater Monitoring and Sampling Report, Adjacent to 1660 Merivale Road, Ottawa, Ontario. Prepared for Imperial Oil by Golder Associates. August 11, 2017.
16	2022	GHD	Caractérisation des sols et de l'eau souterraine	Soil and Groundwater Quality Investigation, 1660 Merivale Road, Ottawa, Ontario. Prepared for Canadian Tire Corporation (CTC) by GHD. August 25, 2022.

TH1 — Screen Interval: 2.6 to 5.6 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-11	<0.20	<0.20	<0.20	<0.40	<25	<100	<100	<100	<5.0	<0.50
13-Jun-13	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	0.53
26-Aug-14	<0.20	0.75	<0.20	1.2	<25	<100	<200	<200	<5.0	<0.50
17-Nov-15	<0.20	0.27	0.28	<0.40	<25	<100	<200	<200	<5.0	<0.50
10-Aug-16	<0.20	<0.20	<0.20	<0.40	<25	<100	300	1,200[IN]	<5.0	<0.50
5-Dec-16	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	na	<0.50

TH2 — Screen Interval: 3.2 to 4.7 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-11	0.77	<0.20	1.3	0.48	<25	<100	<100	<100	<5.0	<0.50
13-Jun-13	0.62	<0.20	2.2	<0.40	<25	<100	<200	<200	<5.0	<0.50
27-Aug-14	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
17-Nov-15	<0.20	0.29	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
9-Aug-16	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50

TH3 — Screen Interval: 3.2 to 4.7 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-11	27	2.4	79	150	1100	430	<100	130	20	3.8
31-Aug-11 (DUP)	23	2.1	69	130	1100	380	<100	110	17	3.9
13-Jun-13	11	0.61	66	85	900	350	<200	<200	<5.0	3.1
26-Aug-14	14	0.28	19	5.2	520	180	<200	<200	<5.0	2.2
28-Oct-15	25	<0.20	15	0.89	450	<100	<100	<200	<5.0	2.0
10-Aug-16	42	<0.20	26	1.5	560	110	<200	<200	<5.0	0.98

TH4 — Screen Interval: 3.4 to 4.9 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-11	610	610	3,400	19,000	26,000	17,000	360	170	540	2.6
13-Jun-13	200	35	1200	4,300	6,200	19,000	580	430	<100	5.8
26-Aug-14	500	37	1400	2600	4,700	1400	<200	<200	58	3.0
26-Aug-14 (DUP)	540	40	1600	2700	400	1400	<200	<200	62	1.9
17-Nov-15	180	18	560	930	1,900	940	240	230	<100	3.1
10-Aug-16 (DUP A)	190	9.7	490	1,400	1,600	400	210	<200	31	1.7
10-Aug-16	210	11	550	1,500	1,800	370	<200	<200	27	1.1

TH5 — Screen Interval: 3.5 to 5.0 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
31-Aug-11	750	140	3,000	13,000	85,000	20,000	690	620	1,400	5.5
13-Jun-13	530	44	1600	3800	9,900	160,000	12,000	6,800	<100	8.3
13-Jun-13 (DUP)	550	44	1600	3800	9,200	110,000	7,000	4,300	<100	8
27-Aug-14	450	46	1600	3100	11,000	2,800	<200	<200	210	4.1
17-Nov-15	360	26	930	1,300	3,300	2,900	320	240	<100	3.7
10-Aug-16	420	43	1,500	3,700	13,000	11,000	1,100	810	240	0.81

TH6 — Screen Interval: 3.6 to 5.1 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
20-Oct-11	<0.20	<0.20	<0.20	<0.40	<25	<100	<100	<100	<5.0	<0.50
20-Oct-11 (DUP)	<0.20	<0.20	<0.20	<0.40	<25	<100	<100	<100	<5.0	<0.50
13-Jun-13	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	0.6
27-Aug-14	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
28-Oct-15	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
9-Aug-16	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50

TH7 — Screen Interval: 4.4 to 5.8 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
14-Nov-11	31	5.4	160	340	430	<100	<100	<100	<30	<0.5
13-Jun-13	37	2.8	140	130	550	460	<200	<200	<5.0	3.2
27-Aug-14	150	18	610	730	1,900	540	<200	<200	22	2.1
28-Oct-15	93	8.4	270	300	1,000	280	<200	<200	<5.0	1.2
9-Aug-16	62	5.8	120	140	500	150	<200	<200	<5.0	<0.50

MW15-01 — Screen Interval: 3.0 to 6.0 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
17-Nov-15	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
9-Aug-16	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50

MW15-02 — Screen Interval: 2.7 to 4.9 mbgs

Date	B	T	E	X	F1	F2	F3	F4	HA	Pb
17-Nov-15	44	5.9	180	170	2,300	750	<200	<200	35	2.2
9-Aug-16	78	4.7	73	25	800	450	<200	<200	5.5	<0.50

ONTARIO STANDARDS

PARAMETERS	B	T	E	X	F1	F2	F3	F4	HA	Pb
STANDARDS[a]	430	18,000	2,300	4,200	750[IC]	150	500	500	520	25
RDL	0.20	0.20	0.20	0.40	25	100	200	200	10	0.50

(a) O.REG 153 (2011) TABLE 3 FULL DEPTH GENERIC SITE CONDITION STANDARDS FOR ALL TYPES OF PROPERTY USE FOR GROUNDWATER IN MEDIUM AND FINE TEXTURED SOIL IN IN A NON-POTABLE GROUND WATER CONDITION.

LEGEND

PROPERTY BOUNDARY

BOREHOLE LOCATION COMPLETED AS A MONITORING WELL

LIST OF APPLICABLE ABBREVIATIONS

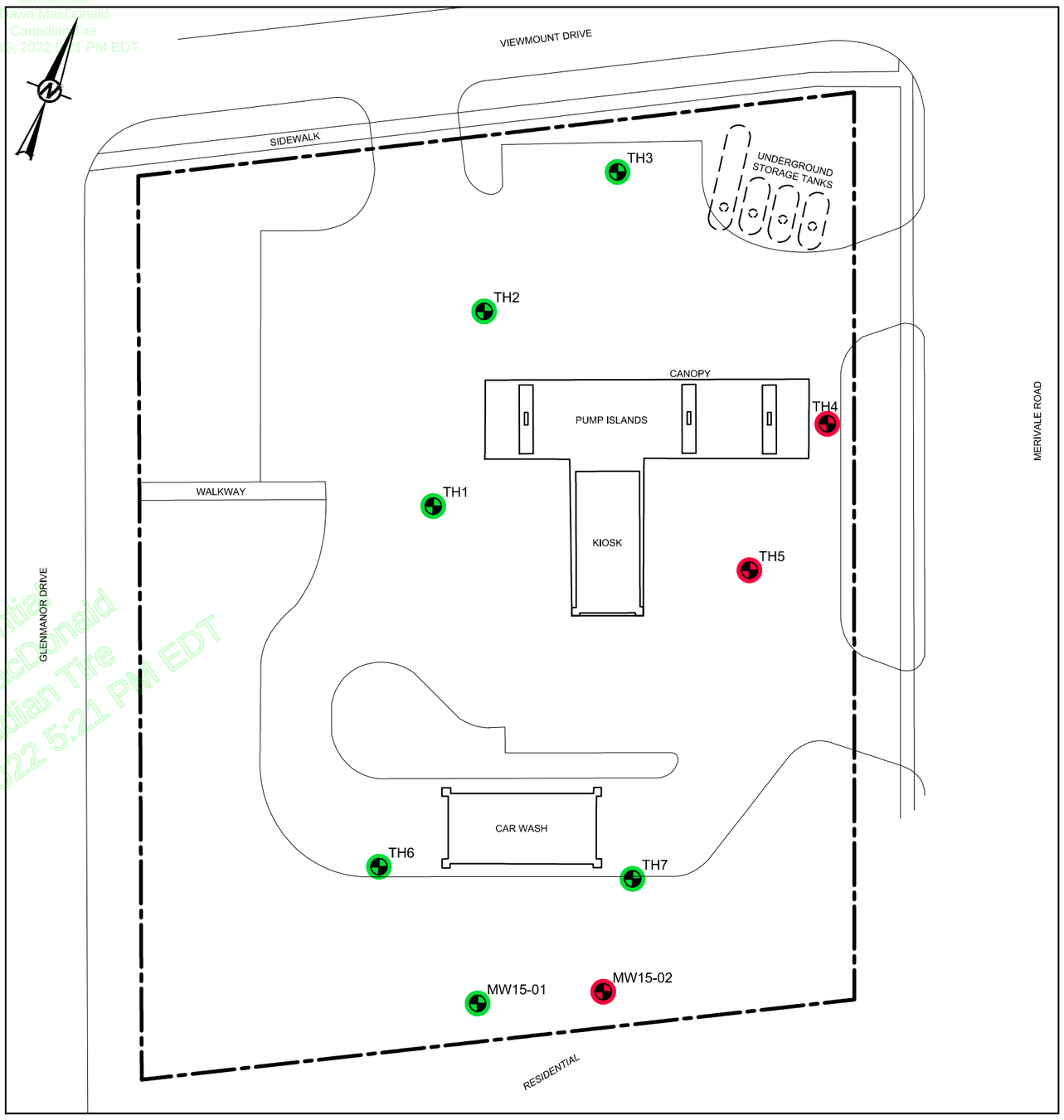
<	LESS THAN
µg/L	MICROGRAMS PER LITRE
B	BENZENE
T	TOLUENE
E	ETHYLBENZENE
X	XYLENES
DUP	DUPLICATE FIELD SAMPLE
F1	PETROLEUM HYDROCARBON FRACTION 1 (C_6-C_{10}) MINUS BTEX
F2	PETROLEUM HYDROCARBON FRACTION 2 (C_{10}-C_{16})
F3	PETROLEUM HYDROCARBON FRACTION 3 (C_{16}-C_{34})
F4	PETROLEUM HYDROCARBON FRACTION 4 (C_{34}-C_{50})
HA	n-HEXANE
mbgs	METRES BELOW GROUND SURFACE
Pb	LEAD
O.REG	ONTARIO REGULATION
RDL	REPORTABLE DETECTION LIMIT

NOTES

1. LOCATIONS WHERE MOST RECENT GROUNDWATER SAMPLE MEETS APPLICABLE STANDARDS FOR ALL PARAMETERS ANALYZED SHOWN IN **GREEN.**
2. LOCATIONS WHERE MOST RECENT GROUNDWATER SAMPLE EXCEEDS APPLICABLE STANDARDS FOR AT LEAST ONE OF THE PARAMETERS ANALYZED SHOWN IN **RED.**
3. EXCEEDANCES OF APPLICABLE STANDARDS IN TEXT ARE SHOWN IN **RED.**
4. LOCATION WHERE NO SAMPLES WERE TAKEN IN THE MOST RECENT SAMPLING EVENT SHOWN IN **BLACK**.
5. ALL RESULTS IN µg/L.

REFERENCE

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No.: 11010-SITE PLAN ONSITE-JUN14; SCALE: UNKNOWN; DATE: JUNE 2014.



0 10 20
1:500 METRES

CLIENT
IMPERIAL OIL LIMITED

CONSULTANT
Golder Associates

YYYY-MM-DD	2017-01-31
DESIGNED	BMcParlan
PREPARED	AMehdilou
REVIEWED	LBurger
APPROVED	SCarrelas

PROJECT
ACTIVE RETAIL OUTLET
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
GROUNDWATER ANALYTICAL RESULTS - BTEX, PHC FRACTIONS F1 - F4, n-HEXANE AND LEAD

PROJECT NO.	PHASE-TASK	REV.	FIGURE
1544125	1155-2016	1	5

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25 mm

confidential
Dawn MacDonald
Canadian Tire
Mar 16, 2022 5:21 PM EDT

Path: \\golder.gds\gal\Windsor\Active\CAD\IMPERIAL_OIL\DOWNSTREAM\OTTAWA_ON_1660_MERIVALE_ROAD\99_PROJECT\S\1544125\02_PRODUCTION\1155-2016\DWG\ONSITE\ | File Name: 1544125-1155-0005.dwg

TH8										Screen Interval: 3.3 to 4.9 mbgs
Date	**B**	**T**	**E**	**X**	**F1**	**F2**	**F3**	**F4**	**HA**	**Pb**
13-Jun-13	3.9	<0.20	4.1	0.61	48	<100	<200	<200	<0.5	1.1
27-Oct-15	4.4	<0.20	0.51	0.41	<25	<100	<200	<200	<5.0	0.82
10-Aug-16	3.0	<0.20	0.66	<0.40	70	<100	<200	<200	<5.0	0.77

TH9										Screen Interval: 3.4 to 4.9 mbgs
Date	**B**	**T**	**E**	**X**	**F1**	**F2**	**F3**	**F4**	**HA**	**Pb**
06-Oct-14	31	3	230	290	1,000	570	610	420	15	1.1
27-Oct-15	51	7.2	390	350	2,500	1,100	220	360	35	2.6
10-Aug-16	23	1.8	250	70	1,600	350	<200	<200	11	1.1
20-Jun-17	36	5.5	460	370	4,200	1,200	<200	<200	NA	2.3

TH10										Screen Interval: 3.3 to 4.9 mbgs
Date	**B**	**T**	**E**	**X**	**F1**	**F2**	**F3**	**F4**	**HA**	**Pb**
11-Jun-13	73	58	52	200	1,400	560	<200	<200	35	1.2
TH10 decomissioned August 24, 2016										

TH11										Screen Interval: 3.3 to 4.9 mbgs
Date	**B**	**T**	**E**	**X**	**F1**	**F2**	**F3**	**F4**	**HA**	**Pb**
11-Jun-13	370	34	2,200	3,400	11,000	1,400	<200	<200	130	2.6
28-Oct-15	96	8.1	710	120	4,400	2,500	1,300	820	72	4.6
11-Aug-16	100	6.3	590	160	5,000	6,700	2,200	1,300	37	6.0
11-Aug-16 DUP	110	7.1	610	170	4,900	7,100	2,400	1,400	43	3.3

TH12										Screen Interval: 3.3 to 4.9 mbgs
Date	**B**	**T**	**E**	**X**	**F1**	**F2**	**F3**	**F4**	**HA**	**Pb**
11-Jun-13	380	35	2,300	3,500	11,000	3,100	<200	<200	<100	6.8
11-Jun-13 DUP	360	34	2,300	3,500	11,000	2,800	<200	<200	<100	6.9
28-Oct-15	95	14	620	400	4,500	1,600	540	320	140	4.5
11-Aug-16	130	17	1,100	630	6,800	1,800	900	510	120	2.1
20-Jun-17	160	11	1,200	170	7,900	2,800	750	460	NA	3.8
20-Jun-17 DUP	150	11	1,200	160	7,300	2,600	700	430	NA	4.5

TH100										Screen Interval: 3.0 to 4.9 mbgs
Date	**B**	**T**	**E**	**X**	**F1**	**F2**	**F3**	**F4**	**HA**	**Pb**
06-Oct-14	<0.20	<0.20	0.31	0.91	<25	<100	<200	<200	<5.0	<0.50
27-Oct-15	<0.20	<0.20	0.94	1.1	<25	<100	<200	<200	<5.0	<0.50
27-Oct-15 DUP	<0.20	<0.20	0.24	<0.40	<25	<100	<200	<200	<5.0	<0.50
10-Aug-16	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	<5.0	<0.50
20-Jun-17	<0.20	<0.20	<0.20	<0.40	<25	<100	<200	<200	NA	<0.50

TH101										Screen Interval: 3.0 to 4.9 mbgs
Date	**B**	**T**	**E**	**X**	**F1**	**F2**	**F3**	**F4**	**HA**	**Pb**
06-Oct-14	85	12	580	500	4,100	830	<200	<200	44	2.9
06-Oct-14 DUP	84	12	580	510	4,100	910	<200	<200	54	4.2
28-Oct-15	110	16	740	590	3,400	830	<200	<200	64	4.6
11-Aug-16	49	8.6	580	390	2,200	590	<200	<200	23	0.63
20-Jun-17	76	14	870	410	4,800	1,100	<200	<200	NA	0.84

TH102										Screen Interval: 3.0 to 4.9 mbgs
Date	**B**	**T**	**E**	**X**	**F1**	**F2**	**F3**	**F4**	**HA**	**Pb**
06-Oct-14	0.72	0.52	16	42	360	360	<200	<200	7.2	3.9
28-Oct-15	42	1.6	100	140	970	350	<200	<200	23	1.5
11-Aug-16	8.3	<0.20	33	21	510	180	<200	<200	18	1.4
20-Jun-17	19	3.1	190	120	1,800	500	<200	<200	NA	<0.50

MW16-01										Screen Interval: 3.3 - 4.8 mbgs
Date	**B**	**T**	**E**	**X**	**F1**	**F2**	**F3**	**F4**	**HA**	**Pb**
31-Aug-16	18	3.8	41	59	250	<100	<200	<200	NA	0.53
21-Jun-17	46	3.7	170	79	820	260	<200	<200	NA	1.2

LEGEND

PROPERTY BOUNDARY

BOREHOLE LOCATION COMPLETED AS A MONITORING WELL

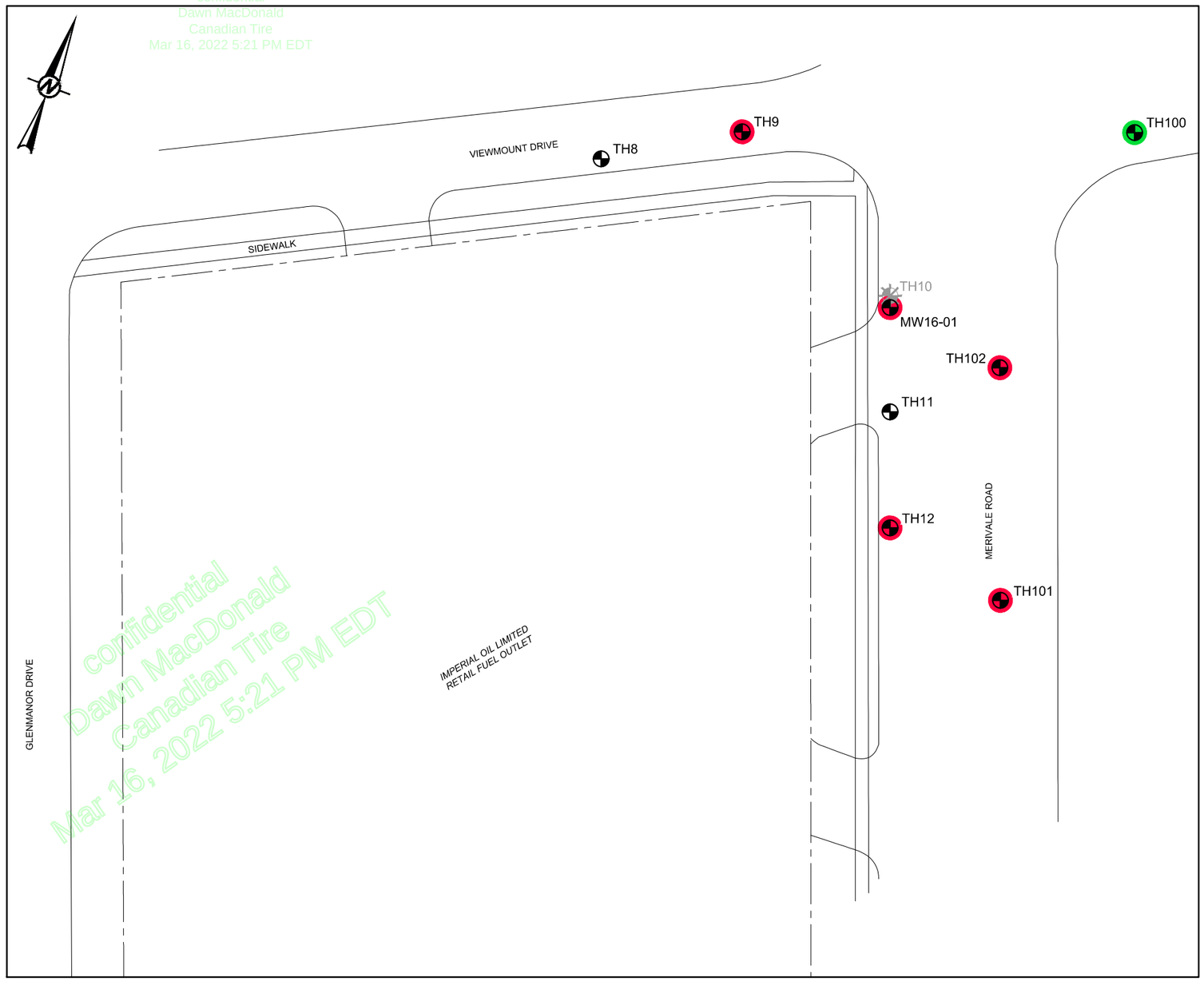
BOREHOLE LOCATION COMPLETED AS A MONITORING WELL (DECOMMISSIONED)

LIST OF APPLICABLE ABBREVIATIONS

>	GREATER THAN
<	LESS THAN
µg/L	MICROGRAMS PER LITRE
B	BENZENE
T	TOLUENE
E	ETHYLBENZENE
X	XYLENES
F1	PETROLEUM HYDROCARBON FRACTION 1 (C_6-C_{10}) LESS BTEX
F2	PETROLEUM HYDROCARBON FRACTION 2 (C_{10}-C_{16})
F3	PETROLEUM HYDROCARBON FRACTION 3 (C_{16}-C_{21})
F4	PETROLEUM HYDROCARBON FRACTION 4 (C_{21}-C_{32})
HA	n-HEXANE
mbgs	METRES BELOW GROUND SURFACE
NA	NOT AVAILABLE
Pb	LEAD
RDL	REPORTABLE DETECTION LIMIT

NOTES

1. LOCATIONS WHERE CURRENT GROUNDWATER SAMPLE MEETS APPLICABLE GUIDELINES/STANDARDS FOR ALL PARAMETERS ANALYZED SHOWN IN **GREEN**.
2. LOCATIONS WHERE CURRENT GROUNDWATER SAMPLE EXCEEDS APPLICABLE GUIDELINES/STANDARDS FOR AT LEAST ONE OF THE PARAMETERS ANALYZED SHOWN IN **RED**.
3. EXCEEDANCES OF APPLICABLE GUIDELINES/STANDARDS IN TEXT ARE SHOWN IN **RED**.
4. LOCATION WHERE NO SAMPLES WERE TAKEN IN THE CURRENT SAMPLING EVENT SHOWN IN **BLACK**.



0 10 20
1:500 METRES

ONTARIO STANDARDS

PARAMETERS	B	T	E	X	F1	F2	F3	F4	HA	Pb
CRITERIA[a]	430	18,000	2,300	4,200	750[b]	150	500	500	520	25
RDL	0.20	0.20	0.20	0.40	130	100	200	200	10	0.50
UNITS	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L

(a) O.REG 153 (2011) TABLE 3 FULL DEPTH GENERIC SITE CONDITION STANDARDS FOR ALL TYPES OF PROPERTY USE FOR GROUNDWATER IN MEDIUM AND FINE TEXTURED SOIL IN IN A NON-POTABLE GROUNDWATER CONDITION.

(b) F1 FRACTION DOES NOT INCLUDE BTEX; HOWEVER, THE PROPONENT HAS THE CHOICE AS TO WHETHER OR NOT TO SUBTRACT BTEX FROM THE ANALYTICAL RESULT.

REFERENCE

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No.: 11010-SITE PLAN OFFSITE-OCT14; SCALE: UNKNOWN; DATE: OCTOBER 2014.

CLIENT
IMPERIAL OIL LIMITED

CONSULTANT
Golder Associates

YYYY-MM-DD	2017-08-09
DESIGNED	ALynn
PREPARED	JHennin
REVIEWED	ISosney
APPROVED	RMungal

PROJECT
ADJACENT TO
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
GROUNDWATER ANALYTICAL RESULTS - BTEX AND PHC FRACTIONS F1 - F4 AND LEAD

PROJECT NO.	PHASE-TASK	REV.	FIGURE
1669090	1155-2016B	0	4

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25 mm

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Dawn MacDonald
Canadian Tire
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Path: \\golder.gds\gal\Waterloo\Active\CAD\IMPERIAL_OIL\DOWNSTREAM\OTTAWA_ON_1660_MERIVALE_ROAD\99_PROJECTS\1669090\002_PRODUCTION\1155-2016B\Offsite.DWG | File Name: 1669090-1155-1004.dwg | Last Edited By: dbondy Date: 2017-08-09 Time:10:09:03 AM | Printed By: dbondy Date: 2017-08-09 Time:10:47:41 AM

VIEWMONT DRIVE

SIDEWALK

MERVALE ROAD

WALKWAY

UNDERGROUND STORAGE TANKS

FORMER PUMP ISLAND

CANOPY

PUMP ISLAND

FORMER SERVICE GARAGE

KIOSK

FORMER PUMP ISLAND

CAR WASH

TH1 *

BH1-22/MW1-22

TH2

BH2-22

TH3

BH3-22

TH4

BH4-22

TH5

BH5-22

TH6

TH7

BH6-22

BH7-22

MW15-01

MW15-02

TH8

TH9

TH10

MW16-01

TH11

TH12

TH100

TH101

TH102

TH3	06/15/2022
Benzene	17
PHC F1 (C6-C10)	560
PHC F1 (C6-C10)-BTEX	520
PHC F2 (C10-C16)	130
Xylenes (total)	0.46

TH2	06/15/2022
Benzene	ND(0.20)
PHC F1 (C6-C10)	ND(25)
PHC F1 (C6-C10)-BTEX	ND(25)
PHC F2 (C10-C16)	ND(100)
Xylenes (total)	ND(0.40)

MW1-22	07/07/2022
Benzene	ND(0.20)
PHC F1 (C6-C10)	ND(25)
PHC F1 (C6-C10)-BTEX	ND(25)
PHC F2 (C10-C16)	ND(100)
Xylenes (total)	ND(0.40)

TH4	06/16/2022
Benzene	380
PHC F1 (C6-C10)	17000
PHC F1 (C6-C10)-BTEX	8900
PHC F2 (C10-C16)	2500
Xylenes (total)	5900

TH5	06/15/2022
Benzene	190
PHC F1 (C6-C10)	7600
PHC F1 (C6-C10)-BTEX	4900
PHC F2 (C10-C16)	3500
Xylenes (total)	1700

TH6	06/15/2022
Benzene	ND(0.20)/ND(0.20)
PHC F1 (C6-C10)	ND(25)/ND(25)
PHC F1 (C6-C10)-BTEX	ND(25)/ND(25)
PHC F2 (C10-C16)	ND(100)/ND(100)
Xylenes (total)	ND(0.40)/ND(0.40)

MW15-02	06/15/2022
Benzene	ND(0.20)
PHC F1 (C6-C10)	ND(25)
PHC F1 (C6-C10)-BTEX	ND(25)
PHC F2 (C10-C16)	ND(100)
Xylenes (total)	ND(0.40)

TH7	06/15/2022
Benzene	7.3
PHC F1 (C6-C10)	45
PHC F1 (C6-C10)-BTEX	38
PHC F2 (C10-C16)	ND(100)
Xylenes (total)	ND(0.40)

LEGEND

- MONITORING WELL LOCATION
- MONITORING WELL LOCATION (GHD, 2022)
- BOREHOLE LOCATION (GHD, 2022)
- * MONITORING WELL DAMAGED
- LIMIT OF 2011 SOIL EXCAVATION
- HISTORICAL GROUNDWATER CONCENTRATION ABOVE MOE STANDARD ON ONE OR MORE OCCASION (PRE 2022)
- CONCENTRATION BELOW MOE TABLE 3 STANDARDS (GHD, 2022)
- CONCENTRATION ABOVE MOE TABLE 3 STANDARDS (GHD, 2022)
- CONCENTRATION ABOVE MOE TABLE 3 STANDARDS (GHD, 2022)
- ug/L MICROGRAMS PER LITRE
- ND (25) NOT DETECTED
- ND(25)/ND(25) PARENT RESULT/DUPLICATE RESULT

NOTE:
(1) Ontario Ministry of the Environment (MOE), "Soil, Ground Water and Sediment Standards for Use XV.1 of the Environmental Protection Act," April 15, 2011, Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition for All Types of Property Uses and Medium to Fine Textured Soils

TH7	06/15/2022
Benzene	7.3
PHC F1 (C6-C10)	45
PHC F1 (C6-C10)-BTEX	38
PHC F2 (C10-C16)	ND(100)
Xylenes (total)	ND(0.40)

SAMPLE LOCATION
SAMPLE DATE
RESULT (ug/L)
PARAMETER

PARAMETER	Table 3 Standard (1) (ug/L)
Benzene	430
PHC F1 (C6-C10)	750
PHC F1 (C6-C10)-BTEX	750
PHC F2 (C10-C16)	150
Xylenes (total)	4200

0 5 10 15m
1:500
Coordinate System:
UTM ZONE 18, NAD83
METRES

N

GHD

CANADIAN TIRE CORPORATION
1660 MERIVALE ROAD,
NEPEAN, ONTARIO (CTP 1126)
SOIL AND GROUNDWATER QUALITY INVESTIGATION

SUMMARY OF GROUNDWATER ANALYTICAL RESULTS

Project No. 12583574
Date August 2022

FIGURE 4

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Filename: N:\CA\Mississauga\Projects\662\12583574\Digital_Design\ACAD\Figures\LTR-Hunter005\12583574-GHD-00-00-LTR-EN-D103_WA-Hunter005.dwg
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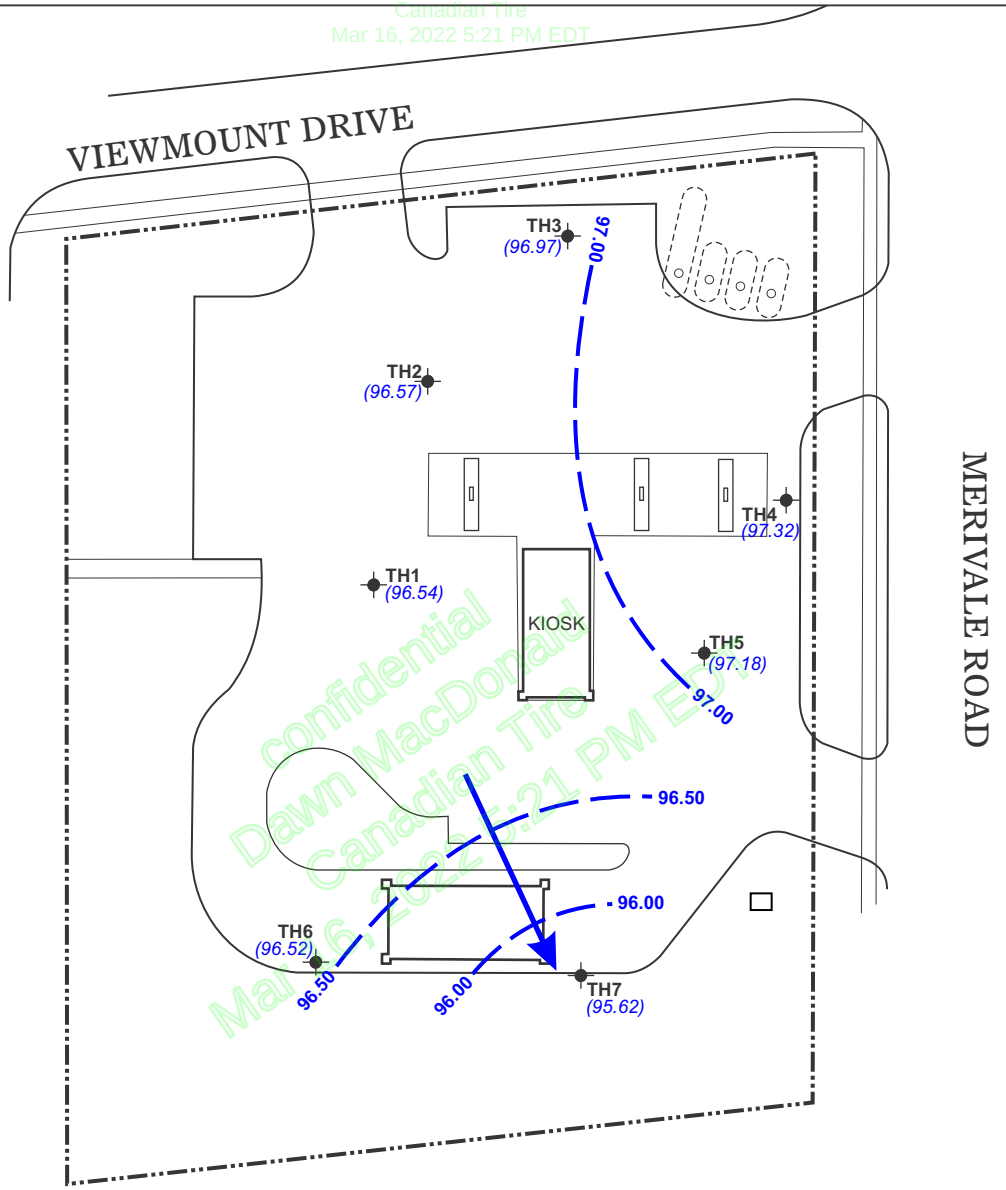

SCALE:

0 10 20m

(APPROXIMATE)

DRAWN BY	CHECKED BY
J.D.H.	T.F.P.

SOURCE:

BASED ON 'SITE PLAN' BY IMPERIAL OIL A0765 DATED JAN. 16, 1984, AND FIELD OBSERVATIONS BY **exp** STAFF

NOTE:

BENCHMARK NORTH SIDE OF MANHOLE COVER ON THE WEST SIDE OF THE KIOSK WITH AN ASSUMED ELEVATION OF 100.00M

LEGEND:

PROPERTY BOUNDARY	(100.00) GROUND WATER ELEVATION (m)
TEST HOLE WITH MONITOR (BARENCO, 2011)	(100.00)* GROUND WATER ELEVATION NOT USED IN CONTOURING (m)
	100.00 GROUND WATER ELEVATION CONTOUR (m)
	GROUND WATER FLOW DIRECTION
	(NM) NOT MONITORED
	(NA) NOT ACCESSIBLE

GROUND WATER CONTOUR PLAN (AUGUST 26, 2014)

FIGURE 1

IMPERIAL OIL
1660 MERIVALE ROAD
OTTAWA, ONTARIO

PROJECT NUMBER: 11010 | DATE: SEPTEMBER 2014

11010-GWC PLAN ONSITE-AUG14-SEP14

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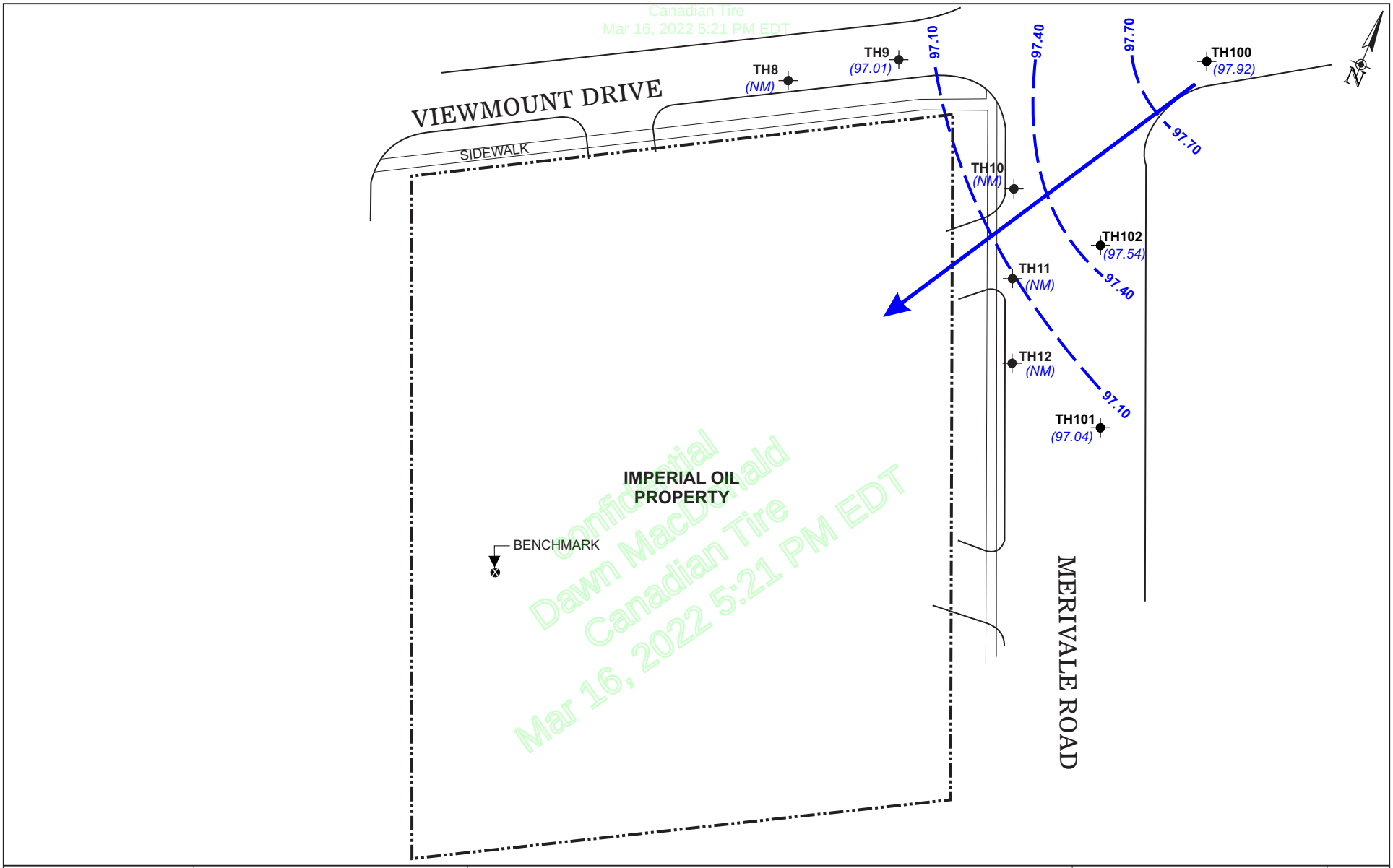

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Canadian Tire
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SCALE:
0 10 20m
(APPROXIMATE)

DRAWN BY	CHECKED BY
K.G.	T.F.P.

exp.

SOURCE:
BASED ON 'PLAN N-04-12' BY OTTAWA UCC DATED FEB. 2014, 'SITE PLAN' BY IMPERIAL OIL DRAWING #A0765 DATED JAN. 16, 1984 AND FIELD OBSERVATIONS BY **exp** STAFF

NOTES:
THE BENCHMARK USED FOR THE MONITOR SURVEY WAS THE NORTH SIDE OF A MANHOLE COVER LOCATED APPROXIMATELY 5 METRES WEST OF THE KIOSK ON THE IMPERIAL OIL PROPERTY, WITH AN ELEVATION OF 100.00 m

LEGEND:

	PROPERTY BOUNDARY
	TEST HOLE WITH MONITOR TH1 SERIES (**exp**, 2012) TH100 SERIES (**exp**, 2014)
	MANHOLE
(100.00)	GROUND WATER ELEVATION (m)
(100.00)*	GROUND WATER ELEVATION NOT USED IN CONTOURING (m)
100.00	GROUND WATER ELEVATION CONTOUR (m)
	GROUND WATER FLOW DIRECTION
(NM)	NOT MONITORED
(NA)	NOT ACCESSIBLE

GROUND WATER CONTOUR PLAN (OCTOBER 6, 2014)

FIGURE 4

IMPERIAL OIL
ADJACENT TO 1660 MERIVALE ROAD
OTTAWA, ONTARIO

PROJECT NUMBER: 11010 | DATE: NOVEMBER 2014

11010-GWC PLAN OFFSITE OCT14-NOV14

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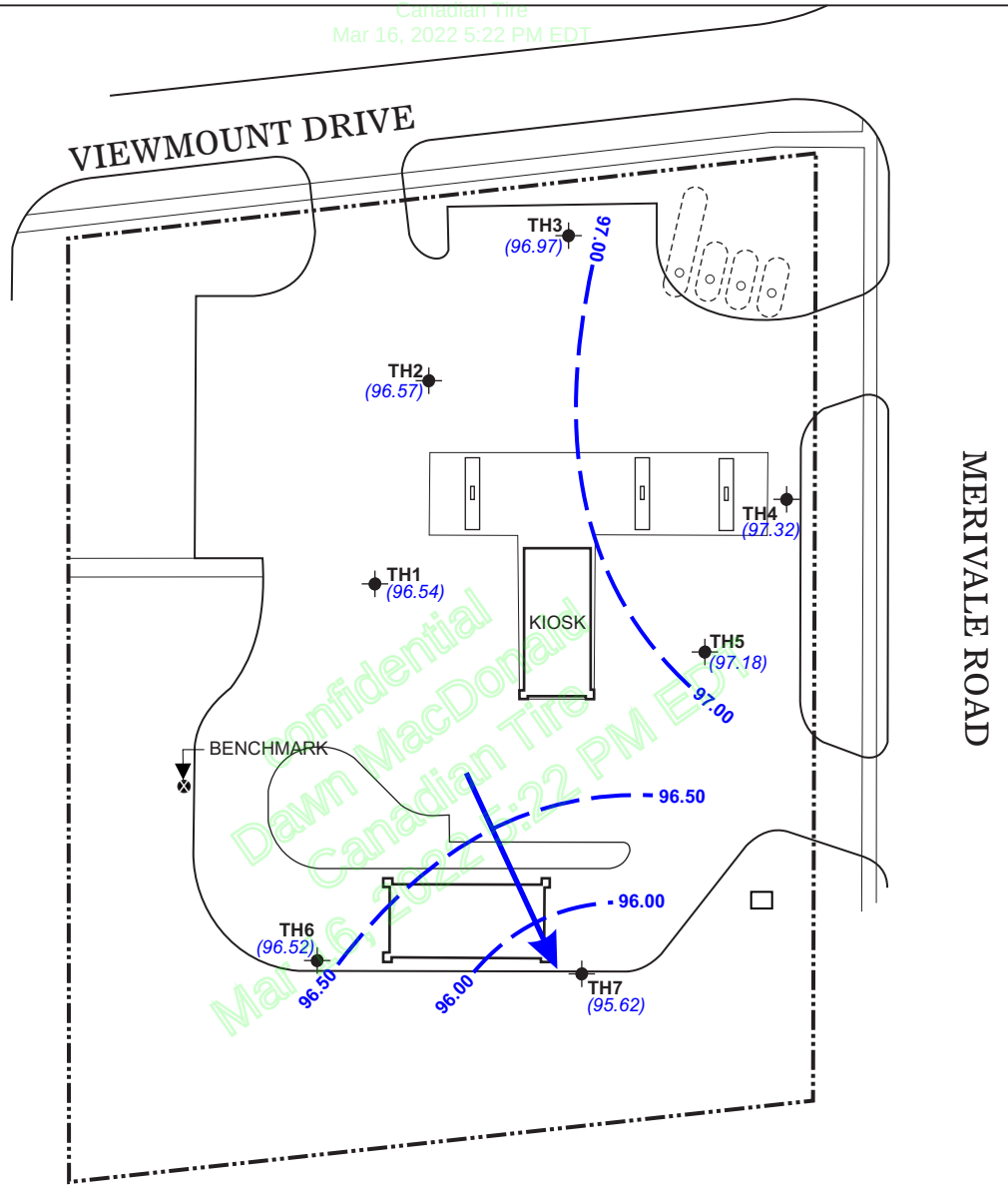

SCALE:

0 10 20m

(APPROXIMATE)

DRAWN BY	CHECKED BY
J.D.H.	T.F.P.

SOURCE:

BASED ON 'SITE PLAN' BY IMPERIAL OIL A0765 DATED JAN. 16, 1984, AND FIELD OBSERVATIONS BY **exp** STAFF

NOTE:

BENCHMARK NORTH SIDE OF MANHOLE COVER ON THE WEST SIDE OF THE KIOSK WITH AN ASSUMED ELEVATION OF 100.00M

LEGEND:

PROPERTY BOUNDARY	
TEST HOLE WITH MONITOR (BARENCO, 2011)	
(100.00)	GROUND WATER ELEVATION (m)
(100.00)*	GROUND WATER ELEVATION NOT USED IN CONTOURING (m)
100.00	GROUND WATER ELEVATION CONTOUR (m)
	GROUND WATER FLOW DIRECTION
(NM)	NOT MONITORED
(NA)	NOT ACCESSIBLE

GROUND WATER CONTOUR PLAN (AUGUST 26, 2014)

FIGURE 5

IMPERIAL
1660 MERIVALE ROAD
OTTAWA, ONTARIO

PROJECT NUMBER: 11010 | DATE: MARCH 2015

11010-GWC PLAN CMP ONSITE-AUG14-MAR15

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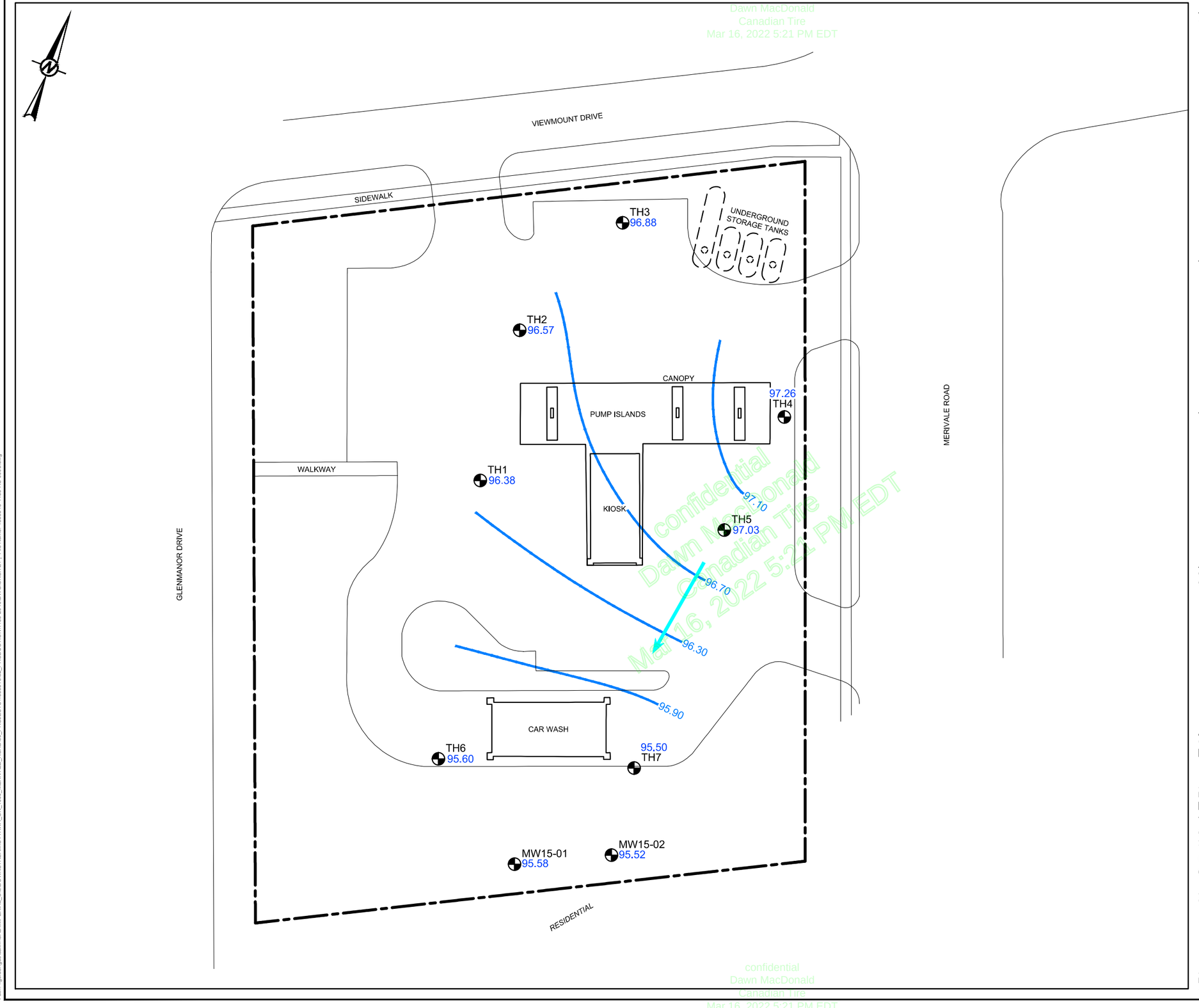

LEGEND

- PROPERTY BOUNDARY
- 96.70 — GROUNDWATER CONTOUR (masl)
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL
- 95.58 — GROUNDWATER ELEVATION (masl)
- DIRECTION OF GROUNDWATER FLOW

LIST OF APPLICABLE ABBREVIATIONS

m	METRE
masl	METRES ABOVE SEA LEVEL

NOTE

TH1 TO TH5 AND TH7 ELEVATIONS ARE RELATIVE TO LOCAL BENCHMARK (CENTRE OF STORM SEWER CATCH BASIN LOCATED APPROXIMATELY 5 METRES WEST OF KIOSK) ASSIGNED ELEVATION: 100.00 m (EXP 2013).

MW15-01, MW15-02 AND TH6 ELEVATIONS ARE RELATIVE TO LOCAL BENCHMARK (GROUND SURFACE AT TH7) ASSIGNED ELEVATION: 99.66 m (EXP 2013).

REFERENCE

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No.: 11010-SITE PLAN ONSITE-JUN14; SCALE: UNKNOWN; DATE: JUNE 2014.

0 10 20
1:500 METRES

CLIENT
IMPERIAL OIL LIMITED

PROJECT
RETAIL FUEL OUTLET
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
GROUNDWATER FLOW DIRECTION
October 28 and November 17, 2015

CONSULTANT
Golder Associates

YYYY-MM-DD	2016-05-04
DESIGNED	BMcParlan
PREPARED	DBondy
REVIEWED	BMcParlan
APPROVED	SCarrelas

PROJECT NO.	CONTROL	REV.	FIGURE
1536518	1155-HS-0005	0	5

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25 mm

0

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Canadian Tire
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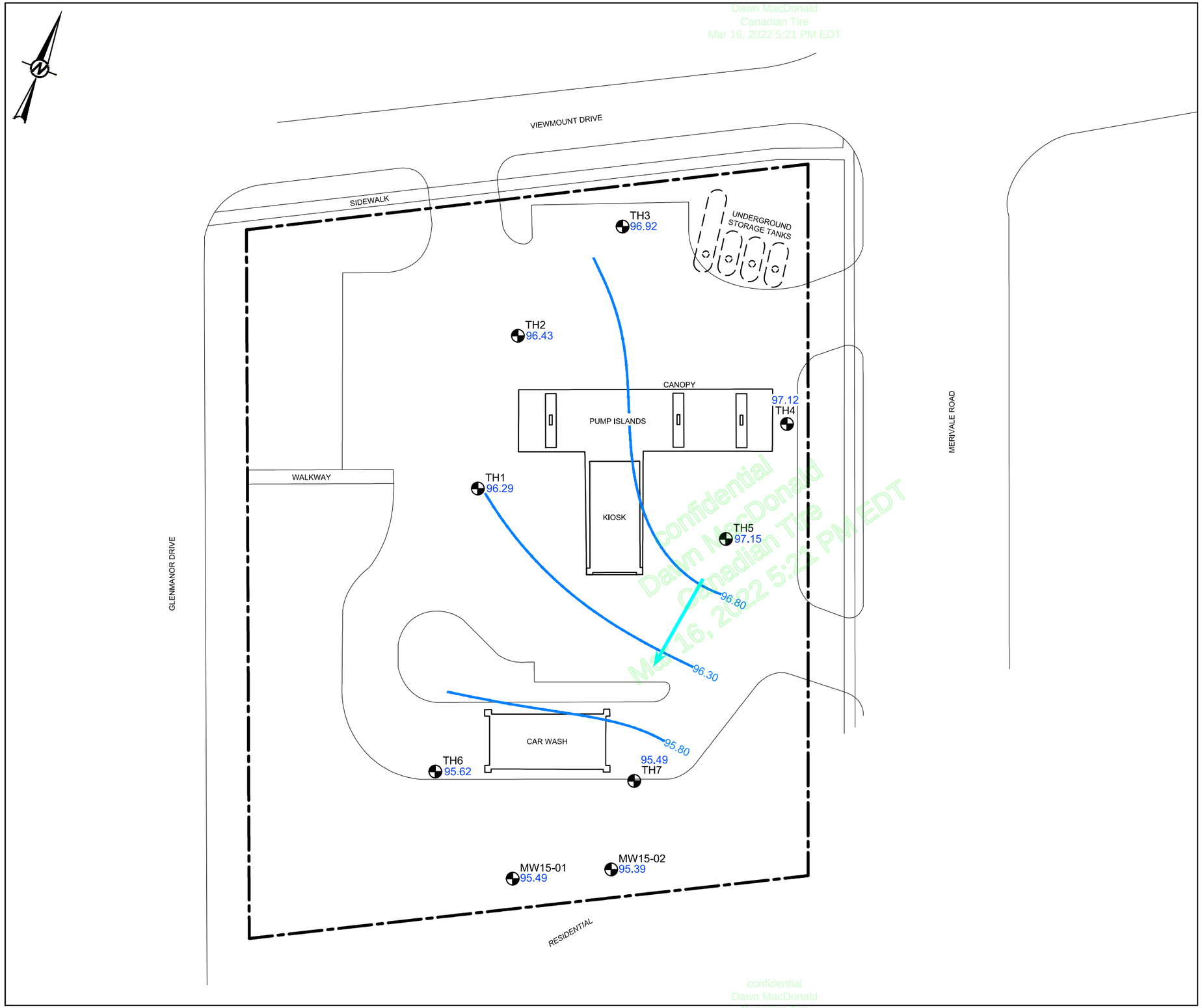

LEGEND

- PROPERTY BOUNDARY
- 96.80 GROUNDWATER CONTOUR (masl)
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL
- 96.92 GROUNDWATER ELEVATION (masl)
- DIRECTION OF GROUNDWATER FLOW

LIST OF APPLICABLE ABBREVIATIONS

m	METRE
masl	METRES ABOVE SEA LEVEL

NOTE

TH1 TO TH5 AND TH7 ELEVATIONS ARE RELATIVE TO LOCAL BENCHMARK (CENTRE OF STORM SEWER CATCH BASIN LOCATED APPROXIMATELY 5 METRES WEST OF KIOSK) ASSIGNED ELEVATION: 100.00 m (EXP 2013).

MW15-01, MW15-02 AND TH6 ELEVATIONS ARE RELATIVE TO LOCAL BENCHMARK (GROUND SURFACE AT TH7) ASSIGNED ELEVATION: 99.66 m (EXP 2013).

REFERENCE

ORIGINAL DRAWING OBTAINED FROM BARENCO INC.; FILE No.: 11010-SITE PLAN ONSITE-JUN14; SCALE: UNKNOWN; DATE: JUNE 2014.

0 10 20
1:500 METRES

CLIENT
IMPERIAL OIL LIMITED

PROJECT
ACTIVE RETAIL OUTLET
1660 MERIVALE ROAD
OTTAWA, ONTARIO

TITLE
GROUNDWATER FLOW DIRECTION
August 9, 2016

CONSULTANT
Golder Associates

YYYY-MM-DD	2017-01-31
DESIGNED	BMcParlan
PREPARED	AMehdilou
REVIEWED	LBurger
APPROVED	SCarrelas

PROJECT NO.	PHASE-TASK	REV.	FIGURE
1544125	1155-2016	1	4

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IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B
25 mm
0

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LEGEND

- MONITORING WELL LOCATION
- MONITORING WELL LOCATION (GHD, 2022)
- BOREHOLE LOCATION (GHD, 2022)
- * MONITORING WELL DAMAGED
- LIMIT OF 2011 SOIL EXCAVATION
- GROUNDWATER FLOW DIRECTION
- 96.00 GROUNDWATER CONTOUR (mASD)
- (96.14) GROUNDWATER ELEVATION (mASD)
- mASD METRES ABOVE SITE DATUM

0 5 10 15m

1:500

Coordinate System:
UTM ZONE 18, NAD83
METRES

N

GHD

CANADIAN TIRE CORPORATION
1660 MERIVALE ROAD,
NEPEAN, ONTARIO (CTP 1126)
SOIL AND GROUNDWATER QUALITY INVESTIGATION

GROUNDWATER ELEVATION CONTOURS
JUNE 15, 2022

Project No. **12583574**
Date **August 2022**

FIGURE 3

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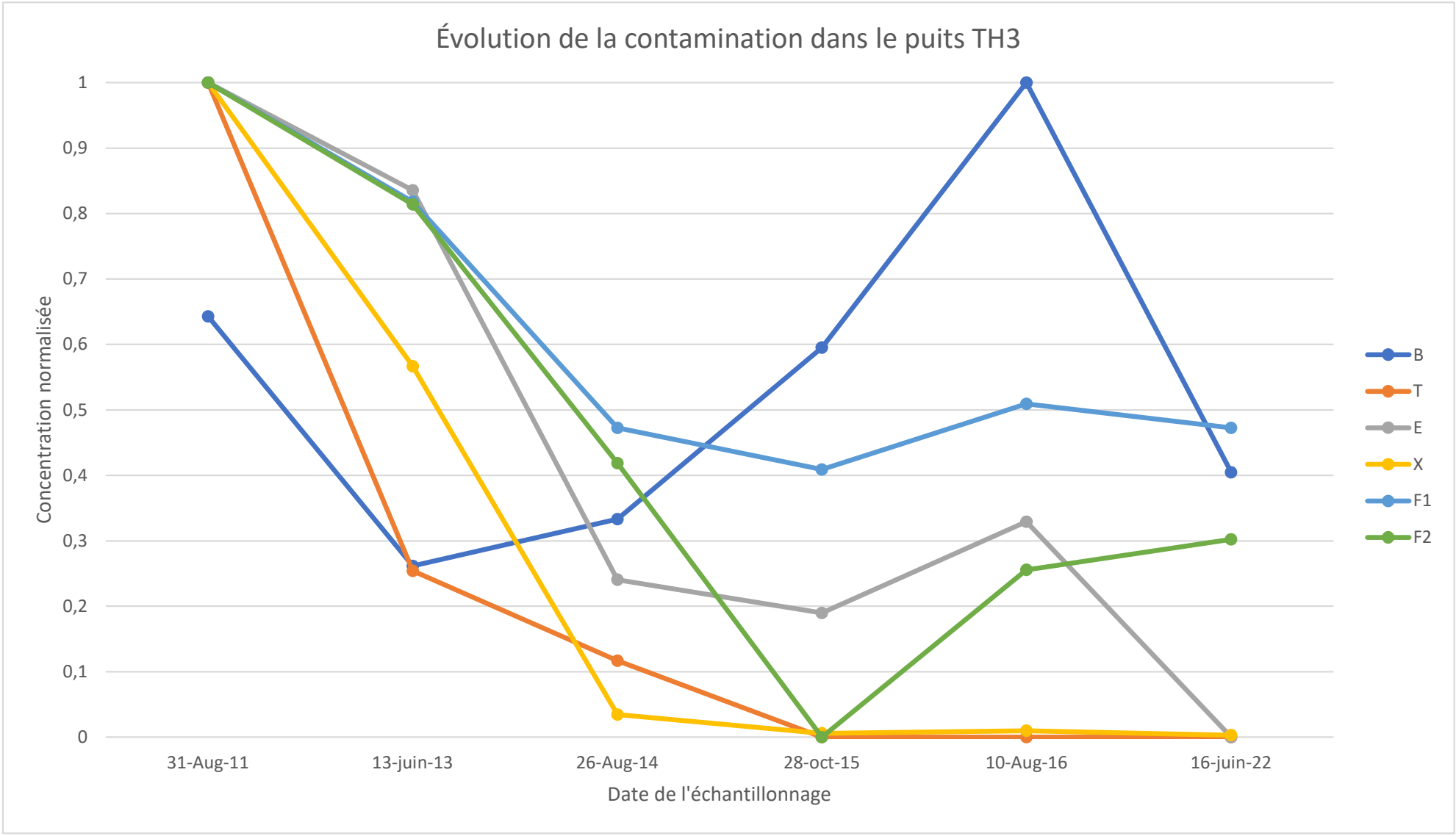
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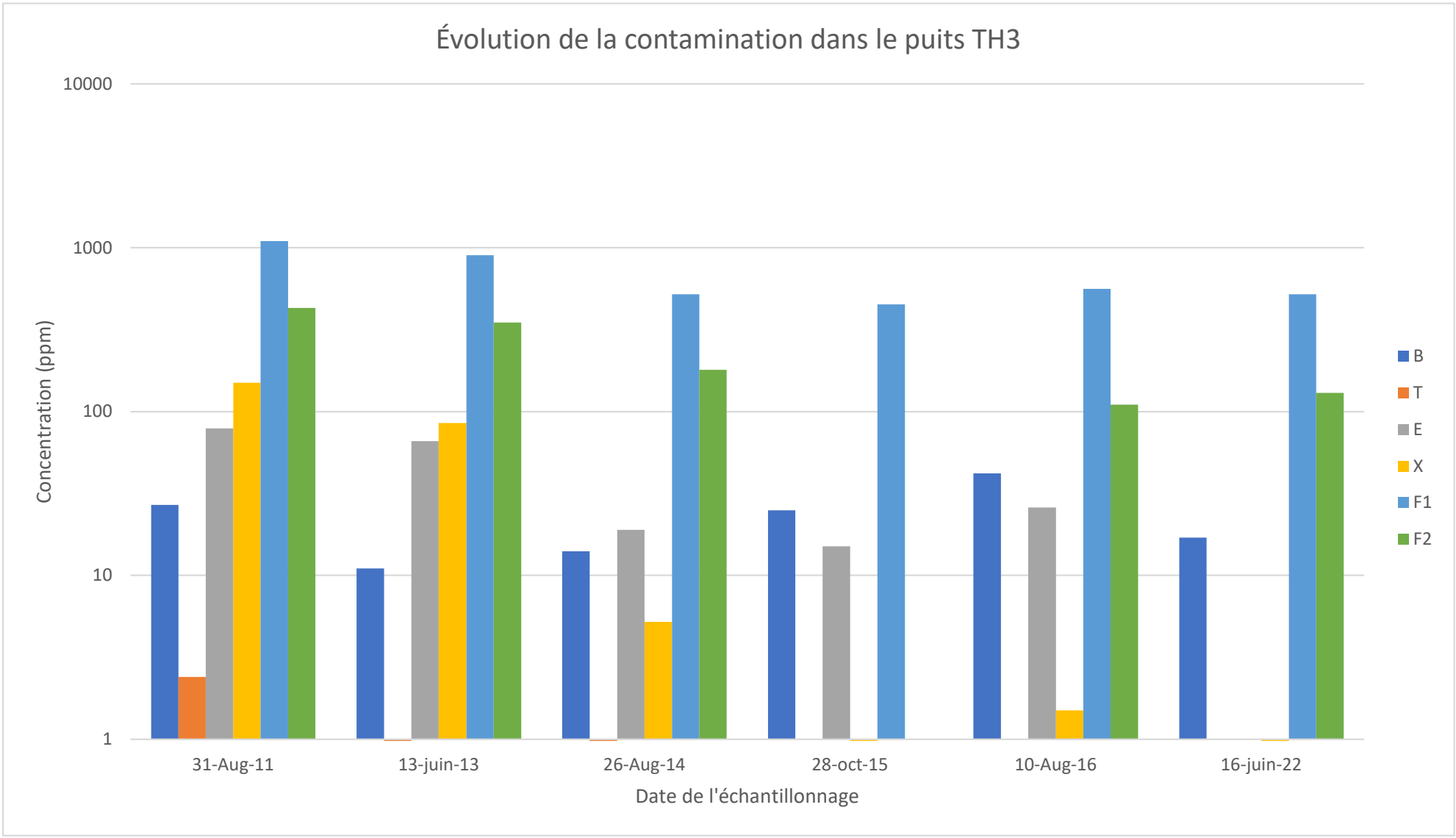
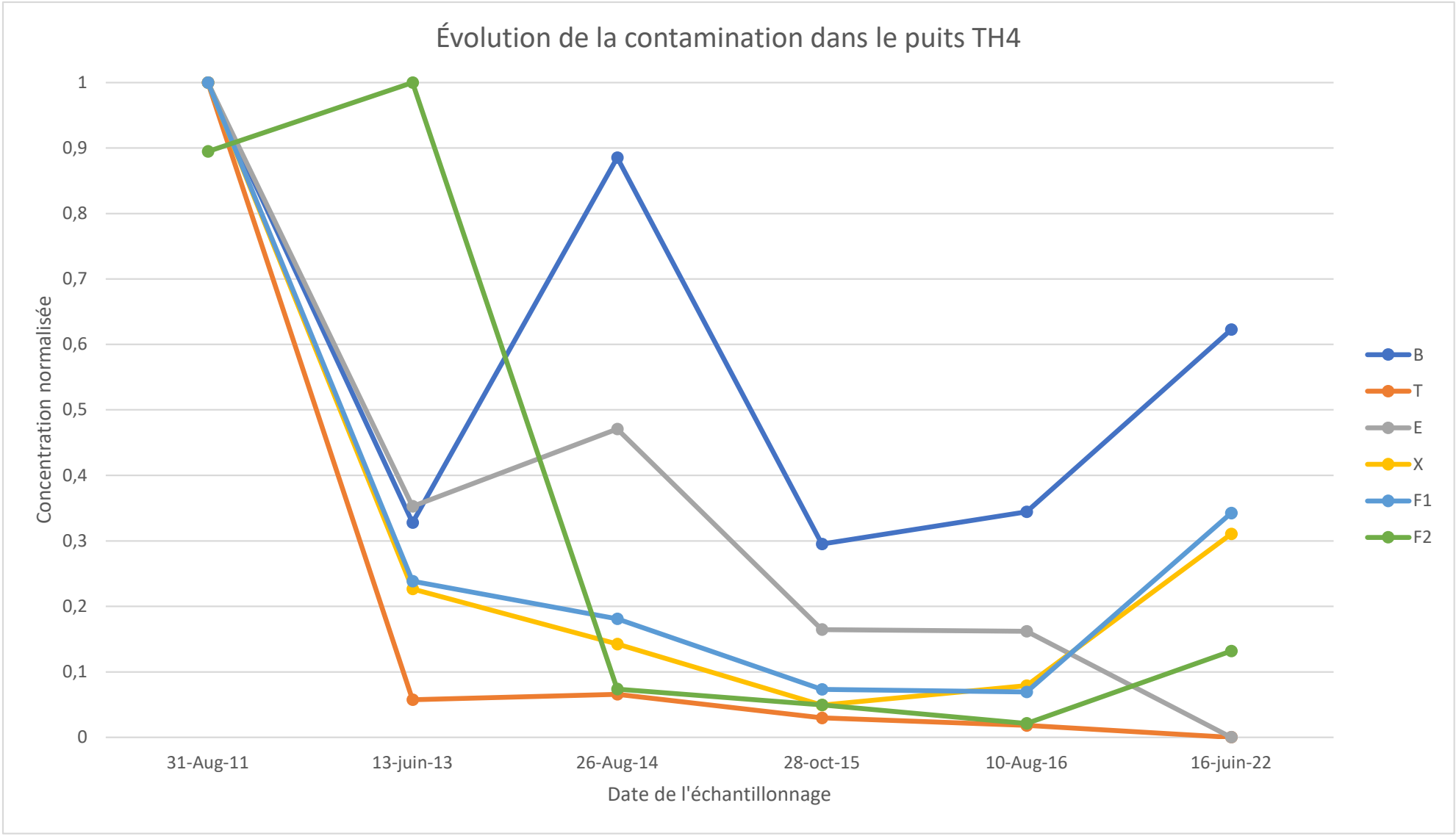
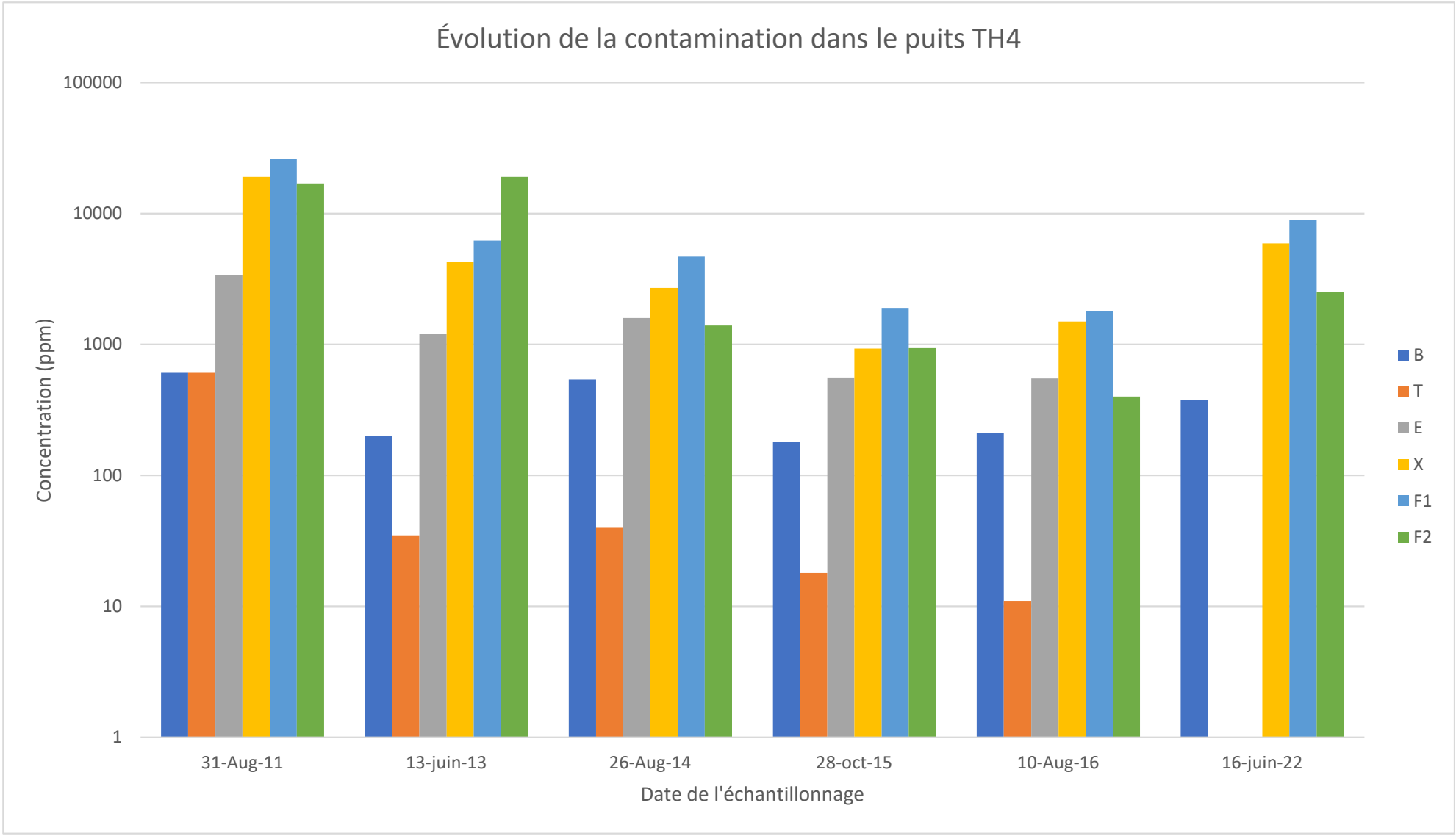
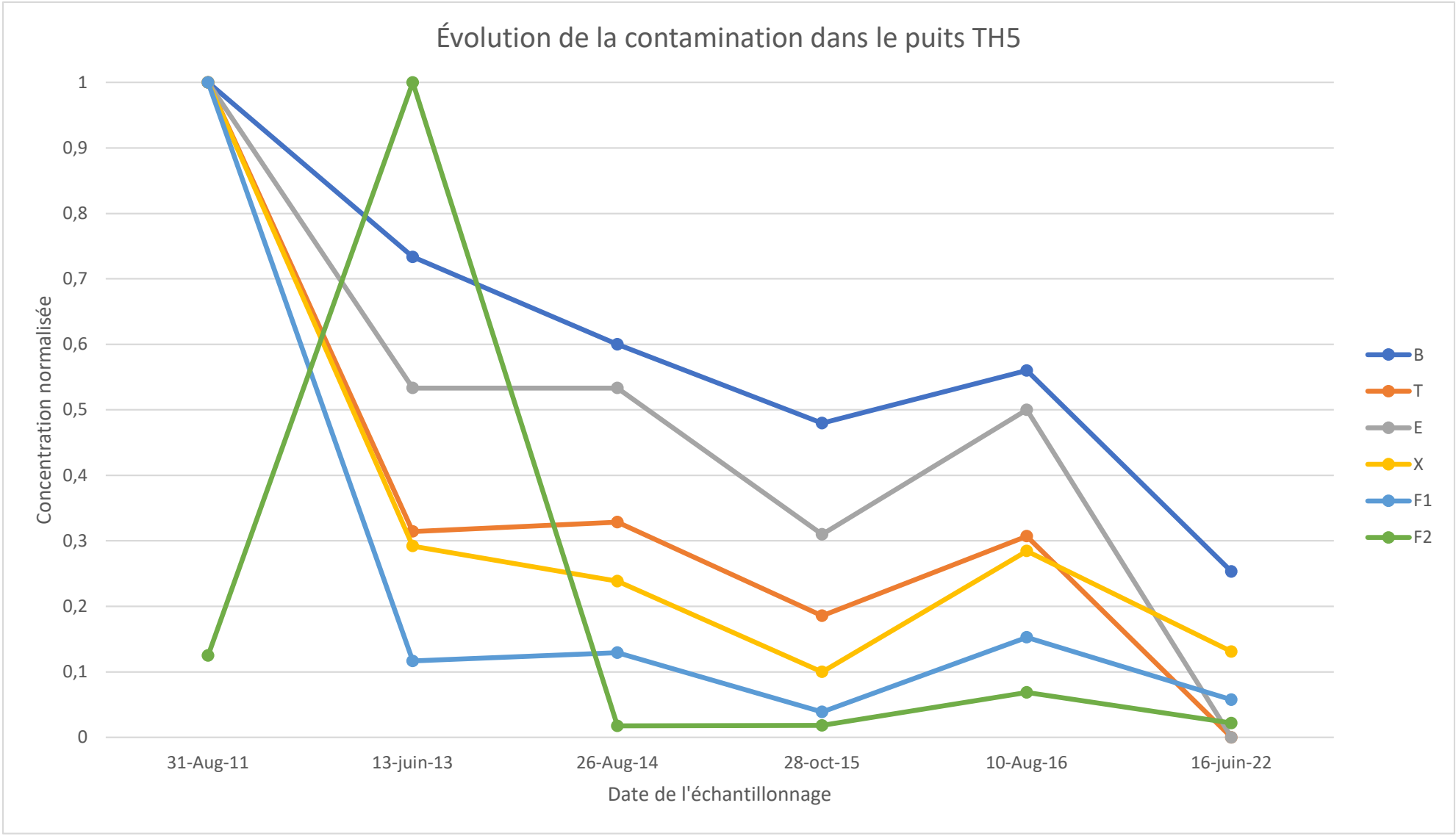
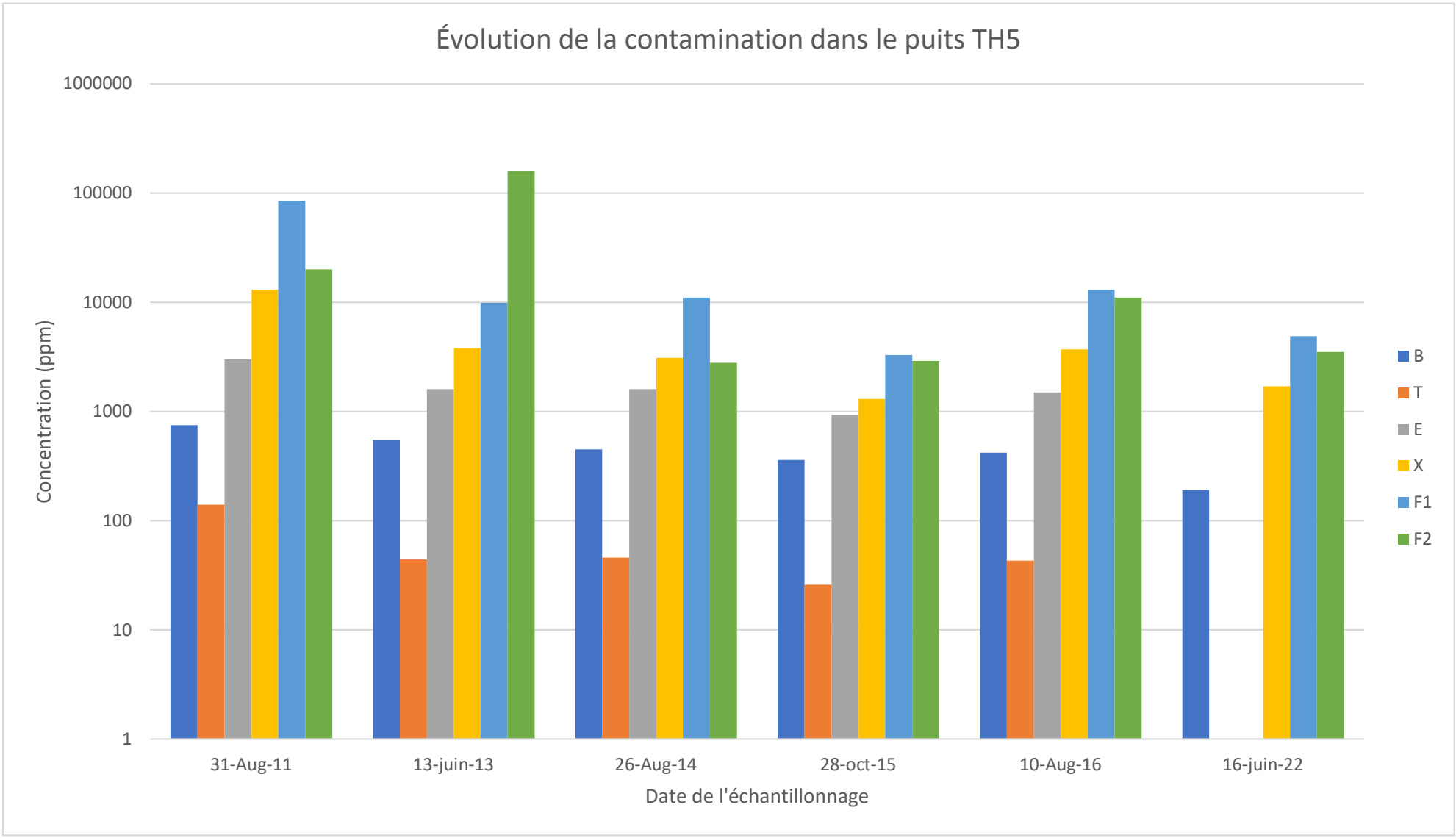
Concentration normalisée
1
0,9
0,8
0,7
0,6
0,5
0,4
0,3
0,2
0,1
0
31-Aug-11
13-juin-13
26-Aug-14
28-oct-15
10-Aug-16
16-juin-22
Date de l'échantillonnage
B
T
E
X
F1
F2


Évolution de la contamination dans le puits TH3
10000
1000
100
10
1
Concentration (ppm)
31-Aug-11
13-juin-13
26-Aug-14
28-oct-15
10-Aug-16
16-juin-22
Date de l'échantillonnage
B
T
E
X
F1
F2


Évolution de la contamination dans le puits TH4
Concentration normalisée
1
0,9
0,8
0,7
0,6
0,5
0,4
0,3
0,2
0,1
0
31-Aug-11
13-juin-13
26-Aug-14
28-oct-15
10-Aug-16
16-juin-22
Date de l'échantillonnage
B
T
E
X
F1
F2


Évolution de la contamination dans le puits TH4
100000
10000
1000
100
10
1
Concentration (ppm)
31-Aug-11
13-juin-13
26-Aug-14
28-oct-15
10-Aug-16
16-juin-22
Date de l'échantillonnage
B
T
E
X
F1
F2


Évolution de la contamination dans le puits TH5
Concentration normalisée
1
0,9
0,8
0,7
0,6
0,5
0,4
0,3
0,2
0,1
0
31-Aug-11
13-juin-13
26-Aug-14
28-oct-15
10-Aug-16
16-juin-22
Date de l'échantillonnage
B
T
E
X
F1
F2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100000
10000
1000
100
10
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Concentration (ppm)
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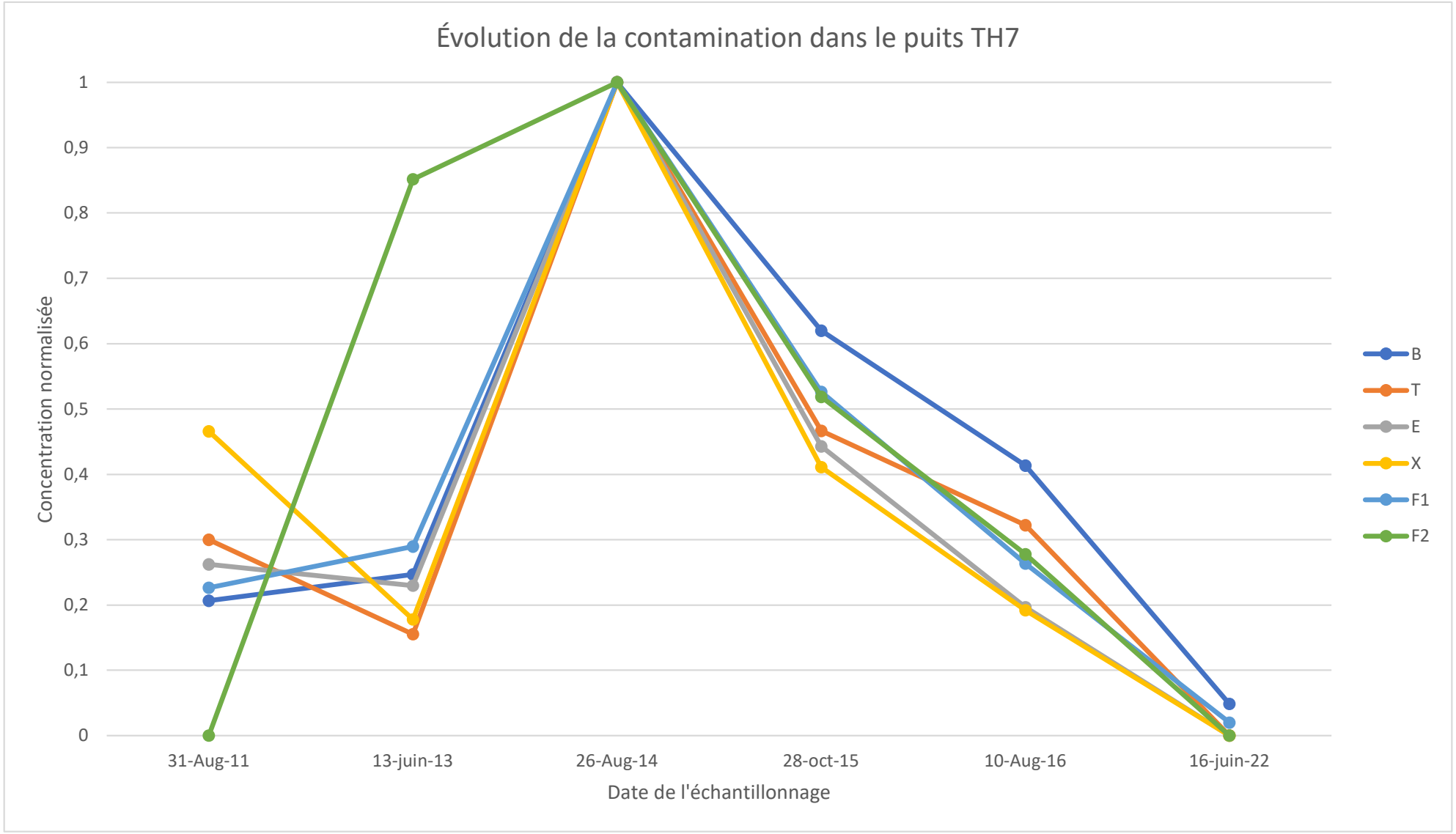
13-juin-13
26-Aug-14
28-oct-15
10-Aug-16
16-juin-22
Date de l'échantillonnage
B
T
E
X
F1
F2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Concentration normalisée
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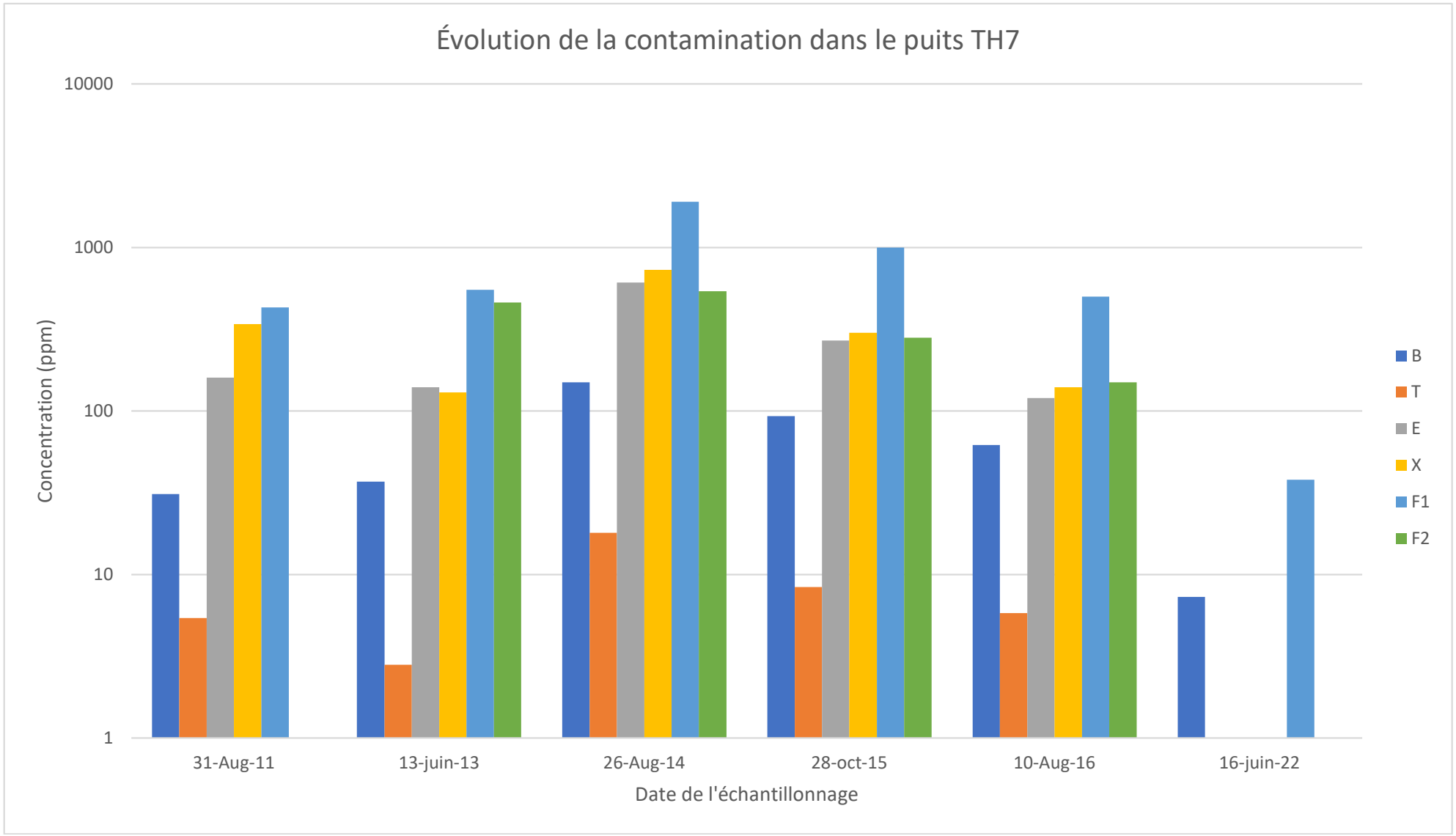
0,8
0,7
0,6
0,5
0,4
0,3
0,2
0,1
0
31-Aug-11
13-juin-13
26-Aug-14
28-oct-15
10-Aug-16
16-juin-22
Date de l'échantillonnage
B
T
E
X
F1
F2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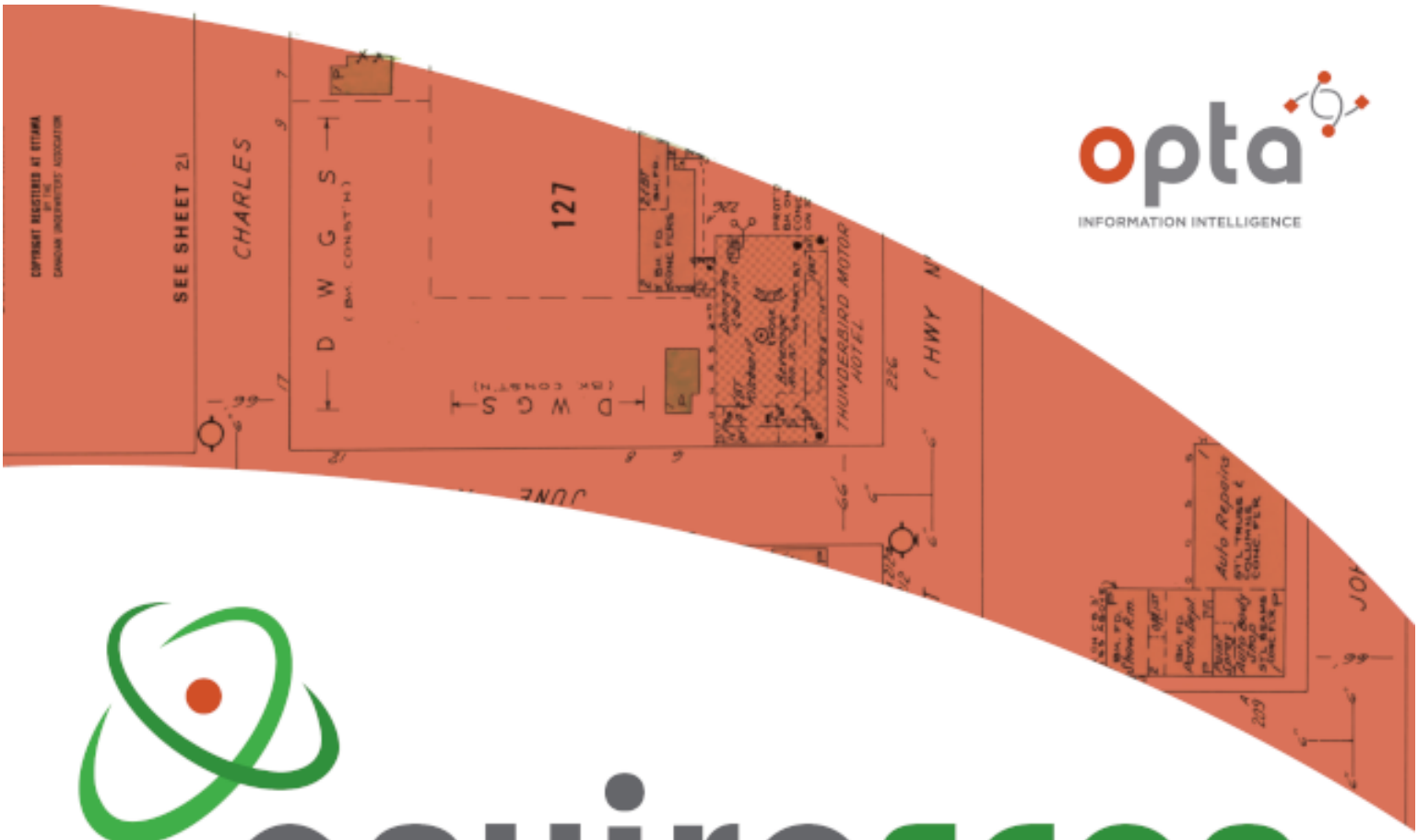
1000
100
10
1
Concentration (ppm)
31-Aug-11
13-juin-13
26-Aug-14
28-oct-15
10-Aug-16
16-juin-22
Date de l'échantillonnage
B
T
E
X
F1
F2

APPENDIX 8
Other relevant documents

GROUPE
C. LAGANIÈRE



opta
INFORMATION INTELLIGENCE

enviroscan







175 Commerce Valley Drive W
Markham, Ontario L3T 7Z3

T: 1 877 244 9437
W: optaintel.ca

Midori

1660 Merivale Road, Nepean, ON

Project No:
HARN1660

Opta Order ID:
145736

Requested by:
Mathieu Bélisle
Groupe C. Laganière 1995 Inc.

Date Completed:
6/20/2024 12:56:51 PM

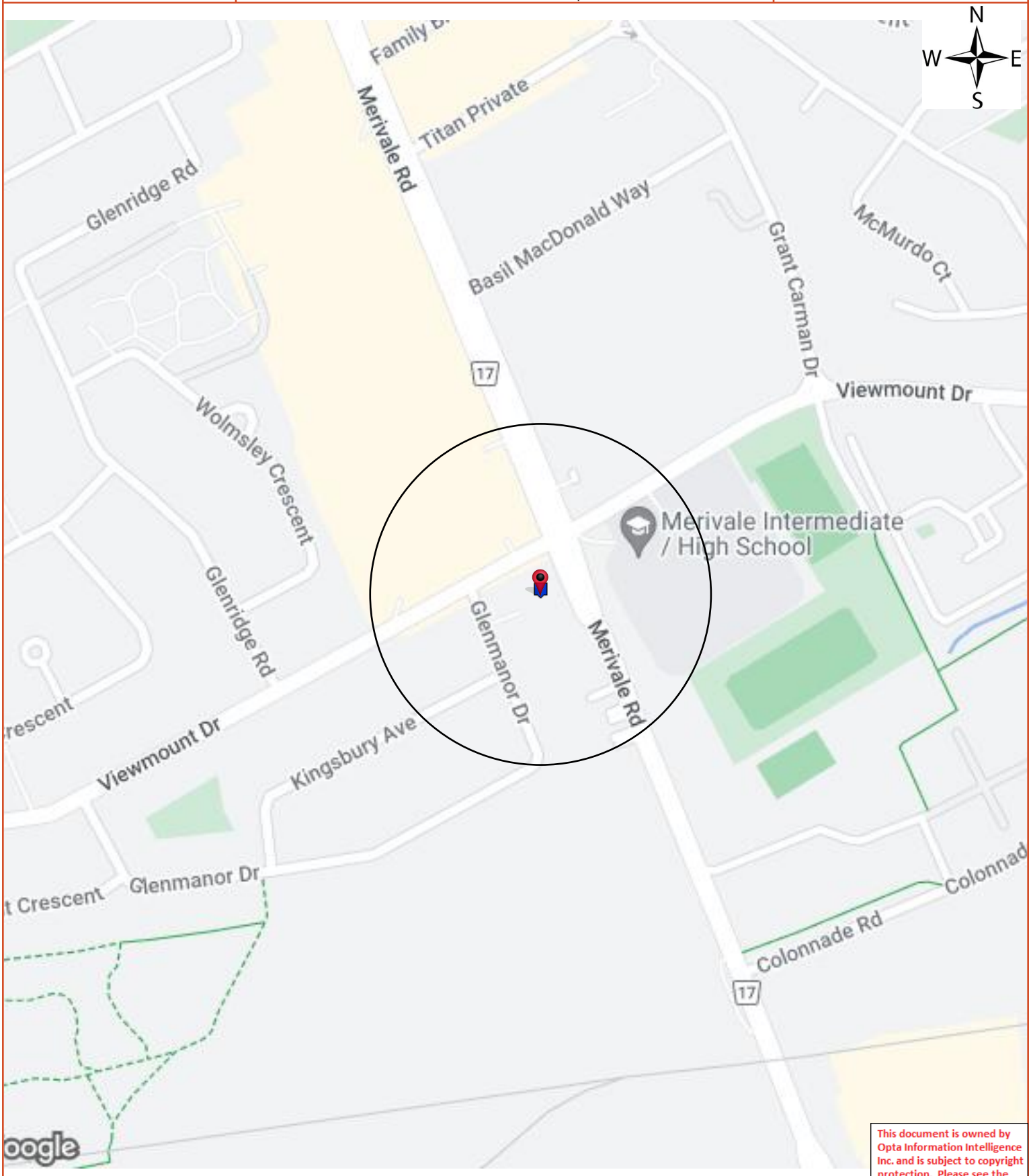
ENVIROSCAN Report

Search Area: 1660 Merivale Road, Nepean, ON

Project #: HARN1660
P.O. #: 0113984

Requested by:
Mathieu Bélisle
Date Completed: 06/20/2024 12:56:51

enviroscan
OPTA INFORMATION INTELLIGENCE



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Report

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Entire Agreement

The parties hereto acknowledge and agree to be bound by the terms and conditions hereof. The request form constitutes the entire agreement between the parties pertaining to the subject matter hereof and supersedes all prior and contemporaneous agreements, negotiations and discussions, whether oral or written, and there are no representations or warranties, or other agreements between the parties in connection with the subject matter hereof except as specifically set forth herein. No supplement, modification, waiver, or termination of the request shall be binding, unless confirmed in writing by the parties hereto.

Governing Document

In the event of any conflicts or inconsistencies between the provisions hereof and the Reports, the rights and obligations of the parties shall be deemed to be governed by the request form, which shall be the paramount document.

Law

This agreement shall be governed by and construed in accordance with the laws of the Province of Ontario and the laws of Canada applicable therein.

ENVIROSCAN Report

Report Index

Project #: HARN1660
P.O. #: 0113984

Requested by:
Mathieu Bélisle
Date Completed: 06/20/2024 12:56:51

OPTA INFORMATION INTELLIGENCE

Page	Report Title

5 (1977) Fire Inspection and Rate Calculation Form Report - 1977 1660 Merivale Road Nepean Township (Ottawa) ON K2G3K4 (distance = 0 metres*)

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Fire Inspection and Rate Calculation Form Report - 1977 1660 Merivale Road Nepean Township (Ottawa) ON K2G3K4

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INSURERS' ADVISORY ORGANIZATION OF CANADA

ONTARIO REGION
MERCANTILE RISKS

FIRE INSPECTION AND RATE CALCULATION FORM

1.

(Use this form for risks of all construction (excluding fire resistive) rated from the Mercantile Masonry Schedule or the Mercantile Brick Veneer — Frame Schedule.)

LOCATION: NORTAN TOWNSHIP (OTTAWA)
ADDRESS: Lot 20 Concession 2 Rd
(Formerly)
IAO PLAN — Sheet No.: N.S.P. ; Block No.: N.S.P. ; Plan No.: ; NOP ☐; See Attached Diagram ☐

		Charges	Ded.
WALLS:	L.R.F.B. IND. ☐: PARTY ☐: L.R.F.B. B.B/HCB., S.CONC., HCB., H.T., B.V., R.C., M.C., AS.C., P.C., FR.		
	EXPOSED WALL (NOT PARAPETTED) — L., R., F., B.		
	GLASS/METAL PANELS — L. %, R. %, F. 100 %, B. %	05	
	STEEL (or ASBESTOS) on STEEL FRAMEWORK, etc.		
	MIXED CONSTRUCTION: Masonry %; Brick Veneer %; Metal or Rigid Asbestos clad %; Other %		
HEIGHT:	1 Storey(s); Basement: YES ☐ NO ☑		
AREA:	BT. x , x , x = sq.ft.		
	1st. 30. x 60. , x , x = 1800 sq.ft.		
	2nd. x , x , x = sq.ft.		
	3rd. x , x , x = sq.ft.		
	4th. x , x , x = sq.ft.		
	Total (All Floors) 1800 sq.ft.		
	FLOOR AREA CHARGE ¢. less (Curtain Walls) %		05
KEY RATE:	65 ¢, (Total Principal Charges – (deductions) = ¢ for determining Key Rate)	65	
	Hydrant Deficiency		
FOUNDATION:	MASONRY ENCLOSED ☐ CONCRETE PAD ☑ POSTS ☐		
ATTACHMENTS:	(Describe)		
ACCESSIBILITY:	Fire fighting restricted by:		
ROOF:	Blind Space 3 ft. Used for ; Joist ☐; Other ☐ (Specify)		
	Mansard: Left ☐, Right ☐, Front ☐, Back ☐;		
	Covering: Wood Shingles ☐; Tarpaper ☐; Patent ☐; Other ☐ (Specify)		
ELECTRIC WIRING:	Used Exclusively — Type "S" Fuses ☐; Type "C" Fuses & Rejector System ☐; Circuit Breakers ☑; Ordinary Fuses ☐		
	Aluminum Wiring ☐; Rigid Conduit ☐; Open ☐.		05
FLOORS:	Grade floor CONCRETE ☒, Basement: YES ☐, NO ☑; Steel Supports: YES ☐, NO ☐		20
	Supporting Steel adequately protected: YES ☐ NO ☐:		
	Heavy Wood floor(s), with floor opening(s) protected — each floor YES ☐ NO ☐		
EXPOSED STEEL:	COLUMNS & BEAMS — BT.Nbr. ; 1st.Nbr. 3 ; 2nd.Nbr. ; 3rd.Nbr. ; 4th.Nbr.	03	
HEATING:	No heat ☐; Stoves ☐ Nbr. O.G.C.W.; Quebec Heaters ☐ Nbr. O.G.C.W.;		
	Furnace (Convection) ☐ Nbr. O.G.C.W.; Furnace (Forced Air) ☐ Nbr. W;		
	Hot Water, Steam ☐ Nbr. O.G.C.W.; Fire Resistive Room YES ☐ NO ☐		
	Suspended Ceiling Units ☑ Nbr. O.G.;	05	
	Electric Heating: Portable ☐, Permanently installed ☐;		
	Salamanders, Oil Drums, etc. (Describe)		
	Oil Burners — Listed YES ☑ NO ☐: Fuel Oil Tanks — Listed YES ☒ NO ☐		
CHIMNEYS:	SOLID BRICK FROM GROUND ☐ Nbr. ; LISTED FACTORY BUILT ☑ Nbr. ;		
	BRACKET ☐ Nbr. , Outside Bldg. ☐, Inside Bldg. Supported by floor or roof joists ☐;		
	METAL STACKS ☐ Nbr. ; GAUGE STEEL Ins., FOUNDATION ;		
	SMOKEPIPE DEFICIENCIES (Describe):		
	STOVEPIPE CHIMNEYS ☐ Nbr. ; CLAY, CEMENT & ASBESTOS PIPES ☐ Nbr. ;		
	DEFICIENCIES (Describe):		
	SUB-TOTAL (Carried forward)	78	30

2054/9.76 (4)

(Over)

	Charges	Ded.
(Total brought fwd.)	78	.30

POWER: AIR CONDITIONING, COMPRESSORS, REFRIGERATION 3 H.P. Sup'vd. ☒ Unsup'vd. ☐; 10
OTHER ELEC. MOTORS ....., H.P. MANUALLY CONTROLLED YES ☐ NO ☐;
PROCESS BOILERS ☐, Nbr. ..... O.G.C.W., CLEARANCE .....,
In Fire Resistive Room YES ☐ NO ☐ .....,
STACK ....., CLEARANCE .....

INTERIOR FINISH:

	BT.	1st.	2nd.	3rd.	4th.
WALLS	/	HCSLW			
CEILINGS	/	GYP			
PARTITIONS					

.05

VERTICAL OPENINGS:
Masonry shafts with Class "B" self-closing doors – Nbr. ..... From ..... To .....;
Self-closing trap doors ..... inches thick – Nbr. ..... From ..... To .....;
Sub-standard shaft or doors with self-closing doors – Nbr. ..... From ..... To .....;
Other than above or open stairs – Nbr. ..... From ..... To .....;

INTERNAL PROTECTION:
EXTINGUISHERS ..... Standard ☐; Non-Standard ☑; (For details see page 3 "Occupancy by Floor")
STANDPIPE & HOSE..... Standard ☐; Non-Standard ☐;
WATCHMAN & CLOCK: Standard ☐ Non-standard ☐ .....;
SPRINKLERED BASEMENT: YES ☐ NO ☐, Approved installation YES ☐ NO ☐;
AUTOMATIC FIRE DETECTION SYSTEM: Local ☐ or otherwise – state .....;
Partial Sprinkler System (in Hazardous areas): YES ☐ NO ☐ .....

OCCUPANCY & PROCESS:
Item # AUTO REPAIR GARAGE 40
SUSPENDED HEATING UNIT 10

TENANTS & PROCESS:
Item # .....

FAULTS OF MANAGEMENT:

	138	.33
Less Deductions	.33	
Sub-Total	105	
Less Special Occupancy Reduction (10 %) (Where applicable)	10	
	95	

EXPOSURE:
Co-insurance Credit: Bldg. 20 %; Contents 12 %. No. Co. Bldg. Rate → 95

IBC IND. Code(s)	IAO Rate Code(s) Occ'y.	C/P 2	IBC Codes: Terr 64 - Ind 551 - Cons 4 - Prot 4	Contents Extra	No. Cr.	80% Co.	No. Co.	80% Co.
551	151	Building (1- BIHCG-P)			95	76		
551	151	Auto Repair Garage Stock		40	55	115		
–		Office Contents						
–	151	Machinery Furniture & Fixtures (Equipment)		20	115	98		
–		Dwelling Contents						

Requested by: OFFICE REVISION Report No. Date:

Initial: CF
Date: 2.11.77

RATE IS NOT PREDICTED ON AN I.A.O. INSPECTION

CHAIN OF TITLE REPORT

Project #: 24061400277
Address: 1660 Chemin Merivale, Nepean
Legal Description: Pt Lot 30 Con 1 RF Nepean, as in CR353127, Except CR456851

Searched at: Ottawa
LRO #: 4

PIN #: 04657-0123(LT)

INSTR #	DOC. TYPE	REG. DATE	PARTY FROM	PARTY TO
30435	Foreclosure	29 03 1916	Supreme Court of Ontario (John C. Smith Defaulted In Mtg)	Robert REID
NP49904	Deed	03 01 1943	Robert Reid - Estate	Clifford NESBITT
CR353127	Deed	06 11 1956	Clifford Nesbitt	Imperial Oil Limited
OC2470870	Deed (Present Owner)	25 03 2022	Imperial Oil Limited	**Harnois Groupe Immobilier Inc.**

* CERTIFIED IN ACCORDANCE WITH THE LAND TITLES ACT * SUBJECT TO RESERVATIONS IN CROWN GRANT *

PROPERTY DESCRIPTION: PT LT 30, CON 1 RIDEAU FRONT , AS IN CR353127 EXCEPT CR456851 ; NEPEAN

PROPERTY REMARKS:

ESTATE/QUALIFIER:
FEE SIMPLE
LT CONVERSION QUALIFIED

RECENTLY:
FIRST CONVERSION FROM BOOK NP9

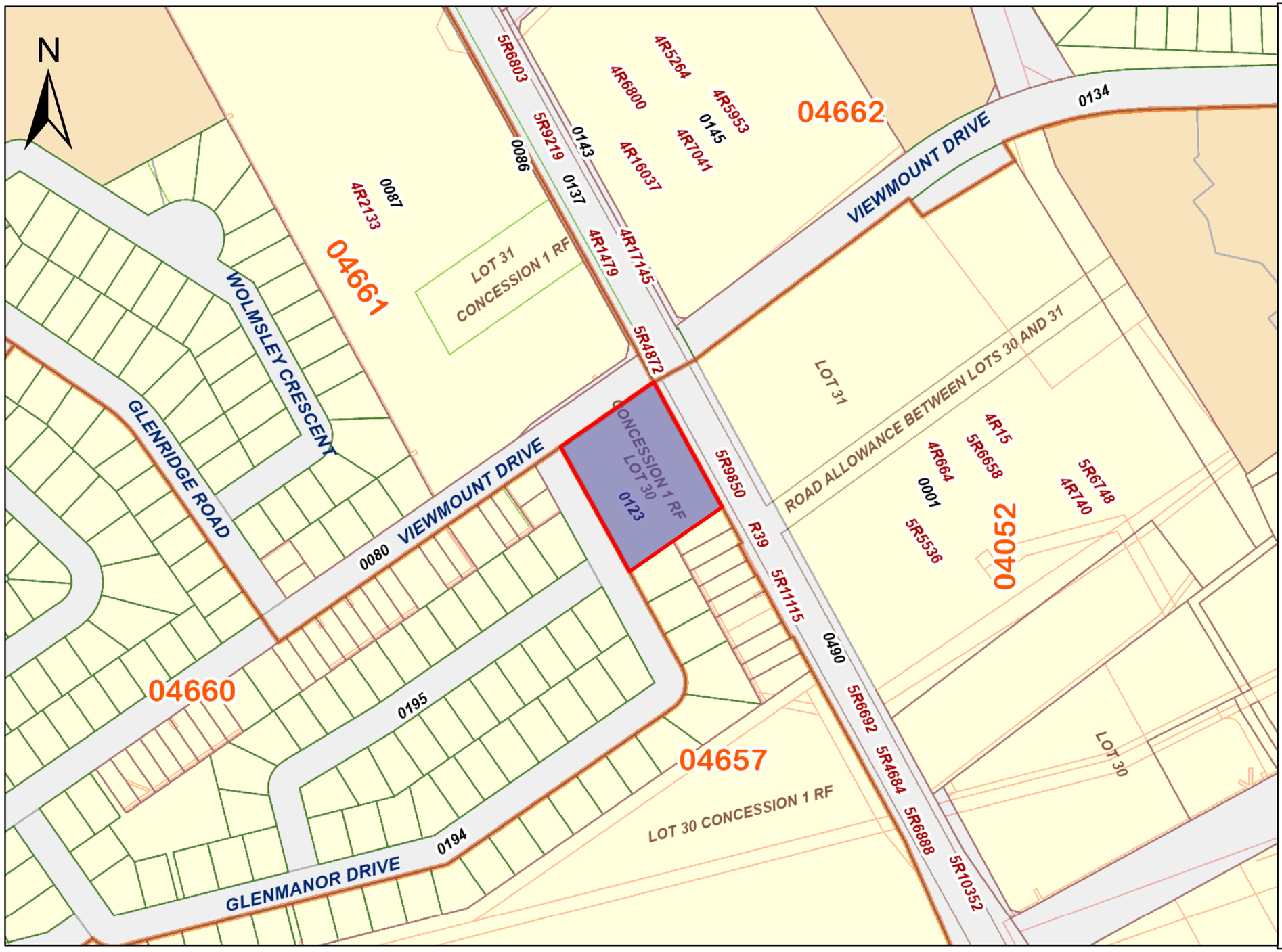
PIN CREATION DATE:
1994/08/22

OWNERS' NAMES
HARNOIS GROUPE IMMOBILIER INC.

CAPACITY SHARE
ROWN

REG. NUM.	DATE	INSTRUMENT TYPE	AMOUNT	PARTIES FROM	PARTIES TO	CERT/ CHKD
EFFECTIVE 2000/07/29 THE NOTATION OF THE "BLOCK IMPLEMENTATION DATE" OF 1994/08/22 ON THIS PIN						
WAS REPLACED WITH THE "PIN CREATION DATE" OF 1994/08/22						
*** PRINTOUT INCLUDES ALL DOCUMENT TYPES AND DELETED INSTRUMENTS SINCE 1994/08/19 ***						
***SUBJECT, ON FIRST REGISTRATION UNDER THE LAND TITLES ACT, TO:*						
*** SUBSECTION 44(1) OF THE LAND TITLES ACT, EXCEPT PARAGRAPH 11, PARAGRAPH 14, PROVINCIAL SUCCESSION DUTIES **						
*** AND ESCHEATS OR FORFEITURE TO THE CROWN.*						
*** THE RIGHTS OF ANY PERSON WHO WOULD, BUT FOR THE LAND TITLES ACT, BE ENTITLED TO THE LAND OR ANY PART OF*						
*** IT THROUGH LENGTH OF ADVERSE POSSESSION, PRESCRIPTION, MISDESCRIPTION OR BOUNDARIES SETTLED BY*						
*** CONVENTION.*						
*** ANY LEASE TO WHICH THE SUBSECTION 70(2) OF THE REGISTRY ACT APPLIES.*						
***DATE OF CONVERSION TO LAND TITLES: 1994/08/22 ***						
CR353127	1956/11/06	TRANSFER		*** COMPLETELY DELETED ***	IMPERIAL OIL LIMITED	
	REMARKS: SKETCH ATTACHED					
NS248053	1984/07/09	AGREEMENT			THE CORPORATION OF THE CITY OF NEPEAN	C
OC1135995	2010/07/16	NOTICE		HER MAJESTY THE QUEEN IN RIGHT OF CANADA		C
	REMARKS: AIRPORT ZONING REGULATION					
OC2470870	2022/03/25	TRANSFER	$1,419,752	IMPERIAL OIL LIMITED	HARNOIS GROUPE IMMOBILIER INC.	C
	REMARKS: PLANNING ACT STATEMENTS.					
OC2470871	2022/03/25	APL ANNEX REST COV		HARNOIS GROUPE IMMOBILIER INC.		C
OC2605605	2023/06/16	CHARGE	$650,000,000	HARNOIS GROUPE IMMOBILIER INC.	FÉDÉRATION DES CAISSES DESJARDINS DU QUÉBEC	C

NOTE: ADJOINING PROPERTIES SHOULD BE INVESTIGATED TO ASCERTAIN DESCRIPTIVE INCONSISTENCIES, IF ANY, WITH DESCRIPTION REPRESENTED FOR THIS PROPERTY.
NOTE: ENSURE THAT YOUR PRINTOUT STATES THE TOTAL NUMBER OF PAGES AND THAT YOU HAVE PICKED THEM ALL UP.



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SCALE

0 20 40 60 80 100 120
meters

PROPERTY INDEX MAP

OTTAWA-CARLETON(No. 04)

LEGEND

FREEHOLD PROPERTY	
LEASEHOLD PROPERTY	
LIMITED INTEREST PROPERTY	
CONDOMINIUM PROPERTY	
RETIRED PIN (MAP UPDATE PENDING)	
PROPERTY NUMBER	*0449*
BLOCK NUMBER	**08050**
GEOGRAPHIC FABRIC	
EASEMENT	

THIS IS NOT A PLAN OF SURVEY

NOTES

REVIEW THE TITLE RECORDS FOR COMPLETE PROPERTY INFORMATION AS THIS MAP MAY NOT REFLECT RECENT REGISTRATIONS

THIS MAP WAS COMPILED FROM PLANS AND DOCUMENTS RECORDED IN THE LAND REGISTRATION SYSTEM AND HAS BEEN PREPARED FOR PROPERTY INDEXING PURPOSES ONLY

FOR DIMENSIONS OF PROPERTIES BOUNDARIES SEE RECORDED PLANS AND DOCUMENTS

ONLY MAJOR EASEMENTS ARE SHOWN

REFERENCE PLANS UNDERLYING MORE RECENT REFERENCE PLANS ARE NOT ILLUSTRATED

Ontario

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CITY DIRECTORY

Project Property:	*HARN1660* *1660 Chemin Merivale* *Nepean,ON K2G 3K4*
Project No:	*01-13987*
Requested By:	*Groupe C. Laganière (1995) Inc.*
Order No:	*24061400277*
Date Completed:	*June 19, 2024*

Environmental Risk Information Services
A division of Glacier Media Inc.
1.866.517.5204 | info@erisinfo.com | erisinfo.com

June 19, 2024
RE: CITY DIRECTORY RESEARCH
1660 Chemin Merivale
Nepean,ON K2G 3K4

Thank you for contacting ERIS regarding our City Directory Search services. Our staff has conducted a reverse listing City Directory search to determine prior occupants of the subject site and adjacent properties. When searching a range of addresses, all civic addresses within that range found in the Directory are included.

Note: Reverse Listing Directories generally are focused on highly developed areas, while newly developed areas may be covered in the more recent years, older directories tend to cover only "central" parts of the city. To complete the search, we have either utilized the Toronto Reference Library, Library & Archives Canada and multiple digitized directories. While these do not claim to be a complete collection of all reverse listing city directories produced, ERIS has made every effort to provide accurate and complete information. ERIS shall not be held liable for missing, incomplete, or inaccurate information. If you believe there are additional addresses or streets that require searching, please contact us.

Search Criteria:

1660 of Merivale Road

Search Notes:

Search Results Summary

Data from 2012 to 2021 does not include residential information

Date	Source	Comment
2021	DIGITAL BUSINESS DIRECTORY	
2017	DIGITAL BUSINESS DIRECTORY	
2012	DIGITAL BUSINESS DIRECTORY	
2006-07	VERNONS	
2000	VERNONS	
1997	POLKS	
1994	POLKS	
1991	MIGHTS	
1987	MIGHTS	
1981-82	MIGHTS	
1976	MIGHTS	
1971	MIGHTS	
1966	MIGHTS	
1960	MIGHTS	

2021 MERIVALE ROAD

SOURCE: DIGITAL BUSINESS DIRECTORY

1660 **ATM**...*AUTOMATED TELLER MACHINES*
1660 **CANADIAN TIRE GAS+**...*CONVENIENCE STORES*
1660 **CANADIAN TIRE GAS+**...*ALTERNATIVE FUELS*

2017 MERIVALE ROAD

SOURCE: DIGITAL BUSINESS DIRECTORY

1660 **CANADIAN TIRE GAS+**...*OTHER GASOLINE STATIONS*
1660 **ESSO**...*OTHER GASOLINE STATIONS*
1660 **TIM HORTONS**...*OTHER GASOLINE STATIONS*
1660 **TIM HORTONS**...*SNACK & NONALCOHOLIC BEVERAGE BARS*
1660 **VIEWMONT ON THE RUN**...*OTHER GASOLINE STATIONS*

2012 MERIVALE ROAD

SOURCE: DIGITAL BUSINESS DIRECTORY

1660 **ESSO**...*OTHER GASOLINE STATIONS*

2006-07 MERIVALE ROAD

SOURCE: VERNONS

1660 **ADDRESS NOT LISTED**

2000 MERIVALE ROAD

SOURCE: VERNONS

1660 **ESSO (IMPERIAL OIL)**

1997 MERIVALE ROAD

SOURCE: POLKS

1660 **ESSO (IMPERIAL OIL)**
1660 **TIM HORTON DONUTS**

1994 MERIVALE ROAD

SOURCE: POLKS

1660 **ADDRESS NOT LISTED**

1991 MERIVALE ROAD

SOURCE: MIGHTS

1660 **ADDRESS NOT LISTED**

1987 MERIVALE ROAD

SOURCE: MIGHTS

1660 **ADDRESS NOT LISTED**

1981-82 MERIVALE ROAD

SOURCE: MIGHTS

1660 **MOE'S ESSO**

1976 MERIVALE ROAD

SOURCE: MIGHTS

1660 **MOE'S ESSO**

1971 MERIVALE ROAD

SOURCE: MIGHTS

1660 **BECKSTEAD SERVICE CENTRE SERV STA**

1966 MERIVALE ROAD

SOURCE: MIGHTS

1660 **ADDRESS NOT LISTED**

1960 MERIVALE ROAD

SOURCE: MIGHTS

1660 **ADDRESS NOT LISTED**

DATABASE REPORT

Project Property:	*HARN1660* *1660 Chemin Merivale* *Nepean ON K2G 3K4*
Project No:	*01-13987*
Report Type:	*Standard Report*
Order No:	*24061400277*
Requested by:	*Groupe C. Laganière (1995) Inc.*
Date Completed:	*June 19, 2024*

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Executive Summary

Property Information:

Project Property:	*HARN1660* *1660 Chemin Merivale Nepean ON K2G 3K4*
Project No:	*01-13987*

Coordinates:

Latitude:	*45.3434035*
Longitude:	*-75.7295684*
UTM Northing:	*5,021,358.19*
UTM Easting:	*442,843.38*
UTM Zone:	*18T*

Elevation:	*281 FT* *85.79 M*

Order Information:

Order No:	*24061400277*
Date Requested:	*June 14, 2024*
Requested by:	*Groupe C. Laganière (1995) Inc.*
Report Type:	*Standard Report*

Historical/Products:

Aerial Photographs	*Aerials - National Collection*
City Directory Search	*CD - Subject Site*
ERIS Xplorer	*ERIS Xplorer*
Land Title Search	*Historical Land Title Search*

Executive Summary: Report Summary

Database	Name	Searched	Project Property	Within 0.25 km	Total
AAGR	Abandoned Aggregate Inventory	Y	0	0	0
AGR	Aggregate Inventory	Y	0	0	0
AMIS	Abandoned Mine Information System	Y	0	0	0
ANDR	Anderson's Waste Disposal Sites	Y	0	0	0
AST	Aboveground Storage Tanks	Y	0	0	0
AUWR	Automobile Wrecking & Supplies	Y	0	0	0
BORE	Borehole	Y	0	1	1
CA	Certificates of Approval	Y	0	4	4
CDRY	Dry Cleaning Facilities	Y	0	0	0
CFOT	Commercial Fuel Oil Tanks	Y	0	0	0
CHEM	Chemical Manufacturers and Distributors	Y	0	0	0
CHM	Chemical Register	Y	0	0	0
CNG	Compressed Natural Gas Stations	Y	0	0	0
COAL	Inventory of Coal Gasification Plants and Coal Tar Sites	Y	0	0	0
CONV	Compliance and Convictions	Y	0	0	0
CPU	Certificates of Property Use	Y	0	0	0
DRL	Drill Hole Database	Y	0	0	0
DTNK	Delisted Fuel Tanks	Y	0	3	3
EASR	Environmental Activity and Sector Registry	Y	0	0	0
EBR	Environmental Registry	Y	0	0	0
ECA	Environmental Compliance Approval	Y	0	1	1
EEM	Environmental Effects Monitoring	Y	0	0	0
EHS	ERIS Historical Searches	Y	0	16	16
EIIS	Environmental Issues Inventory System	Y	0	0	0
EMHE	Emergency Management Historical Event	Y	0	0	0
EPAR	Environmental Penalty Annual Report	Y	0	0	0
EXP	List of Expired Fuels Safety Facilities	Y	0	4	4
FCON	Federal Convictions	Y	0	0	0
FCS	Contaminated Sites on Federal Land	Y	0	0	0
FOFT	Fisheries & Oceans Fuel Tanks	Y	0	0	0
FRST	Federal Identification Registry for Storage Tank Systems (FIRSTS)	Y	0	0	0
FST	Fuel Storage Tank	Y	0	5	5
FSTH	Fuel Storage Tank - Historic	Y	0	2	2
GEN	Ontario Regulation 347 Waste Generators Summary	Y	0	58	58
GHG	Greenhouse Gas Emissions from Large Facilities	Y	0	0	0
HINC	TSSA Historic Incidents	Y	0	0	0
IAFT	Indian & Northern Affairs Fuel Tanks	Y	0	0	0

Database	Name	Searched	Project Property	Within 0.25 km	Total
INC	Fuel Oil Spills and Leaks	Y	0	0	0
LIMO	Landfill Inventory Management Ontario	Y	0	0	0
MINE	Canadian Mine Locations	Y	0	0	0
MNR	Mineral Occurrences	Y	0	0	0
NATE	National Analysis of Trends in Emergencies System (NATES)	Y	0	0	0
NCPL	Non-Compliance Reports	Y	0	0	0
NDFT	National Defense & Canadian Forces Fuel Tanks	Y	0	0	0
NDSP	National Defense & Canadian Forces Spills	Y	0	0	0
NDWD	National Defence & Canadian Forces Waste Disposal Sites	Y	0	0	0
NEBI	National Energy Board Pipeline Incidents	Y	0	0	0
NEBP	National Energy Board Wells	Y	0	0	0
NEES	National Environmental Emergencies System (NEES)	Y	0	0	0
NPCB	National PCB Inventory	Y	0	0	0
NPR2	National Pollutant Release Inventory 1993-2020	Y	0	0	0
NPRI	National Pollutant Release Inventory - Historic	Y	0	0	0
OGWE	Oil and Gas Wells	Y	0	0	0
OOGW	Ontario Oil and Gas Wells	Y	0	0	0
OPCB	Inventory of PCB Storage Sites	Y	0	0	0
ORD	Orders	Y	0	0	0
PAP	Canadian Pulp and Paper	Y	0	0	0
PCFT	Parks Canada Fuel Storage Tanks	Y	0	0	0
PES	Pesticide Register	Y	0	8	8
PFCH	NPRI Reporters - PFAS Substances	Y	0	0	0
PFHA	Potential PFAS Handlers from NPRI	Y	0	0	0
PINC	Pipeline Incidents	Y	0	0	0
PRT	Private and Retail Fuel Storage Tanks	Y	0	1	1
PTTW	Permit to Take Water	Y	0	0	0
REC	Ontario Regulation 347 Waste Receivers Summary	Y	0	0	0
RSC	Record of Site Condition	Y	0	0	0
RST	Retail Fuel Storage Tanks	Y	0	0	0
SCT	Scott's Manufacturing Directory	Y	0	2	2
SPL	Ontario Spills	Y	0	15	15
SRDS	Wastewater Discharger Registration Database	Y	0	0	0
TANK	Anderson's Storage Tanks	Y	0	0	0
TCFT	Transport Canada Fuel Storage Tanks	Y	0	0	0
VAR	Variances for Abandonment of Underground Storage Tanks	Y	0	0	0
WDS	Waste Disposal Sites - MOE CA Inventory	Y	0	0	0
WDSH	Waste Disposal Sites - MOE 1991 Historical Approval Inventory	Y	0	0	0
WWIS	Water Well Information System	Y	0	18	18

Database	Name	Searched	Project Property	Within 0.25 km	Total
Total:		0		138	138

Executive Summary: Site Report Summary - Project Property

Map Key	DB	Company/Site Name	Address	Dir/Dist (m)	Elev diff (m)	Page Number

No records found in the selected databases for the project property.

Executive Summary: Site Report Summary - Surrounding Properties

Map Key	DB	Company/Site Name	Address	Dir/Dist (m)	Elev Diff (m)	Page Number
1	PRT	990846 ONT INC	1660 MERIVALE RD NEPEAN ON K2G3K4	SSW/2.5	1.08	36
1	FSTH	6161278 CANADA INC	1660 MERIVALE RD NEPEAN ON K2G 3K4	SSW/2.5	1.08	36
1	FSTH	6161278 CANADA INC	1660 MERIVALE RD NEPEAN ON K2G 3K4	SSW/2.5	1.08	36
1	EHS		1660 Merivale Road Ottawa ON	SSW/2.5	1.08	37
1	DTNK	7095686 CANADA INC	1660 MERIVALE RD NEPEAN ON	SSW/2.5	1.08	37
1	DTNK	7095686 CANADA INC	1660 MERIVALE RD NEPEAN ON	SSW/2.5	1.08	38
1	DTNK	7095686 CANADA INC	1660 MERIVALE RD NEPEAN ON	SSW/2.5	1.08	38
1	GEN	Imperial Oil	1660 Merivale Road Ottawa ON K2G 1E2	SSW/2.5	1.08	39
1	FST	HARNOIS GROUPE IMMOBILIER INC.	1660 MERIVALE RD NEPEAN ON	SSW/2.5	1.08	39
1	FST	HARNOIS GROUPE IMMOBILIER INC.	1660 MERIVALE RD NEPEAN ON	SSW/2.5	1.08	40
1	FST	HARNOIS GROUPE IMMOBILIER INC.	1660 MERIVALE RD NEPEAN ON	SSW/2.5	1.08	40
1	FST	HARNOIS GROUPE IMMOBILIER INC.	1660 MERIVALE RD NEPEAN ON	SSW/2.5	1.08	40

Map Key	DB	Company/Site Name	Address	Dir/Dist (m)	Elev Diff (m)	Page Number
1	GEN	Imperial Oil	1660 Merivale Road Ottawa ON	SSW/2.5	1.08	40
1	GEN	Imperial Oil	1660 Merivale Road Ottawa ON K2G 1E2	SSW/2.5	1.08	41
1	GEN	Imperial Oil	1660 Merivale Road Ottawa ON	SSW/2.5	1.08	41
1	GEN	Imperial Oil	1660 Merivale Road Ottawa ON K2G 1E2	SSW/2.5	1.08	41
1	GEN	Imperial Oil	1660 Merivale Road Ottawa ON K2G 1E2	SSW/2.5	1.08	42
1	GEN	Imperial Oil	1660 Merivale Road Ottawa ON K2G 1E2	SSW/2.5	1.08	42
1	GEN	Imperial Oil	1660 Merivale Road Ottawa ON K2G 1E2	SSW/2.5	1.08	43
1	EHS		1660 Merivale Road Nepean ON K2G 3K4	SSW/2.5	1.08	43
1	GEN	Imperial Oil	1660 Merivale Road Ottawa ON K2G 1E2	SSW/2.5	1.08	43
1	GEN	Imperial Oil	1660 Merivale Road Ottawa ON K2G 1E2	SSW/2.5	1.08	44
1	GEN	Imperial Oil	1660 Merivale Road Ottawa ON K2G 1E2	SSW/2.5	1.08	44
1	GEN	Canadian Tire Corporation, Limited	1660 Merivale Road Nepean ON K2G 3K4	SSW/2.5	1.08	45
1	EHS		1660 Merivale Road Nepean ON K2G 3K4	SSW/2.5	1.08	45

Map Key	DB	Company/Site Name	Address	Dir/Dist (m)	Elev Diff (m)	Page Number
1	EXP	HARNOIS GROUPE IMMOBILIER INC.	1660 MERIVALE RD NEPEAN ON	SSW/2.5	1.08	45
1	EXP	HARNOIS GROUPE IMMOBILIER INC.	1660 MERIVALE RD NEPEAN ON	SSW/2.5	1.08	46
1	EXP	HARNOIS GROUPE IMMOBILIER INC.	1660 MERIVALE RD NEPEAN ON	SSW/2.5	1.08	46
1	EXP	HARNOIS GROUPE IMMOBILIER INC.	1660 MERIVALE RD NEPEAN ON	SSW/2.5	1.08	46
1	FST	HARNOIS GROUPE IMMOBILIER INC.	1660 MERIVALE RD NEPEAN ON	SSW/2.5	1.08	46
1	EHS		1660 Merivale Road Nepean ON K2G 3K4	SSW/2.5	1.08	47
1	EHS		1660 Merivale Road Nepean ON K2G 3K4	SSW/2.5	1.08	47
2	SPL	ESSO PETROLEUM	MERRIVALE & VIEWMOUNT SERVICE STATION NEPEAN CITY ON	ENE/19.7	1.08	47
3	SPL	ESSO PETROLEUM CANADA	1660 MERIVALE RD. SERVICE STATION NEPEAN CITY ON K2G 3K4	SSW/24.3	0.00	48
4	WWIS		ON ***Well ID:*** 7174548	WSW/25.7	0.24	49
5	WWIS		ON ***Well ID:*** 7174547	WSW/26.2	0.24	50
6	WWIS		lot 30 con 1 ON ***Well ID:*** 7409560	WNW/27.8	1.08	50
7	WWIS		ON	NE/34.4	1.05	51

Map Key	DB	Company/Site Name	Address	Dir/Dist (m)	Elev Diff (m)	Page Number
			Well ID: 7197932			
8	WWIS		1660 MERRIVALE Ottawa ON ***Well ID:*** 7271903	NE/36.2	1.05	52
8	WWIS		1660 MERIVALE Ottawa ON ***Well ID:*** 7271902	NE/36.2	1.05	55
9	WWIS		lot 30 con 1 ON ***Well ID:*** 7409559	WSW/43.5	0.77	58
10	WWIS		ON ***Well ID:*** 7233984	E/43.9	1.08	59
11	WWIS		1650 Merival Road lot 30 con 1 Ottawa ON ***Well ID:*** 7345849	NW/53.1	1.05	60
12	WWIS		1642 Merivale Road Ottawa ON ***Well ID:*** 7344790	NW/53.7	1.05	63
13	WWIS		1660 MERIVALE ROAD Ottawa ON ***Well ID:*** 7250163	SSE/59.8	0.08	66
14	WWIS		ON ***Well ID:*** 7417212	E/61.7	1.08	69
15	WWIS		1660 MERIVALE ROAD Ottawa ON ***Well ID:*** 7250162	SSE/61.8	0.11	70
16	WWIS		ON ***Well ID:*** 7417213	ENE/63.1	1.05	73
17	WWIS		1642 Merivale Rd Ottawa ON ***Well ID:*** 7344836	NW/70.1	1.75	74
18	GEN	OTTAWA-CARLETON DISTRICT SCHOOL BOARD Health and Safety	MERIVALE HIGH SCHOOL 1755 MERIVALE ROAD NEPEAN ON K2G 1E2	SE/114.1	-0.92	78
19	WWIS		1642 Merivale Rd Ottawa ON	NW/127.3	2.08	79

Map Key	DB	Company/Site Name	Address	Dir/Dist (m)	Elev Diff (m)	Page Number
			Well ID: 7344837			
20	BORE		ON	SE/147.9	-0.87	82
21	GEN	CARLETON BOARD OF EDUCATION	MERIVALE HIGH SCHOOL 1755 MERIVALE ROAD NEPEAN ON K2G 1E2	ESE/148.5	-0.61	84
21	GEN	CARLETON BOARD OF EDUCATION 07-622	MERIVALE HIGH SCHOOL 1755 MERIVALE ROAD NEPEAN ON K2G 1E2	ESE/148.5	-0.61	84
21	GEN	OTTAWA-CARLETON DISTRICT SCHOOL BOARD	MERIVALE HIGH SCHOOL 1755 MERIVALE ROAD NEPEAN ON K2G 1E2	ESE/148.5	-0.61	85
21	GEN	OTTAWA CARLETON DISTRICT SCHOOL BAORD	1755 MERIVALE ROAD NEPEAN ON K2G 1E2	ESE/148.5	-0.61	86
21	CA	Ottawa-Carleton District School Board	1755 Merivale Road Ottawa ON	ESE/148.5	-0.61	86
21	GEN	OTTAWA-CARLETON DISTRICT SCHOOL BOARD	MERIVALE HIGH SCHOOL 1755 MERIVALE ROAD NEPEAN ON K2G 1E2	ESE/148.5	-0.61	86
21	GEN	OTTAWA-CARLETON DISTRICT SCHOOL BOARD	MERIVALE HIGH SCHOOL 1755 MERIVALE ROAD NEPEAN ON K2G 1E2	ESE/148.5	-0.61	87
21	GEN	OTTAWA-CARLETON DISTRICT SCHOOL BOARD	MERIVALE HIGH SCHOOL 1755 MERIVALE ROAD NEPEAN ON K2G 1E2	ESE/148.5	-0.61	88
21	GEN	OTTAWA-CARLETON DISTRICT SCHOOL BOARD	MERIVALE HIGH SCHOOL 1755 MERIVALE ROAD NEPEAN ON K2G 1E2	ESE/148.5	-0.61	88
21	GEN	OTTAWA-CARLETON DISTRICT SCHOOL BOARD	MERIVALE HIGH SCHOOL 1755 MERIVALE ROAD NEPEAN ON	ESE/148.5	-0.61	89
21	ECA	Ottawa-Carleton District School Board	1755 Merivale Road Ottawa ON K2H 6L3	ESE/148.5	-0.61	90

Map Key	DB	Company/Site Name	Address	Dir/Dist (m)	Elev Diff (m)	Page Number
21	GEN	OTTAWA-CARLETON DISTRICT SCHOOL BOARD	MERIVALE HIGH SCHOOL 1755 MERIVALE ROAD NEPEAN ON K2G 1E2	ESE/148.5	-0.61	90
21	GEN	OTTAWA-CARLETON DISTRICT SCHOOL BOARD	MERIVALE HIGH SCHOOL 1755 MERIVALE ROAD NEPEAN ON K2G 1E2	ESE/148.5	-0.61	91
21	GEN	OTTAWA-CARLETON DISTRICT SCHOOL BOARD	MERIVALE HIGH SCHOOL 1755 MERIVALE ROAD NEPEAN ON K2G 1E2	ESE/148.5	-0.61	92
21	GEN	OTTAWA-CARLETON DISTRICT SCHOOL BOARD Health and Safety	MERIVALE HIGH SCHOOL 1755 MERIVALE ROAD NEPEAN ON K2G 1E2	ESE/148.5	-0.61	93
21	EHS		1755 Merivale Rd Ottawa ON K2G1E2	ESE/148.5	-0.61	94
21	GEN	OTTAWA-CARLETON DISTRICT SCHOOL BOARD Health and Safety	MERIVALE HIGH SCHOOL 1755 MERIVALE ROAD NEPEAN ON K2G 1E2	ESE/148.5	-0.61	94
21	GEN	OTTAWA-CARLETON DISTRICT SCHOOL BOARD Health and Safety	MERIVALE HIGH SCHOOL 1755 MERIVALE ROAD NEPEAN ON K2G 1E2	ESE/148.5	-0.61	96
22	SPL	PRIVATE RESIDENCE	160 VIEWMOUNT FURNACE OIL TANK NEPEAN CITY ON K2G 3B7	WSW/150.5	1.08	97
23	WWIS		1642 Merivale Rd lot 31 con 1 Ottawa ON ***Well ID:*** 7344838	WNW/158.8	2.78	98
24	SCT	Doro Inc.	1680B Merivale Rd Nepean ON K2G 3K4	SSE/161.3	-0.83	101
25	SCT	RONS WOODWORKS AND CRAFTS	13 GLENMANOR DR NEPEAN ON K2G 3E8	SW/194.3	-0.61	102
26	SPL	Parson Refridgeration<UNOFFICIAL>	LOEB STORE - 1705 MERIVALE RD. <UNOFFICIAL> Ottawa ON	NE/207.4	3.12	102
26	SPL	Loeb's<UNOFFICIAL>	1705 Merivale Road Ottawa ON	NE/207.4	3.12	103

Map Key	DB	Company/Site Name	Address	Dir/Dist (m)	Elev Diff (m)	Page Number
26	SPL	Loeb Grocery Store<UNOFFICIAL>	1705 Merivale Rd Ottawa ON	NE/207.4	3.12	104
26	SPL	Loeb Inc. <UNOFFICIAL>	1705 Merivale Road Ottawa ON	NE/207.4	3.12	104
26	SPL	Loeb<UNOFFICIAL>	1705 Merivale Road Ottawa ON	NE/207.4	3.12	105
26	PES	METRO ONTARIO INC O/A METRO/FOOD BASICS # 272	1705 MERIVALE ROAD OTTAWA ON K2G3K2	NE/207.4	3.12	106
26	PES	METRO ONTARIO INC O/A METRO/FOOD BASICS # 272	1705 Merivale Road Ottawa ON K2G 3K2	NE/207.4	3.12	106
26	SPL	Parson Refrigeration (1985) Ltd.	1705 Marivale Road Ottawa ON	NE/207.4	3.12	107
26	SPL		1705 Merivale Road Ottawa ON	NE/207.4	3.12	108
26	SPL		1705 Merivale Road, Nepean Ottawa ON K2G 3K2	NE/207.4	3.12	108
26	SPL	Metro	1705 Merivale Road Ottawa ON	NE/207.4	3.12	109
26	PES	METRO ONTARIO INC O/A METRO/FOOD BASICS # 272	1705 MERIVALE ROAD OTTAWA ON K2G3K2	NE/207.4	3.12	110
27	WWIS		1642 MERIVALE RD Ottawa ON ***Well ID:*** 7201222	N/220.6	4.23	110
28	EHS		1701-1719 Merivale Road Nepean (Ottawa) ON K2G 3K2	NNE/223.5	4.17	113
29	EHS		1701 Merivale Road Nepean ON K2G 3K2	NNE/224.2	4.17	113

Map Key	DB	Company/Site Name	Address	Dir/Dist (m)	Elev Diff (m)	Page Number
30	CA	A&W FOOD SERVICES OF CANADA LTD.	1642 MERIVALE RD., (MALL) NEPEAN CITY ON K2G 4A1	NW/239.1	4.08	113
30	PES	WOOLCO DEPARTMENT STORE #6364 MERIVALE MALL	1642 MERIVALE ROAD OTTAWA ON	NW/239.1	4.08	113
30	CA	MARATHON REALTY COMPANY LTD.	1642 MERIVALE RD. (MALL) NEPEAN CITY ON K2G 4A1	NW/239.1	4.08	114
30	CA	EUSTRATIOS ZEIBEKIS	1642 MERIVALE ROAD NEPEAN CITY ON K2G 4A1	NW/239.1	4.08	114
30	EHS		1642 Merivale Road Ottawa ON K2G 4A1	NW/239.1	4.08	114
30	GEN	BLACK PHOTO CORPORATION	1642 MERIVALE ROAD - OTTAWA C/O 371 GOUGH ROAD MARKHAM ON K2G 4A1	NW/239.1	4.08	114
30	GEN	BLACK PHOTO CORPORATION 05-658	1642 MERIVALE ROAD - OTTAWA OTTAWA ON K2G 4A1	NW/239.1	4.08	115
30	GEN	BLACK PHOTO CORPORATION 05-658	1642 MERIVALE ROAD - OTTAWA C/O 371 GOUGH ROAD MARKHAM ON K2G 4A1	NW/239.1	4.08	115
30	GEN	BLACK PHOTO CORPORATION	1642 MERIVALE ROAD - OTTAWA OTTAWA ON K2G 4A1	NW/239.1	4.08	116
30	GEN	BLACK PHOTO CORPORATION	1642 MERIVALE ROAD OTTAWA ON K2G 4A1	NW/239.1	4.08	116
30	GEN	FORZANI GROUP LTD./SPORT CHEK	1642 MERIVALE ROAD, UNIT 680 NEPEAN ON K2G 4A1	NW/239.1	4.08	116
30	GEN	SPORT CHEK	1642 MERIVALE ROAD, UNIT 680 NEPEAN ON K2G 4A1	NW/239.1	4.08	117
30	GEN	SHOPPERS DRUG MART	1642 MERIVALE ROAD NEPEAN ON K2G 4A1	NW/239.1	4.08	117

Map Key	DB	Company/Site Name	Address	Dir/Dist (m)	Elev Diff (m)	Page Number
30	GEN	forzani group	1642 merivale rd nepean ON K2G 4A1	NW/239.1	4.08	117
30	GEN	Merivale Family Medical Centre	1642 Merivale Road Ottawa ON	NW/239.1	4.08	118
30	EHS		1642 Merivale Road Ottawa ON	NW/239.1	4.08	118
30	EHS		1642 Merivale Road Ottawa ON	NW/239.1	4.08	118
30	EHS		1642 Merivale Rd Ottawa ON	NW/239.1	4.08	118
30	PES	SHOPPERS DRUG MART #0910 (MERIVALE MALL)	1642 MERIVALE RD OTTAWA ON K2G4A1	NW/239.1	4.08	119
30	GEN	Farm Boy Inc.	1642 Merivale Road Ottawa ON K2G 4A1	NW/239.1	4.08	119
30	GEN	3363961 Canada Inc.	1642 Merivale Rd. Nepean ON K2G 4A1	NW/239.1	4.08	119
30	SPL	Waste Management of Canada Corporation	1642 Merivale Road Ottawa ON	NW/239.1	4.08	120
30	GEN	forzani group	1642 merivale rd nepean ON	NW/239.1	4.08	120
30	PES	SHOPPERS DRUG MART #0910 (MERIVALE MALL)	1642 MERIVALE RD OTTAWA ON K2G4A1	NW/239.1	4.08	121
30	SPL	Parson Refrigeration (1985) Ltd.	1642 Merivale Road Ottawa ON K2G 4A1	NW/239.1	4.08	121
30	SPL	Farmboy Inc.<UNOFFICIAL>	1642 Merivale Rd Ottawa ON K2G 4A1	NW/239.1	4.08	122

Map Key	DB	Company/Site Name	Address	Dir/Dist (m)	Elev Diff (m)	Page Number
30	GEN	forzani group	1642 merivale rd nepean ON K2G 4A1	NW/239.1	4.08	123
30	EHS		1642 Merivale Rd Nepean ON K2G 4A1	NW/239.1	4.08	123
30	EHS		1642 Merivale Rd Ottawa ON K2G 4A1	NW/239.1	4.08	124
30	GEN	forzani group	1642 merivale rd nepean ON K2G 4A1	NW/239.1	4.08	124
30	GEN	forzani group	1642 merivale rd nepean ON K2G 4A1	NW/239.1	4.08	124
30	PES	SHOPPERS DRUG MART #0910 (MERIVALE MALL)	1642 MERIVALE RD OTTAWA ON K2G 4A1	NW/239.1	4.08	125
30	GEN	forzani group	1642 merivale rd nepean ON K2G 4A1	NW/239.1	4.08	125
30	GEN	B. Surani Drugs Ltd.	1642 MERIVALE RD Ottawa ON K2G 4A1	NW/239.1	4.08	126
30	GEN	FGL SPORTS LIMITED	1642 merivale rd nepean ON K2G4A1	NW/239.1	4.08	126
30	GEN	B. Surani Drugs Ltd.	1642 MERIVALE RD Ottawa ON K2G 4A1	NW/239.1	4.08	126
30	GEN	forzani group	1642 merivale rd nepean ON K2G4A1	NW/239.1	4.08	127
30	GEN	forzani group	1642 merivale rd nepean ON K2G4A1	NW/239.1	4.08	127
30	GEN	B. Surani Drugs Ltd.	1642 MERIVALE RD Ottawa ON K2G 4A1	NW/239.1	4.08	128

Map Key	DB	Company/Site Name	Address	Dir/Dist (m)	Elev Diff (m)	Page Number
30	GEN	FGL SPORTS LIMITED sport chek	1642 merivale rd nepean ON K2G4A1	NW/239.1	4.08	128
30	EHS		1642 Merivale Rd Ottawa ON K2G4A1	NW/239.1	4.08	128
30	EHS		1642 & 1650 Merivale Road Nepean ON K2G 5Y3	NW/239.1	4.08	129
30	PES	SHOPPERS DRUG MART #0910 (MERIVALE MALL)	1642 MERIVALE RD OTTAWA ON K2G4A1	NW/239.1	4.08	129
30	GEN	FGL SPORTS LIMITED sport chek	1642 Merivale Rd. Unit #0580 Nepean ON K2G 4A1	NW/239.1	4.08	129
30	GEN	A.M.Pharmacare Limited	1642 MERIVALE RD Shoppers Drug Mart Ottawa ON K2G 4A1	NW/239.1	4.08	130
30	GEN	EMAN A. RAHMAN PHARMACY INC.	1642 MERIVALE RD Shoppers Drug Mart Ottawa ON K2G 4A1	NW/239.1	4.08	130
30	GEN	FGL SPORTS LIMITED sport chek	1642 Merivale Rd. Unit #0580 Nepean ON K2G 4A1	NW/239.1	4.08	130
30	GEN	FGL SPORTS LIMITED sport chek	1642 Merivale Rd. Unit #0580 Nepean ON K2G 4A1	NW/239.1	4.08	131
30	GEN	EMAN A. RAHMAN PHARMACY INC.	1642 MERIVALE RD Shoppers Drug Mart Ottawa ON K2G 4A1	NW/239.1	4.08	131

Executive Summary: Summary By Data Source

BORE - Borehole

A search of the BORE database, dated 1875-Jul 2018 has found that there are 1 BORE site(s) within approximately 0.25 kilometers of the project property.

Lower Elevation	Address	Direction	Distance (m)	Map Key
	ON	SE	147.90	20

CA - Certificates of Approval

A search of the CA database, dated 1985-Oct 30, 2011* has found that there are 4 CA site(s) within approximately 0.25 kilometers of the project property.

Equal/Higher Elevation	Address	Direction	Distance (m)	Map Key
A&W FOOD SERVICES OF CANADA LTD.	1642 MERIVALE RD., (MALL) NEPEAN CITY ON K2G 4A1	NW	239.10	30
EUSTRATIOS ZEIBEKIS	1642 MERIVALE ROAD NEPEAN CITY ON K2G 4A1	NW	239.10	30
MARATHON REALTY COMPANY LTD.	1642 MERIVALE RD. (MALL) NEPEAN CITY ON K2G 4A1	NW	239.10	30

Lower Elevation	Address	Direction	Distance (m)	Map Key
Ottawa-Carleton District School Board	1755 Merivale Road Ottawa ON	ESE	148.50	21

DTNK - Delisted Fuel Tanks

A search of the DTNK database, dated Oct 2023 has found that there are 3 DTNK site(s) within approximately 0.25 kilometers of the project property.

Equal/Higher Elevation	Address	Direction	Distance (m)	Map Key
7095686 CANADA INC	1660 MERIVALE RD NEPEAN ON	SSW	2.53	1

Equal/Higher Elevation	Address	Direction	Distance (m)	Map Key
7095686 CANADA INC	1660 MERIVALE RD NEPEAN ON	SSW	2.53	1
7095686 CANADA INC	1660 MERIVALE RD NEPEAN ON	SSW	2.53	1

ECA - Environmental Compliance Approval

A search of the ECA database, dated Oct 2011-Apr 30, 2024 has found that there are 1 ECA site(s) within approximately 0.25 kilometers of the project property.

Lower Elevation	Address	Direction	Distance (m)	Map Key
Ottawa-Carleton District School Board	1755 Merivale Road Ottawa ON K2H 6L3	ESE	148.50	21

EHS - ERIS Historical Searches

A search of the EHS database, dated 1999-Mar 31, 2024 has found that there are 16 EHS site(s) within approximately 0.25 kilometers of the project property.

Equal/Higher Elevation	Address	Direction	Distance (m)	Map Key
	1660 Merivale Road Ottawa ON	SSW	2.53	1
	1660 Merivale Road Nepean ON K2G 3K4	SSW	2.53	1
	1660 Merivale Road Nepean ON K2G 3K4	SSW	2.53	1
	1660 Merivale Road Nepean ON K2G 3K4	SSW	2.53	1
	1660 Merivale Road Nepean ON K2G 3K4	SSW	2.53	1

Equal/Higher Elevation	Address	Direction	Distance (m)	Map Key
	1701-1719 Merivale Road Nepean (Ottawa) ON K2G 3K2	NNE	223.54	28
	1701 Merivale Road Nepean ON K2G 3K2	NNE	224.20	29
	1642 Merivale Rd Nepean ON K2G 4A1	NW	239.10	30
	1642 Merivale Rd Ottawa ON K2G4A1	NW	239.10	30
	1642 Merivale Rd Ottawa ON K2G 4A1	NW	239.10	30
	1642 & 1650 Merivale Road Nepean ON K2G 5Y3	NW	239.10	30
	1642 Merivale Rd Ottawa ON	NW	239.10	30
	1642 Merivale Road Ottawa ON	NW	239.10	30
	1642 Merivale Road Ottawa ON K2G 4A1	NW	239.10	30
	1642 Merivale Road Ottawa ON	NW	239.10	30

Lower Elevation	Address	Direction	Distance (m)	Map Key
	1755 Merivale Rd Ottawa ON K2G1E2	ESE	148.50	21

EXP - List of Expired Fuels Safety Facilities

A search of the EXP database, dated Oct 2023 has found that there are 4 EXP site(s) within approximately 0.25 kilometers of the project property.

Equal/Higher Elevation	Address	Direction	Distance (m)	Map Key
HARNOIS GROUPE IMMOBILIER INC.	1660 MERIVALE RD NEPEAN ON	SSW	2.53	1
HARNOIS GROUPE IMMOBILIER INC.	1660 MERIVALE RD NEPEAN ON	SSW	2.53	1
HARNOIS GROUPE IMMOBILIER INC.	1660 MERIVALE RD NEPEAN ON	SSW	2.53	1
HARNOIS GROUPE IMMOBILIER INC.	1660 MERIVALE RD NEPEAN ON	SSW	2.53	1

FST - Fuel Storage Tank

A search of the FST database, dated Oct 2023 has found that there are 5 FST site(s) within approximately 0.25 kilometers of the project property.

Equal/Higher Elevation	Address	Direction	Distance (m)	Map Key
HARNOIS GROUPE IMMOBILIER INC.	1660 MERIVALE RD NEPEAN ON	SSW	2.53	1
HARNOIS GROUPE IMMOBILIER INC.	1660 MERIVALE RD NEPEAN ON	SSW	2.53	1
HARNOIS GROUPE IMMOBILIER INC.	1660 MERIVALE RD NEPEAN ON	SSW	2.53	1
HARNOIS GROUPE IMMOBILIER INC.	1660 MERIVALE RD NEPEAN ON	SSW	2.53	1
HARNOIS GROUPE IMMOBILIER INC.	1660 MERIVALE RD NEPEAN ON	SSW	2.53	1

Equal/Higher Elevation	Address	Direction	Distance (m)	Map Key

FSTH - Fuel Storage Tank - Historic

A search of the FSTH database, dated Pre-Jan 2010* has found that there are 2 FSTH site(s) within approximately 0.25 kilometers of the project property.

Equal/Higher Elevation	Address	Direction	Distance (m)	Map Key
6161278 CANADA INC	1660 MERIVALE RD NEPEAN ON K2G 3K4	SSW	2.53	1
6161278 CANADA INC	1660 MERIVALE RD NEPEAN ON K2G 3K4	SSW	2.53	1

GEN - Ontario Regulation 347 Waste Generators Summary

A search of the GEN database, dated 1986-Oct 31, 2022 has found that there are 58 GEN site(s) within approximately 0.25 kilometers of the project property.

Equal/Higher Elevation	Address	Direction	Distance (m)	Map Key
Imperial Oil	1660 Merivale Road Ottawa ON K2G 1E2	SSW	2.53	1
Imperial Oil	1660 Merivale Road Ottawa ON	SSW	2.53	1
Imperial Oil	1660 Merivale Road Ottawa ON K2G 1E2	SSW	2.53	1
Imperial Oil	1660 Merivale Road Ottawa ON	SSW	2.53	1
Imperial Oil	1660 Merivale Road Ottawa ON K2G 1E2	SSW	2.53	1
Imperial Oil	1660 Merivale Road Ottawa ON K2G 1E2	SSW	2.53	1

Equal/Higher Elevation	Address	Direction	Distance (m)	Map Key
Imperial Oil	1660 Merivale Road Ottawa ON K2G 1E2	SSW	2.53	1
Imperial Oil	1660 Merivale Road Ottawa ON K2G 1E2	SSW	2.53	1
Imperial Oil	1660 Merivale Road Ottawa ON K2G 1E2	SSW	2.53	1
Imperial Oil	1660 Merivale Road Ottawa ON K2G 1E2	SSW	2.53	1
Imperial Oil	1660 Merivale Road Ottawa ON K2G 1E2	SSW	2.53	1
Canadian Tire Corporation, Limited	1660 Merivale Road Nepean ON K2G 3K4	SSW	2.53	1
BLACK PHOTO CORPORATION	1642 MERIVALE ROAD - OTTAWA C/O 371 GOUGH ROAD MARKHAM ON K2G 4A1	NW	239.10	30
BLACK PHOTO CORPORATION 05-658	1642 MERIVALE ROAD - OTTAWA OTTAWA ON K2G 4A1	NW	239.10	30
BLACK PHOTO CORPORATION 05-658	1642 MERIVALE ROAD - OTTAWA C/O 371 GOUGH ROAD MARKHAM ON K2G 4A1	NW	239.10	30
BLACK PHOTO CORPORATION	1642 MERIVALE ROAD - OTTAWA OTTAWA ON K2G 4A1	NW	239.10	30
BLACK PHOTO CORPORATION	1642 MERIVALE ROAD OTTAWA ON K2G 4A1	NW	239.10	30
FORZANI GROUP LTD./SPORT CHEK	1642 MERIVALE ROAD, UNIT 680 NEPEAN ON K2G 4A1	NW	239.10	30

Equal/Higher Elevation	Address	Direction	Distance (m)	Map Key
SPORT CHEK	1642 MERIVALE ROAD, UNIT 680 NEPEAN ON K2G 4A1	NW	239.10	30
SHOPPERS DRUG MART	1642 MERIVALE ROAD NEPEAN ON K2G 4A1	NW	239.10	30
forzani group	1642 merivale rd nepean ON K2G 4A1	NW	239.10	30
Merivale Family Medical Centre	1642 Merivale Road Ottawa ON	NW	239.10	30
Farm Boy Inc.	1642 Merivale Road Ottawa ON K2G 4A1	NW	239.10	30
3363961 Canada Inc.	1642 Merivale Rd. Nepean ON K2G 4A1	NW	239.10	30
forzani group	1642 merivale rd nepean ON	NW	239.10	30
forzani group	1642 merivale rd nepean ON K2G 4A1	NW	239.10	30
forzani group	1642 merivale rd nepean ON K2G 4A1	NW	239.10	30
forzani group	1642 merivale rd nepean ON K2G 4A1	NW	239.10	30
forzani group	1642 merivale rd nepean ON K2G 4A1	NW	239.10	30

Equal/Higher Elevation	Address	Direction	Distance (m)	Map Key
B. Surani Drugs Ltd.	1642 MERIVALE RD Ottawa ON K2G 4A1	NW	239.10	30
FGL SPORTS LIMITED	1642 merivale rd nepean ON K2G4A1	NW	239.10	30
B. Surani Drugs Ltd.	1642 MERIVALE RD Ottawa ON K2G 4A1	NW	239.10	30
forzani group	1642 merivale rd nepean ON K2G4A1	NW	239.10	30
forzani group	1642 merivale rd nepean ON K2G4A1	NW	239.10	30
B. Surani Drugs Ltd.	1642 MERIVALE RD Ottawa ON K2G 4A1	NW	239.10	30
FGL SPORTS LIMITED sport chek	1642 merivale rd nepean ON K2G4A1	NW	239.10	30
FGL SPORTS LIMITED sport chek	1642 Merivale Rd. Unit #0580 Nepean ON K2G 4A1	NW	239.10	30
A.M.Pharmacare Limited	1642 MERIVALE RD Shoppers Drug Mart Ottawa ON K2G 4A1	NW	239.10	30
EMAN A. RAHMAN PHARMACY INC.	1642 MERIVALE RD Shoppers Drug Mart Ottawa ON K2G 4A1	NW	239.10	30
FGL SPORTS LIMITED sport chek	1642 Merivale Rd. Unit #0580 Nepean ON K2G 4A1	NW	239.10	30
FGL SPORTS LIMITED sport chek	1642 Merivale Rd. Unit #0580 Nepean ON K2G 4A1	NW	239.10	30

Equal/Higher Elevation	Address	Direction	Distance (m)	Map Key
EMAN A. RAHMAN PHARMACY INC.	1642 MERIVALE RD Shoppers Drug Mart Ottawa ON K2G 4A1	NW	239.10	30

Lower Elevation	Address	Direction	Distance (m)	Map Key
OTTAWA-CARLETON DISTRICT SCHOOL BOARD Health and Safety	MERIVALE HIGH SCHOOL 1755 MERIVALE ROAD NEPEAN ON K2G 1E2	SE	114.09	18
CARLETON BOARD OF EDUCATION	MERIVALE HIGH SCHOOL 1755 MERIVALE ROAD NEPEAN ON K2G 1E2	ESE	148.50	21
CARLETON BOARD OF EDUCATION 07-622	MERIVALE HIGH SCHOOL 1755 MERIVALE ROAD NEPEAN ON K2G 1E2	ESE	148.50	21
OTTAWA-CARLETON DISTRICT SCHOOL BOARD	MERIVALE HIGH SCHOOL 1755 MERIVALE ROAD NEPEAN ON K2G 1E2	ESE	148.50	21
OTTAWA CARLETON DISTRICT SCHOOL BAORD	1755 MERIVALE ROAD NEPEAN ON K2G 1E2	ESE	148.50	21
OTTAWA-CARLETON DISTRICT SCHOOL BOARD	MERIVALE HIGH SCHOOL 1755 MERIVALE ROAD NEPEAN ON K2G 1E2	ESE	148.50	21
OTTAWA-CARLETON DISTRICT SCHOOL BOARD	MERIVALE HIGH SCHOOL 1755 MERIVALE ROAD NEPEAN ON K2G 1E2	ESE	148.50	21
OTTAWA-CARLETON DISTRICT SCHOOL BOARD	MERIVALE HIGH SCHOOL 1755 MERIVALE ROAD NEPEAN ON K2G 1E2	ESE	148.50	21
OTTAWA-CARLETON DISTRICT SCHOOL BOARD	MERIVALE HIGH SCHOOL 1755 MERIVALE ROAD NEPEAN ON K2G 1E2	ESE	148.50	21
OTTAWA-CARLETON DISTRICT SCHOOL BOARD	MERIVALE HIGH SCHOOL 1755 MERIVALE ROAD NEPEAN ON	ESE	148.50	21

OTTAWA-CARLETON DISTRICT SCHOOL BOARD	MERIVALE HIGH SCHOOL 1755 MERIVALE ROAD NEPEAN ON K2G 1E2	ESE	148.50	21
OTTAWA-CARLETON DISTRICT SCHOOL BOARD	MERIVALE HIGH SCHOOL 1755 MERIVALE ROAD NEPEAN ON K2G 1E2	ESE	148.50	21
OTTAWA-CARLETON DISTRICT SCHOOL BOARD	MERIVALE HIGH SCHOOL 1755 MERIVALE ROAD NEPEAN ON K2G 1E2	ESE	148.50	21
OTTAWA-CARLETON DISTRICT SCHOOL BOARD Health and Safety	MERIVALE HIGH SCHOOL 1755 MERIVALE ROAD NEPEAN ON K2G 1E2	ESE	148.50	21
OTTAWA-CARLETON DISTRICT SCHOOL BOARD Health and Safety	MERIVALE HIGH SCHOOL 1755 MERIVALE ROAD NEPEAN ON K2G 1E2	ESE	148.50	21
OTTAWA-CARLETON DISTRICT SCHOOL BOARD Health and Safety	MERIVALE HIGH SCHOOL 1755 MERIVALE ROAD NEPEAN ON K2G 1E2	ESE	148.50	21

PES - Pesticide Register

A search of the PES database, dated Oct 2011-Apr 30, 2024 has found that there are 8 PES site(s) within approximately 0.25 kilometers of the project property.

Equal/Higher Elevation	Address	Direction	Distance (m)	Map Key
METRO ONTARIO INC O/A METRO/FOOD BASICS # 272	1705 MERIVALE ROAD OTTAWA ON K2G3K2	NE	207.36	26
METRO ONTARIO INC O/A METRO/FOOD BASICS # 272	1705 Merivale Road Ottawa ON K2G 3K2	NE	207.36	26
METRO ONTARIO INC O/A METRO/FOOD BASICS # 272	1705 MERIVALE ROAD OTTAWA ON K2G3K2	NE	207.36	26
WOOLCO DEPARTMENT STORE #6364 MERIVALE MALL	1642 MERIVALE ROAD OTTAWA ON	NW	239.10	30

Equal/Higher Elevation	Address	Direction	Distance (m)	Map Key
SHOPPERS DRUG MART #0910 (MERIVALE MALL)	1642 MERIVALE RD OTTAWA ON K2G 4A1	NW	239.10	30
SHOPPERS DRUG MART #0910 (MERIVALE MALL)	1642 MERIVALE RD OTTAWA ON K2G4A1	NW	239.10	30
SHOPPERS DRUG MART #0910 (MERIVALE MALL)	1642 MERIVALE RD OTTAWA ON K2G4A1	NW	239.10	30
SHOPPERS DRUG MART #0910 (MERIVALE MALL)	1642 MERIVALE RD OTTAWA ON K2G4A1	NW	239.10	30

PRT - Private and Retail Fuel Storage Tanks

A search of the PRT database, dated 1989-1996* has found that there are 1 PRT site(s) within approximately 0.25 kilometers of the project property.

Equal/Higher Elevation	Address	Direction	Distance (m)	Map Key
990846 ONT INC	1660 MERIVALE RD NEPEAN ON K2G3K4	SSW	2.53	1

SCT - Scott's Manufacturing Directory

A search of the SCT database, dated 1992-Mar 2011* has found that there are 2 SCT site(s) within approximately 0.25 kilometers of the project property.

Lower Elevation	Address	Direction	Distance (m)	Map Key
Doro Inc.	1680B Merivale Rd Nepean ON K2G 3K4	SSE	161.30	24
RONS WOODWORKS AND CRAFTS	13 GLENMANOR DR NEPEAN ON K2G 3E8	SW	194.34	25

SPL - Ontario Spills

A search of the SPL database, dated 1988-Jan 2023; see description has found that there are 15 SPL site(s) within approximately 0.25 kilometers of the project property.

Equal/Higher Elevation	Address	Direction	Distance (m)	Map Key
ESSO PETROLEUM	MERRIVALE & VIEWMOUNT SERVICE STATION NEPEAN CITY ON	ENE	19.75	2
ESSO PETROLEUM CANADA	1660 MERIVALE RD. SERVICE STATION NEPEAN CITY ON K2G 3K4	SSW	24.26	3
PRIVATE RESIDENCE	160 VIEWMOUNT FURNACE OIL TANK NEPEAN CITY ON K2G 3B7	WSW	150.54	22
Loeb<UNOFFICIAL>	1705 Merivale Road Ottawa ON	NE	207.36	26
Loeb Inc. <UNOFFICIAL>	1705 Merivale Road Ottawa ON	NE	207.36	26
	1705 Merivale Road Ottawa ON	NE	207.36	26
Loeb's<UNOFFICIAL>	1705 Merivale Road Ottawa ON	NE	207.36	26
Parson Refridgeration<UNOFFICIAL>	LOEB STORE - 1705 MERIVALE RD. <UNOFFICIAL> Ottawa ON	NE	207.36	26
Metro	1705 Merivale Road Ottawa ON	NE	207.36	26
	1705 Merivale Road, Nepean Ottawa ON K2G 3K2	NE	207.36	26
Parson Refrigeration (1985) Ltd.	1705 Marivale Road Ottawa ON	NE	207.36	26
Loeb Grocery Store<UNOFFICIAL>	1705 Merivale Rd Ottawa ON	NE	207.36	26

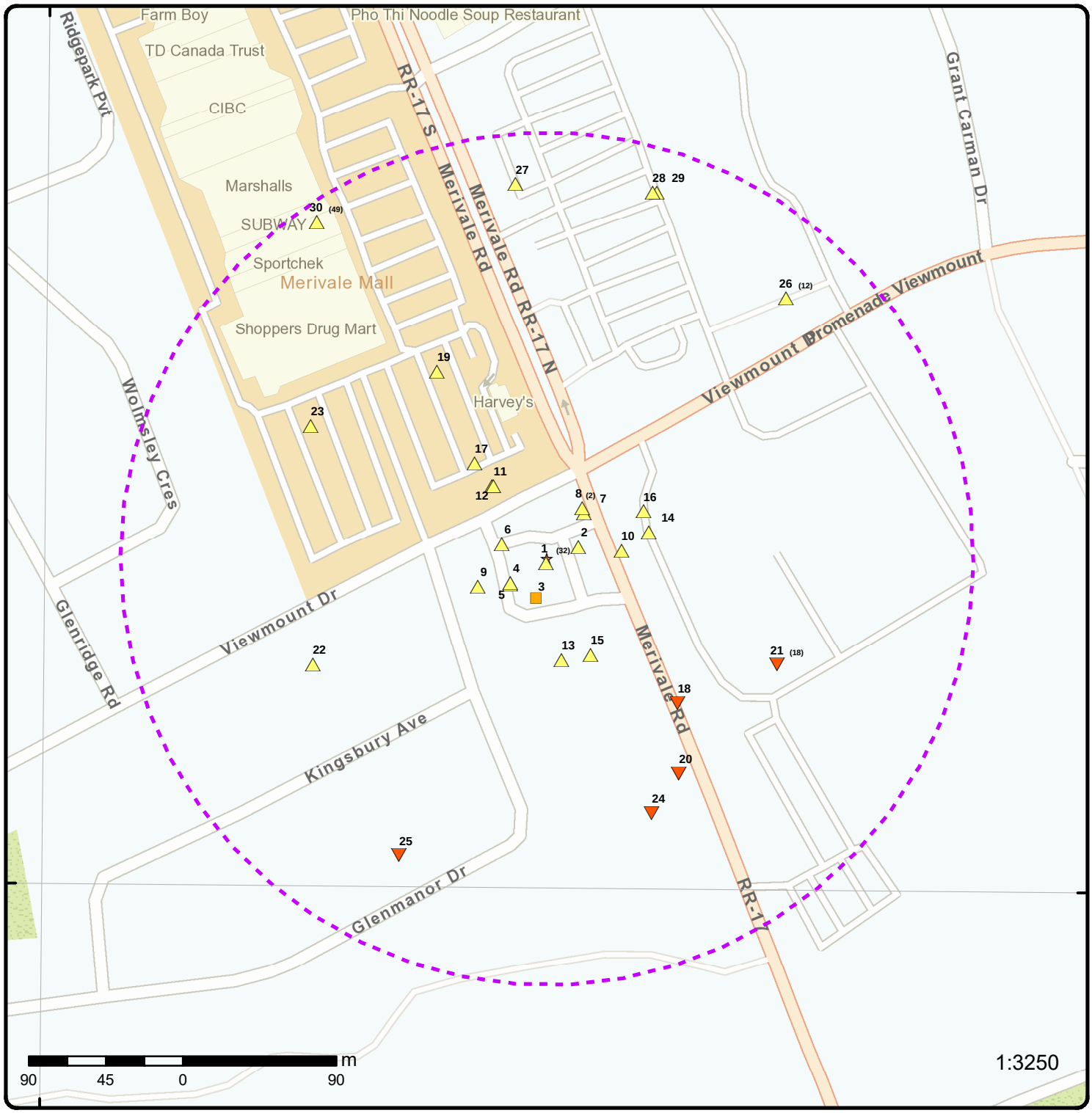
Equal/Higher Elevation	Address	Direction	Distance (m)	Map Key
Parson Refrigeration (1985) Ltd.	1642 Merivale Road Ottawa ON K2G 4A1	NW	239.10	30
Farmboy Inc.<UNOFFICIAL>	1642 Merivale Rd Ottawa ON K2G 4A1	NW	239.10	30
Waste Management of Canada Corporation	1642 Merivale Road Ottawa ON	NW	239.10	30

WWIS - Water Well Information System

A search of the WWIS database, dated Dec 31 2023 has found that there are 18 WWIS site(s) within approximately 0.25 kilometers of the project property.

Equal/Higher Elevation	Address	Direction	Distance (m)	Map Key
	ON ***Well ID:*** 7174548	WSW	25.66	4
	ON ***Well ID:*** 7174547	WSW	26.23	5
	lot 30 con 1 ON ***Well ID:*** 7409560	WNW	27.81	6
	ON ***Well ID:*** 7197932	NE	34.44	7
	1660 MERRIVALE Ottawa ON ***Well ID:*** 7271903	NE	36.25	8
	1660 MERIVALE Ottawa ON ***Well ID:*** 7271902	NE	36.25	8
	lot 30 con 1 ON	WSW	43.50	9

Equal/Higher Elevation	Address	Direction	Distance (m)	Map Key
	Well ID: 7409559			
	ON ***Well ID:*** 7233984	E	43.88	10
	1650 Merival Road lot 30 con 1 Ottawa ON ***Well ID:*** 7345849	NW	53.08	11
	1642 Merivale Road Ottawa ON ***Well ID:*** 7344790	NW	53.68	12
	1660 MERIVALE ROAD Ottawa ON ***Well ID:*** 7250163	SSE	59.81	13
	ON ***Well ID:*** 7417212	E	61.68	14
	1660 MERIVALE ROAD Ottawa ON ***Well ID:*** 7250162	SSE	61.75	15
	ON ***Well ID:*** 7417213	ENE	63.08	16
	1642 Merivale Rd Ottawa ON ***Well ID:*** 7344836	NW	70.08	17
	1642 Merivale Rd Ottawa ON ***Well ID:*** 7344837	NW	127.29	19
	1642 Merivale Rd lot 31 con 1 Ottawa ON ***Well ID:*** 7344838	WNW	158.76	23
	1642 MERIVALE RD Ottawa ON ***Well ID:*** 7201222	N	220.58	27



Map: 0.25 Kilometer Radius

Order Number: 24061400277

Address: 1660 Chemin Merivale, Nepean, ON

- Project Property
- Buffer Outline
- Eris Sites with Higher Elevation
- Eris Sites with Same Elevation
- Eris Sites with Lower Elevation
- Eris Sites with Unknown Elevation
- Freeways; Highways
- Traffic Circle; Ramp
- Major Arterial; Minor Arterial
- Local Road
- Service Road; Traffic Circle; Ramp
- Rail
- Beach
- Airport
- Industrial Area
- Military Base
- Aircraft Roads
- Native Reservation
- Hospital
- Shopping & Sports Area
- University/College
- Cemetery; Golf Course
- Parkt (National)
- Park (City/County)

Source: © 2021 ESRI StreetMap Premium.

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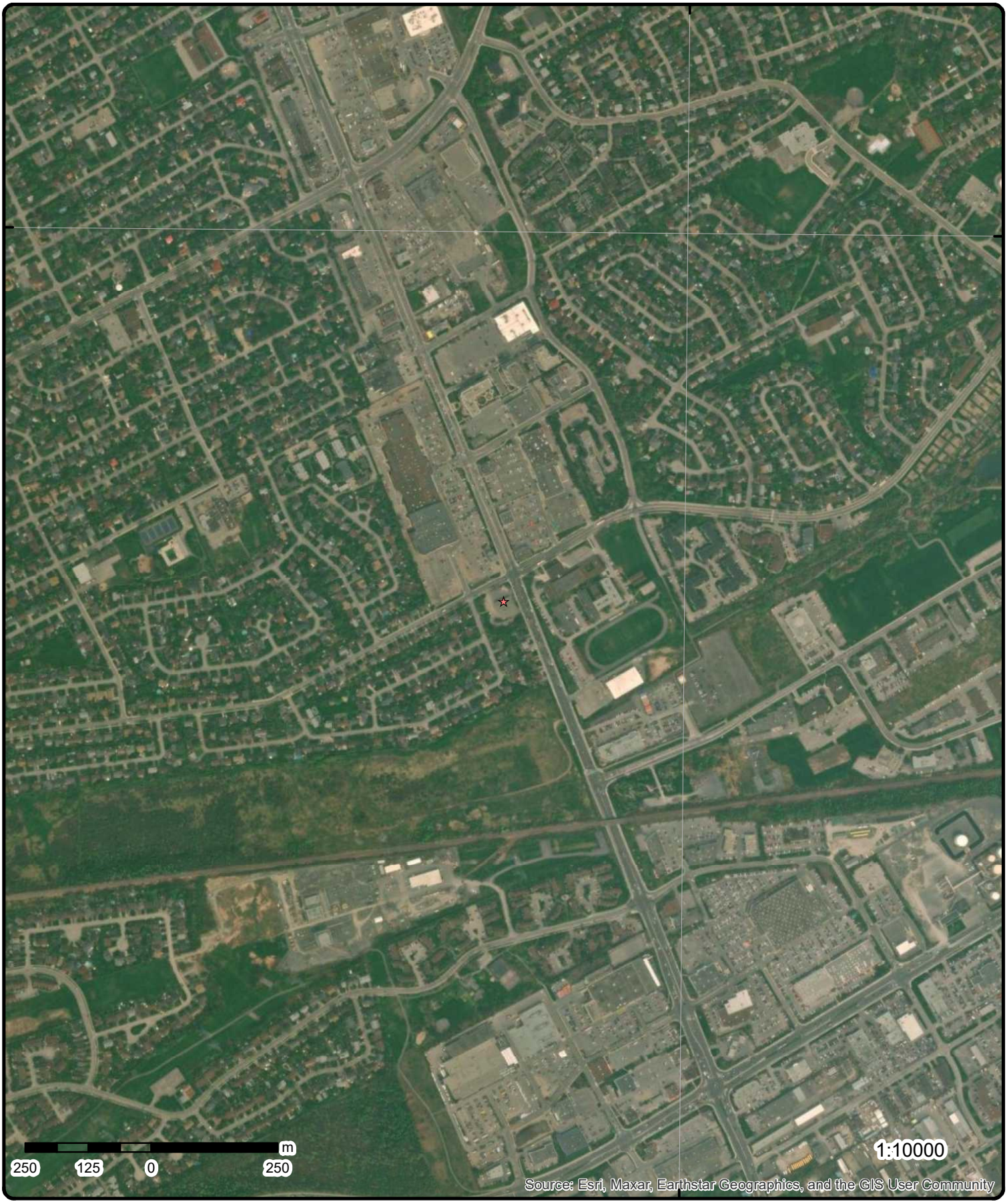

Aerial **Year: 2023**

Order Number: 24061400277

Address: 1660 Chemin Merivale, Nepean, ON

Source: ESRI World Imagery

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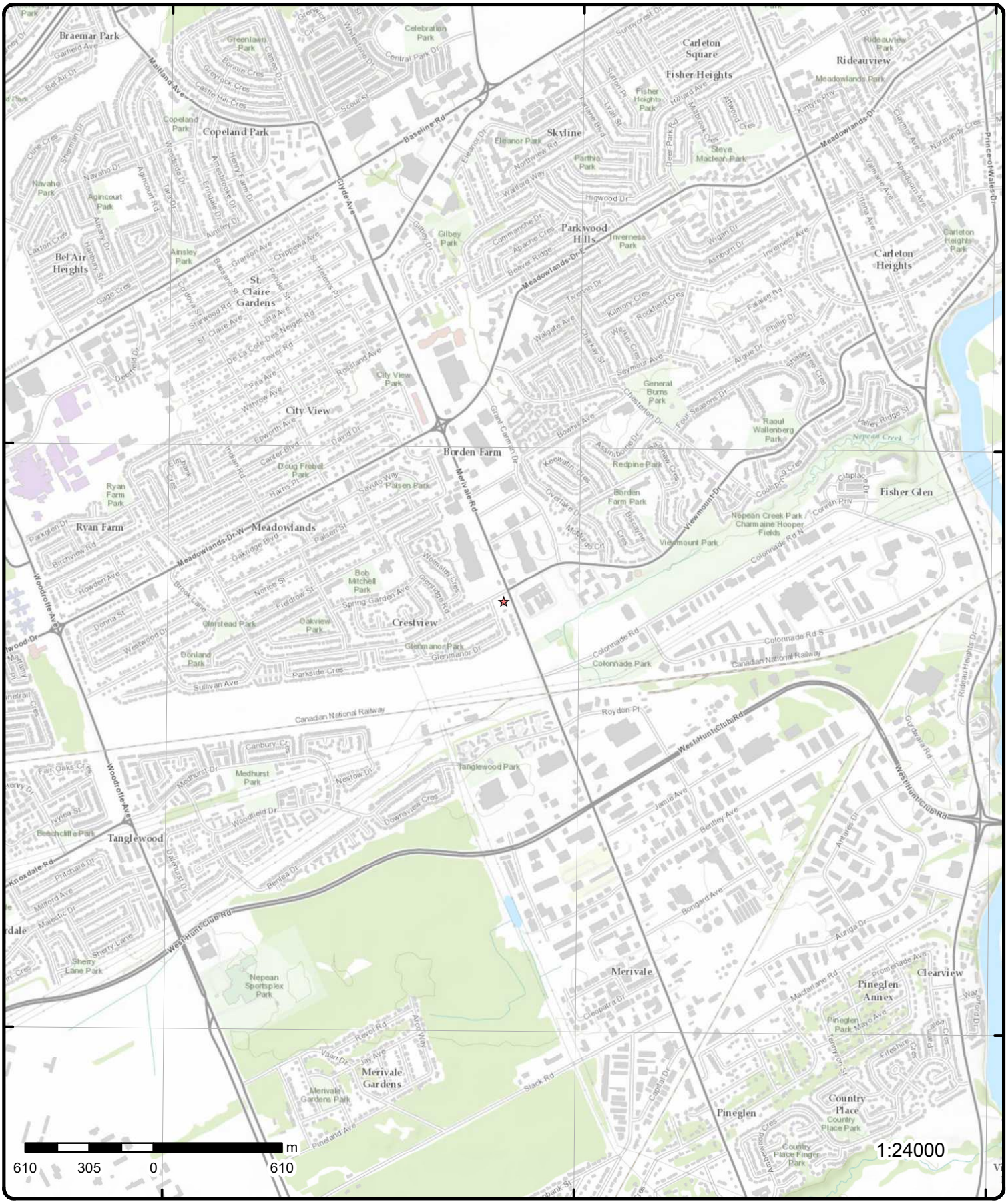
75°45'W 75°43'30"W 75°42'W

45°21'N 45°19'30"N



Topographic Map

Address: 1660 Chemin Merivale, ON

Source: ESRI World Topographic Map

Order Number: 24061400277

ERIS

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Detail Report

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
1	1 of 32	SSW/2.5	86.9 / 1.08	990846 ONT INC 1660 MERIVALE RD NEPEAN ON K2G3K4	PRT

Location ID: 9619
Type: retail
Expiry Date: 1995-09-30
Capacity (L): 113650
Licence #: 0076428465

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
1	2 of 32	SSW/2.5	86.9 / 1.08	6161278 CANADA INC 1660 MERIVALE RD NEPEAN ON K2G 3K4	FSTH

License Issue Date: 8/22/2005
Tank Status: Licensed
Tank Status As Of: August 2007
Operation Type: Retail Fuel Outlet
Facility Type: Gasoline Station - Self Serve

--Details--
Status: Active
Year of Installation: 1987
Corrosion Protection:
Capacity: 45460
Tank Fuel Type: Liquid Fuel Single Wall UST - Gasoline

Status: Active
Year of Installation: 1987
Corrosion Protection:
Capacity: 22700
Tank Fuel Type: Liquid Fuel Single Wall UST - Gasoline

Status: Active
Year of Installation: 1987
Corrosion Protection:
Capacity: 22700
Tank Fuel Type: Liquid Fuel Single Wall UST - Gasoline

Status: Active
Year of Installation: 1987
Corrosion Protection:
Capacity: 22700
Tank Fuel Type: Liquid Fuel Single Wall UST - Gasoline

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
1	3 of 32	SSW/2.5	86.9 / 1.08	6161278 CANADA INC 1660 MERIVALE RD NEPEAN ON K2G 3K4	FSTH

License Issue Date: 8/22/2005 4:16:00 PM
Tank Status: Pending Renewal
Tank Status As Of: December 2008

Operation Type: Retail Fuel Outlet
Facility Type: Gasoline Station - Self Serve

--Details--
Status: Active
Year of Installation: 1987
Corrosion Protection:
Capacity: 45460
Tank Fuel Type: Liquid Fuel Single Wall UST - Gasoline

Status: Active
Year of Installation: 1987
Corrosion Protection:
Capacity: 22700
Tank Fuel Type: Liquid Fuel Single Wall UST - Gasoline

Status: Active
Year of Installation: 1987
Corrosion Protection:
Capacity: 22700
Tank Fuel Type: Liquid Fuel Single Wall UST - Gasoline

Status: Active
Year of Installation: 1987
Corrosion Protection:
Capacity: 22700
Tank Fuel Type: Liquid Fuel Single Wall UST - Gasoline

1	4 of 32	SSW/2.5	86.9 / 1.08	**1660 Merivale Road** **Ottawa ON**	EHS

Order No: 20110812010
Status: C
Report Type: Custom Report
Report Date: 8/22/2011
Date Received: 8/12/2011 11:07:15 AM
Previous Site Name:
Lot/Building Size:
Additional Info Ordered: Fire Insur. Maps and/or Site Plans

Nearest Intersection:
Municipality:
Client Prov/State: ON
Search Radius (km): 0.25
X: -75.729703
Y: 45.343277

1	5 of 32	SSW/2.5	86.9 / 1.08	**7095686 CANADA INC** **1660 MERIVALE RD** **NEPEAN ON**	DTNK

Delisted Expired Fuel Safety Facilities

Instance No: 10869777
Status: EXPIRED
Instance ID: 47447
Instance Type: FS Piping
Instance Creation Dt:
Instance Install Dt:
Item Description:
Manufacturer:
Model:
Serial No:
ULC Standard:
Quantity:
Unit of Measure:

Expired Date:
Max Hazard Rank:
Facility Location:
Facility Type:
Fuel Type 2:
Fuel Type 3:
Panam Related:
Panam Venue Nm:
External Identifier:
Item:
Piping Steel:
Piping Galvanized:
Tank Single Wall St:

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Overfill Prot Type: ***Piping Underground:***
Creation Date: ***Tank Underground:***
Next Periodic Str DT: ***Source:***
TSSA Base Sched Cycle 2:
TSSAMax Hazard Rank 1:
TSSA Risk Based Periodic Yn:
TSSA Volume of Directives:
TSSA Periodic Exempt:
TSSA Statutory Interval:
TSSA Recd Insp Interva:
TSSA Recd Tolerance:
TSSA Program Area:
TSSA Program Area 2:
Description: FS Piping
Original Source: EXP
Record Date: Up to Mar 2012

1	*6 of 32*	*SSW/2.5*	*86.9 / 1.08*	*7095686 CANADA INC* *1660 MERIVALE RD* *NEPEAN ON*	*DTNK*

Delisted Expired Fuel Safety Facilities

Instance No: 10869833
Status: EXPIRED
Instance ID: 47922
Instance Type: FS Piping
Instance Creation Dt:
Instance Install Dt:
Item Description:
Manufacturer:
Model:
Serial No:
ULC Standard:
Quantity:
Unit of Measure:
Overfill Prot Type:
Creation Date:
Next Periodic Str DT:
TSSA Base Sched Cycle 2:
TSSAMax Hazard Rank 1:
TSSA Risk Based Periodic Yn:
TSSA Volume of Directives:
TSSA Periodic Exempt:
TSSA Statutory Interval:
TSSA Recd Insp Interva:
TSSA Recd Tolerance:
TSSA Program Area:
TSSA Program Area 2:
Description: FS Piping
Original Source: EXP
Record Date: Up to Mar 2012

Expired Date:
Max Hazard Rank:
Facility Location:
Facility Type:
Fuel Type 2:
Fuel Type 3:
Panam Related:
Panam Venue Nm:
External Identifier:
Item:
Piping Steel:
Piping Galvanized:
Tank Single Wall St:
Piping Underground:
Tank Underground:
Source:

1	*7 of 32*	*SSW/2.5*	*86.9 / 1.08*	*7095686 CANADA INC* *1660 MERIVALE RD* *NEPEAN ON*	*DTNK*

Delisted Expired Fuel Safety Facilities

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Instance No:	10869818	**Expired Date:**	
Status:	EXPIRED	**Max Hazard Rank:**	
Instance ID:	47989	**Facility Location:**	
Instance Type:	FS Piping	**Facility Type:**	
Instance Creation Dt:		**Fuel Type 2:**	
Instance Install Dt:		**Fuel Type 3:**	
Item Description:		**Panam Related:**	
Manufacturer:		**Panam Venue Nm:**	
Model:		**External Identifier:**	
Serial No:		**Item:**	
ULC Standard:		**Piping Steel:**	
Quantity:		**Piping Galvanized:**	
Unit of Measure:		**Tank Single Wall St:**	
Overfill Prot Type:		**Piping Underground:**	
Creation Date:		**Tank Underground:**	
Next Periodic Str DT:		**Source:**	
TSSA Base Sched Cycle 2:			
TSSAMax Hazard Rank 1:			
TSSA Risk Based Periodic Yn:			
TSSA Volume of Directives:			
TSSA Periodic Exempt:			
TSSA Statutory Interval:			
TSSA Recd Insp Interva:			
TSSA Recd Tolerance:			
TSSA Program Area:			
TSSA Program Area 2:			
Description:	FS Piping		
Original Source:	EXP		
Record Date:	Up to Mar 2012		

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
1	8 of 32	SSW/2.5	86.9 / 1.08	**Imperial Oil** **1660 Merivale Road** **Ottawa ON K2G 1E2**	GEN

Generator No:	ON3917879
SIC Code:	447190
SIC Description:	
Approval Years:	2011
PO Box No:	
Country:	
Status:	
Co Admin:	
Choice of Contact:	
Phone No Admin:	
Contaminated Facility:	
MHSW Facility:	

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
1	9 of 32	SSW/2.5	86.9 / 1.08	**HARNOIS GROUPE IMMOBILIER INC.** **1660 MERIVALE RD** **NEPEAN ON**	FST

Inventory No:	64512671	**Tank Material:**	Fiberglass (FRP)
Inventory Status:	active	**Corrosion Protect:**	Fiberglass
Installation Year:	2011	**Overfill Protection:**	
Capacity:	25000	**Inventory Context:**	FS Liquid Fuel
Capacity Unit:	L	**Inventory Item:**	FS Liquid Fuel Tank
Tank Type:	Double Wall UST		
Manufacturer:			
Model:			
Description:			

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
1	10 of 32	SSW/2.5	86.9 / 1.08	HARNOIS GROUPE IMMOBILIER INC. 1660 MERIVALE RD NEPEAN ON	FST

Inventory No:	64512672	**Tank Material:**	Fiberglass (FRP)
Inventory Status:	active	**Corrosion Protect:**	Fiberglass
Installation Year:	2011	**Overfill Protection:**	
Capacity:	25000	**Inventory Context:**	FS Liquid Fuel
Capacity Unit:	L	**Inventory Item:**	FS Liquid Fuel Tank
Tank Type:	Double Wall UST		
Manufacturer:			
Model:			
Description:			

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
1	11 of 32	SSW/2.5	86.9 / 1.08	HARNOIS GROUPE IMMOBILIER INC. 1660 MERIVALE RD NEPEAN ON	FST

Inventory No:	64512673	**Tank Material:**	Fiberglass (FRP)
Inventory Status:	active	**Corrosion Protect:**	Fiberglass
Installation Year:	2011	**Overfill Protection:**	
Capacity:	25000	**Inventory Context:**	FS Liquid Fuel
Capacity Unit:	L	**Inventory Item:**	FS Liquid Fuel Tank
Tank Type:	Double Wall UST		
Manufacturer:			
Model:			
Description:			

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
1	12 of 32	SSW/2.5	86.9 / 1.08	HARNOIS GROUPE IMMOBILIER INC. 1660 MERIVALE RD NEPEAN ON	FST

Inventory No:	64512674	**Tank Material:**	Fiberglass (FRP)
Inventory Status:	active	**Corrosion Protect:**	Fiberglass
Installation Year:	2011	**Overfill Protection:**	
Capacity:	25000	**Inventory Context:**	FS Liquid Fuel
Capacity Unit:	L	**Inventory Item:**	FS Liquid Fuel Tank
Tank Type:	Double Wall UST		
Manufacturer:			
Model:			
Description:			

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
1	13 of 32	SSW/2.5	86.9 / 1.08	Imperial Oil 1660 Merivale Road Ottawa ON	GEN

Generator No:	ON7078515
SIC Code:	447190
SIC Description:	Other Gasoline Stations
Approval Years:	2012
PO Box No:	
Country:	
Status:	
Co Admin:	
Choice of Contact:	
Phone No Admin:	
Contaminated Facility:	
MHSW Facility:	

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
1	14 of 32	SSW/2.5	86.9 / 1.08	Imperial Oil 1660 Merivale Road Ottawa ON K2G 1E2	GEN

Generator No: ON3917879
SIC Code: 447190
SIC Description: Other Gasoline Stations
Approval Years: 2012
PO Box No:
Country:
Status:
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
1	15 of 32	SSW/2.5	86.9 / 1.08	Imperial Oil 1660 Merivale Road Ottawa ON	GEN

Generator No: ON7078515
SIC Code: 447190
SIC Description:
Approval Years: 2013
PO Box No:
Country:
Status:
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

Detail(s)

Waste Class: 252
Waste Class Name: WASTE OILS & LUBRICANTS

Waste Class: 251
Waste Class Name: OIL SKIMMINGS & SLUDGES

Waste Class: 221
Waste Class Name: LIGHT FUELS

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
1	16 of 32	SSW/2.5	86.9 / 1.08	Imperial Oil 1660 Merivale Road Ottawa ON K2G 1E2	GEN

Generator No: ON7078515
SIC Code: 447190
SIC Description: 447190
Approval Years: 2016
PO Box No:
Country: Canada
Status:
Co Admin: JESSICA J SNELGROVE
Choice of Contact: CO_OFFICIAL
Phone No Admin: 587 476 5080 Ext.
Contaminated Facility: No
MHSW Facility: No

Detail(s)

Waste Class: 221
Waste Class Name: LIGHT FUELS

Waste Class: 252
Waste Class Name: WASTE OILS & LUBRICANTS

Waste Class: 251
Waste Class Name: OIL SKIMMINGS & SLUDGES

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
1	17 of 32	SSW/2.5	86.9 / 1.08	Imperial Oil 1660 Merivale Road Ottawa ON K2G 1E2	GEN

Generator No: ON7078515
SIC Code: 447190
SIC Description: 447190
Approval Years: 2015
PO Box No:
Country: Canada
Status:
Co Admin: Nicole Bradley
Choice of Contact: CO_ADMIN
Phone No Admin: 519-652-0099 Ext.4301
Contaminated Facility: No
MHSW Facility: No

Detail(s)

Waste Class: 252
Waste Class Name: WASTE OILS & LUBRICANTS

Waste Class: 251
Waste Class Name: OIL SKIMMINGS & SLUDGES

Waste Class: 221
Waste Class Name: LIGHT FUELS

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
1	18 of 32	SSW/2.5	86.9 / 1.08	Imperial Oil 1660 Merivale Road Ottawa ON K2G 1E2	GEN

Generator No: ON7078515
SIC Code: 447190
SIC Description: 447190
Approval Years: 2014
PO Box No:
Country: Canada
Status:
Co Admin: Grant Pettypiece
Choice of Contact: CO_ADMIN
Phone No Admin: 905-695-3217 Ext.3633
Contaminated Facility: No
MHSW Facility: No

Detail(s)

Waste Class: 251
Waste Class Name: OIL SKIMMINGS & SLUDGES

Waste Class: 252
Waste Class Name: WASTE OILS & LUBRICANTS

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
Waste Class:		221			
Waste Class Name:		LIGHT FUELS			

1	19 of 32	SSW/2.5	86.9 / 1.08	**Imperial Oil** **1660 Merivale Road** **Ottawa ON K2G 1E2**	GEN

Generator No: ON7078515
SIC Code:
SIC Description:
Approval Years: As of Dec 2018
PO Box No:
Country: Canada
Status: Registered
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

Detail(s)

Waste Class: 221 I
Waste Class Name: Light fuels

Waste Class: 221 L
Waste Class Name: Light fuels

Waste Class: 251 L
Waste Class Name: Waste oils/sludges (petroleum based)

Waste Class: 252 L
Waste Class Name: Waste crankcase oils and lubricants

1	20 of 32	SSW/2.5	86.9 / 1.08	**1660 Merivale Road** **Nepean ON K2G 3K4**	EHS

Order No: 20180720110
Status: C
Report Type: Standard Report
Report Date: 26-JUL-18
Date Received: 20-JUL-18
Previous Site Name:
Lot/Building Size:
Additional Info Ordered:

Nearest Intersection:
Municipality:
Client Prov/State: ON
Search Radius (km): .25
X: -75.72956
Y: 45.343294

1	21 of 32	SSW/2.5	86.9 / 1.08	**Imperial Oil** **1660 Merivale Road** **Ottawa ON K2G 1E2**	GEN

Generator No: ON7078515
SIC Code:
SIC Description:
Approval Years: As of Jul 2020
PO Box No:
Country: Canada
Status: Registered
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Detail(s)

Waste Class: 221 L
Waste Class Name: Light fuels

Waste Class: 221 I
Waste Class Name: Light fuels

Waste Class: 252 L
Waste Class Name: Waste crankcase oils and lubricants

Waste Class: 251 L
Waste Class Name: Waste oils/sludges (petroleum based)

1	22 of 32	SSW/2.5	86.9 / 1.08	**Imperial Oil** **1660 Merivale Road** **Ottawa ON K2G 1E2**	GEN

Generator No: ON7078515
SIC Code:
SIC Description:
Approval Years: As of Nov 2021
PO Box No:
Country: Canada
Status: Registered
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

Detail(s)

Waste Class: 221 I
Waste Class Name: Light fuels

Waste Class: 252 L
Waste Class Name: Waste crankcase oils and lubricants

Waste Class: 221 L
Waste Class Name: Light fuels

Waste Class: 251 L
Waste Class Name: Waste oils/sludges (petroleum based)

1	23 of 32	SSW/2.5	86.9 / 1.08	**Imperial Oil** **1660 Merivale Road** **Ottawa ON K2G 1E2**	GEN

Generator No: ON7078515
SIC Code:
SIC Description:
Approval Years: As of Oct 2022
PO Box No:
Country: Canada
Status: Registered
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Detail(s)

Waste Class: 221 I
Waste Class Name: LIGHT FUELS

Waste Class: 251 L
Waste Class Name: OIL SKIMMINGS & SLUDGES

Waste Class: 221 L
Waste Class Name: LIGHT FUELS

Waste Class: 252 L
Waste Class Name: WASTE OILS & LUBRICANTS

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1 | ***24 of 32*** | ***SSW/2.5*** | ***86.9 / 1.08*** | ***Canadian Tire Corporation, Limited***
1660 Merivale Road
Nepean ON K2G 3K4 | ***GEN***

Generator No: ON4889867
SIC Code:
SIC Description:
Approval Years: As of Oct 2022
PO Box No:
Country: Canada
Status: Registered
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

Detail(s)

Waste Class: 221 I
Waste Class Name: LIGHT FUELS

Waste Class: 251 I
Waste Class Name: OIL SKIMMINGS & SLUDGES

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1 | ***25 of 32*** | ***SSW/2.5*** | ***86.9 / 1.08*** | ***1660 Merivale Road***
Nepean ON K2G 3K4 | ***EHS***

Order No: 23091100064
Status: C
Report Type: Standard Report
Report Date: 14-SEP-23
Date Received: 11-SEP-23
Previous Site Name:
Lot/Building Size:
Additional Info Ordered:

Nearest Intersection:
Municipality:
Client Prov/State: ON
Search Radius (km): .25
X: -75.7295762
Y: 45.3433814

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1 | ***26 of 32*** | ***SSW/2.5*** | ***86.9 / 1.08*** | ***HARNOIS GROUPE IMMOBILIER INC.***
1660 MERIVALE RD
NEPEAN ON | ***EXP***

Inventory No: 10869768
Inventory Status: inactive
Installation Year: 1987
Capacity: 45460
Capacity Unit: L
Tank Type: Single Wall UST

Tank Material: Fiberglass (FRP)
Corrosion Protect: Fiberglass
Overfill Protection:
Inventory Context: FS Liquid Fuel
Inventory Item: FS Liquid Fuel Tank

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Manufacturer:
Model:
Description: 2009VBS
Previous Fuel Type:

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
1	27 of 32	SSW/2.5	86.9 / 1.08	HARNOIS GROUPE IMMOBILIER INC. 1660 MERIVALE RD NEPEAN ON	EXP

Inventory No: 10869826
Inventory Status: inactive
Installation Year: 1987
Capacity: 22700
Capacity Unit: L
Tank Type: Single Wall UST
Manufacturer:
Model:
Description: 2009VBS
Previous Fuel Type:

Tank Material: Fiberglass (FRP)
Corrosion Protect: Fiberglass
Overfill Protection:
Inventory Context: FS Liquid Fuel
Inventory Item: FS Liquid Fuel Tank

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
1	28 of 32	SSW/2.5	86.9 / 1.08	HARNOIS GROUPE IMMOBILIER INC. 1660 MERIVALE RD NEPEAN ON	EXP

Inventory No: 10869809
Inventory Status: inactive
Installation Year: 1987
Capacity: 22700
Capacity Unit: L
Tank Type: Single Wall UST
Manufacturer:
Model:
Description: 2009VBS
Previous Fuel Type:

Tank Material: Fiberglass (FRP)
Corrosion Protect: Fiberglass
Overfill Protection:
Inventory Context: FS Liquid Fuel
Inventory Item: FS Liquid Fuel Tank

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
1	29 of 32	SSW/2.5	86.9 / 1.08	HARNOIS GROUPE IMMOBILIER INC. 1660 MERIVALE RD NEPEAN ON	EXP

Inventory No: 10869783
Inventory Status: inactive
Installation Year: 1987
Capacity: 22700
Capacity Unit: L
Tank Type: Single Wall UST
Manufacturer:
Model:
Description: 2009VBS
Previous Fuel Type:

Tank Material: Fiberglass (FRP)
Corrosion Protect: Fiberglass
Overfill Protection:
Inventory Context: FS Liquid Fuel
Inventory Item: FS Liquid Fuel Tank

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
1	30 of 32	SSW/2.5	86.9 / 1.08	HARNOIS GROUPE IMMOBILIER INC. 1660 MERIVALE RD NEPEAN ON	FST

Inventory No: 9714891
Inventory Status: Active
Installation Year:
Capacity: 100000
Capacity Unit: L

Tank Material:
Corrosion Protect:
Overfill Protection:
Inventory Context: Liquid Fuels
Inventory Item: FS Gasoline Station - Self Serve

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Tank Type:
Manufacturer:
Model:
Description:

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1 | **31 of 32** | **SSW/2.5** | **86.9 / 1.08** | **1660 Merivale Road Nepean ON K2G 3K4** | **EHS**

Order No:	23091100064	**Nearest Intersection:**	
Status:	C	**Municipality:**	
Report Type:	Standard Report	**Client Prov/State:**	ON
Report Date:	14-SEP-23	**Search Radius (km):**	.25
Date Received:	11-SEP-23	**X:**	-75.7295762
Previous Site Name:		**Y:**	45.3433814
Lot/Building Size:			
Additional Info Ordered:			

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1 | **32 of 32** | **SSW/2.5** | **86.9 / 1.08** | **1660 Merivale Road Nepean ON K2G 3K4** | **EHS**

Order No:	23091100064	**Nearest Intersection:**	
Status:	C	**Municipality:**	
Report Type:	Standard Report	**Client Prov/State:**	ON
Report Date:	14-SEP-23	**Search Radius (km):**	.25
Date Received:	11-SEP-23	**X:**	-75.7295762
Previous Site Name:		**Y:**	45.3433814
Lot/Building Size:			
Additional Info Ordered:			

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2 | **1 of 1** | **ENE/19.7** | **86.9 / 1.08** | **ESSO PETROLEUM MERRIVALE & VIEWMOUNT SERVICE STATION NEPEAN CITY ON** | **SPL**

Ref No:	3973	**Municipality No:**	20104
Year:		**Nature of Damage:**	
Incident Dt:	5/20/1988	**Discharger Report:**	
Dt MOE Arvl on Scn:		**Material Group:**	
MOE Reported Dt:	5/20/1988	**Impact to Health:**	
Dt Document Closed:		**Agency Involved:**	
Site No:			
MOE Response:			
Site County/District:			
Site Geo Ref Meth:			
Site District Office:			
Nearest Watercourse:			
Site Name:			
Site Address:			
Site Region:			
Site Municipality:	NEPEAN CITY		
Site Lot:			
Site Conc:			
Site Geo Ref Accu:			
Site Map Datum:			
Northing:			
Easting:			
Incident Cause:	CONTAINER OVERFLOW		
Incident Preceding Spill:			
Environment Impact:			
Health Env Consequence:			
Nature of Impact:			

Contaminant Qty:
System Facility Address:
Client Name:
Client Type:
Source Type:
Contaminant Code:
Contaminant Name:
Contaminant Limit 1:
Contam Limit Freq 1:
Contaminant UN No 1:
Receiving Medium: LAND
Incident Reason: ERROR
Incident Summary: ESSO SERVICE STN - 4.5 LITRES OF GASOLINE TO PAVEMENT.
Activity Preceding Spill:
Property 2nd Watershed:
Property Tertiary Watershed:
Sector Type:
SAC Action Class:
Call Report Locatn Geodata:

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
3	1 of 1	SSW/24.3	85.8 / 0.00	ESSO PETROLEUM CANADA 1660 MERIVALE RD. SERVICE STATION NEPEAN CITY ON K2G 3K4	SPL

Ref No: 67565
Year:
Incident Dt: 2/29/1992
Dt MOE Arvl on Scn:
MOE Reported Dt: 3/2/1992
Dt Document Closed:
Site No:
MOE Response:
Site County/District:
Site Geo Ref Meth:
Site District Office:
Nearest Watercourse:
Site Name:
Site Address:
Site Region:
Site Municipality: NEPEAN CITY
Site Lot:
Site Conc:
Site Geo Ref Accu:
Site Map Datum:
Northing:
Easting:
Incident Cause: VALVE/FITTING LEAK OR FAILURE
Incident Preceding Spill:
Environment Impact: NOT ANTICIPATED
Health Env Consequence:
Nature of Impact:
Contaminant Qty:
System Facility Address:
Client Name:
Client Type:
Source Type:
Contaminant Code:
Contaminant Name:
Contaminant Limit 1:
Contam Limit Freq 1:
Contaminant UN No 1:
Receiving Medium: LAND
Incident Reason: OVERSTRESS/OVERPRESSURE
Incident Summary: ESSO PETROLEUM: 4-5 L GASOLINE TO GRND DUE TO PLUGGED TANK VENT.
Municipality No: 20104
Nature of Damage:
Discharger Report:
Material Group:
Impact to Health:
Agency Involved:

Activity Preceding Spill:
Property 2nd Watershed:
Property Tertiary Watershed:
Sector Type:
SAC Action Class:
Call Report Locatn Geodata:

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4 | 1 of 1 | WSW/25.7 | 86.0 / 0.24 | ON | WWIS

Well ID:	7174548	**Flowing (Y/N):**	
Construction Date:		**Flow Rate:**	
Use 1st:		**Data Entry Status:**	Yes
Use 2nd:		**Data Src:**	
Final Well Status:		**Date Received:**	01/05/2012
Water Type:		**Selected Flag:**	TRUE
Casing Material:		**Abandonment Rec:**	
Audit No:	M08599	**Contractor:**	1844
Tag:	A110641	**Form Version:**	5
Constructn Method:		**Owner:**	
Elevation (m):		**County:**	OTTAWA-CARLETON
Elevatn Reliabilty:		**Lot:**	
Depth to Bedrock:		**Concession:**	
Well Depth:		**Concession Name:**	
Overburden/Bedrock:		**Easting NAD83:**	
Pump Rate:		**Northing NAD83:**	
Static Water Level:		**Zone:**	
Clear/Cloudy:		**UTM Reliability:**	
Municipality:	NEPEAN TOWNSHIP		
Site Info:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/717\7174548.pdf

Additional Detail(s) (Map)

Well Completed Date:	08/24/2011
Year Completed:	2011
Depth (m):	
Latitude:	45.3432740585711
Longitude:	-75.7298396516995
X:	-75.72983949066439
Y:	45.34327405197994
Path:	717\7174548.pdf

Bore Hole Information

Bore Hole ID:	1003629075	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	18
Code OB:		**East83:**	442822.00
Code OB Desc:		**North83:**	5021344.00
Open Hole:		**Org CS:**	UTM83
Cluster Kind:		**UTMRC:**	4
Date Completed:	08/24/2011	**UTMRC Desc:**	margin of error : 30 m - 100 m
Remarks:		**Location Method:**	wwr
Location Method Desc:	on Water Well Record		
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

5 **1 of 1** **WSW/26.2** **86.0 / 0.24** **ON** **WWIS**

Well ID:	7174547	**Flowing (Y/N):**	
Construction Date:		**Flow Rate:**	
Use 1st:		**Data Entry Status:**	Yes
Use 2nd:		**Data Src:**	
Final Well Status:		**Date Received:**	01/05/2012
Water Type:		**Selected Flag:**	TRUE
Casing Material:		**Abandonment Rec:**	
Audit No:	M08706	**Contractor:**	1844
Tag:	A110641	**Form Version:**	5
Constructn Method:		**Owner:**	
Elevation (m):		**County:**	OTTAWA-CARLETON
Elevatn Reliabilty:		**Lot:**	
Depth to Bedrock:		**Concession:**	
Well Depth:		**Concession Name:**	
Overburden/Bedrock:		**Easting NAD83:**	
Pump Rate:		**Northing NAD83:**	
Static Water Level:		**Zone:**	
Clear/Cloudy:		**UTM Reliability:**	
Municipality:	NEPEAN TOWNSHIP		
Site Info:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/717\7174547.pdf

Additional Detail(s) (Map)

Well Completed Date:	10/18/2011
Year Completed:	2011
Depth (m):	
Latitude:	45.3432650579189
Longitude:	-75.729839536045
X:	-75.72983937478251
Y:	45.34326505091807
Path:	717\7174547.pdf

Bore Hole Information

Bore Hole ID:	1003629073	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	18
Code OB:		**East83:**	442822.00
Code OB Desc:		**North83:**	5021343.00
Open Hole:		**Org CS:**	UTM83
Cluster Kind:		**UTMRC:**	4
Date Completed:	10/18/2011	**UTMRC Desc:**	margin of error : 30 m - 100 m
Remarks:		**Location Method:**	wwr
Location Method Desc:	on Water Well Record		
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

6 **1 of 1** **WNW/27.8** **86.9 / 1.08** **lot 30 con 1 ON** **WWIS**

Well ID:	7409560	**Flowing (Y/N):**	
Construction Date:		**Flow Rate:**	
Use 1st:		**Data Entry Status:**	Yes

Use 2nd:		**Data Src:**	
Final Well Status:		**Date Received:**	02/02/2022
Water Type:		**Selected Flag:**	TRUE
Casing Material:		**Abandonment Rec:**	
Audit No:	Z379361	**Contractor:**	7241
Tag:	A342634	**Form Version:**	7
Constructn Method:		**Owner:**	
Elevation (m):		**County:**	OTTAWA-CARLETON
Elevatn Reliabilty:		**Lot:**	030
Depth to Bedrock:		**Concession:**	01
Well Depth:		**Concession Name:**	RF
Overburden/Bedrock:		**Easting NAD83:**	
Pump Rate:		**Northing NAD83:**	
Static Water Level:		**Zone:**	
Clear/Cloudy:		**UTM Reliability:**	
Municipality:	NEPEAN TOWNSHIP		
Site Info:			

Additional Detail(s) (Map)

Bore Hole ID:	1008950772	**Tag No:**	A342634
Depth M:		**Contractor:**	7241
Year Completed:	2021	**Latitude:**	45.3434806657519
Well Completed Dt:	12/01/2021	**Longitude:**	-75.7299061285169
Audit No:	Z379361	**Y:**	45.343480659295416
Path:		**X:**	-75.72990596775253

Bore Hole Information

Bore Hole ID:	1008950772	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	18
Code OB:		**East83:**	442817.00
Code OB Desc:		**North83:**	5021367.00
Open Hole:		**Org CS:**	UTM83
Cluster Kind:		**UTMRC:**	4
Date Completed:	12/01/2021	**UTMRC Desc:**	margin of error : 30 m - 100 m
Remarks:		**Location Method:**	wwr
Location Method Desc:	on Water Well Record		
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

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7 | ***1 of 1*** | ***NE/34.4*** | ***86.8 / 1.05*** | ***ON*** | ***WWIS***

Well ID:	7197932	**Flowing (Y/N):**	
Construction Date:		**Flow Rate:**	
Use 1st:		**Data Entry Status:**	Yes
Use 2nd:		**Data Src:**	
Final Well Status:		**Date Received:**	03/04/2013
Water Type:		**Selected Flag:**	TRUE
Casing Material:		**Abandonment Rec:**	
Audit No:	C20604	**Contractor:**	1844
Tag:	A122861	**Form Version:**	8
Constructn Method:		**Owner:**	
Elevation (m):		**County:**	OTTAWA-CARLETON
Elevatn Reliabilty:		**Lot:**	
Depth to Bedrock:		**Concession:**	
Well Depth:		**Concession Name:**	

Overburden/Bedrock:		**Easting NAD83:**	
Pump Rate:		**Northing NAD83:**	
Static Water Level:		**Zone:**	
Clear/Cloudy:		**UTM Reliability:**	
Municipality:	NEPEAN TOWNSHIP		
Site Info:			

Additional Detail(s) (Map)

Bore Hole ID:	1004259201	**Tag No:**	A122861
Depth M:		**Contractor:**	1844
Year Completed:	2012	**Latitude:**	45.3436465910814
Well Completed Dt:	08/30/2012	**Longitude:**	-75.72929556794
Audit No:	C20604	**Y:**	45.34364658391583
Path:		**X:**	-75.72929540639834

Bore Hole Information

Bore Hole ID:	1004259201	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	18
Code OB:		**East83:**	442865.00
Code OB Desc:		**North83:**	5021385.00
Open Hole:		**Org CS:**	UTM83
Cluster Kind:		**UTMRC:**	4
Date Completed:	08/30/2012	**UTMRC Desc:**	margin of error : 30 m - 100 m
Remarks:		**Location Method:**	wwr
Location Method Desc:	on Water Well Record		
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
8	1 of 2	NE/36.2	86.8 / 1.05	1660 MERRIVALE Ottawa ON	WWIS

Well ID:	7271903	**Flowing (Y/N):**	
Construction Date:		**Flow Rate:**	
Use 1st:	Monitoring and Test Hole	**Data Entry Status:**	
Use 2nd:	0	**Data Src:**	
Final Well Status:	Abandoned-Other	**Date Received:**	09/22/2016
Water Type:		**Selected Flag:**	TRUE
Casing Material:		**Abandonment Rec:**	
Audit No:	Z233022	**Contractor:**	7241
Tag:		**Form Version:**	7
Constructn Method:		**Owner:**	
Elevation (m):		**County:**	OTTAWA-CARLETON
Elevatn Reliabilty:		**Lot:**	
Depth to Bedrock:		**Concession:**	
Well Depth:		**Concession Name:**	
Overburden/Bedrock:		**Easting NAD83:**	
Pump Rate:		**Northing NAD83:**	
Static Water Level:		**Zone:**	
Clear/Cloudy:		**UTM Reliability:**	
Municipality:	OTTAWA CITY		
Site Info:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/727\7271903.pdf

Additional Detail(s) (Map)

Well Completed Date: 08/22/2016
Year Completed: 2016
Depth (m):
Latitude: 45.3436735115397
Longitude: -75.7293086780442
X: -75.72930851640494
Y: 45.34367350546719
Path: 727\7271903.pdf

Bore Hole Information

Bore Hole ID: 1006251683
DP2BR:
Spatial Status:
Code OB:
Code OB Desc:
Open Hole:
Cluster Kind:
Date Completed: 08/22/2016
Remarks:
Location Method Desc: on Water Well Record
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:

Elevation:
Elevrc:
Zone: 18
East83: 442864.00
North83: 5021388.00
Org CS: UTM83
UTMRC: 4
UTMRC Desc: margin of error : 30 m - 100 m
Location Method: wwr

Overburden and Bedrock Materials Interval

Formation ID: 1006338225
Layer:
Color:
General Color:
Material 1:
Material 1 Desc:
Material 2:
Material 2 Desc:
Material 3:
Material 3 Desc:
Formation Top Depth:
Formation End Depth:
Formation End Depth UOM: m

Annular Space/Abandonment Sealing Record

Plug ID: 1006338235
Layer: 3
Plug From: 1.2200000286102295
Plug To: 4.570000171661377
Plug Depth UOM: m

Annular Space/Abandonment Sealing Record

Plug ID: 1006338234
Layer: 2
Plug From: 0.3100000023841858
Plug To: 1.2200000286102295

Plug Depth UOM: m

Annular Space/Abandonment Sealing Record

Plug ID: 1006338233
Layer: 1
Plug From: 0.0
Plug To: 0.3100000023841858
Plug Depth UOM: m

Method of Construction & Well Use

Method Construction ID: 1006338232
Method Construction Code:
Method Construction:
Other Method Construction:

Pipe Information

Pipe ID: 1006338224
Casing No: 0
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 1006338228
Layer: 1
Material: 5
Open Hole or Material: PLASTIC
Depth From: 0.0
Depth To:
Casing Diameter: 5.199999809265137
Casing Diameter UOM: cm
Casing Depth UOM: m

Construction Record - Screen

Screen ID: 1006338229
Layer:
Slot:
Screen Top Depth:
Screen End Depth:
Screen Material:
Screen Depth UOM: m
Screen Diameter UOM: cm
Screen Diameter:

Water Details

Water ID: 1006338227
Layer:
Kind Code:
Kind:
Water Found Depth:
Water Found Depth UOM: m

Hole Diameter

Hole ID: 1006338226
Diameter: 15.239999771118164
Depth From: 0.0
Depth To: 1.8300000429153442
Hole Depth UOM: m
Hole Diameter UOM: cm

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8 | **2 of 2** | **NE/36.2** | **86.8 / 1.05** | **1660 MERIVALE Ottawa ON** | **WWIS**

Well ID: 7271902
Construction Date:
Use 1st: Monitoring and Test Hole
Use 2nd: 0
Final Well Status: Monitoring and Test Hole
Water Type:
Casing Material:
Audit No: Z233023
Tag: A191039
Constructn Method:
Elevation (m):
Elevatn Reliabilty:
Depth to Bedrock:
Well Depth:
Overburden/Bedrock:
Pump Rate:
Static Water Level:
Clear/Cloudy:
Municipality: OTTAWA CITY
Site Info:

Flowing (Y/N):
Flow Rate:
Data Entry Status:
Data Src:
Date Received: 09/22/2016
Selected Flag: TRUE
Abandonment Rec:
Contractor: 7241
Form Version: 7
Owner:
County: OTTAWA-CARLETON
Lot:
Concession:
Concession Name:
Easting NAD83:
Northing NAD83:
Zone:
UTM Reliability:

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/727\7271902.pdf

Additional Detail(s) (Map)

Well Completed Date: 08/22/2016
Year Completed: 2016
Depth (m): 4.88
Latitude: 45.3436735115397
Longitude: -75.7293086780442
X: -75.72930851640494
Y: 45.34367350546719
Path: 727\7271902.pdf

Bore Hole Information

Bore Hole ID: 1006251674
DP2BR:
Spatial Status:
Code OB:
Code OB Desc:
Open Hole:
Cluster Kind:
Date Completed: 08/22/2016
Remarks:
Location Method Desc: on Water Well Record
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:

Elevation:
Elevrc:
Zone: 18
East83: 442864.00
North83: 5021388.00
Org CS: UTM83
UTMRC: 4
UTMRC Desc: margin of error : 30 m - 100 m
Location Method: wwr

Overburden and Bedrock Materials Interval

Formation ID:	1006338210
Layer:	1
Color:	6
General Color:	BROWN
Material 1:	01
Material 1 Desc:	FILL
Material 2:	
Material 2 Desc:	
Material 3:	
Material 3 Desc:	
Formation Top Depth:	0.0
Formation End Depth:	1.0
Formation End Depth UOM:	m

Overburden and Bedrock Materials Interval

Formation ID:	1006338211
Layer:	2
Color:	6
General Color:	BROWN
Material 1:	06
Material 1 Desc:	SILT
Material 2:	11
Material 2 Desc:	GRAVEL
Material 3:	
Material 3 Desc:	
Formation Top Depth:	1.0
Formation End Depth:	2.440000057220459
Formation End Depth UOM:	m

Overburden and Bedrock Materials Interval

Formation ID:	1006338212
Layer:	3
Color:	1
General Color:	WHITE
Material 1:	15
Material 1 Desc:	LIMESTONE
Material 2:	
Material 2 Desc:	
Material 3:	
Material 3 Desc:	
Formation Top Depth:	2.440000057220459
Formation End Depth:	4.880000114440918
Formation End Depth UOM:	m

Annular Space/Abandonment Sealing Record

Plug ID:	1006338222
Layer:	2
Plug From:	0.3100000023841858
Plug To:	3.0999999046325684
Plug Depth UOM:	m

Annular Space/Abandonment

Sealing Record

Plug ID:	1006338223
Layer:	3
Plug From:	3.0999999046325684
Plug To:	4.880000114440918
Plug Depth UOM:	m

Annular Space/Abandonment Sealing Record

Plug ID:	1006338221
Layer:	1
Plug From:	0.0
Plug To:	0.3100000023841858
Plug Depth UOM:	m

Method of Construction & Well Use

Method Construction ID:	1006338220
Method Construction Code:	7
Method Construction:	Diamond
Other Method Construction:	

Pipe Information

Pipe ID:	1006338209
Casing No:	0
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	1006338216
Layer:	1
Material:	5
Open Hole or Material:	PLASTIC
Depth From:	0.0
Depth To:	3.5
Casing Diameter:	6.0
Casing Diameter UOM:	cm
Casing Depth UOM:	m

Construction Record - Screen

Screen ID:	1006338217
Layer:	1
Slot:	10
Screen Top Depth:	3.5
Screen End Depth:	4.880000114440918
Screen Material:	5
Screen Depth UOM:	m
Screen Diameter UOM:	cm
Screen Diameter:	6.03000020980835

Water Details

Water ID:	1006338215
Layer:	
Kind Code:	

Kind:
Water Found Depth:
Water Found Depth UOM: m

Hole Diameter

Hole ID: 1006338213
Diameter:
Depth From: 0.0
Depth To: 2.440000057220459
Hole Depth UOM: m
Hole Diameter UOM: cm

Hole Diameter

Hole ID: 1006338214
Diameter:
Depth From: 2.440000057220459
Depth To: 4.880000114440918
Hole Depth UOM: m
Hole Diameter UOM: cm

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9 | ***1 of 1*** | ***WSW/43.5*** | ***86.6 / 0.77*** | ***lot 30 con 1 ON*** | ***WWIS***

Well ID:	7409559	***Flowing (Y/N):***	
Construction Date:		***Flow Rate:***	
Use 1st:		***Data Entry Status:***	Yes
Use 2nd:		***Data Src:***	
Final Well Status:		***Date Received:***	02/02/2022
Water Type:		***Selected Flag:***	TRUE
Casing Material:		***Abandonment Rec:***	
Audit No:	Z379360	***Contractor:***	7241
Tag:	A342631	***Form Version:***	7
Constructn Method:		***Owner:***	
Elevation (m):		***County:***	OTTAWA-CARLETON
Elevatn Reliabilty:		***Lot:***	030
Depth to Bedrock:		***Concession:***	01
Well Depth:		***Concession Name:***	RF
Overburden/Bedrock:		***Easting NAD83:***	
Pump Rate:		***Northing NAD83:***	
Static Water Level:		***Zone:***	
Clear/Cloudy:		***UTM Reliability:***	
Municipality:	NEPEAN TOWNSHIP		
Site Info:			

Additional Detail(s) (Map)

Bore Hole ID:	1008950769	***Tag No:***	A342631
Depth M:		***Contractor:***	7241
Year Completed:	2021	***Latitude:***	45.3432545073821
Well Completed Dt:	12/01/2021	***Longitude:***	-75.7300819230607
Audit No:	Z379360	***Y:***	45.34325450043946
Path:		***X:***	-75.73008176172634

Bore Hole Information

Bore Hole ID:	1008950769	***Elevation:***	
DP2BR:		***Elevrc:***	
Spatial Status:		***Zone:***	18
Code OB:		***East83:***	442803.00
Code OB Desc:		***North83:***	5021342.00

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Open Hole:		**Org CS:**	UTM83
Cluster Kind:		**UTMRC:**	4
Date Completed:	12/01/2021	**UTMRC Desc:**	margin of error : 30 m - 100 m
Remarks:		**Location Method:**	wwr
Location Method Desc:	on Water Well Record		
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

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10 **1 of 1** **E/43.9** **86.9 / 1.08** **ON** **WWIS**

Well ID:	7233984	**Flowing (Y/N):**	
Construction Date:		**Flow Rate:**	
Use 1st:		**Data Entry Status:**	Yes
Use 2nd:		**Data Src:**	
Final Well Status:		**Date Received:**	12/16/2014
Water Type:		**Selected Flag:**	TRUE
Casing Material:		**Abandonment Rec:**	
Audit No:	C22637	**Contractor:**	1844
Tag:	A156973	**Form Version:**	8
Constructn Method:		**Owner:**	
Elevation (m):		**County:**	OTTAWA-CARLETON
Elevatn Reliabilty:		**Lot:**	
Depth to Bedrock:		**Concession:**	
Well Depth:		**Concession Name:**	
Overburden/Bedrock:		**Easting NAD83:**	
Pump Rate:		**Northing NAD83:**	
Static Water Level:		**Zone:**	
Clear/Cloudy:		**UTM Reliability:**	
Municipality:	NEPEAN TOWNSHIP		
Site Info:			

Additional Detail(s) (Map)

Bore Hole ID:	1005262094	**Tag No:**	A156973
Depth M:		**Contractor:**	1844
Year Completed:	2014	**Latitude:**	45.3434503693394
Well Completed Dt:	09/17/2014	**Longitude:**	-75.7290122318393
Audit No:	C22637	**Y:**	45.34345036222798
Path:		**X:**	-75.72901207068165

Bore Hole Information

Bore Hole ID:	1005262094	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	18
Code OB:		**East83:**	442887.00
Code OB Desc:		**North83:**	5021363.00
Open Hole:		**Org CS:**	UTM83
Cluster Kind:		**UTMRC:**	4
Date Completed:	09/17/2014	**UTMRC Desc:**	margin of error : 30 m - 100 m
Remarks:		**Location Method:**	wwr
Location Method Desc:	on Water Well Record		
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
11	1 of 1	NW/53.1	86.8 / 1.05	1650 Merival Road lot 30 con 1 Ottawa ON	WWIS

Well ID: 7345849
Construction Date:
Use 1st:
Use 2nd:
Final Well Status: Observation Wells
Water Type:
Casing Material:
Audit No: Z311156
Tag: A274756
Constructn Method:
Elevation (m):
Elevatn Reliabilty:
Depth to Bedrock:
Well Depth:
Overburden/Bedrock:
Pump Rate:
Static Water Level:
Clear/Cloudy:
Municipality: NEPEAN TOWNSHIP
Site Info:

Flowing (Y/N):
Flow Rate:
Data Entry Status:
Data Src:
Date Received: 10/30/2019
Selected Flag: TRUE
Abandonment Rec:
Contractor: 7241
Form Version: 7
Owner:
County: OTTAWA-CARLETON
Lot: 030
Concession: 01
Concession Name: RF
Easting NAD83:
Northing NAD83:
Zone:
UTM Reliability:

Additional Detail(s) (Map)

Bore Hole ID: 1007696184
Depth M: 6.7
Year Completed: 2019
Well Completed Dt: 08/10/2019
Audit No: Z311156
Path:

Tag No: A274756
Contractor: 7241
Latitude: 45.3437862800475
Longitude: -75.729973878281
Y: 45.34378627293163
X: -75.729973715948

Bore Hole Information

Bore Hole ID: 1007696184
DP2BR:
Spatial Status:
Code OB:
Code OB Desc:
Open Hole:
Cluster Kind:
Date Completed: 08/10/2019
Remarks:
Location Method Desc: on Water Well Record
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:

Elevation:
Elevrc:
Zone: 18
East83: 442812.00
North83: 5021401.00
Org CS: UTM83
UTMRC: 4
UTMRC Desc: margin of error : 30 m - 100 m
Location Method: wwr

Overburden and Bedrock Materials Interval

Formation ID: 1007881213
Layer: 3
Color: 2
General Color: GREY
Material 1: 15
Material 1 Desc: LIMESTONE

Material 2:
Material 2 Desc:
Material 3: 74
Material 3 Desc: LAYERED
Formation Top Depth: 2.740000009536743
Formation End Depth: 6.699999809265137
Formation End Depth UOM: m

Overburden and Bedrock Materials Interval

Formation ID: 1007881212
Layer: 2
Color: 6
General Color: BROWN
Material 1: 28
Material 1 Desc: SAND
Material 2: 06
Material 2 Desc: SILT
Material 3: 85
Material 3 Desc: SOFT
Formation Top Depth: 0.3100000023841858
Formation End Depth: 2.740000009536743
Formation End Depth UOM: m

Overburden and Bedrock Materials Interval

Formation ID: 1007881211
Layer: 1
Color: 8
General Color: BLACK
Material 1: 27
Material 1 Desc: OTHER
Material 2: 11
Material 2 Desc: GRAVEL
Material 3: 66
Material 3 Desc: DENSE
Formation Top Depth: 0.0
Formation End Depth: 0.3100000023841858
Formation End Depth UOM: m

Annular Space/Abandonment Sealing Record

Plug ID: 1007882653
Layer: 1
Plug From: 0.0
Plug To: 0.3100000023841858
Plug Depth UOM: m

Annular Space/Abandonment Sealing Record

Plug ID: 1007882655
Layer: 3
Plug From: 3.3499999046325684
Plug To: 6.699999809265137
Plug Depth UOM: m

Annular Space/Abandonment Sealing Record

Plug ID: 1007882654
Layer: 2
Plug From: 0.3100000023841858
Plug To: 3.3499999046325684
Plug Depth UOM: m

Method of Construction & Well Use

Method Construction ID: 1007884340
Method Construction Code: 5
Method Construction: Air Percussion
Other Method Construction:

Pipe Information

Pipe ID: 1007879469
Casing No: 0
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 1007884962
Layer: 1
Material: 5
Open Hole or Material: PLASTIC
Depth From: 0.0
Depth To: 3.6600000858306885
Casing Diameter: 5.199999809265137
Casing Diameter UOM: cm
Casing Depth UOM: m

Construction Record - Screen

Screen ID: 1007885541
Layer: 1
Slot: 10
Screen Top Depth: 3.6600000858306885
Screen End Depth: 6.699999809265137
Screen Material: 5
Screen Depth UOM: m
Screen Diameter UOM: cm
Screen Diameter: 6.03000020980835

Results of Well Yield Testing

Pumping Test Method Desc:
Pump Test ID: 1007886368
Pump Set At:
Static Level:
Final Level After Pumping:
Recommended Pump Depth:
Pumping Rate:
Flowing Rate:
Recommended Pump Rate:
Levels UOM: m
Rate UOM: LPM
Water State After Test Code:
Water State After Test:
Pumping Test Method: 0

Pumping Duration HR:
Pumping Duration MIN:
Flowing:

Hole Diameter

Hole ID: 1007883641
Diameter: 8.890000343322754
Depth From:
Depth To:
Hole Depth UOM:
Hole Diameter UOM: cm

Hole Diameter

Hole ID: 1007883640
Diameter: 11.430000305175781
Depth From: 0.0
Depth To: 6.699999809265137
Hole Depth UOM: m
Hole Diameter UOM: cm

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12 | ***1 of 1*** | ***NW/53.7*** | ***86.8 / 1.05*** | ***1642 Merivale Road Ottawa ON*** | ***WWIS***

Well ID: 7344790
Construction Date:
Use 1st: Monitoring and Test Hole
Use 2nd:
Final Well Status: Monitoring and Test Hole
Water Type:
Casing Material:
Audit No: Z317323
Tag: A274756
Constructn Method:
Elevation (m):
Elevatn Reliabilty:
Depth to Bedrock:
Well Depth:
Overburden/Bedrock:
Pump Rate:
Static Water Level:
Clear/Cloudy:
Municipality: NEPEAN TOWNSHIP
Site Info:

Flowing (Y/N):
Flow Rate:
Data Entry Status:
Data Src:
Date Received: 10/09/2019
Selected Flag: TRUE
Abandonment Rec:
Contractor: 7241
Form Version: 7
Owner:
County: OTTAWA-CARLETON
Lot:
Concession:
Concession Name:
Easting NAD83:
Northing NAD83:
Zone:
UTM Reliability:

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/734\7344790.pdf

Additional Detail(s) (Map)

Well Completed Date: 07/10/2019
Year Completed: 2019
Depth (m): 3.1
Latitude: 45.3437861984717
Longitude: -75.7299866416987
X: -75.72998648010565
Y: 45.34378619085252
Path: 734\7344790.pdf

Bore Hole Information

Bore Hole ID: 1007683708
Elevation:

DP2BR:		***Elevrc:***	
Spatial Status:		***Zone:***	18
Code OB:		***East83:***	442811.00
Code OB Desc:		***North83:***	5021401.00
Open Hole:		***Org CS:***	UTM83
Cluster Kind:		***UTMRC:***	4
Date Completed:	07/10/2019	***UTMRC Desc:***	margin of error : 30 m - 100 m
Remarks:		***Location Method:***	wwr
Location Method Desc:	on Water Well Record		
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	1007873205
Layer:	2
Color:	6
General Color:	BROWN
Material 1:	28
Material 1 Desc:	SAND
Material 2:	06
Material 2 Desc:	SILT
Material 3:	85
Material 3 Desc:	SOFT
Formation Top Depth:	0.3100000023841858
Formation End Depth:	1.850000023841858
Formation End Depth UOM:	m

Overburden and Bedrock Materials Interval

Formation ID:	1007873204
Layer:	1
Color:	8
General Color:	BLACK
Material 1:	27
Material 1 Desc:	OTHER
Material 2:	11
Material 2 Desc:	GRAVEL
Material 3:	66
Material 3 Desc:	DENSE
Formation Top Depth:	0.0
Formation End Depth:	0.3100000023841858
Formation End Depth UOM:	m

Overburden and Bedrock Materials Interval

Formation ID:	1007873206
Layer:	3
Color:	6
General Color:	BROWN
Material 1:	05
Material 1 Desc:	CLAY
Material 2:	06
Material 2 Desc:	SILT
Material 3:	66
Material 3 Desc:	DENSE

Formation Top Depth: 1.850000023841858
Formation End Depth: 3.0999999046325684
Formation End Depth UOM: m

Annular Space/Abandonment Sealing Record

Plug ID: 1007874255
Layer: 1
Plug From: 0.0
Plug To: 0.3100000023841858
Plug Depth UOM: m

Annular Space/Abandonment Sealing Record

Plug ID: 1007874257
Layer: 3
Plug From: 1.2200000286102295
Plug To: 3.0999999046325684
Plug Depth UOM: m

Annular Space/Abandonment Sealing Record

Plug ID: 1007874256
Layer: 2
Plug From: 0.3100000023841858
Plug To: 1.2200000286102295
Plug Depth UOM: m

Method of Construction & Well Use

Method Construction ID: 1007875502
Method Construction Code: 5
Method Construction: Air Percussion
Other Method Construction:

Pipe Information

Pipe ID: 1007871782
Casing No: 0
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 1007876069
Layer: 1
Material: 5
Open Hole or Material: PLASTIC
Depth From: 0.0
Depth To: 1.5199999809265137
Casing Diameter: 5.199999809265137
Casing Diameter UOM: cm
Casing Depth UOM: m

Construction Record - Screen

Screen ID:	1007876532
Layer:	1
Slot:	10
Screen Top Depth:	1.5199999809265137
Screen End Depth:	3.0999999046325684
Screen Material:	5
Screen Depth UOM:	m
Screen Diameter UOM:	cm
Screen Diameter:	6.03000020980835

Results of Well Yield Testing

Pumping Test Method Desc:	
Pump Test ID:	1007877170
Pump Set At:	
Static Level:	
Final Level After Pumping:	
Recommended Pump Depth:	
Pumping Rate:	
Flowing Rate:	
Recommended Pump Rate:	
Levels UOM:	m
Rate UOM:	LPM
Water State After Test Code:	
Water State After Test:	
Pumping Test Method:	0
Pumping Duration HR:	
Pumping Duration MIN:	
Flowing:	

Hole Diameter

Hole ID:	1007874975
Diameter:	11.430000305175781
Depth From:	0.0
Depth To:	3.0999999046325684
Hole Depth UOM:	m
Hole Diameter UOM:	cm

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13 | ***1 of 1*** | ***SSE/59.8*** | ***85.9 / 0.08*** | ***1660 MERIVALE ROAD Ottawa ON*** | ***WWIS***

Well ID:	7250163	**Flowing (Y/N):**	
Construction Date:		**Flow Rate:**	
Use 1st:	Monitoring and Test Hole	**Data Entry Status:**	
Use 2nd:	0	**Data Src:**	
Final Well Status:	Test Hole	**Date Received:**	10/16/2015
Water Type:		**Selected Flag:**	TRUE
Casing Material:		**Abandonment Rec:**	
Audit No:	Z215138	**Contractor:**	7241
Tag:	A175695	**Form Version:**	7
Constructn Method:		**Owner:**	
Elevation (m):		**County:**	OTTAWA-CARLETON
Elevatn Reliabilty:		**Lot:**	
Depth to Bedrock:		**Concession:**	
Well Depth:		**Concession Name:**	
Overburden/Bedrock:		**Easting NAD83:**	
Pump Rate:		**Northing NAD83:**	
Static Water Level:		**Zone:**	
Clear/Cloudy:		**UTM Reliability:**	
Municipality:	NEPEAN TOWNSHIP		
Site Info:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/725\7250163.pdf

Additional Detail(s) (Map)

Well Completed Date: 09/09/2015
Year Completed: 2015
Depth (m): 6.1
Latitude: 45.3428714753093
Longitude: -75.7294515509125
X: -75.7294513889799
Y: 45.34287146835072
Path: 725\7250163.pdf

Bore Hole Information

Bore Hole ID: 1005743866
DP2BR:
Spatial Status:
Code OB:
Code OB Desc:
Open Hole:
Cluster Kind:
Date Completed: 09/09/2015
Remarks:
Location Method Desc: on Water Well Record
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:

Elevation:
Elevrc:
Zone: 18
East83: 442852.00
North83: 5021299.00
Org CS: UTM83
UTMRC: 4
UTMRC Desc: margin of error : 30 m - 100 m
Location Method: wwr

Overburden and Bedrock Materials Interval

Formation ID: 1005791046
Layer: 1
Color: 6
General Color: BROWN
Material 1: 02
Material 1 Desc: TOPSOIL
Material 2:
Material 2 Desc:
Material 3: 85
Material 3 Desc: SOFT
Formation Top Depth: 0.0
Formation End Depth: 0.3100000023841858
Formation End Depth UOM: m

Overburden and Bedrock Materials Interval

Formation ID: 1005791048
Layer: 3
Color: 2
General Color: GREY
Material 1: 15
Material 1 Desc: LIMESTONE
Material 2:
Material 2 Desc:
Material 3: 74
Material 3 Desc: LAYERED

Formation Top Depth:	1.8200000524520874
Formation End Depth:	6.099999904632568
Formation End Depth UOM:	m

Overburden and Bedrock Materials Interval

Formation ID:	1005791047
Layer:	2
Color:	6
General Color:	BROWN
Material 1:	28
Material 1 Desc:	SAND
Material 2:	06
Material 2 Desc:	SILT
Material 3:	85
Material 3 Desc:	SOFT
Formation Top Depth:	0.3100000023841858
Formation End Depth:	1.8200000524520874
Formation End Depth UOM:	m

Annular Space/Abandonment Sealing Record

Plug ID:	1005791059
Layer:	3
Plug From:	2.740000009536743
Plug To:	6.099999904632568
Plug Depth UOM:	m

Annular Space/Abandonment Sealing Record

Plug ID:	1005791058
Layer:	2
Plug From:	0.3100000023841858
Plug To:	2.740000009536743
Plug Depth UOM:	m

Annular Space/Abandonment Sealing Record

Plug ID:	1005791057
Layer:	1
Plug From:	0.0
Plug To:	0.3100000023841858
Plug Depth UOM:	m

Method of Construction & Well Use

Method Construction ID:	1005791056
Method Construction Code:	7
Method Construction:	Diamond
Other Method Construction:	

Pipe Information

Pipe ID:	1005791045
Casing No:	0
Comment:	

Alt Name:

Construction Record - Casing

Casing ID:	1005791052
Layer:	1
Material:	5
Open Hole or Material:	PLASTIC
Depth From:	0.0
Depth To:	3.0999999046325684
Casing Diameter:	5.199999809265137
Casing Diameter UOM:	cm
Casing Depth UOM:	m

Construction Record - Screen

Screen ID:	1005791053
Layer:	1
Slot:	10
Screen Top Depth:	3.0999999046325684
Screen End Depth:	6.099999904632568
Screen Material:	5
Screen Depth UOM:	m
Screen Diameter UOM:	cm
Screen Diameter:	6.03000020980835

Water Details

Water ID:	1005791051
Layer:	1
Kind Code:	
Kind:	
Water Found Depth:	
Water Found Depth UOM:	m

Hole Diameter

Hole ID:	1005791049
Diameter:	11.430000305175781
Depth From:	0.0
Depth To:	2.130000114440918
Hole Depth UOM:	m
Hole Diameter UOM:	cm

Hole Diameter

Hole ID:	1005791050
Diameter:	7.619999885559082
Depth From:	2.130000114440918
Depth To:	6.099999904632568
Hole Depth UOM:	m
Hole Diameter UOM:	cm

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14 ***1 of 1*** ***E/61.7*** ***86.9 / 1.08*** ***ON*** ***WWIS***

Well ID:	7417212	***Flowing (Y/N):***	
Construction Date:		***Flow Rate:***	
Use 1st:		***Data Entry Status:***	Yes
Use 2nd:		***Data Src:***	
Final Well Status:		***Date Received:***	05/10/2022

Water Type:		**Selected Flag:**	TRUE
Casing Material:		**Abandonment Rec:**	
Audit No:	Z379468	**Contractor:**	7241
Tag:	A342620	**Form Version:**	7
Constructn Method:		**Owner:**	
Elevation (m):		**County:**	OTTAWA-CARLETON
Elevatn Reliabilty:		**Lot:**	
Depth to Bedrock:		**Concession:**	
Well Depth:		**Concession Name:**	
Overburden/Bedrock:		**Easting NAD83:**	
Pump Rate:		**Northing NAD83:**	
Static Water Level:		**Zone:**	
Clear/Cloudy:		**UTM Reliability:**	
Municipality:	NEPEAN TOWNSHIP		
Site Info:			

Additional Detail(s) (Map)

Bore Hole ID:	1009022829	**Tag No:**	A342620
Depth M:		**Contractor:**	7241
Year Completed:	2022	**Latitude:**	45.3435506798251
Well Completed Dt:	03/26/2022	**Longitude:**	-75.7288092887266
Audit No:	Z379468	**Y:**	45.34355067288598
Path:		**X:**	-75.72880912694465

Bore Hole Information

Bore Hole ID:	1009022829	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	18
Code OB:		**East83:**	442903.00
Code OB Desc:		**North83:**	5021374.00
Open Hole:		**Org CS:**	UTM83
Cluster Kind:		**UTMRC:**	4
Date Completed:	03/26/2022	**UTMRC Desc:**	margin of error : 30 m - 100 m
Remarks:		**Location Method:**	wwr
Location Method Desc:	on Water Well Record		
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

15 ***1 of 1*** ***SSE/61.8*** ***85.9 / 0.11*** ***1660 MERIVALE ROAD Ottawa ON*** ***WWIS***

Well ID:	7250162	**Flowing (Y/N):**	
Construction Date:		**Flow Rate:**	
Use 1st:	Monitoring and Test Hole	**Data Entry Status:**	
Use 2nd:	0	**Data Src:**	
Final Well Status:	Test Hole	**Date Received:**	10/16/2015
Water Type:		**Selected Flag:**	TRUE
Casing Material:		**Abandonment Rec:**	
Audit No:	Z215137	**Contractor:**	7241
Tag:	A175697	**Form Version:**	7
Constructn Method:		**Owner:**	
Elevation (m):		**County:**	OTTAWA-CARLETON
Elevatn Reliabilty:		**Lot:**	
Depth to Bedrock:		**Concession:**	
Well Depth:		**Concession Name:**	
Overburden/Bedrock:		**Easting NAD83:**	
Pump Rate:		**Northing NAD83:**	

Static Water Level:		***Zone:***	
Clear/Cloudy:		***UTM Reliability:***	
Municipality:	NEPEAN TOWNSHIP		
Site Info:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/725\7250162.pdf

Additional Detail(s) (Map)

Well Completed Date:	09/09/2015
Year Completed:	2015
Depth (m):	4.88
Latitude:	45.3428998628281
Longitude:	-75.7292349229443
X:	-75.72923476121682
Y:	45.34289985635256
Path:	725\7250162.pdf

Bore Hole Information

Bore Hole ID:	1005743863	***Elevation:***	
DP2BR:		***Elevrc:***	
Spatial Status:		***Zone:***	18
Code OB:		***East83:***	442869.00
Code OB Desc:		***North83:***	5021302.00
Open Hole:		***Org CS:***	UTM83
Cluster Kind:		***UTMRC:***	4
Date Completed:	09/09/2015	***UTMRC Desc:***	margin of error : 30 m - 100 m
Remarks:		***Location Method:***	wwr
Location Method Desc:	on Water Well Record		
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	1005791021
Layer:	1
Color:	6
General Color:	BROWN
Material 1:	02
Material 1 Desc:	TOPSOIL
Material 2:	
Material 2 Desc:	
Material 3:	85
Material 3 Desc:	SOFT
Formation Top Depth:	0.0
Formation End Depth:	0.3100000023841858
Formation End Depth UOM:	m

Overburden and Bedrock Materials Interval

Formation ID:	1005791023
Layer:	3
Color:	2
General Color:	GREY
Material 1:	15

Material 1 Desc: LIMESTONE
Material 2:
Material 2 Desc:
Material 3: 74
Material 3 Desc: LAYERED
Formation Top Depth: 1.8200000524520874
Formation End Depth: 4.880000114440918
Formation End Depth UOM: m

Overburden and Bedrock Materials Interval

Formation ID: 1005791022
Layer: 2
Color: 6
General Color: BROWN
Material 1: 28
Material 1 Desc: SAND
Material 2: 06
Material 2 Desc: SILT
Material 3: 85
Material 3 Desc: SOFT
Formation Top Depth: 0.3100000023841858
Formation End Depth: 1.8200000524520874
Formation End Depth UOM: m

Annular Space/Abandonment Sealing Record

Plug ID: 1005791034
Layer: 3
Plug From: 2.430000066757202
Plug To: 4.880000114440918
Plug Depth UOM: m

Annular Space/Abandonment Sealing Record

Plug ID: 1005791033
Layer: 2
Plug From: 0.3100000023841858
Plug To: 2.430000066757202
Plug Depth UOM: m

Annular Space/Abandonment Sealing Record

Plug ID: 1005791032
Layer: 1
Plug From: 0.0
Plug To: 0.3100000023841858
Plug Depth UOM: m

Method of Construction & Well Use

Method Construction ID: 1005791031
Method Construction Code: 7
Method Construction: Diamond
Other Method Construction:

Pipe Information

Pipe ID:	1005791020
Casing No:	0
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	1005791027
Layer:	1
Material:	5
Open Hole or Material:	PLASTIC
Depth From:	0.0
Depth To:	2.740000009536743
Casing Diameter:	6.199999809265137
Casing Diameter UOM:	cm
Casing Depth UOM:	m

Construction Record - Screen

Screen ID:	1005791028
Layer:	1
Slot:	10
Screen Top Depth:	2.740000009536743
Screen End Depth:	4.880000114440918
Screen Material:	5
Screen Depth UOM:	m
Screen Diameter UOM:	cm
Screen Diameter:	6.03000020980835

Water Details

Water ID:	1005791026
Layer:	
Kind Code:	
Kind:	
Water Found Depth:	
Water Found Depth UOM:	m

Hole Diameter

Hole ID:	1005791024
Diameter:	11.430000305175781
Depth From:	0.0
Depth To:	2.130000114440918
Hole Depth UOM:	m
Hole Diameter UOM:	cm

Hole Diameter

Hole ID:	1005791025
Diameter:	7.619999885559082
Depth From:	2.130000114440918
Depth To:	4.880000114440918
Hole Depth UOM:	m
Hole Diameter UOM:	cm

16	***1 of 1***	***ENE/63.1***	***86.8 / 1.05***	***ON***	***WWIS***

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Well ID:	7417213	**Flowing (Y/N):**	
Construction Date:		**Flow Rate:**	
Use 1st:		**Data Entry Status:**	Yes
Use 2nd:		**Data Src:**	
Final Well Status:		**Date Received:**	05/17/2022
Water Type:		**Selected Flag:**	TRUE
Casing Material:		**Abandonment Rec:**	
Audit No:	Z384380	**Contractor:**	7241
Tag:	A342619	**Form Version:**	7
Constructn Method:		**Owner:**	
Elevation (m):		**County:**	OTTAWA-CARLETON
Elevatn Reliabilty:		**Lot:**	
Depth to Bedrock:		**Concession:**	
Well Depth:		**Concession Name:**	
Overburden/Bedrock:		**Easting NAD83:**	
Pump Rate:		**Northing NAD83:**	
Static Water Level:		**Zone:**	
Clear/Cloudy:		**UTM Reliability:**	
Municipality:	NEPEAN TOWNSHIP		
Site Info:			

Additional Detail(s) (Map)

Bore Hole ID:	1009022832	**Tag No:**	A342619
Depth M:		**Contractor:**	7241
Year Completed:	2022	**Latitude:**	45.3436584433296
Well Completed Dt:	03/26/2022	**Longitude:**	-75.7288489648168
Audit No:	Z384380	**Y:**	45.343658436225134
Path:		**X:**	-75.72884880371187

Bore Hole Information

Bore Hole ID:	1009022832	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	18
Code OB:		**East83:**	442900.00
Code OB Desc:		**North83:**	5021386.00
Open Hole:		**Org CS:**	UTM83
Cluster Kind:		**UTMRC:**	4
Date Completed:	03/26/2022	**UTMRC Desc:**	margin of error : 30 m - 100 m
Remarks:		**Location Method:**	wwr
Location Method Desc:	on Water Well Record		
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
17	1 of 1	NW/70.1	87.5 / 1.75	1642 Merivale Rd Ottawa ON	WWIS

Well ID:	7344836	**Flowing (Y/N):**	
Construction Date:		**Flow Rate:**	
Use 1st:	Monitoring and Test Hole	**Data Entry Status:**	
Use 2nd:		**Data Src:**	
Final Well Status:	Monitoring and Test Hole	**Date Received:**	10/09/2019
Water Type:		**Selected Flag:**	TRUE
Casing Material:		**Abandonment Rec:**	
Audit No:	Z302739	**Contractor:**	7241
Tag:	A182676	**Form Version:**	7
Constructn Method:		**Owner:**	
Elevation (m):		**County:**	OTTAWA-CARLETON

Elevatn Reliabilty: ***Lot:***
Depth to Bedrock: ***Concession:***
Well Depth: ***Concession Name:***
Overburden/Bedrock: ***Easting NAD83:***
Pump Rate: ***Northing NAD83:***
Static Water Level: ***Zone:***
Clear/Cloudy: ***UTM Reliability:***
Municipality: NEPEAN TOWNSHIP
Site Info:

Additional Detail(s) (Map)

Bore Hole ID:	1007683846	***Tag No:***	A182676
Depth M:	3.41	***Contractor:***	7241
Year Completed:	2019	***Latitude:***	45.3439023910959
Well Completed Dt:	07/28/2019	***Longitude:***	-75.7301157799797
Audit No:	Z302739	***Y:***	45.343902383940986
Path:		***X:***	-75.730115618265

Bore Hole Information

Bore Hole ID:	1007683846	***Elevation:***	
DP2BR:		***Elevrc:***	
Spatial Status:		***Zone:***	18
Code OB:		***East83:***	442801.00
Code OB Desc:		***North83:***	5021414.00
Open Hole:		***Org CS:***	UTM83
Cluster Kind:		***UTMRC:***	4
Date Completed:	07/28/2019	***UTMRC Desc:***	margin of error : 30 m - 100 m
Remarks:		***Location Method:***	wwr

Location Method Desc: on Water Well Record
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:

Overburden and Bedrock Materials Interval

Formation ID: 1007873251
Layer: 1
Color: 2
General Color: GREY
Material 1: 11
Material 1 Desc: GRAVEL
Material 2: 27
Material 2 Desc: OTHER
Material 3: 77
Material 3 Desc: LOOSE
Formation Top Depth: 0.0
Formation End Depth: 0.3100000023841858
Formation End Depth UOM: m

Overburden and Bedrock Materials Interval

Formation ID: 1007873253
Layer: 3
Color: 2
General Color: GREY

Material 1: 06
Material 1 Desc: SILT
Material 2: 11
Material 2 Desc: GRAVEL
Material 3: 66
Material 3 Desc: DENSE
Formation Top Depth: 1.0
Formation End Depth: 3.4100000858306885
Formation End Depth UOM: m

Overburden and Bedrock Materials Interval

Formation ID: 1007873252
Layer: 2
Color: 6
General Color: BROWN
Material 1: 28
Material 1 Desc: SAND
Material 2: 06
Material 2 Desc: SILT
Material 3: 85
Material 3 Desc: SOFT
Formation Top Depth: 0.3100000023841858
Formation End Depth: 1.0
Formation End Depth UOM: m

Annular Space/Abandonment Sealing Record

Plug ID: 1007874349
Layer: 2
Plug From: 0.3100000023841858
Plug To: 1.5499999523162842
Plug Depth UOM: m

Annular Space/Abandonment Sealing Record

Plug ID: 1007874350
Layer: 3
Plug From: 1.5499999523162842
Plug To: 3.4100000858306885
Plug Depth UOM: m

Annular Space/Abandonment Sealing Record

Plug ID: 1007874348
Layer: 1
Plug From: 0.0
Plug To: 0.3100000023841858
Plug Depth UOM: m

Method of Construction & Well Use

Method Construction ID: 1007875533
Method Construction Code: 2
Method Construction: Rotary (Convent.)
Other Method Construction:

Pipe Information

Pipe ID:	1007871828
Casing No:	0
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	1007876117
Layer:	1
Material:	5
Open Hole or Material:	PLASTIC
Depth From:	0.0
Depth To:	1.659999966621399
Casing Diameter:	5.199999809265137
Casing Diameter UOM:	cm
Casing Depth UOM:	m

Construction Record - Casing

Casing ID:	1007876118
Layer:	2
Material:	
Open Hole or Material:	
Depth From:	
Depth To:	
Casing Diameter:	
Casing Diameter UOM:	cm
Casing Depth UOM:	

Construction Record - Screen

Screen ID:	1007876578
Layer:	1
Slot:	10
Screen Top Depth:	1.5499999523162842
Screen End Depth:	3.4100000858306885
Screen Material:	5
Screen Depth UOM:	m
Screen Diameter UOM:	cm
Screen Diameter:	6.03000020980835

Results of Well Yield Testing

Pumping Test Method Desc:	
Pump Test ID:	1007877216
Pump Set At:	
Static Level:	
Final Level After Pumping:	
Recommended Pump Depth:	
Pumping Rate:	
Flowing Rate:	
Recommended Pump Rate:	
Levels UOM:	m
Rate UOM:	LPM
Water State After Test Code:	
Water State After Test:	
Pumping Test Method:	0
Pumping Duration HR:	
Pumping Duration MIN:	
Flowing:	

Hole Diameter

Hole ID:	1007875015
Diameter:	15.239999771118164
Depth From:	0.0
Depth To:	3.4100000858306885
Hole Depth UOM:	m
Hole Diameter UOM:	cm

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18 | ***1 of 1*** | ***SE/114.1*** | ***84.9 / -0.92*** | ***OTTAWA-CARLETON DISTRICT SCHOOL BOARD Health and Safety MERIVALE HIGH SCHOOL 1755 MERIVALE ROAD NEPEAN ON K2G 1E2*** | ***GEN***

Generator No:	ON0051012
SIC Code:	
SIC Description:	
Approval Years:	As of Oct 2022
PO Box No:	
Country:	Canada
Status:	Registered
Co Admin:	
Choice of Contact:	
Phone No Admin:	
Contaminated Facility:	
MHSW Facility:	

Detail(s)

Waste Class:	264 C
Waste Class Name:	PHOTOPROCESSING WASTES
Waste Class:	145 I
Waste Class Name:	PAINT/PIGMENT/COATING RESIDUES
Waste Class:	221 L
Waste Class Name:	LIGHT FUELS
Waste Class:	264 T
Waste Class Name:	PHOTOPROCESSING WASTES
Waste Class:	122 C
Waste Class Name:	ALKALINE WASTES - OTHER METALS
Waste Class:	221 I
Waste Class Name:	LIGHT FUELS
Waste Class:	148 C
Waste Class Name:	INORGANIC LABORATORY CHEMICALS
Waste Class:	213 I
Waste Class Name:	PETROLEUM DISTILLATES
Waste Class:	252 L
Waste Class Name:	WASTE OILS & LUBRICANTS
Waste Class:	148 A
Waste Class Name:	INORGANIC LABORATORY CHEMICALS
Waste Class:	212 H
Waste Class Name:	ALIPHATIC SOLVENTS

Waste Class: 263 I
Waste Class Name: ORGANIC LABORATORY CHEMICALS

Waste Class: 263 B
Waste Class Name: ORGANIC LABORATORY CHEMICALS

Waste Class: 148 R
Waste Class Name: INORGANIC LABORATORY CHEMICALS

Waste Class: 112 C
Waste Class Name: ACID WASTE - HEAVY METALS

Waste Class: 331 I
Waste Class Name: WASTE COMPRESSED GASES

Waste Class: 212 B
Waste Class Name: ALIPHATIC SOLVENTS

Waste Class: 263 C
Waste Class Name: ORGANIC LABORATORY CHEMICALS

Waste Class: 148 I
Waste Class Name: INORGANIC LABORATORY CHEMICALS

Waste Class: 212 L
Waste Class Name: ALIPHATIC SOLVENTS

Waste Class: 148 B
Waste Class Name: INORGANIC LABORATORY CHEMICALS

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19 | **1 of 1** | **NW/127.3** | **87.9 / 2.08** | **1642 Merivale Rd Ottawa ON** | **WWIS**

Well ID:	7344837	**Flowing (Y/N):**	
Construction Date:		**Flow Rate:**	
Use 1st:	Monitoring and Test Hole	**Data Entry Status:**	
Use 2nd:		**Data Src:**	
Final Well Status:	Monitoring and Test Hole	**Date Received:**	10/09/2019
Water Type:		**Selected Flag:**	TRUE
Casing Material:		**Abandonment Rec:**	
Audit No:	Z317419	**Contractor:**	7241
Tag:	A268924	**Form Version:**	7
Constructn Method:		**Owner:**	
Elevation (m):		**County:**	OTTAWA-CARLETON
Elevatn Reliabilty:		**Lot:**	
Depth to Bedrock:		**Concession:**	
Well Depth:		**Concession Name:**	
Overburden/Bedrock:		**Easting NAD83:**	
Pump Rate:		**Northing NAD83:**	
Static Water Level:		**Zone:**	
Clear/Cloudy:		**UTM Reliability:**	
Municipality:	NEPEAN TOWNSHIP		
Site Info:			

Additional Detail(s) (Map)

Bore Hole ID:	1007683849	**Tag No:**	A268924
Depth M:	2.79	**Contractor:**	7241
Year Completed:	2019	**Latitude:**	45.3443866308342
Well Completed Dt:	07/08/2019	**Longitude:**	-75.730402826052
Audit No:	Z317419	**Y:**	45.34438662425063
Path:		**X:**	-75.73040266399816

Bore Hole Information

Bore Hole ID:	1007683849	***Elevation:***	
DP2BR:		***Elevrc:***	
Spatial Status:		***Zone:***	18
Code OB:		***East83:***	442779.00
Code OB Desc:		***North83:***	5021468.00
Open Hole:		***Org CS:***	UTM83
Cluster Kind:		***UTMRC:***	4
Date Completed:	07/08/2019	***UTMRC Desc:***	margin of error : 30 m - 100 m
Remarks:		***Location Method:***	wwr
Location Method Desc:	on Water Well Record		
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	1007873255
Layer:	2
Color:	6
General Color:	BROWN
Material 1:	28
Material 1 Desc:	SAND
Material 2:	11
Material 2 Desc:	GRAVEL
Material 3:	85
Material 3 Desc:	SOFT
Formation Top Depth:	0.3100000023841858
Formation End Depth:	1.0
Formation End Depth UOM:	m

Overburden and Bedrock Materials Interval

Formation ID:	1007873254
Layer:	1
Color:	2
General Color:	GREY
Material 1:	11
Material 1 Desc:	GRAVEL
Material 2:	27
Material 2 Desc:	OTHER
Material 3:	77
Material 3 Desc:	LOOSE
Formation Top Depth:	0.0
Formation End Depth:	0.3100000023841858
Formation End Depth UOM:	m

Overburden and Bedrock Materials Interval

Formation ID:	1007873256
Layer:	3
Color:	2
General Color:	GREY
Material 1:	06
Material 1 Desc:	SILT

Material 2: 11
Material 2 Desc: GRAVEL
Material 3: 66
Material 3 Desc: DENSE
Formation Top Depth: 1.0
Formation End Depth: 2.7899999618530273
Formation End Depth UOM: m

Annular Space/Abandonment Sealing Record

Plug ID: 1007874352
Layer: 2
Plug From: 0.3100000023841858
Plug To: 1.0
Plug Depth UOM: m

Annular Space/Abandonment Sealing Record

Plug ID: 1007874353
Layer: 3
Plug From: 1.0
Plug To: 2.7899999618530273
Plug Depth UOM: m

Annular Space/Abandonment Sealing Record

Plug ID: 1007874351
Layer: 1
Plug From: 0.0
Plug To: 0.3100000023841858
Plug Depth UOM: m

Method of Construction & Well Use

Method Construction ID: 1007875534
Method Construction Code: 2
Method Construction: Rotary (Convent.)
Other Method Construction:

Pipe Information

Pipe ID: 1007871829
Casing No: 0
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 1007876119
Layer: 1
Material: 5
Open Hole or Material: PLASTIC
Depth From: 0.0
Depth To: 1.2400000095367432
Casing Diameter: 5.199999809265137
Casing Diameter UOM: cm
Casing Depth UOM: m

Construction Record - Screen

Screen ID:	1007876579
Layer:	1
Slot:	10
Screen Top Depth:	1.2400000095367432
Screen End Depth:	2.7899999618530273
Screen Material:	5
Screen Depth UOM:	m
Screen Diameter UOM:	cm
Screen Diameter:	6.03000020980835

Results of Well Yield Testing

Pumping Test Method Desc:	
Pump Test ID:	1007877217
Pump Set At:	
Static Level:	
Final Level After Pumping:	
Recommended Pump Depth:	
Pumping Rate:	
Flowing Rate:	
Recommended Pump Rate:	
Levels UOM:	m
Rate UOM:	LPM
Water State After Test Code:	
Water State After Test:	
Pumping Test Method:	0
Pumping Duration HR:	
Pumping Duration MIN:	
Flowing:	

Hole Diameter

Hole ID:	1007875016
Diameter:	15.239999771118164
Depth From:	0.0
Depth To:	2.7899999618530273
Hole Depth UOM:	m
Hole Diameter UOM:	cm

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20 ***1 of 1*** ***SE/147.9*** ***84.9 / -0.87*** ***ON*** ***BORE***

Borehole ID:	612424	***Inclin FLG:***	No
OGF ID:	215513733	***SP Status:***	Initial Entry
Status:		***Surv Elev:***	No
Type:	Borehole	***Piezometer:***	No
Use:		***Primary Name:***	
Completion Date:	OCT-1964	***Municipality:***	
Static Water Level:		***Lot:***	
Primary Water Use:		***Township:***	
Sec. Water Use:		***Latitude DD:***	45.342275
Total Depth m:	-999	***Longitude DD:***	-75.728567
Depth Ref:	Ground Surface	***UTM Zone:***	18
Depth Elev:		***Easting:***	442921
Drill Method:		***Northing:***	5021232
Orig Ground Elev m:	85.5	***Location Accuracy:***	
Elev Reliabil Note:		***Accuracy:***	Not Applicable
DEM Ground Elev m:	85.1		
Concession:			

Location D:
Survey D:
Comments:

Borehole Geology Stratum

Geology Stratum ID: 218391235
Top Depth: 13.4
Bottom Depth:
Material Color: Grey
Material 1: Bedrock
Material 2:
Material 3:
Material 4:
Gsc Material Description:
Stratum Description: BEDROCK. AND. GREY,DENSE. 000100140011000100175033 003 00160 003 0003002000115025 **Note: Many records provided by the department have a truncated [Stratum Description] field.

Mat Consistency: Dense
Material Moisture:
Material Texture:
Non Geo Mat Type:
Geologic Formation:
Geologic Group:
Geologic Period:
Depositional Gen:

Geology Stratum ID: 218391232
Top Depth: 3.2
Bottom Depth: 5.3
Material Color:
Material 1: Till
Material 2: Sand
Material 3:
Material 4:
Gsc Material Description:
Stratum Description: TILL. COMPACT.

Mat Consistency: Compact
Material Moisture:
Material Texture:
Non Geo Mat Type:
Geologic Formation:
Geologic Group:
Geologic Period:
Depositional Gen:

Geology Stratum ID: 218391230
Top Depth: 0
Bottom Depth: 1.5
Material Color:
Material 1: Fill
Material 2:
Material 3:
Material 4:
Gsc Material Description:
Stratum Description: FILL.

Mat Consistency:
Material Moisture:
Material Texture:
Non Geo Mat Type:
Geologic Formation:
Geologic Group:
Geologic Period:
Depositional Gen: fill

Geology Stratum ID: 218391231
Top Depth: 1.5
Bottom Depth: 3.2
Material Color:
Material 1: Till
Material 2: Sand
Material 3:
Material 4:
Gsc Material Description:
Stratum Description: TILL. COMPACT.

Mat Consistency: Compact
Material Moisture:
Material Texture:
Non Geo Mat Type:
Geologic Formation:
Geologic Group:
Geologic Period:
Depositional Gen:

Geology Stratum ID: 218391234
Top Depth: 9.1
Bottom Depth: 13.4
Material Color:
Material 1: Till
Material 2: Sand
Material 3:
Material 4:
Gsc Material Description:
Stratum Description: TILL.

Mat Consistency:
Material Moisture:
Material Texture:
Non Geo Mat Type:
Geologic Formation:
Geologic Group:
Geologic Period:
Depositional Gen:

Geology Stratum ID: 218391233
Top Depth: 5.3
Bottom Depth: 9.1

Mat Consistency: Compact
Material Moisture:
Material Texture:

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Material Color:
Material 1: Till
Material 2: Gravel
Material 3:
Material 4:
Gsc Material Description:
Stratum Description: TILL. COMPACT.

Non Geo Mat Type:
Geologic Formation:
Geologic Group:
Geologic Period:
Depositional Gen:

Source

Source Type: Data Survey
Source Orig: Geological Survey of Canada
Source Date: 1956-1972
Confidence:
Observatio:
Source Name: Urban Geology Automated Information System (UGAIS)
Source Details: File: OTTAWA1.txt RecordID: 049320 NTS_Sheet: 31G05B
Confiden 1:

Source Appl: Spatial/Tabular
Source Iden: 1
Scale or Res: Varies
Horizontal: NAD27
Verticalda: Mean Average Sea Level

Source List

Source Identifier: 1
Source Type: Data Survey
Source Date: 1956-1972
Scale or Resolution: Varies
Source Name: Urban Geology Automated Information System (UGAIS)
Source Originators: Geological Survey of Canada

Horizontal Datum: NAD27
Vertical Datum: Mean Average Sea Level
Projection Name: Universal Transverse Mercator

21	*1 of 18*	*ESE/148.5*	*85.2 / -0.61*	***CARLETON BOARD OF EDUCATION MERIVALE HIGH SCHOOL 1755 MERIVALE ROAD NEPEAN ON K2G 1E2***	*GEN*

Generator No: ON0051012
SIC Code: 8511
SIC Description: ELEMT./SECON. EDUC.
Approval Years: 92,93,97
PO Box No:
Country:
Status:
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

Detail(s)

Waste Class: 212
Waste Class Name: ALIPHATIC SOLVENTS

Waste Class: 213
Waste Class Name: PETROLEUM DISTILLATES

Waste Class: 252
Waste Class Name: WASTE OILS & LUBRICANTS

21	*2 of 18*	*ESE/148.5*	*85.2 / -0.61*	***CARLETON BOARD OF EDUCATION 07-622 MERIVALE HIGH SCHOOL 1755 MERIVALE ROAD NEPEAN ON K2G 1E2***	*GEN*

Generator No: ON0051012
SIC Code: 8511
SIC Description: ELEMT./SECON. EDUC.
Approval Years: 94,95,96
PO Box No:
Country:
Status:
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

Detail(s)

Waste Class: 212
Waste Class Name: ALIPHATIC SOLVENTS

Waste Class: 213
Waste Class Name: PETROLEUM DISTILLATES

Waste Class: 252
Waste Class Name: WASTE OILS & LUBRICANTS

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
21	3 of 18	ESE/148.5	85.2 / -0.61	OTTAWA-CARLETON DISTRICT SCHOOL BOARD MERIVALE HIGH SCHOOL 1755 MERIVALE ROAD NEPEAN ON K2G 1E2	GEN

Generator No: ON0051012
SIC Code: 8511
SIC Description: ELEMT./SECON. EDUC.
Approval Years: 98,99,00,01,02,03,04,05,06,07,08
PO Box No:
Country:
Status:
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

Detail(s)

Waste Class: 331
Waste Class Name: WASTE COMPRESSED GASES

Waste Class: 331
Waste Class Name: WASTE COMPRESSED GASES

Waste Class: 145
Waste Class Name: PAINT/PIGMENT/COATING RESIDUES

Waste Class: 213
Waste Class Name: PETROLEUM DISTILLATES

Waste Class: 148
Waste Class Name: INORGANIC LABORATORY CHEMICALS

Waste Class: 263
Waste Class Name: ORGANIC LABORATORY CHEMICALS

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
Waste Class:		212			
Waste Class Name:		ALIPHATIC SOLVENTS			
Waste Class:		252			
Waste Class Name:		WASTE OILS & LUBRICANTS			
21	4 of 18	ESE/148.5	85.2 / -0.61	OTTAWA CARLETON DISTRICT SCHOOL BAORD 1755 MERIVALE ROAD NEPEAN ON K2G 1E2	GEN
Generator No:		ON4458050			
SIC Code:					
SIC Description:					
Approval Years:		03,04			
PO Box No:					
Country:					
Status:					
Co Admin:					
Choice of Contact:					
Phone No Admin:					
Contaminated Facility:					
MHSW Facility:					
21	5 of 18	ESE/148.5	85.2 / -0.61	Ottawa-Carleton District School Board 1755 Merivale Road Ottawa ON	CA
Certificate #:		9832-6U3R4M			
Application Year:		2006			
Issue Date:		10/4/2006			
Approval Type:		Air			
Status:		Approved			
Application Type:					
Client Name:					
Client Address:					
Client City:					
Client Postal Code:					
Project Description:					
Contaminants:					
Emission Control:					
21	6 of 18	ESE/148.5	85.2 / -0.61	OTTAWA-CARLETON DISTRICT SCHOOL BOARD MERIVALE HIGH SCHOOL 1755 MERIVALE ROAD NEPEAN ON K2G 1E2	GEN
Generator No:		ON0051012			
SIC Code:		611110			
SIC Description:		Elementary and Secondary Schools			
Approval Years:		2009			
PO Box No:					
Country:					
Status:					
Co Admin:					
Choice of Contact:					
Phone No Admin:					
Contaminated Facility:					
MHSW Facility:					

Detail(s)

Waste Class: 148
Waste Class Name: INORGANIC LABORATORY CHEMICALS

Waste Class: 145
Waste Class Name: PAINT/PIGMENT/COATING RESIDUES

Waste Class: 212
Waste Class Name: ALIPHATIC SOLVENTS

Waste Class: 213
Waste Class Name: PETROLEUM DISTILLATES

Waste Class: 252
Waste Class Name: WASTE OILS & LUBRICANTS

Waste Class: 263
Waste Class Name: ORGANIC LABORATORY CHEMICALS

Waste Class: 331
Waste Class Name: WASTE COMPRESSED GASES

21	7 of 18	ESE/148.5	85.2 / -0.61	OTTAWA-CARLETON DISTRICT SCHOOL BOARD MERIVALE HIGH SCHOOL 1755 MERIVALE ROAD NEPEAN ON K2G 1E2	GEN

Generator No: ON0051012
SIC Code: 611110
SIC Description: Elementary and Secondary Schools
Approval Years: 2010
PO Box No:
Country:
Status:
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

Detail(s)

Waste Class: 252
Waste Class Name: WASTE OILS & LUBRICANTS

Waste Class: 213
Waste Class Name: PETROLEUM DISTILLATES

Waste Class: 331
Waste Class Name: WASTE COMPRESSED GASES

Waste Class: 145
Waste Class Name: PAINT/PIGMENT/COATING RESIDUES

Waste Class: 212
Waste Class Name: ALIPHATIC SOLVENTS

Waste Class: 221
Waste Class Name: LIGHT FUELS

Waste Class: 263
Waste Class Name: ORGANIC LABORATORY CHEMICALS

Waste Class: 148
Waste Class Name: INORGANIC LABORATORY CHEMICALS

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21 | **8 of 18** | **ESE/148.5** | **85.2 / -0.61** | **OTTAWA-CARLETON DISTRICT SCHOOL BOARD**
MERIVALE HIGH SCHOOL 1755 MERIVALE ROAD
NEPEAN ON K2G 1E2 | **GEN**

Generator No: ON0051012
SIC Code: 611110
SIC Description: Elementary and Secondary Schools
Approval Years: 2011
PO Box No:
Country:
Status:
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

Detail(s)

Waste Class: 145
Waste Class Name: PAINT/PIGMENT/COATING RESIDUES

Waste Class: 148
Waste Class Name: INORGANIC LABORATORY CHEMICALS

Waste Class: 212
Waste Class Name: ALIPHATIC SOLVENTS

Waste Class: 221
Waste Class Name: LIGHT FUELS

Waste Class: 252
Waste Class Name: WASTE OILS & LUBRICANTS

Waste Class: 263
Waste Class Name: ORGANIC LABORATORY CHEMICALS

Waste Class: 331
Waste Class Name: WASTE COMPRESSED GASES

Waste Class: 213
Waste Class Name: PETROLEUM DISTILLATES

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21 | **9 of 18** | **ESE/148.5** | **85.2 / -0.61** | **OTTAWA-CARLETON DISTRICT SCHOOL BOARD**
MERIVALE HIGH SCHOOL 1755 MERIVALE ROAD
NEPEAN ON K2G 1E2 | **GEN**

Generator No: ON0051012
SIC Code: 611110
SIC Description: Elementary and Secondary Schools
Approval Years: 2012
PO Box No:
Country:
Status:
Co Admin:
Choice of Contact:

Phone No Admin:
Contaminated Facility:
MHSW Facility:

Detail(s)

Waste Class: 331
Waste Class Name: WASTE COMPRESSED GASES

Waste Class: 145
Waste Class Name: PAINT/PIGMENT/COATING RESIDUES

Waste Class: 263
Waste Class Name: ORGANIC LABORATORY CHEMICALS

Waste Class: 148
Waste Class Name: INORGANIC LABORATORY CHEMICALS

Waste Class: 252
Waste Class Name: WASTE OILS & LUBRICANTS

Waste Class: 213
Waste Class Name: PETROLEUM DISTILLATES

Waste Class: 212
Waste Class Name: ALIPHATIC SOLVENTS

Waste Class: 221
Waste Class Name: LIGHT FUELS

21	***10 of 18***	***ESE/148.5***	***85.2 / -0.61***	***OTTAWA-CARLETON DISTRICT SCHOOL BOARD MERIVALE HIGH SCHOOL 1755 MERIVALE ROAD NEPEAN ON***	***GEN***

Generator No: ON0051012
SIC Code: 611110
SIC Description: ELEMENTARY AND SECONDARY SCHOOLS
Approval Years: 2013
PO Box No:
Country:
Status:
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

Detail(s)

Waste Class: 252
Waste Class Name: WASTE OILS & LUBRICANTS

Waste Class: 212
Waste Class Name: ALIPHATIC SOLVENTS

Waste Class: 148
Waste Class Name: INORGANIC LABORATORY CHEMICALS

Waste Class: 264
Waste Class Name: PHOTOPROCESSING WASTES

Waste Class: 145
Waste Class Name: PAINT/PIGMENT/COATING RESIDUES

Waste Class: 213
Waste Class Name: PETROLEUM DISTILLATES

Waste Class: 221
Waste Class Name: LIGHT FUELS

Waste Class: 263
Waste Class Name: ORGANIC LABORATORY CHEMICALS

Waste Class: 122
Waste Class Name: ALKALINE WASTES - OTHER METALS

Waste Class: 112
Waste Class Name: ACID WASTE - HEAVY METALS

Waste Class: 331
Waste Class Name: WASTE COMPRESSED GASES

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21 | **11 of 18** | **ESE/148.5** | **85.2 / -0.61** | **Ottawa-Carleton District School Board**
1755 Merivale Road
Ottawa ON K2H 6L3 | **ECA**

Approval No: 9832-6U3R4M
Approval Date: 2006-10-04
Status: Approved
Record Type: ECA
Link Source: IDS
SWP Area Name: Rideau Valley
Approval Type: ECA-AIR
Project Type: AIR
Business Name: Ottawa-Carleton District School Board
Address: 1755 Merivale Road
Full Address:
Full PDF Link: https://www.accessenvironment.ene.gov.on.ca/instruments/4490-6EFQ29-14.pdf
PDF Site Location:

MOE District: Ottawa
City:
Longitude: -75.72692
Latitude: 45.34321
Geometry X:
Geometry Y:

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21 | **12 of 18** | **ESE/148.5** | **85.2 / -0.61** | **OTTAWA-CARLETON DISTRICT SCHOOL BOARD**
MERIVALE HIGH SCHOOL 1755 MERIVALE ROAD
NEPEAN ON K2G 1E2 | **GEN**

Generator No: ON0051012
SIC Code: 611110
SIC Description: ELEMENTARY AND SECONDARY SCHOOLS
Approval Years: 2015
PO Box No:
Country: Canada
Status:
Co Admin: Greg Benson
Choice of Contact: CO_OFFICIAL
Phone No Admin: 613-596-8211 Ext.8549
Contaminated Facility: No
MHSW Facility: No

Detail(s)

Waste Class: 148
Waste Class Name: INORGANIC LABORATORY CHEMICALS

Waste Class: 252
Waste Class Name: WASTE OILS & LUBRICANTS

Waste Class: 122
Waste Class Name: ALKALINE WASTES - OTHER METALS

Waste Class: 331
Waste Class Name: WASTE COMPRESSED GASES

Waste Class: 221
Waste Class Name: LIGHT FUELS

Waste Class: 145
Waste Class Name: PAINT/PIGMENT/COATING RESIDUES

Waste Class: 263
Waste Class Name: ORGANIC LABORATORY CHEMICALS

Waste Class: 112
Waste Class Name: ACID WASTE - HEAVY METALS

Waste Class: 212
Waste Class Name: ALIPHATIC SOLVENTS

Waste Class: 264
Waste Class Name: PHOTOPROCESSING WASTES

Waste Class: 213
Waste Class Name: PETROLEUM DISTILLATES

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
21	13 of 18	ESE/148.5	85.2 / -0.61	OTTAWA-CARLETON DISTRICT SCHOOL BOARD MERIVALE HIGH SCHOOL 1755 MERIVALE ROAD NEPEAN ON K2G 1E2	GEN

Generator No: ON0051012
SIC Code: 611110
SIC Description: ELEMENTARY AND SECONDARY SCHOOLS
Approval Years: 2016
PO Box No:
Country: Canada
Status:
Co Admin: Greg Benson
Choice of Contact: CO_OFFICIAL
Phone No Admin: 613-596-8211 Ext.8549
Contaminated Facility: No
MHSW Facility: No

Detail(s)

Waste Class: 252
Waste Class Name: WASTE OILS & LUBRICANTS

Waste Class: 263
Waste Class Name: ORGANIC LABORATORY CHEMICALS

Waste Class: 148
Waste Class Name: INORGANIC LABORATORY CHEMICALS

Waste Class: 331
Waste Class Name: WASTE COMPRESSED GASES

Waste Class: 212
Waste Class Name: ALIPHATIC SOLVENTS

Waste Class: 122
Waste Class Name: ALKALINE WASTES - OTHER METALS

Waste Class: 112
Waste Class Name: ACID WASTE - HEAVY METALS

Waste Class: 221
Waste Class Name: LIGHT FUELS

Waste Class: 213
Waste Class Name: PETROLEUM DISTILLATES

Waste Class: 264
Waste Class Name: PHOTOPROCESSING WASTES

Waste Class: 145
Waste Class Name: PAINT/PIGMENT/COATING RESIDUES

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
21	14 of 18	ESE/148.5	85.2 / -0.61	OTTAWA-CARLETON DISTRICT SCHOOL BOARD MERIVALE HIGH SCHOOL 1755 MERIVALE ROAD NEPEAN ON K2G 1E2	GEN

Generator No: ON0051012
SIC Code: 611110
SIC Description: ELEMENTARY AND SECONDARY SCHOOLS
Approval Years: 2014
PO Box No:
Country: Canada
Status:
Co Admin: Greg Benson
Choice of Contact: CO_OFFICIAL
Phone No Admin: 613-596-8211 Ext.8549
Contaminated Facility: No
MHSW Facility: No

Detail(s)

Waste Class: 112
Waste Class Name: ACID WASTE - HEAVY METALS

Waste Class: 213
Waste Class Name: PETROLEUM DISTILLATES

Waste Class: 264
Waste Class Name: PHOTOPROCESSING WASTES

Waste Class: 263
Waste Class Name: ORGANIC LABORATORY CHEMICALS

Waste Class: 331
Waste Class Name: WASTE COMPRESSED GASES

Waste Class: 221
Waste Class Name: LIGHT FUELS

Waste Class: 145
Waste Class Name: PAINT/PIGMENT/COATING RESIDUES

Waste Class: 252

Waste Class Name: WASTE OILS & LUBRICANTS

Waste Class: 148
Waste Class Name: INORGANIC LABORATORY CHEMICALS

Waste Class: 122
Waste Class Name: ALKALINE WASTES - OTHER METALS

Waste Class: 212
Waste Class Name: ALIPHATIC SOLVENTS

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
21	15 of 18	ESE/148.5	85.2 / -0.61	OTTAWA-CARLETON DISTRICT SCHOOL BOARD Health and Safety MERIVALE HIGH SCHOOL 1755 MERIVALE ROAD NEPEAN ON K2G 1E2	GEN

Generator No: ON0051012
SIC Code:
SIC Description:
Approval Years: As of Dec 2018
PO Box No:
Country: Canada
Status: Registered
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

Detail(s)

Waste Class: 112 C
Waste Class Name: Acid solutions - containing heavy metals

Waste Class: 122 C
Waste Class Name: Alkaline slutions - containing other metals and non-metals (not cyanide)

Waste Class: 145 I
Waste Class Name: Wastes from the use of pigments, coatings and paints

Waste Class: 148 A
Waste Class Name: Misc. wastes and inorganic chemicals

Waste Class: 148 B
Waste Class Name: Misc. wastes and inorganic chemicals

Waste Class: 148 C
Waste Class Name: Misc. wastes and inorganic chemicals

Waste Class: 148 I
Waste Class Name: Misc. wastes and inorganic chemicals

Waste Class: 148 R
Waste Class Name: Misc. wastes and inorganic chemicals

Waste Class: 212 B
Waste Class Name: Aliphatic solvents and residues

Waste Class: 212 H
Waste Class Name: Aliphatic solvents and residues

Waste Class: 212 L
Waste Class Name: Aliphatic solvents and residues

Waste Class: 213 I
Waste Class Name: Petroleum distillates

Waste Class: 221 I
Waste Class Name: Light fuels

Waste Class: 221 L
Waste Class Name: Light fuels

Waste Class: 252 L
Waste Class Name: Waste crankcase oils and lubricants

Waste Class: 263 B
Waste Class Name: Misc. waste organic chemicals

Waste Class: 263 C
Waste Class Name: Misc. waste organic chemicals

Waste Class: 263 I
Waste Class Name: Misc. waste organic chemicals

Waste Class: 264 C
Waste Class Name: Photoprocessing wastes

Waste Class: 264 T
Waste Class Name: Photoprocessing wastes

Waste Class: 331 I
Waste Class Name: Waste compressed gases including cylinders

21	16 of 18	ESE/148.5	85.2 / -0.61	1755 Merivale Rd Ottawa ON K2G1E2	EHS

Order No: 20171003060
Status: C
Report Type: RSC Report (Urban)
Report Date: 10-OCT-17
Date Received: 03-OCT-17
Previous Site Name:
Lot/Building Size:
Additional Info Ordered: Fire Insur. Maps and/or Site Plans; Title Searches; City Directory; Aerial Photos

Nearest Intersection:
Municipality:
Client Prov/State: ON
Search Radius (km): .3
X: -75.727097
Y: 45.343342

21	17 of 18	ESE/148.5	85.2 / -0.61	OTTAWA-CARLETON DISTRICT SCHOOL BOARD Health and Safety MERIVALE HIGH SCHOOL 1755 MERIVALE ROAD NEPEAN ON K2G 1E2	GEN

Generator No: ON0051012
SIC Code:
SIC Description:
Approval Years: As of Jul 2020
PO Box No:
Country: Canada
Status: Registered
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

Detail(s)

Waste Class:	264 C
Waste Class Name:	Photoprocessing wastes
Waste Class:	148 C
Waste Class Name:	Misc. wastes and inorganic chemicals
Waste Class:	263 I
Waste Class Name:	Misc. waste organic chemicals
Waste Class:	148 A
Waste Class Name:	Misc. wastes and inorganic chemicals
Waste Class:	213 I
Waste Class Name:	Petroleum distillates
Waste Class:	252 L
Waste Class Name:	Waste crankcase oils and lubricants
Waste Class:	112 C
Waste Class Name:	Acid solutions - containing heavy metals
Waste Class:	148 I
Waste Class Name:	Misc. wastes and inorganic chemicals
Waste Class:	331 I
Waste Class Name:	Waste compressed gases including cylinders
Waste Class:	264 T
Waste Class Name:	Photoprocessing wastes
Waste Class:	212 L
Waste Class Name:	Aliphatic solvents and residues
Waste Class:	263 C
Waste Class Name:	Misc. waste organic chemicals
Waste Class:	145 I
Waste Class Name:	Wastes from the use of pigments, coatings and paints
Waste Class:	122 C
Waste Class Name:	Alkaline slutions - containing other metals and non-metals (not cyanide)
Waste Class:	221 L
Waste Class Name:	Light fuels
Waste Class:	148 B
Waste Class Name:	Misc. wastes and inorganic chemicals
Waste Class:	263 B
Waste Class Name:	Misc. waste organic chemicals
Waste Class:	148 R
Waste Class Name:	Misc. wastes and inorganic chemicals
Waste Class:	212 H
Waste Class Name:	Aliphatic solvents and residues
Waste Class:	221 I
Waste Class Name:	Light fuels
Waste Class:	212 B
Waste Class Name:	Aliphatic solvents and residues

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
21	18 of 18	ESE/148.5	85.2 / -0.61	OTTAWA-CARLETON DISTRICT SCHOOL BOARD Health and Safety MERIVALE HIGH SCHOOL 1755 MERIVALE ROAD NEPEAN ON K2G 1E2	GEN

Generator No: ON0051012
SIC Code:
SIC Description:
Approval Years: As of Nov 2021
PO Box No:
Country: Canada
Status: Registered
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

Detail(s)

Waste Class: 252 L
Waste Class Name: Waste crankcase oils and lubricants

Waste Class: 213 I
Waste Class Name: Petroleum distillates

Waste Class: 221 I
Waste Class Name: Light fuels

Waste Class: 148 I
Waste Class Name: Misc. wastes and inorganic chemicals

Waste Class: 148 C
Waste Class Name: Misc. wastes and inorganic chemicals

Waste Class: 212 B
Waste Class Name: Aliphatic solvents and residues

Waste Class: 112 C
Waste Class Name: Acid solutions - containing heavy metals

Waste Class: 331 I
Waste Class Name: Waste compressed gases including cylinders

Waste Class: 263 B
Waste Class Name: Misc. waste organic chemicals

Waste Class: 263 C
Waste Class Name: Misc. waste organic chemicals

Waste Class: 264 T
Waste Class Name: Photoprocessing wastes

Waste Class: 148 A
Waste Class Name: Misc. wastes and inorganic chemicals

Waste Class: 148 R
Waste Class Name: Misc. wastes and inorganic chemicals

Waste Class: 145 I
Waste Class Name: Wastes from the use of pigments, coatings and paints

Waste Class: 264 C
Waste Class Name: Photoprocessing wastes

Waste Class: 148 B
Waste Class Name: Misc. wastes and inorganic chemicals

Waste Class: 212 H
Waste Class Name: Aliphatic solvents and residues

Waste Class: 212 L
Waste Class Name: Aliphatic solvents and residues

Waste Class: 263 I
Waste Class Name: Misc. waste organic chemicals

Waste Class: 122 C
Waste Class Name: Alkaline slutions - containing other metals and non-metals (not cyanide)

Waste Class: 221 L
Waste Class Name: Light fuels

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22 | **1 of 1** | **WSW/150.5** | **86.9 / 1.08** | **PRIVATE RESIDENCE**
160 VIEWMOUNT FURNACE OIL TANK
NEPEAN CITY ON K2G 3B7 | **SPL**

Ref No: 124143
Year:
Incident Dt: 3/10/1996
Dt MOE Arvl on Scn:
MOE Reported Dt: 3/11/1996
Dt Document Closed:
Site No:
MOE Response:
Site County/District:
Site Geo Ref Meth:
Site District Office:
Nearest Watercourse:
Site Name:
Site Address:
Site Region:
Site Municipality: NEPEAN CITY
Site Lot:
Site Conc:
Site Geo Ref Accu:
Site Map Datum:
Northing:
Easting:
Incident Cause: VALVE/FITTING LEAK OR FAILURE
Incident Preceding Spill:
Environment Impact: POSSIBLE
Health Env Consequence:
Nature of Impact: Soil contamination
Contaminant Qty:
System Facility Address:
Client Name:
Client Type:
Source Type:
Contaminant Code:
Contaminant Name:
Contaminant Limit 1:
Contam Limit Freq 1:
Contaminant UN No 1:
Receiving Medium: LAND
Incident Reason: MATERIAL FAILURE
Incident Summary: 450 L FURNACE OIL TO FLOOR AND SOAK THROUGH SLAB FROM HOME HEATING TANK.
Activity Preceding Spill:
Property 2nd Watershed:

Municipality No: 20104
Nature of Damage:
Discharger Report:
Material Group:
Impact to Health:
Agency Involved:

Property Tertiary Watershed:
Sector Type:
SAC Action Class:
Call Report Locatn Geodata:

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23 **1 of 1** **WNW/158.8** **88.6 / 2.78** **1642 Merivale Rd lot 31 con 1 Ottawa ON** **WWIS**

Well ID: 7344838
Construction Date:
Use 1st: Test Hole
Use 2nd:
Final Well Status: Monitoring and Test Hole
Water Type:
Casing Material:
Audit No: Z317418
Tag: _NO_TAG
Constructn Method:
Elevation (m):
Elevatn Reliabilty:
Depth to Bedrock:
Well Depth:
Overburden/Bedrock:
Pump Rate:
Static Water Level:
Clear/Cloudy:
Municipality: NEPEAN TOWNSHIP
Site Info:

Flowing (Y/N):
Flow Rate:
Data Entry Status:
Data Src:
Date Received: 10/09/2019
Selected Flag: TRUE
Abandonment Rec:
Contractor: 7241
Form Version: 7
Owner:
County: OTTAWA-CARLETON
Lot: 031
Concession: 01
Concession Name: RF
Easting NAD83:
Northing NAD83:
Zone:
UTM Reliability:

Additional Detail(s) (Map)

Bore Hole ID: 1007683852
Depth M: 5.27
Year Completed: 2019
Well Completed Dt: 07/08/2019
Audit No: Z317418
Path:

Tag No: _NO_TAG
Contractor: 7241
Latitude: 45.3440925660372
Longitude: -75.7313436199984
Y: 45.34409255928506
X: -75.73134345852871

Bore Hole Information

Bore Hole ID: 1007683852
DP2BR:
Spatial Status:
Code OB:
Code OB Desc:
Open Hole:
Cluster Kind:
Date Completed: 07/08/2019
Remarks:
Location Method Desc: on Water Well Record
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:

Elevation:
Elevrc:
Zone: 18
East83: 442705.00
North83: 5021436.00
Org CS: UTM83
UTMRC: 4
UTMRC Desc: margin of error : 30 m - 100 m
Location Method: wwr

Overburden and Bedrock Materials Interval

Formation ID: 1007873257

Layer: 1
Color: 2
General Color: GREY
Material 1: 11
Material 1 Desc: GRAVEL
Material 2: 27
Material 2 Desc: OTHER
Material 3: 77
Material 3 Desc: LOOSE
Formation Top Depth: 0.0
Formation End Depth: 0.3100000023841858
Formation End Depth UOM: m

Overburden and Bedrock Materials Interval

Formation ID: 1007873260
Layer: 4
Color: 2
General Color: GREY
Material 1: 06
Material 1 Desc: SILT
Material 2: 28
Material 2 Desc: SAND
Material 3: 85
Material 3 Desc: SOFT
Formation Top Depth: 3.5
Formation End Depth: 5.269999980926514
Formation End Depth UOM: m

Overburden and Bedrock Materials Interval

Formation ID: 1007873258
Layer: 2
Color: 6
General Color: BROWN
Material 1: 28
Material 1 Desc: SAND
Material 2: 11
Material 2 Desc: GRAVEL
Material 3: 85
Material 3 Desc: SOFT
Formation Top Depth: 0.3100000023841858
Formation End Depth: 1.0
Formation End Depth UOM: m

Overburden and Bedrock Materials Interval

Formation ID: 1007873259
Layer: 3
Color: 2
General Color: GREY
Material 1: 06
Material 1 Desc: SILT
Material 2: 11
Material 2 Desc: GRAVEL
Material 3: 66
Material 3 Desc: DENSE
Formation Top Depth: 1.0
Formation End Depth: 3.5
Formation End Depth UOM: m

Annular Space/Abandonment Sealing Record

Plug ID:	1007874355
Layer:	2
Plug From:	0.3100000023841858
Plug To:	1.8600000143051147
Plug Depth UOM:	m

Annular Space/Abandonment Sealing Record

Plug ID:	1007874354
Layer:	1
Plug From:	0.0
Plug To:	0.3100000023841858
Plug Depth UOM:	m

Annular Space/Abandonment Sealing Record

Plug ID:	1007874356
Layer:	3
Plug From:	1.8600000143051147
Plug To:	5.269999980926514
Plug Depth UOM:	m

Method of Construction & Well Use

Method Construction ID:	1007875535
Method Construction Code:	2
Method Construction:	Rotary (Convent.)
Other Method Construction:	

Pipe Information

Pipe ID:	1007871830
Casing No:	0
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	1007876120
Layer:	1
Material:	5
Open Hole or Material:	PLASTIC
Depth From:	0.0
Depth To:	2.1700000762939453
Casing Diameter:	5.199999809265137
Casing Diameter UOM:	cm
Casing Depth UOM:	m

Construction Record - Screen

Screen ID:	1007876580
Layer:	1
Slot:	10

Screen Top Depth:	2.1700000762939453
Screen End Depth:	5.239999771118164
Screen Material:	5
Screen Depth UOM:	m
Screen Diameter UOM:	cm
Screen Diameter:	6.03000020980835

Results of Well Yield Testing

Pumping Test Method Desc:	
Pump Test ID:	1007877218
Pump Set At:	
Static Level:	
Final Level After Pumping:	
Recommended Pump Depth:	
Pumping Rate:	
Flowing Rate:	
Recommended Pump Rate:	
Levels UOM:	m
Rate UOM:	LPM
Water State After Test Code:	
Water State After Test:	
Pumping Test Method:	0
Pumping Duration HR:	
Pumping Duration MIN:	
Flowing:	

Hole Diameter

Hole ID:	1007875017
Diameter:	15.239999771118164
Depth From:	0.0
Depth To:	5.269999980926514
Hole Depth UOM:	m
Hole Diameter UOM:	cm

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24 | ***1 of 1*** | ***SSE/161.3*** | ***85.0 / -0.83*** | ***Doro Inc.***
1680B Merivale Rd
Nepean ON K2G 3K4 | ***SCT***

Established:	1987
Plant Size (ft²):	2000
Employment:	3

--Details--

Description:	Service Establishment Machinery, Equipment and Supplies Wholesaler-Distributors
SIC/NAICS Code:	417920
Description:	All Other Wholesaler-Distributors
SIC/NAICS Code:	418990
Description:	All Other Miscellaneous Fabricated Metal Product Manufacturing
SIC/NAICS Code:	332999
Description:	Other Communications Equipment Manufacturing
SIC/NAICS Code:	334290
Description:	Semiconductor and Other Electronic Component Manufacturing
SIC/NAICS Code:	334410
Description:	Hardware Wholesaler-Distributors
SIC/NAICS Code:	416330

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Description: Electronic Components, Navigational and Communications Equipment and Supplies Wholesaler-Distributors
SIC/NAICS Code: 417320

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25 **1 of 1** **SW/194.3** **85.2 / -0.61** **RONS WOODWORKS AND CRAFTS** **SCT**
13 GLENMANOR DR
NEPEAN ON K2G 3E8

Established: 1993
Plant Size (ft²): 400
Employment: 1

--Details--
Description: WOOD PRODUCTS, NOT ELSEWHERE CLASSIFIED
SIC/NAICS Code: 2499

Description: WATCHES, CLOCKS, CLOCKWORK OPERATED DEVICES, AND PARTS
SIC/NAICS Code: 3873

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26 **1 of 12** **NE/207.4** **88.9 / 3.12** **Parson Refridgeration<UNOFFICIAL>** **SPL**
LOEB STORE - 1705 MERIVALE RD.
<UNOFFICIAL>
Ottawa ON

Ref No: 3550-5T2H3K
Year:
Incident Dt: 11/6/2003
Dt MOE Arvl on Scn:
MOE Reported Dt: 11/6/2003
Dt Document Closed:
Site No:
MOE Response:
Site County/District:
Site Geo Ref Meth:
Site District Office: Ottawa
Nearest Watercourse:
Site Name: LOEB STORE - 1705 MERIVALE RD.<UNOFFICIAL>
Site Address:
Site Region: Eastern
Site Municipality: Ottawa
Site Lot:
Site Conc:
Site Geo Ref Accu:
Site Map Datum:
Northing:
Easting:
Incident Cause: Discharge or Emission to Air
Incident Preceding Spill:
Environment Impact: Possible
Health Env Consequence:
Nature of Impact: Air Pollution
Contaminant Qty:
System Facility Address:
Client Name: Parson Refridgeration<UNOFFICIAL>
Client Type:
Source Type:
Contaminant Code: 38
Contaminant Name: FREON R-22 (CFC)
Contaminant Limit 1:
Contam Limit Freq 1:
Contaminant UN No 1:

Municipality No:
Nature of Damage:
Discharger Report:
Material Group: Gases/Particulate
Impact to Health:
Agency Involved:

Receiving Medium: Air
Incident Reason: Equipment Failure
Incident Summary: Parson Refridgeration, 875 lbs of R22 to air
Activity Preceding Spill:
Property 2nd Watershed:
Property Tertiary Watershed:
Sector Type: Other
SAC Action Class: Notification
Call Report Locatn Geodata:

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26 | **2 of 12** | **NE/207.4** | **88.9 / 3.12** | **Loeb's<UNOFFICIAL>**
1705 Merivale Road
Ottawa ON | **SPL**

Ref No: 5310-6J5HZM
Year:
Incident Dt: 11/12/2005
Dt MOE Arvl on Scn:
MOE Reported Dt: 11/14/2005
Dt Document Closed:
Site No:
MOE Response:
Site County/District:
Site Geo Ref Meth:
Site District Office: Ottawa
Nearest Watercourse:
Site Name: 1705 Merivale Road<UNOFFICIAL>
Site Address:
Site Region:
Site Municipality: Ottawa
Site Lot:
Site Conc:
Site Geo Ref Accu:
Site Map Datum:
Northing:
Easting:
Incident Cause: Cooling System Leak
Incident Preceding Spill:
Environment Impact: Possible
Health Env Consequence:
Nature of Impact: Air Pollution
Contaminant Qty: 170.5 Kg
System Facility Address:
Client Name: Loeb's<UNOFFICIAL>
Client Type:
Source Type:
Contaminant Code:
Contaminant Name: FREON R-22 (CFC)
Contaminant Limit 1:
Contam Limit Freq 1:
Contaminant UN No 1:
Receiving Medium: Air
Incident Reason:
Incident Summary: Loeb's: 375 lbs R22 to air
Activity Preceding Spill:
Property 2nd Watershed:
Property Tertiary Watershed:
Sector Type: Other
SAC Action Class: Air Spills - Gases and Vapours
Call Report Locatn Geodata:

Municipality No:
Nature of Damage:
Discharger Report: 0
Material Group: Gases/Particulate
Impact to Health:
Agency Involved:

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
26	3 of 12	NE/207.4	88.9 / 3.12	Loeb Grocery Store<UNOFFICIAL> 1705 Merivale Rd Ottawa ON	SPL

Ref No:	8032-6RVGEN	**Municipality No:**	
Year:		**Nature of Damage:**	
Incident Dt:	7/19/2006	**Discharger Report:**	
Dt MOE Arvl on Scn:		**Material Group:**	
MOE Reported Dt:	7/20/2006	**Impact to Health:**	
Dt Document Closed:		**Agency Involved:**	
Site No:			
MOE Response:			
Site County/District:			
Site Geo Ref Meth:			
Site District Office:	Ottawa		
Nearest Watercourse:			
Site Name:	Loeb Grocery Store<UNOFFICIAL>		
Site Address:	1705 Merivale Rd		
Site Region:			
Site Municipality:	Ottawa		
Site Lot:			
Site Conc:			
Site Geo Ref Accu:			
Site Map Datum:			
Northing:			
Easting:			
Incident Cause:			
Incident Preceding Spill:			
Environment Impact:	Not Anticipated		
Health Env Consequence:			
Nature of Impact:			
Contaminant Qty:	115 kg		
System Facility Address:			
Client Name:	Loeb Inc.<UNOFFICIAL>		
Client Type:			
Source Type:	Other		
Contaminant Code:	38		
Contaminant Name:	FREON R-22 (CFC)		
Contaminant Limit 1:			
Contam Limit Freq 1:			
Contaminant UN No 1:			
Receiving Medium:			
Incident Reason:			
Incident Summary:	Loeb: spill of 115 kg R22 refrigerant		
Activity Preceding Spill:			
Property 2nd Watershed:			
Property Tertiary Watershed:			
Sector Type:			
SAC Action Class:			
Call Report Locatn Geodata:			

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
26	4 of 12	NE/207.4	88.9 / 3.12	Loeb Inc. <UNOFFICIAL> 1705 Merivale Road Ottawa ON	SPL

Ref No:	8847-72SFZG	**Municipality No:**	
Year:		**Nature of Damage:**	
Incident Dt:		**Discharger Report:**	
Dt MOE Arvl on Scn:		**Material Group:**	Gases/Particulate
MOE Reported Dt:	5/1/2007	**Impact to Health:**	
Dt Document Closed:	5/3/2007	**Agency Involved:**	
Site No:			
MOE Response:	No Field Response		
Site County/District:			

Site Geo Ref Meth:	
Site District Office:	
Nearest Watercourse:	
Site Name:	1705 Merivale Road<UNOFFICIAL>
Site Address:	
Site Region:	
Site Municipality:	Ottawa
Site Lot:	
Site Conc:	
Site Geo Ref Accu:	
Site Map Datum:	
Northing:	
Easting:	
Incident Cause:	
Incident Preceding Spill:	
Environment Impact:	Not Anticipated
Health Env Consequence:	
Nature of Impact:	Air Pollution
Contaminant Qty:	375 lb
System Facility Address:	
Client Name:	Loeb Inc. <UNOFFICIAL>
Client Type:	
Source Type:	
Contaminant Code:	38
Contaminant Name:	REFRIGERANT GAS, N.O.S.
Contaminant Limit 1:	
Contam Limit Freq 1:	
Contaminant UN No 1:	
Receiving Medium:	Air
Incident Reason:	
Incident Summary:	Loeb: 375 lbs R22 release
Activity Preceding Spill:	
Property 2nd Watershed:	
Property Tertiary Watershed:	
Sector Type:	Miscellaneous
SAC Action Class:	
Call Report Locatn Geodata:	

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26 | ***5 of 12*** | ***NE/207.4*** | ***88.9 / 3.12*** | ***Loeb<UNOFFICIAL>***
1705 Merivale Road
Ottawa ON | ***SPL***

Ref No:	7114-7AHSSV	**Municipality No:**	
Year:		**Nature of Damage:**	
Incident Dt:		**Discharger Report:**	
Dt MOE Arvl on Scn:		**Material Group:**	
MOE Reported Dt:	1/3/2008	**Impact to Health:**	
Dt Document Closed:		**Agency Involved:**	

Site No:	
MOE Response:	No Field Response
Site County/District:	
Site Geo Ref Meth:	
Site District Office:	Ottawa
Nearest Watercourse:	
Site Name:	Loeb<UNOFFICIAL>
Site Address:	
Site Region:	
Site Municipality:	Ottawa
Site Lot:	
Site Conc:	
Site Geo Ref Accu:	
Site Map Datum:	
Northing:	
Easting:	

Incident Cause:	Pipe Or Hose Leak
Incident Preceding Spill:	
Environment Impact:	Confirmed
Health Env Consequence:	
Nature of Impact:	Air Pollution
Contaminant Qty:	500 lb
System Facility Address:	
Client Name:	Loeb<UNOFFICIAL>
Client Type:	
Source Type:	
Contaminant Code:	
Contaminant Name:	Refrigerant R22
Contaminant Limit 1:	
Contam Limit Freq 1:	
Contaminant UN No 1:	
Receiving Medium:	
Incident Reason:	Unknown - Reason not determined
Incident Summary:	Loeb - 500 lbs R22 to atmosphere
Activity Preceding Spill:	
Property 2nd Watershed:	
Property Tertiary Watershed:	
Sector Type:	Other
SAC Action Class:	Air Spills - Gases and Vapours
Call Report Locatn Geodata:	

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26 | ***6 of 12*** | ***NE/207.4*** | ***88.9 / 3.12*** | ***METRO ONTARIO INC O/A METRO/FOOD BASICS # 272 1705 MERIVALE ROAD OTTAWA ON K2G3K2*** | ***PES***

Detail Licence No:		**Operator Box:**	
Licence No:		**Operator Class:**	
Status:		**Operator No:**	
Approval Date:		**Operator Type:**	
Report Source:		**Oper Area Code:**	
Licence Type:	Vendor	**Oper Phone No:**	
Licence Type Code:		**Operator Ext:**	
Licence Class:		**Operator Lot:**	
Licence Control:		**Oper Concession:**	
Latitude:		**Operator Region:**	
Longitude:		**Operator District:**	
Lot:		**Operator County:**	
Concession:		**Op Municipality:**	
Region:		**Post Office Box:**	
District:		**MOE District:**	
County:		**SWP Area Name:**	
Trade Name:			
PDF URL:			

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26 | ***7 of 12*** | ***NE/207.4*** | ***88.9 / 3.12*** | ***METRO ONTARIO INC O/A METRO/FOOD BASICS # 272 1705 Merivale Road Ottawa ON K2G 3K2*** | ***PES***

Detail Licence No:	23-01-15318-0	**Operator Box:**	
Licence No:		**Operator Class:**	
Status:		**Operator No:**	
Approval Date:		**Operator Type:**	
Report Source:		**Oper Area Code:**	
Licence Type:	LIMITED	**Oper Phone No:**	
Licence Type Code:		**Operator Ext:**	
Licence Class:		**Operator Lot:**	

Licence Control:
Latitude:
Longitude:
Lot:
Concession:
Region:
District:
County:
Trade Name:
PDF URL:

Oper Concession:
Operator Region:
Operator District:
Operator County:
Op Municipality:
Post Office Box:
MOE District:
SWP Area Name:

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26 | **8 of 12** | **NE/207.4** | **88.9 / 3.12** | **Parson Refrigeration (1985) Ltd.**
1705 Marivale Road
Ottawa ON | **SPL**

Ref No: 2343-9EYRGN
Year:
Incident Dt: 2014/01/02
Dt MOE Arvl on Scn:
MOE Reported Dt: 2014/01/02
Dt Document Closed:
Site No:
MOE Response: No Field Response
Site County/District:
Site Geo Ref Meth:
Site District Office:
Nearest Watercourse:
Site Name: Metro<UNOFFICIAL>
Site Address: 1705 Marivale Road
Site Region:
Site Municipality: Ottawa
Site Lot:
Site Conc:
Site Geo Ref Accu:
Site Map Datum:
Northing:
Easting:
Incident Cause: Leak/Break
Incident Preceding Spill:
Environment Impact: Confirmed
Health Env Consequence:
Nature of Impact: Air Pollution
Contaminant Qty: 110 kg
System Facility Address:
Client Name: Parson Refrigeration (1985) Ltd.
Client Type:
Source Type:
Contaminant Code: 38
Contaminant Name: REFRIGERANT GAS, N.O.S.
Contaminant Limit 1:
Contam Limit Freq 1:
Contaminant UN No 1:
Receiving Medium:
Incident Reason: Material Failure - Poor Design/Substandard Material
Incident Summary: Parson's Refrigeration: 110 kg R22 to atm
Activity Preceding Spill:
Property 2nd Watershed:
Property Tertiary Watershed:
Sector Type: Other
SAC Action Class: Air Spills - Gases and Vapours
Call Report Locatn Geodata:

Municipality No:
Nature of Damage:
Discharger Report:
Material Group:
Impact to Health:
Agency Involved:

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
26	9 of 12	NE/207.4	88.9 / 3.12	1705 Merivale Road Ottawa ON	SPL

Ref No:	7036-ALM3ZQ	**Municipality No:**	
Year:		**Nature of Damage:**	
Incident Dt:	4/20/2017	**Discharger Report:**	
Dt MOE Arvl on Scn:		**Material Group:**	
MOE Reported Dt:	4/20/2017	**Impact to Health:**	2 - Minor Environment
Dt Document Closed:		**Agency Involved:**	
Site No:			
MOE Response:			
Site County/District:			
Site Geo Ref Meth:			
Site District Office:	Ottawa		
Nearest Watercourse:			
Site Name:	Metro<UNOFFICIAL>		
Site Address:	1705 Merivale Road		
Site Region:	Eastern		
Site Municipality:	Ottawa		
Site Lot:			
Site Conc:			
Site Geo Ref Accu:			
Site Map Datum:			
Northing:			
Easting:			
Incident Cause:			
Incident Preceding Spill:	Leak/Break		
Environment Impact:			
Health Env Consequence:			
Nature of Impact:			
Contaminant Qty:	113 kg		
System Facility Address:			
Client Name:			
Client Type:			
Source Type:	Pipeline/Components		
Contaminant Code:	38		
Contaminant Name:	REFRIGERANT GAS, N.O.S.		
Contaminant Limit 1:			
Contam Limit Freq 1:			
Contaminant UN No 1:	1078		
Receiving Medium:	Air		
Incident Reason:	Equipment Failure		
Incident Summary:	Parson Refigeration - Metro - 250lbs(113kg) R22 to atm		
Activity Preceding Spill:			
Property 2nd Watershed:			
Property Tertiary Watershed:			
Sector Type:	Miscellaneous Communal		
SAC Action Class:			
Call Report Locatn Geodata:			

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
26	10 of 12	NE/207.4	88.9 / 3.12	1705 Merivale Road, Nepean Ottawa ON K2G 3K2	SPL

Ref No:	0817-B2AV9S	**Municipality No:**	
Year:		**Nature of Damage:**	
Incident Dt:	2018/07/02	**Discharger Report:**	
Dt MOE Arvl on Scn:		**Material Group:**	
MOE Reported Dt:	2018/07/02	**Impact to Health:**	2 - Minor Environment
Dt Document Closed:	2018/07/13	**Agency Involved:**	
Site No:	NA		
MOE Response:	No		
Site County/District:			
Site Geo Ref Meth:			
Site District Office:	Ottawa		

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Nearest Watercourse:	
Site Name:	grocery store Metro # 272<UNOFFICIAL>
Site Address:	1705 Merivale Road, Nepean
Site Region:	Eastern
Site Municipality:	Ottawa
Site Lot:	
Site Conc:	
Site Geo Ref Accu:	
Site Map Datum:	
Northing:	5021548
Easting:	442774
Incident Cause:	
Incident Preceding Spill:	Leak/Break
Environment Impact:	
Health Env Consequence:	
Nature of Impact:	
Contaminant Qty:	285 kg
System Facility Address:	
Client Name:	
Client Type:	
Source Type:	Valve/Fitting/Piping
Contaminant Code:	38
Contaminant Name:	FREON R-22 (CFC)
Contaminant Limit 1:	0
Contam Limit Freq 1:	none
Contaminant UN No 1:	1018
Receiving Medium:	Air
Incident Reason:	Equipment Failure
Incident Summary:	Metro Grocery: ~ 285kgs R22 to atm; unrcvrble
Activity Preceding Spill:	
Property 2nd Watershed:	
Property Tertiary Watershed:	
Sector Type:	Miscellaneous Industrial
SAC Action Class:	Air Spills - Gases and Vapours
Call Report Locatn Geodata:	

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
26	11 of 12	NE/207.4	88.9 / 3.12	**Metro** **1705 Merivale Road** **Ottawa ON**	SPL

Ref No:	6322-B6NV9A	**Municipality No:**	
Year:		**Nature of Damage:**	
Incident Dt:	2018/11/19	**Discharger Report:**	
Dt MOE Arvl on Scn:		**Material Group:**	
MOE Reported Dt:	2018/11/19	**Impact to Health:**	2 - Minor Environment
Dt Document Closed:		**Agency Involved:**	
Site No:	NA		
MOE Response:	No		
Site County/District:			
Site Geo Ref Meth:			
Site District Office:	Ottawa		
Nearest Watercourse:			
Site Name:	Metro<UNOFFICIAL>		
Site Address:	1705 Merivale Road		
Site Region:	Eastern		
Site Municipality:	Ottawa		
Site Lot:			
Site Conc:			
Site Geo Ref Accu:			
Site Map Datum:			
Northing:	5021555		
Easting:	442814		
Incident Cause:			
Incident Preceding Spill:	Leak/Break		

Environment Impact:	
Health Env Consequence:	
Nature of Impact:	
Contaminant Qty:	122.7 kg
System Facility Address:	
Client Name:	Metro
Client Type:	Corporation
Source Type:	Valve/Fitting/Piping
Contaminant Code:	38
Contaminant Name:	REFRIGERANT GAS, N.O.S.
Contaminant Limit 1:	
Contam Limit Freq 1:	
Contaminant UN No 1:	1078
Receiving Medium:	Air
Incident Reason:	Material Failure - Poor Design/Substandard Material
Incident Summary:	Metro: leak of ~ 122.7 kg of R22
Activity Preceding Spill:	
Property 2nd Watershed:	
Property Tertiary Watershed:	
Sector Type:	Miscellaneous Industrial
SAC Action Class:	Air Spills - Gases and Vapours
Call Report Locatn Geodata:	

26 | ***12 of 12*** | ***NE/207.4*** | ***88.9 / 3.12*** | ***METRO ONTARIO INC O/A METRO/FOOD BASICS # 272 1705 MERIVALE ROAD OTTAWA ON K2G3K2*** | ***PES***

Detail Licence No:		**Operator Box:**	
Licence No:	15318	**Operator Class:**	
Status:		**Operator No:**	
Approval Date:		**Operator Type:**	
Report Source:	Legacy Licenses (Excluding TS)	**Oper Area Code:**	613
Licence Type:	Limited Vendor	**Oper Phone No:**	
Licence Type Code:	23	**Operator Ext:**	
Licence Class:	01	**Operator Lot:**	
Licence Control:		**Oper Concession:**	
Latitude:		**Operator Region:**	
Longitude:		**Operator District:**	
Lot:		**Operator County:**	
Concession:		**Op Municipality:**	
Region:		**Post Office Box:**	
District:		**MOE District:**	
County:		**SWP Area Name:**	
Trade Name:			
PDF URL:			

27 | ***1 of 1*** | ***N/220.6*** | ***90.0 / 4.23*** | ***1642 MERIVALE RD Ottawa ON*** | ***WWIS***

Well ID:	7201222	**Flowing (Y/N):**	
Construction Date:		**Flow Rate:**	
Use 1st:		**Data Entry Status:**	
Use 2nd:		**Data Src:**	
Final Well Status:	0	**Date Received:**	05/06/2013
Water Type:		**Selected Flag:**	TRUE
Casing Material:		**Abandonment Rec:**	
Audit No:	Z096880	**Contractor:**	6894
Tag:	A111262	**Form Version:**	7
Constructn Method:		**Owner:**	
Elevation (m):		**County:**	OTTAWA-CARLETON
Elevatn Reliabilty:		**Lot:**	

Depth to Bedrock:		**Concession:**	
Well Depth:		**Concession Name:**	
Overburden/Bedrock:		**Easting NAD83:**	
Pump Rate:		**Northing NAD83:**	
Static Water Level:		**Zone:**	
Clear/Cloudy:		**UTM Reliability:**	
Municipality:	NEPEAN TOWNSHIP		
Site Info:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/720\7201222.pdf

Additional Detail(s) (Map)

Well Completed Date:	
Year Completed:	
Depth (m):	1.6764
Latitude:	45.3453804554955
Longitude:	-75.7298284250449
X:	-75.7298282633453
Y:	45.34538044798218
Path:	720\7201222.pdf

Bore Hole Information

Bore Hole ID:	1004284825	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	18
Code OB:		**East83:**	442825.00
Code OB Desc:		**North83:**	5021578.00
Open Hole:		**Org CS:**	UTM83
Cluster Kind:		**UTMRC:**	4
Date Completed:		**UTMRC Desc:**	margin of error : 30 m - 100 m
Remarks:		**Location Method:**	wwr
Location Method Desc:	on Water Well Record		
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	1004767613
Layer:	1
Color:	6
General Color:	BROWN
Material 1:	28
Material 1 Desc:	SAND
Material 2:	05
Material 2 Desc:	CLAY
Material 3:	11
Material 3 Desc:	GRAVEL
Formation Top Depth:	0.0
Formation End Depth:	5.5
Formation End Depth UOM:	ft

Annular Space/Abandonment Sealing Record

Plug ID: 1004767619

Layer: 1
Plug From: 1.8300000429153442
Plug To: 0.30000001192092896
Plug Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 1004767618
Method Construction Code: 2
Method Construction: Rotary (Convent.)
Other Method Construction:

Pipe Information

Pipe ID: 1004767612
Casing No: 0
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 1004767616
Layer: 1
Material:
Open Hole or Material:
Depth From: 2.5
Depth To: 0.15000000596046448
Casing Diameter: 2.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Screen

Screen ID: 1004767617
Layer: 1
Slot: 10
Screen Top Depth: 2.5
Screen End Depth:
Screen Material: 5
Screen Depth UOM: ft
Screen Diameter UOM: inch
Screen Diameter: 2.0

Water Details

Water ID: 1004767615
Layer:
Kind Code:
Kind:
Water Found Depth:
Water Found Depth UOM: ft

Hole Diameter

Hole ID: 1004767614
Diameter:
Depth From: 0.0
Depth To:
Hole Depth UOM: ft
Hole Diameter UOM: inch

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
28	1 of 1	NNE/223.5	90.0 / 4.17	1701-1719 Merivale Road Nepean (Ottawa) ON K2G 3K2	EHS

Order No:	20071206031	**Nearest Intersection:**	Viewmount Drive
Status:	C	**Municipality:**	
Report Type:	CAN - Complete Report	**Client Prov/State:**	
Report Date:	12/17/2007	**Search Radius (km):**	0.25
Date Received:	12/6/2007	**X:**	-75.728804
Previous Site Name:		**Y:**	45.345342
Lot/Building Size:			
Additional Info Ordered:			

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
29	1 of 1	NNE/224.2	90.0 / 4.17	1701 Merivale Road Nepean ON K2G 3K2	EHS

Order No:	20030116001w	**Nearest Intersection:**	
Status:	C	**Municipality:**	
Report Type:	Online Mapless Report	**Client Prov/State:**	ON
Report Date:	1/16/03	**Search Radius (km):**	0.25
Date Received:	1/16/03	**X:**	0
Previous Site Name:		**Y:**	0
Lot/Building Size:			
Additional Info Ordered:			

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
30	1 of 49	NW/239.1	89.9 / 4.08	A&W FOOD SERVICES OF CANADA LTD. 1642 MERIVALE RD., (MALL) NEPEAN CITY ON K2G 4A1	CA

Certificate #:	8-4084-91-
Application Year:	91
Issue Date:	11/14/1991
Approval Type:	Industrial air
Status:	Approved
Application Type:	
Client Name:	
Client Address:	
Client City:	
Client Postal Code:	
Project Description:	INSTALL EXHAUST EQUIP. FOR RESTAURANT
Contaminants:	Nitrogen Oxides, Odour/Fumes
Emission Control:	

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
30	2 of 49	NW/239.1	89.9 / 4.08	WOOLCO DEPARTMENT STORE #6364 MERIVALE MALL 1642 MERIVALE ROAD OTTAWA ON	PES

Detail Licence No:		**Operator Box:**	
Licence No:		**Operator Class:**	
Status:		**Operator No:**	
Approval Date:		**Operator Type:**	
Report Source:		**Oper Area Code:**	
Licence Type:	Vendor	**Oper Phone No:**	
Licence Type Code:		**Operator Ext:**	
Licence Class:		**Operator Lot:**	
Licence Control:		**Oper Concession:**	
Latitude:		**Operator Region:**	
Longitude:		**Operator District:**	
Lot:		**Operator County:**	

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Concession: **Op Municipality:**
Region: **Post Office Box:**
District: **MOE District:**
County: **SWP Area Name:**
Trade Name:
PDF URL:

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30 | 3 of 49 | NW/239.1 | 89.9 / 4.08 | **MARATHON REALTY COMPANY LTD.**
1642 MERIVALE RD. (MALL)
NEPEAN CITY ON K2G 4A1 | CA

Certificate #: 8-4132-96-
Application Year: 96
Issue Date: 9/11/1996
Approval Type: Industrial air
Status: Approved
Application Type:
Client Name:
Client Address:
Client City:
Client Postal Code:
Project Description: NAT.GAS FIRED SPACE HEATING EQUIPMENT
Contaminants: Nitrogen Oxides
Emission Control: No Controls

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30 | 4 of 49 | NW/239.1 | 89.9 / 4.08 | **EUSTRATIOS ZEIBEKIS**
1642 MERIVALE ROAD
NEPEAN CITY ON K2G 4A1 | CA

Certificate #: 8-4173-97-
Application Year: 97
Issue Date: 10/2/1997
Approval Type: Industrial air
Status: Approved
Application Type:
Client Name:
Client Address:
Client City:
Client Postal Code:
Project Description: COMMERCIAL KITCHEN EXHAUST HOOD
Contaminants: Odour/Fumes
Emission Control: No Controls

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30 | 5 of 49 | NW/239.1 | 89.9 / 4.08 | **1642 Merivale Road**
Ottawa ON K2G 4A1 | EHS

Order No: 20021031002
Status: C
Report Type: Complete Report
Report Date: 11/5/02
Date Received: 10/31/02
Previous Site Name:
Lot/Building Size:
Additional Info Ordered:
Nearest Intersection: Viewmount Drive
Municipality:
Client Prov/State: ON
Search Radius (km): 0.40
X: -75.731427
Y: 45.345164

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30 | 6 of 49 | NW/239.1 | 89.9 / 4.08 | **BLACK PHOTO CORPORATION**
1642 MERIVALE ROAD - OTTAWA C/O 371
GOUGH ROAD
MARKHAM ON K2G 4A1 | GEN

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Generator No: ON0074321
SIC Code: 6571
SIC Description: CAMERA/PHOTO. SUPPLY
Approval Years: 86,87,88,89,90
PO Box No:
Country:
Status:
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

Detail(s)

Waste Class: 264
Waste Class Name: PHOTOPROCESSING WASTES

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30 | ***7 of 49*** | ***NW/239.1*** | ***89.9 / 4.08*** | ***BLACK PHOTO CORPORATION 05-658***
1642 MERIVALE ROAD - OTTAWA
OTTAWA ON K2G 4A1 | ***GEN***

Generator No: ON0074321
SIC Code: 6571
SIC Description: CAMERA/PHOTO. SUPPLY
Approval Years: 92,93
PO Box No:
Country:
Status:
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

Detail(s)

Waste Class: 264
Waste Class Name: PHOTOPROCESSING WASTES

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30 | ***8 of 49*** | ***NW/239.1*** | ***89.9 / 4.08*** | ***BLACK PHOTO CORPORATION 05-658***
1642 MERIVALE ROAD - OTTAWA C/O 371
GOUGH ROAD
MARKHAM ON K2G 4A1 | ***GEN***

Generator No: ON0074321
SIC Code: 6571
SIC Description: CAMERA/PHOTO. SUPPLY
Approval Years: 94,95,96
PO Box No:
Country:
Status:
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

Detail(s)

Waste Class: 264

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
Waste Class Name:		PHOTOPROCESSING WASTES			

30	9 of 49	NW/239.1	89.9 / 4.08	**BLACK PHOTO CORPORATION** **1642 MERIVALE ROAD - OTTAWA** **OTTAWA ON K2G 4A1**	GEN

Generator No: ON0074321
SIC Code: 6571
SIC Description: CAMERA/PHOTO. SUPPLY
Approval Years: 97
PO Box No:
Country:
Status:
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

Detail(s)

Waste Class: 264
Waste Class Name: PHOTOPROCESSING WASTES

30	10 of 49	NW/239.1	89.9 / 4.08	**BLACK PHOTO CORPORATION** **1642 MERIVALE ROAD** **OTTAWA ON K2G 4A1**	GEN

Generator No: ON0074321
SIC Code: 6571
SIC Description: CAMERA/PHOTO. SUPPLY
Approval Years: 98,99,00,01
PO Box No:
Country:
Status:
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

Detail(s)

Waste Class: 264
Waste Class Name: PHOTOPROCESSING WASTES

30	11 of 49	NW/239.1	89.9 / 4.08	**FORZANI GROUP LTD./SPORT CHEK** **1642 MERIVALE ROAD, UNIT 680** **NEPEAN ON K2G 4A1**	GEN

Generator No: ON2010400
SIC Code: 6121
SIC Description: M'S CLOTHING STORES
Approval Years: 95,96,97,98
PO Box No:
Country:
Status:
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Detail(s)

Waste Class: 213
Waste Class Name: PETROLEUM DISTILLATES

30	*12 of 49*	*NW/239.1*	*89.9 / 4.08*	***SPORT CHEK*** ***1642 MERIVALE ROAD, UNIT 680*** ***NEPEAN ON K2G 4A1***	*GEN*

Generator No: ON2010400
SIC Code: 6121
SIC Description: M'S CLOTHING STORES
Approval Years: 99,00,01
PO Box No:
Country:
Status:
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

Detail(s)

Waste Class: 213
Waste Class Name: PETROLEUM DISTILLATES

30	*13 of 49*	*NW/239.1*	*89.9 / 4.08*	***SHOPPERS DRUG MART*** ***1642 MERIVALE ROAD*** ***NEPEAN ON K2G 4A1***	*GEN*

Generator No: ON2530722
SIC Code: 6031
SIC Description: PHARMACIES
Approval Years: 99,00,01
PO Box No:
Country:
Status:
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

Detail(s)

Waste Class: 261
Waste Class Name: PHARMACEUTICALS

Waste Class: 312
Waste Class Name: PATHOLOGICAL WASTES

30	*14 of 49*	*NW/239.1*	*89.9 / 4.08*	***forzani group*** ***1642 merivale rd*** ***nepean ON K2G 4A1***	*GEN*

Generator No: ON3906634
SIC Code:
SIC Description:
Approval Years: 03,04

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

PO Box No:
Country:
Status:
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

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30 | 15 of 49 | NW/239.1 | 89.9 / 4.08 | **Merivale Family Medical Centre**
1642 Merivale Road
Ottawa ON | GEN

Generator No: ON6937159
SIC Code:
SIC Description:
Approval Years: 03,04
PO Box No:
Country:
Status:
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

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30 | 16 of 49 | NW/239.1 | 89.9 / 4.08 | **1642 Merivale Road**
Ottawa ON | EHS

Order No: 20050728001
Status: C
Report Type: Custom Report
Report Date: 8/8/2005
Date Received: 7/28/2005
Previous Site Name:
Lot/Building Size:
Additional Info Ordered:
Nearest Intersection:
Municipality:
Client Prov/State: ON
Search Radius (km): 0.4
X: -75.731701
Y: 45.345595

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30 | 17 of 49 | NW/239.1 | 89.9 / 4.08 | **1642 Merivale Road**
Ottawa ON | EHS

Order No: 20060124011
Status: C
Report Type: Complete Report
Report Date: 2/2/2006
Date Received: 1/24/2006
Previous Site Name:
Lot/Building Size:
Additional Info Ordered: Fire Insur. Maps and/or Site Plans; City Directory
Nearest Intersection: Viewmount Drive
Municipality:
Client Prov/State: ON
Search Radius (km): 0.35
X: -75.731555
Y: 45.345182

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30 | 18 of 49 | NW/239.1 | 89.9 / 4.08 | **1642 Merivale Rd**
Ottawa ON | EHS

Order No: 20060321013
Status: C
Report Type: Custom Report
Report Date: 3/30/2006
Date Received: 3/21/2006
Previous Site Name:
Lot/Building Size:
Additional Info Ordered:
Nearest Intersection: Viewmount Dr
Municipality:
Client Prov/State: ON
Search Radius (km): 0.4
X: -75.731345
Y: 45.345285

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
30	19 of 49	NW/239.1	89.9 / 4.08	SHOPPERS DRUG MART #0910 (MERIVALE MALL) 1642 MERIVALE RD OTTAWA ON K2G4A1	PES

Detail Licence No:
Licence No:
Status:
Approval Date:
Report Source:
Licence Type: Limited Vendor
Licence Type Code: 23
Licence Class:
Licence Control:
Latitude:
Longitude:
Lot:
Concession:
Region:
District:
County:
Trade Name:
PDF URL:

Operator Box:
Operator Class:
Operator No:
Operator Type:
Oper Area Code:
Oper Phone No:
Operator Ext:
Operator Lot:
Oper Concession:
Operator Region:
Operator District:
Operator County:
Op Municipality:
Post Office Box:
MOE District:
SWP Area Name:

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
30	20 of 49	NW/239.1	89.9 / 4.08	Farm Boy Inc. 1642 Merivale Road Ottawa ON K2G 4A1	GEN

Generator No: ON5281864
SIC Code: 445110
SIC Description: Supermarkets and Other Grocery (except Convenience) Stores
Approval Years: 05
PO Box No:
Country:
Status:
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

Detail(s)

Waste Class: 243
Waste Class Name: PCB'S

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
30	21 of 49	NW/239.1	89.9 / 4.08	3363961 Canada Inc. 1642 Merivale Rd. Nepean ON K2G 4A1	GEN

Generator No: ON6659528
SIC Code: 713990
SIC Description: All Other Amusement and Recreation Industries
Approval Years: 05
PO Box No:
Country:
Status:
Co Admin:
Choice of Contact:
Phone No Admin:

Contaminated Facility:
MHSW Facility:

Detail(s)

Waste Class: 122
Waste Class Name: ALKALINE WASTES - OTHER METALS

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30 | ***22 of 49*** | ***NW/239.1*** | ***89.9 / 4.08*** | ***Waste Management of Canada Corporation*** ***1642 Merivale Road*** ***Ottawa ON*** | ***SPL***

Ref No: 0201-6CPS92
Year:
Incident Dt: 5/24/2005
Dt MOE Arvl on Scn:
MOE Reported Dt: 5/24/2005
Dt Document Closed:
Site No:
MOE Response:
Site County/District:
Site Geo Ref Meth:
Site District Office: Ottawa
Nearest Watercourse:
Site Name: Farm Boy<UNOFFICIAL>
Site Address:
Site Region:
Site Municipality: Ottawa
Site Lot:
Site Conc:
Site Geo Ref Accu:
Site Map Datum:
Northing:
Easting:
Incident Cause:
Incident Preceding Spill:
Environment Impact: Not Anticipated
Health Env Consequence:
Nature of Impact:
Contaminant Qty:
System Facility Address:
Client Name: Waste Management of Canada Corporation
Client Type:
Source Type:
Contaminant Code:
Contaminant Name: HYDRAULIC OIL
Contaminant Limit 1:
Contam Limit Freq 1:
Contaminant UN No 1:
Receiving Medium: Land
Incident Reason:
Incident Summary: Waste Management, 10-gal hyd. oil to c/b
Activity Preceding Spill:
Property 2nd Watershed:
Property Tertiary Watershed:
Sector Type: Other Motor Vehicle
SAC Action Class: Spills to Watercourses
Call Report Locatn Geodata:

Municipality No:
Nature of Damage:
Discharger Report: 0
Material Group: Oil
Impact to Health:
Agency Involved:

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30 | ***23 of 49*** | ***NW/239.1*** | ***89.9 / 4.08*** | ***forzani group*** ***1642 merivale rd*** ***nepean ON*** | ***GEN***

Generator No: ON3906634
SIC Code: 104350
SIC Description:
Approval Years: 2013
PO Box No:
Country:
Status:
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

Detail(s)

Waste Class: 212
Waste Class Name: ALIPHATIC SOLVENTS

Waste Class: 251
Waste Class Name: OIL SKIMMINGS & SLUDGES

Waste Class: 213
Waste Class Name: PETROLEUM DISTILLATES

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30 | ***24 of 49*** | ***NW/239.1*** | ***89.9 / 4.08*** | ***SHOPPERS DRUG MART #0910 (MERIVALE MALL)***
1642 MERIVALE RD
OTTAWA ON K2G4A1 | ***PES***

Detail Licence No:
Licence No:
Status:
Approval Date:
Report Source:
Licence Type: Vendor
Licence Type Code:
Licence Class:
Licence Control:
Latitude:
Longitude:
Lot:
Concession:
Region:
District:
County:
Trade Name:
PDF URL:

Operator Box:
Operator Class:
Operator No:
Operator Type:
Oper Area Code:
Oper Phone No:
Operator Ext:
Operator Lot:
Oper Concession:
Operator Region:
Operator District:
Operator County:
Op Municipality:
Post Office Box:
MOE District:
SWP Area Name:

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30 | ***25 of 49*** | ***NW/239.1*** | ***89.9 / 4.08*** | ***Parson Refrigeration (1985) Ltd.***
1642 Merivale Road
Ottawa ON K2G 4A1 | ***SPL***

Ref No: 3223-8NTSS4
Year:
Incident Dt: 11/21/2011
Dt MOE Arvl on Scn:
MOE Reported Dt: 11/21/2011
Dt Document Closed:
Site No:
MOE Response: No Field Response
Site County/District:
Site Geo Ref Meth:

Municipality No:
Nature of Damage:
Discharger Report:
Material Group:
Impact to Health:
Agency Involved:

Site District Office:	
Nearest Watercourse:	
Site Name:	Farmboy Grocery<UNOFFICIAL>
Site Address:	1642 Merivale Road
Site Region:	
Site Municipality:	Ottawa
Site Lot:	
Site Conc:	
Site Geo Ref Accu:	
Site Map Datum:	
Northing:	
Easting:	
Incident Cause:	Discharge or Emission to Air
Incident Preceding Spill:	
Environment Impact:	Not Anticipated
Health Env Consequence:	
Nature of Impact:	Air Pollution; Other Impact(s)
Contaminant Qty:	256 lb
System Facility Address:	
Client Name:	Parson Refrigeration (1985) Ltd.
Client Type:	
Source Type:	
Contaminant Code:	38
Contaminant Name:	REFRIGERANT GAS, N.O.S.
Contaminant Limit 1:	
Contam Limit Freq 1:	
Contaminant UN No 1:	
Receiving Medium:	Sewage - Municipal/Private and Commercial
Incident Reason:	Spill
Incident Summary:	Farmboy: R22 leak; 256 lbs replaced
Activity Preceding Spill:	
Property 2nd Watershed:	
Property Tertiary Watershed:	
Sector Type:	Pipeline
SAC Action Class:	Air Spills - Gases and Vapours
Call Report Locatn Geodata:	

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
30	26 of 49	NW/239.1	89.9 / 4.08	**Farmboy Inc.<UNOFFICIAL>** **1642 Merivale Rd** **Ottawa ON K2G 4A1**	SPL

Ref No:	6582-8PDSFZ	**Municipality No:**	
Year:		**Nature of Damage:**	
Incident Dt:	12/9/2011	**Discharger Report:**	
Dt MOE Arvl on Scn:		**Material Group:**	
MOE Reported Dt:	12/9/2011	**Impact to Health:**	
Dt Document Closed:		**Agency Involved:**	
Site No:			
MOE Response:	No Field Response		
Site County/District:			
Site Geo Ref Meth:			
Site District Office:			
Nearest Watercourse:			
Site Name:	Farmboy Market<UNOFFICIAL>		
Site Address:	1642 Merivale Rd		
Site Region:			
Site Municipality:	Ottawa		
Site Lot:			
Site Conc:			
Site Geo Ref Accu:			
Site Map Datum:			
Northing:			
Easting:			
Incident Cause:	Discharge or Emission to Air		

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Incident Preceding Spill:	
Environment Impact:	Not Anticipated
Health Env Consequence:	
Nature of Impact:	
Contaminant Qty:	120 kg
System Facility Address:	
Client Name:	Farmboy Inc.<UNOFFICIAL>
Client Type:	
Source Type:	
Contaminant Code:	38
Contaminant Name:	FREON R-22 (CFC)
Contaminant Limit 1:	
Contam Limit Freq 1:	
Contaminant UN No 1:	
Receiving Medium:	Sewage - Municipal/Private and Commercial
Incident Reason:	
Incident Summary:	Farmboy Market: R22 leak to atmos, ~120 kg
Activity Preceding Spill:	
Property 2nd Watershed:	
Property Tertiary Watershed:	
Sector Type:	Other
SAC Action Class:	Air Spills - Gases and Vapours
Call Report Locatn Geodata:	

30	27 of 49	NW/239.1	89.9 / 4.08	forzani group 1642 merivale rd nepean ON K2G 4A1	GEN

Generator No:	ON3906634
SIC Code:	104350
SIC Description:	
Approval Years:	2009
PO Box No:	
Country:	
Status:	
Co Admin:	
Choice of Contact:	
Phone No Admin:	
Contaminated Facility:	
MHSW Facility:	

Detail(s)

Waste Class:	212
Waste Class Name:	ALIPHATIC SOLVENTS
Waste Class:	213
Waste Class Name:	PETROLEUM DISTILLATES
Waste Class:	251
Waste Class Name:	OIL SKIMMINGS & SLUDGES

30	28 of 49	NW/239.1	89.9 / 4.08	1642 Merivale Rd Nepean ON K2G 4A1	EHS

Order No:	20130315040	**Nearest Intersection:**	
Status:	C	**Municipality:**	Nepean
Report Type:	Waste Disposal Site Report	**Client Prov/State:**	ON
Report Date:	26-MAR-13	**Search Radius (km):**	.5
Date Received:	15-MAR-13	**X:**	0
Previous Site Name:		**Y:**	0
Lot/Building Size:			

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
Additional Info Ordered:					

30	29 of 49	NW/239.1	89.9 / 4.08	1642 Merivale Rd Ottawa ON K2G 4A1	EHS

Order No:	20121218016	**Nearest Intersection:**	
Status:	C	**Municipality:**	
Report Type:	Custom Report	**Client Prov/State:**	ON
Report Date:	27-DEC-12	**Search Radius (km):**	.25
Date Received:	18-DEC-12	**X:**	-75.731489
Previous Site Name:		**Y:**	45.345432
Lot/Building Size:			
Additional Info Ordered:			

30	30 of 49	NW/239.1	89.9 / 4.08	forzani group 1642 merivale rd nepean ON K2G 4A1	GEN

Generator No:	ON3906634
SIC Code:	104350
SIC Description:	
Approval Years:	2010
PO Box No:	
Country:	
Status:	
Co Admin:	
Choice of Contact:	
Phone No Admin:	
Contaminated Facility:	
MHSW Facility:	

Detail(s)

Waste Class:	251
Waste Class Name:	OIL SKIMMINGS & SLUDGES
Waste Class:	212
Waste Class Name:	ALIPHATIC SOLVENTS
Waste Class:	213
Waste Class Name:	PETROLEUM DISTILLATES

30	31 of 49	NW/239.1	89.9 / 4.08	forzani group 1642 merivale rd nepean ON K2G 4A1	GEN

Generator No:	ON3906634
SIC Code:	104350
SIC Description:	
Approval Years:	2011
PO Box No:	
Country:	
Status:	
Co Admin:	
Choice of Contact:	
Phone No Admin:	
Contaminated Facility:	
MHSW Facility:	

Detail(s)

Waste Class: 251
Waste Class Name: OIL SKIMMINGS & SLUDGES

Waste Class: 212
Waste Class Name: ALIPHATIC SOLVENTS

Waste Class: 213
Waste Class Name: PETROLEUM DISTILLATES

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30 | **32 of 49** | **NW/239.1** | **89.9 / 4.08** | **SHOPPERS DRUG MART #0910 (MERIVALE MALL)**
1642 MERIVALE RD
OTTAWA ON K2G 4A1 | **PES**

Detail Licence No: 23-01-13118-0
Licence No:
Status:
Approval Date:
Report Source:
Licence Type: LIMITED
Licence Type Code:
Licence Class:
Licence Control:
Latitude:
Longitude:
Lot:
Concession:
Region:
District:
County:
Trade Name:
PDF URL:

Operator Box:
Operator Class:
Operator No:
Operator Type:
Oper Area Code:
Oper Phone No:
Operator Ext:
Operator Lot:
Oper Concession:
Operator Region:
Operator District:
Operator County:
Op Municipality:
Post Office Box:
MOE District:
SWP Area Name:

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30 | **33 of 49** | **NW/239.1** | **89.9 / 4.08** | **forzani group**
1642 merivale rd
nepean ON K2G 4A1 | **GEN**

Generator No: ON3906634
SIC Code: 104350
SIC Description:
Approval Years: 2012
PO Box No:
Country:
Status:
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

Detail(s)

Waste Class: 251
Waste Class Name: OIL SKIMMINGS & SLUDGES

Waste Class: 212
Waste Class Name: ALIPHATIC SOLVENTS

Waste Class: 213
Waste Class Name: PETROLEUM DISTILLATES

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
30	34 of 49	NW/239.1	89.9 / 4.08	B. Surani Drugs Ltd. 1642 MERIVALE RD Ottawa ON K2G 4A1	GEN

Generator No: ON7213549
SIC Code: 446110
SIC Description: 446110
Approval Years: 2016
PO Box No:
Country: Canada
Status:
Co Admin: Nastran Najafi-Fard
Choice of Contact: CO_ADMIN
Phone No Admin: 416-493-1220 Ext.3218
Contaminated Facility: No
MHSW Facility: No

Detail(s)

Waste Class: 261
Waste Class Name: PHARMACEUTICALS

Waste Class: 312
Waste Class Name: PATHOLOGICAL WASTES

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
30	35 of 49	NW/239.1	89.9 / 4.08	FGL SPORTS LIMITED 1642 merivale rd nepean ON K2G4A1	GEN

Generator No: ON3906634
SIC Code: 104350
SIC Description: 104350
Approval Years: 2016
PO Box No:
Country: Canada
Status:
Co Admin: ian goudge
Choice of Contact: CO_OFFICIAL
Phone No Admin: 613-225-6674 Ext.
Contaminated Facility: No
MHSW Facility: No

Detail(s)

Waste Class: 212
Waste Class Name: ALIPHATIC SOLVENTS

Waste Class: 213
Waste Class Name: PETROLEUM DISTILLATES

Waste Class: 251
Waste Class Name: OIL SKIMMINGS & SLUDGES

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
30	36 of 49	NW/239.1	89.9 / 4.08	B. Surani Drugs Ltd. 1642 MERIVALE RD Ottawa ON K2G 4A1	GEN

Generator No: ON7213549
SIC Code: 446110
SIC Description: 446110
Approval Years: 2015
PO Box No:

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Country: Canada
Status:
Co Admin: Nastran Najafi-Fard
Choice of Contact: CO_ADMIN
Phone No Admin: 416-493-1220 Ext.3218
Contaminated Facility: No
MHSW Facility: No

Detail(s)

Waste Class: 312
Waste Class Name: PATHOLOGICAL WASTES

Waste Class: 261
Waste Class Name: PHARMACEUTICALS

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
30	37 of 49	NW/239.1	89.9 / 4.08	forzani group 1642 merivale rd nepean ON K2G4A1	GEN

Generator No: ON3906634
SIC Code: 104350
SIC Description: 104350
Approval Years: 2015
PO Box No:
Country: Canada
Status:
Co Admin: ian goudge
Choice of Contact: CO_OFFICIAL
Phone No Admin: 613-225-6674 Ext.
Contaminated Facility: No
MHSW Facility: No

Detail(s)

Waste Class: 213
Waste Class Name: PETROLEUM DISTILLATES

Waste Class: 251
Waste Class Name: OIL SKIMMINGS & SLUDGES

Waste Class: 212
Waste Class Name: ALIPHATIC SOLVENTS

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
30	38 of 49	NW/239.1	89.9 / 4.08	forzani group 1642 merivale rd nepean ON K2G4A1	GEN

Generator No: ON3906634
SIC Code: 104350
SIC Description: 104350
Approval Years: 2014
PO Box No:
Country: Canada
Status:
Co Admin: ian goudge
Choice of Contact: CO_OFFICIAL
Phone No Admin: 613-225-6674 Ext.
Contaminated Facility: No
MHSW Facility: No

Detail(s)

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Waste Class: 212
Waste Class Name: ALIPHATIC SOLVENTS

Waste Class: 251
Waste Class Name: OIL SKIMMINGS & SLUDGES

Waste Class: 213
Waste Class Name: PETROLEUM DISTILLATES

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
30	39 of 49	NW/239.1	89.9 / 4.08	B. Surani Drugs Ltd. 1642 MERIVALE RD Ottawa ON K2G 4A1	GEN

Generator No: ON7213549
SIC Code:
SIC Description:
Approval Years: As of Dec 2018
PO Box No:
Country: Canada
Status: Registered
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

Detail(s)

Waste Class: 261 A
Waste Class Name: Pharmaceuticals

Waste Class: 312 P
Waste Class Name: Pathological wastes

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
30	40 of 49	NW/239.1	89.9 / 4.08	FGL SPORTS LIMITED sport chek 1642 merivale rd nepean ON K2G4A1	GEN

Generator No: ON3906634
SIC Code:
SIC Description:
Approval Years: As of Dec 2018
PO Box No:
Country: Canada
Status: Registered
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

Detail(s)

Waste Class: 212 L
Waste Class Name: Aliphatic solvents and residues

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
30	41 of 49	NW/239.1	89.9 / 4.08	1642 Merivale Rd Ottawa ON K2G4A1	EHS

Order No: 20170626040
Status: C
Nearest Intersection:
Municipality:

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Report Type:	Standard Report	**Client Prov/State:**	ON
Report Date:	29-JUN-17	**Search Radius (km):**	.25
Date Received:	26-JUN-17	**X:**	-75.730771
Previous Site Name:		**Y:**	45.345402
Lot/Building Size:			
Additional Info Ordered:			

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
30	42 of 49	NW/239.1	89.9 / 4.08	**1642 & 1650 Merivale Road** **Nepean ON K2G 5Y3**	EHS

Order No:	20181015177	**Nearest Intersection:**	
Status:	C	**Municipality:**	
Report Type:	Custom Report	**Client Prov/State:**	ON
Report Date:	26-OCT-18	**Search Radius (km):**	.25
Date Received:	15-OCT-18	**X:**	-75.731467
Previous Site Name:		**Y:**	45.345285
Lot/Building Size:			
Additional Info Ordered:	Fire Insur. Maps and/or Site Plans; City Directory; Aerial Photos		

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
30	43 of 49	NW/239.1	89.9 / 4.08	**SHOPPERS DRUG MART #0910 (MERIVALE MALL)** **1642 MERIVALE RD** **OTTAWA ON K2G4A1**	PES

Detail Licence No:		**Operator Box:**	
Licence No:	13118	**Operator Class:**	
Status:		**Operator No:**	
Approval Date:		**Operator Type:**	
Report Source:	Legacy Licenses (Excluding TS)	**Oper Area Code:**	613
Licence Type:	Limited Vendor	**Oper Phone No:**	2261155
Licence Type Code:	23	**Operator Ext:**	
Licence Class:	01	**Operator Lot:**	
Licence Control:		**Oper Concession:**	
Latitude:		**Operator Region:**	
Longitude:		**Operator District:**	
Lot:		**Operator County:**	
Concession:		**Op Municipality:**	
Region:		**Post Office Box:**	
District:		**MOE District:**	
County:		**SWP Area Name:**	
Trade Name:			
PDF URL:			

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
30	44 of 49	NW/239.1	89.9 / 4.08	**FGL SPORTS LIMITED sport chek** **1642 Merivale Rd. Unit #0580** **Nepean ON K2G 4A1**	GEN

Generator No:	ON3906634
SIC Code:	
SIC Description:	
Approval Years:	As of Jul 2020
PO Box No:	
Country:	Canada
Status:	Registered
Co Admin:	
Choice of Contact:	
Phone No Admin:	
Contaminated Facility:	
MHSW Facility:	

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Detail(s)

Waste Class: 212 L
Waste Class Name: Aliphatic solvents and residues

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
30	45 of 49	NW/239.1	89.9 / 4.08	**A.M.Pharmacare Limited** **1642 MERIVALE RD Shoppers Drug Mart** **Ottawa ON K2G 4A1**	GEN

Generator No: ON7213549
SIC Code:
SIC Description:
Approval Years: As of Jul 2020
PO Box No:
Country: Canada
Status: Registered
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

Detail(s)

Waste Class: 312 P
Waste Class Name: Pathological wastes

Waste Class: 261 A
Waste Class Name: Pharmaceuticals

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
30	46 of 49	NW/239.1	89.9 / 4.08	**EMAN A. RAHMAN PHARMACY INC.** **1642 MERIVALE RD Shoppers Drug Mart** **Ottawa ON K2G 4A1**	GEN

Generator No: ON7213549
SIC Code:
SIC Description:
Approval Years: As of Nov 2021
PO Box No:
Country: Canada
Status: Registered
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

Detail(s)

Waste Class: 312 P
Waste Class Name: Pathological wastes

Waste Class: 261 A
Waste Class Name: Pharmaceuticals

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
30	47 of 49	NW/239.1	89.9 / 4.08	**FGL SPORTS LIMITED sport chek** **1642 Merivale Rd. Unit #0580** **Nepean ON K2G 4A1**	GEN

Generator No: ON3906634
SIC Code:
SIC Description:

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Approval Years: As of Nov 2021
PO Box No:
Country: Canada
Status: Registered
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

Detail(s)

Waste Class: 212 L
Waste Class Name: Aliphatic solvents and residues

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
30	48 of 49	NW/239.1	89.9 / 4.08	***FGL SPORTS LIMITED sport chek*** ***1642 Merivale Rd. Unit #0580*** ***Nepean ON K2G 4A1***	GEN

Generator No: ON3906634
SIC Code:
SIC Description:
Approval Years: As of Oct 2022
PO Box No:
Country: Canada
Status: Registered
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

Detail(s)

Waste Class: 212 L
Waste Class Name: ALIPHATIC SOLVENTS

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
30	49 of 49	NW/239.1	89.9 / 4.08	***EMAN A. RAHMAN PHARMACY INC.*** ***1642 MERIVALE RD Shoppers Drug Mart*** ***Ottawa ON K2G 4A1***	GEN

Generator No: ON7213549
SIC Code:
SIC Description:
Approval Years: As of Oct 2022
PO Box No:
Country: Canada
Status: Registered
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

Detail(s)

Waste Class: 312 P
Waste Class Name: PATHOLOGICAL WASTES

Waste Class: 261 A
Waste Class Name: PHARMACEUTICALS

Unplottable Summary

Total: 51 Unplottable sites

DB	Company Name/Site Name	Address	City	Postal
CA		Merivale Road	Nepean ON	
CA	ROYAL OTTAWA HOSPITAL	MERIVALE RD.	OTTAWA CITY ON	
CA	MINTO CONSTRUCTION LTD.	MERIVALE RD.	NEPEAN CITY ON	
CA	City of Ottawa	Works within an easement adjacent to Merivale Rd	Ottawa ON	
CA		Merivale Road	Nepean ON	
CA	JAMES STEWART	MERIVALE RD.	NEPEAN CITY ON	
CA	THOMAS C. ASSALY CORPORATION	PRIVATE RD. VIEWMOUNT DR. WEST	NEPEAN CITY ON	
CA	City of Nepean	MERIVALE RD./S.W.MGT	NEPEAN CITY ON	
CA	MID CANADA CONSTRUCTION LTD.	ACESS RD. W. OF MERIVALE RD.	NEPEAN CITY ON	
CA	JAMES STEWART	MERIVALE RD. STEWART FUELS	NEPEAN CITY ON	
CA	R.M. OF OTTAWA-CARLETON	MERIVALE RD. RECONT. WOODFIELD	NEPEAN CITY ON	
CA	NEPEAN CITY	EASEMENT GLENMANOR DR.	NEPEAN CITY ON	
CA	J. PEREZ CONSTRUCTION LTD.	MERIVALE RD.	NEPEAN CITY ON	
CA	TONY GRAHAM MOTORS (1980) LIMITED	MERIVALE RD. (SWM)	NEPEAN CITY ON	
CA	MR. G. PASQUA HELMER STRANKS COLE ARCHIT	K-MART PLAZA, MERIVALE ROAD	NEPEAN CITY ON	
CA	THOMAS C. ASSALY CORP.	PRIVATE RD. VIEWMOUNT DR. W.	NEPEAN CITY ON	
CA	MINTO CONSTRUCTION LTD.	MERIVALE RD. EAST SIDE	NEPEAN CITY ON	
CA	PRICE COSTCO CANADA INC.	LOT 30/CON.A, PLAN 4R-7278	NEPEAN CITY ON	

CA	SHELL CANADA PRODUCTS LIMITED	MERIVALE RD., BULK TANK FARM	NEPEAN CITY ON	
CA	THOMAS C. ASSALY CORP.	PRIVATE RD. VIEWMOUNT DR. W.	NEPEAN CITY ON	
CONV	IMPERIAL OIL LIMITED		NORTH YORK ON	
CONV	IMPERIAL OIL LIMITED		DON MILLS ON	
ECA	City of Ottawa	Works within an easement adjacent to Merivale Rd	Ottawa ON	K2G 6J8
GEN	PETRO-CANADA PRODUCTS	OTTAWA TERMINAL - GULF MERIVALE ROAD	OTTAWA ON	K2C 3G1
GEN	Carmelo Idone	Rear Merivale Rd.	Ottawa ON	K1Z 6A5
GEN	7770251 CANADA INC	MERIVALE ROAD	OTTAWA ON	
HINC		OLD HIGHWAY 17	OTTAWA ON	
NPCB	WILLIAMS OPERATING CORPORATION	HEMLO GOLD FIELD WILLIAMS MINE SITE HWY 17	ON	P0T 2E0
PRT	SHELL CANADA PRODUCTS LTD	MERIVALE RD	OTTAWA ON	
PTTW	Price Costco Canada Inc.	Parts 1 and 2, Plan 4R-7269, Lot 30, Concession A NEPEAN	ON	
RST	MR GAS LTD	HWY 17 ARNPRIOR	OTTAWA ON	K0A 2H0
SPL	CANADIAN TIRE CORPORATION LTD.	SAWMILL CREEK RETAIL STORE	OTTAWA CITY ON	
SPL	IMPERIAL OIL	TANK TRUCK (CARGO)	NEPEAN CITY ON	
SPL	ESSO PETROLEUM CANADA	ESSO DISTRIBUTION STATION BULK STATION	OTTAWA CITY ON	
SPL	ESSO PETROLEUM CANADA	TANK TRUCK (CARGO)	OTTAWA CITY ON	
SPL	ESSO PETROLEUM CANADA	TRANSPORT TRUCK (CARGO)	OTTAWA CITY ON	
SPL	ESSO PETROLEUM CANADA	SERVICE STATION	NEPEAN CITY ON	
SPL	CANADIAN NATIONAL RAILWAY	CN RAILLINE FROM BELLS CORNERS TO MERIVALE ROAD. TRAIN	NEPEAN CITY ON	
SPL	ESSO PETROLEUM CANADA	BULK STATION	OTTAWA CITY ON	
SPL	City of Ottawa	Merivale Rd Southbound, just before Meadowlands	Ottawa ON	
SPL		Hwy 17 where crosses South Indian Creek (Limoges Casselman Construction Site)	Ottawa ON	

SPL	Esso Petroleum Canada, A Division of Imperial Oil Limited	Nepean	Ottawa ON
SPL	ONTARIO HYDRO	MERIVALE RD TRANSFORMER STATION TRANSFORMER	NEPEAN CITY ON
WWIS		lot 31	ON
WWIS		lot 31	ON
WWIS		lot 31	ON
WWIS		lot 31	ON
WWIS		lot 31	ON
WWIS		lot 30 con A	ON
WWIS		lot 31 con A	ON
WWIS		lot 31 con A	ON

Unplottable Report

Site:
Merivale Road Nepean ON

Database:
CA

Certificate #:	6408-4PJHR7
Application Year:	00
Issue Date:	9/27/00
Approval Type:	Municipal & Private water
Status:	Approved
Application Type:	New Certificate of Approval
Client Name:	Corporation of the Regional Municipality of Ottawa-Carleton
Client Address:	111 Lisgar Street
Client City:	Ottawa
Client Postal Code:	K2P 2L7
Project Description:	Installation of watermains and appurtenances in Merivale Road from Amberwood Crescent to approximately 100 m north of Fallowfield Road.
Contaminants:	
Emission Control:	

Site: ***ROYAL OTTAWA HOSPITAL***
MERIVALE RD. OTTAWA CITY ON

Database:
CA

Certificate #:	3-1424-85-006
Application Year:	85
Issue Date:	12/13/85
Approval Type:	Municipal sewage
Status:	Approved
Application Type:	
Client Name:	
Client Address:	
Client City:	
Client Postal Code:	
Project Description:	
Contaminants:	
Emission Control:	

Site: ***MINTO CONSTRUCTION LTD.***
MERIVALE RD. NEPEAN CITY ON

Database:
CA

Certificate #:	3-0874-85-006
Application Year:	85
Issue Date:	8/14/85
Approval Type:	Municipal sewage
Status:	Approved
Application Type:	
Client Name:	
Client Address:	
Client City:	
Client Postal Code:	
Project Description:	
Contaminants:	
Emission Control:	

Site: ***City of Ottawa***
Works within an easement adjacent to Merivale Rd Ottawa ON

Database:
CA

Certificate #:	0702-82CL4A

Application Year: 2010
Issue Date: 2/8/2010
Approval Type: Municipal and Private Sewage Works
Status: Approved
Application Type:
Client Name:
Client Address:
Client City:
Client Postal Code:
Project Description:
Contaminants:
Emission Control:

Site: ***Database:*** ***CA***
Merivale Road Nepean ON

Certificate #: 0030-4N8JQX
Application Year: 00
Issue Date: 8/17/00
Approval Type: Municipal & Private water
Status: Approved
Application Type: New Certificate of Approval
Client Name: Corporation of the Regional Municipality of Ottawa-Carleton
Client Address: 111 Lisgar Street
Client City: Ottawa
Client Postal Code: K2P 2L7
Project Description: Installation of watermains on Merivale Road, Boyce Street
Contaminants:
Emission Control:

Site: ***JAMES STEWART*** ***Database:*** ***CA***
MERIVALE RD. NEPEAN CITY ON

Certificate #: 7-1585-88-
Application Year: 88
Issue Date: 10/6/1988
Approval Type: Municipal water
Status: Approved
Application Type:
Client Name:
Client Address:
Client City:
Client Postal Code:
Project Description:
Contaminants:
Emission Control:

Site: ***THOMAS C. ASSALY CORPORATION*** ***Database:*** ***CA***
PRIVATE RD. VIEWMOUNT DR. WEST NEPEAN CITY ON

Certificate #: 7-0371-86-
Application Year: 86
Issue Date: 4/28/1986
Approval Type: Municipal water
Status: Approved
Application Type:
Client Name:
Client Address:
Client City:
Client Postal Code:
Project Description:
Contaminants:
Emission Control:

Site: ***City of Nepean***
MERIVALE RD./S.W.MGT NEPEAN CITY ON

Database: ***CA***

Certificate #: 3-1378-92-
Application Year: 92
Issue Date: 11/30/1992
Approval Type: Municipal sewage
Status: Approved
Application Type:
Client Name:
Client Address:
Client City:
Client Postal Code:
Project Description:
Contaminants:
Emission Control:

Site: ***MID CANADA CONSTRUCTION LTD.***
ACESS RD. W. OF MERIVALE RD. NEPEAN CITY ON

Database: ***CA***

Certificate #: 3-0198-89-
Application Year: 89
Issue Date: 2/17/1989
Approval Type: Municipal sewage
Status: Approved
Application Type:
Client Name:
Client Address:
Client City:
Client Postal Code:
Project Description:
Contaminants:
Emission Control:

Site: ***JAMES STEWART***
MERIVALE RD. STEWART FUELS NEPEAN CITY ON

Database: ***CA***

Certificate #: 3-1845-88-
Application Year: 88
Issue Date: 10/6/1988
Approval Type: Municipal sewage
Status: Approved
Application Type:
Client Name:
Client Address:
Client City:
Client Postal Code:
Project Description:
Contaminants:
Emission Control:

Site: ***R.M. OF OTTAWA-CARLETON***
MERIVALE RD. RECONT. WOODFIELD NEPEAN CITY ON

Database: ***CA***

Certificate #: 3-0317-88-
Application Year: 88
Issue Date: 3/17/1988
Approval Type: Municipal sewage
Status: Approved
Application Type:
Client Name:
Client Address:
Client City:
Client Postal Code:

Project Description:
Contaminants:
Emission Control:

Site: ***NEPEAN CITY***
EASEMENT GLENMANOR DR. NEPEAN CITY ON

Database: ***CA***

Certificate #: 3-1319-86-
Application Year: 86
Issue Date: 9/11/1986
Approval Type: Municipal sewage
Status: Approved
Application Type:
Client Name:
Client Address:
Client City:
Client Postal Code:
Project Description:
Contaminants:
Emission Control:

Site: ***J. PEREZ CONSTRUCTION LTD.***
MERIVALE RD. NEPEAN CITY ON

Database: ***CA***

Certificate #: 3-1266-86-
Application Year: 86
Issue Date: 9/10/1986
Approval Type: Municipal sewage
Status: Approved
Application Type:
Client Name:
Client Address:
Client City:
Client Postal Code:
Project Description:
Contaminants:
Emission Control:

Site: ***TONY GRAHAM MOTORS (1980) LIMITED***
MERIVALE RD. (SWM) NEPEAN CITY ON

Database: ***CA***

Certificate #: 3-1310-97-
Application Year: 97
Issue Date: 10/3/1997
Approval Type: Municipal sewage
Status: Approved
Application Type:
Client Name:
Client Address:
Client City:
Client Postal Code:
Project Description:
Contaminants:
Emission Control:

Site: ***MR. G. PASQUA HELMER STRANKS COLE ARCHIT***
K-MART PLAZA, MERIVALE ROAD NEPEAN CITY ON

Database: ***CA***

Certificate #: 8-4088-89-
Application Year: 89
Issue Date: 8/17/1989
Approval Type: Industrial air
Status: Approved

Application Type:
Client Name:
Client Address:
Client City:
Client Postal Code:
Project Description: RESTAURANT EXHAUST
Contaminants:
Emission Control:

Site: ***THOMAS C. ASSALY CORP.***
PRIVATE RD. VIEWMOUNT DR. W. NEPEAN CITY ON

Database: ***CA***

Certificate #: 3-0663-86-
Application Year: 86
Issue Date: 6/13/1986
Approval Type: Municipal sewage
Status: Approved
Application Type:
Client Name:
Client Address:
Client City:
Client Postal Code:
Project Description:
Contaminants:
Emission Control:

Site: ***MINTO CONSTRUCTION LTD.***
MERIVALE RD. EAST SIDE NEPEAN CITY ON

Database: ***CA***

Certificate #: 7-0594-85-006
Application Year: 85
Issue Date: 7/25/85
Approval Type: Municipal water
Status: Approved
Application Type:
Client Name:
Client Address:
Client City:
Client Postal Code:
Project Description:
Contaminants:
Emission Control:

Site: ***PRICE COSTCO CANADA INC.***
LOT 30/CON.A, PLAN 4R-7278 NEPEAN CITY ON

Database: ***CA***

Certificate #: 8-4132-95-
Application Year: 95
Issue Date: 9/12/1995
Approval Type: Industrial air
Status: Approved
Application Type:
Client Name:
Client Address:
Client City:
Client Postal Code:
Project Description: CLOSED LOOP VAPOUR EXTRACTION SYSTEM
Contaminants: Benzene (Carcinogen Requires Bact), Ethyl Benzene, Toluene(Pentyl Methane)(Methyl Benzene), Xylene
Emission Control: Adsorption, Adsorption, Adsorption, Adsorption

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Site: ***SHELL CANADA PRODUCTS LIMITED***
MERIVALE RD., BULK TANK FARM NEPEAN CITY ON

Database: ***CA***

Certificate #: 4-0099-91-
Application Year: 91
Issue Date: 11/14/1991
Approval Type: Industrial wastewater
Status: Cancelled
Application Type:
Client Name:
Client Address:
Client City:
Client Postal Code:
Project Description: MODIFY OIL/WATER SEPARATOR
Contaminants:
Emission Control:

Site: ***THOMAS C. ASSALY CORP.***
PRIVATE RD. VIEWMOUNT DR. W. NEPEAN CITY ON

Database: ***CA***

Certificate #: 3-0505-86-
Application Year: 86
Issue Date: 4/25/1986
Approval Type: Municipal sewage
Status: Approved
Application Type:
Client Name:
Client Address:
Client City:
Client Postal Code:
Project Description:
Contaminants:
Emission Control:

Site: ***IMPERIAL OIL LIMITED***
NORTH YORK ON

Database: ***CONV***

File No:
Crown Brief No:
Court Location:
Publication City:
Publication Title:
Act:
Act(s):
First Matter:
Second Matter:
Investigation 1:
Investigation 2:
Penalty Imposed:
Description: FAILED TO INSPECT OIL/WATER SEPARATOR WEEKLY & MAINTAIN LOG BOOK AT SITE
Background:
URL:

Location:
Region: EASTERN REGION
Ministry District:

Additional Details

Publication Date:
Count: 1
Act: OWRA
Regulation:
Section: 66(3)
Act/Regulation/Section: OWRA- -66(3)
Date of Offence:
Date of Conviction:
Date Charged: 6/4/93
Charge Disposition:
Fine: $4,000
Synopsis:

Additional Details

Publication Date:
Count: 1
Act: OWRA
Regulation:
Section: 66(3)
Act/Regulation/Section: OWRA- -66(3)
Date of Offence:
Date of Conviction:
Date Charged: 6/4/93
Charge Disposition:
Fine: $1,000
Synopsis:

Site: ***IMPERIAL OIL LIMITED***
DON MILLS ON

Database: ***CONV***

File No:
Crown Brief No:
Court Location:
Publication City:
Publication Title:
Act:
Act(s):
First Matter:
Second Matter:
Investigation 1:
Investigation 2:
Penalty Imposed:
Description: FAILED TO COMPLY WITH CONDITIONS OF C. OF A.
Background:
URL:

Location:
Region: EASTERN REGION
Ministry District:

Additional Details

Publication Date:
Count: 1
Act: OWRA
Regulation:
Section: 66(3)
Act/Regulation/Section: OWRA- -66(3)
Date of Offence:
Date of Conviction:
Date Charged: 6/4/93
Charge Disposition:
Fine: $6,000
Synopsis:

Site: ***City of Ottawa***
Works within an easement adjacent to Merivale Rd Ottawa ON K2G 6J8

Database: ***ECA***

Approval No: 0702-82CL4A
Approval Date: 2010-02-08
Status: Approved
Record Type: ECA
Link Source: IDS
SWP Area Name:
Approval Type: ECA-MUNICIPAL AND PRIVATE SEWAGE WORKS
Project Type: MUNICIPAL AND PRIVATE SEWAGE WORKS
Business Name: City of Ottawa
Address: Works within an easement adjacent to Merivale Rd
Full Address:
Full PDF Link: https://www.accessenvironment.ene.gov.on.ca/instruments/9895-824SV6-14.pdf
PDF Site Location:

MOE District:
City:
Longitude:
Latitude:
Geometry X:
Geometry Y:

Site: ***PETRO-CANADA PRODUCTS***
OTTAWA TERMINAL - GULF MERIVALE ROAD OTTAWA ON K2C 3G1

Database: ***GEN***

Generator No: ON0031027
SIC Code: 3611
SIC Description: REFINED PETRO. PROD.
Approval Years: 98
PO Box No:
Country:
Status:
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

Detail(s)

Waste Class: 251
Waste Class Name: OIL SKIMMINGS & SLUDGES

Site: ***Carmelo Idone***
Rear Merivale Rd. Ottawa ON K1Z 6A5

Database: ***GEN***

Generator No: ON5601283
SIC Code: 531120
SIC Description: LESSORS OF NON-RESIDENTIAL BUILDINGS (EXCEPT MINI-WAREHOUSES)
Approval Years: 2015
PO Box No:
Country: Canada
Status:
Co Admin:
Choice of Contact: CO_OFFICIAL
Phone No Admin:
Contaminated Facility: No
MHSW Facility: No

Detail(s)

Waste Class: 252
Waste Class Name: WASTE OILS & LUBRICANTS

Waste Class: 251
Waste Class Name: OIL SKIMMINGS & SLUDGES

Site: ***7770251 CANADA INC***
MERIVALE ROAD OTTAWA ON

Database: ***GEN***

Generator No: ON6163455
SIC Code: 812320
SIC Description: DRY CLEANING AND LAUNDRY SERVICES (EXCEPT COIN-OPERATED)
Approval Years: 2013
PO Box No:
Country:
Status:
Co Admin:
Choice of Contact:
Phone No Admin:
Contaminated Facility:
MHSW Facility:

Detail(s)

Waste Class: 241
Waste Class Name: HALOGENATED SOLVENTS

Site:
OLD HIGHWAY 17 OTTAWA ON

Database:
HINC

External File Num: FS INC 0708-04538
Fuel Occurrence Type:
Date of Occurrence:
Fuel Type Involved:
Status Desc: Completed - No Action Required
Job Type Desc: Incident/Near-Miss Occurrence (FS)
Oper. Type Involved:
Service Interruptions:
Property Damage:
Fuel Life Cycle Stage:
Root Cause:
Reported Details: Facility type is not specified. Report of waste oil spill. Non-mandated.
Fuel Category: Unknown
Occurrence Type: Incident
Affiliation: Member of the General Public
County Name: Ottawa
Approx. Quant. Rel:
Nearby body of water:
Enter Drainage Syst.:
Approx. Quant. Unit:
Environmental Impact:

Site: ***WILLIAMS OPERATING CORPORATION***
HEMLO GOLD FIELD WILLIAMS MINE SITE HWY 17 ON P0T 2E0

Database:
NPCB

Company Code: F1510
Industry: UNDEFINED
Site Status:
Transaction Date:
Inspection Date:

--Details--
Label: F151004
Serial No.:
PCB Type/Code: OTHER WASTE/LOW
Location:
Item/State: CTNR DEBRIS. ETC/FULL
No. of Items: 1
Manufacturer:
Status: STORED FOR DISPOSAL
Contents: 2565 KG

Label: F151002
Serial No.:
PCB Type/Code: MINERAL OIL/UNKNOWN
Location:
Item/State: BARREL MINERAL OIL/FULL
No. of Items: 1
Manufacturer:
Status: STORED FOR DISPOSAL
Contents: 136 KG

Label: F151000
Serial No.:
PCB Type/Code: ASKAREL/ASKAREL
Location:
Item/State: CAPACITOR/FULL
No. of Items: 2
Manufacturer:
Status: STORED FOR DISPOSAL
Contents: 100 KG

Label: F151001
Serial No.:
PCB Type/Code: OTHER WASTE/HIGH

Location:
Item/State: CTNR DEBRIS. ETC/FULL
No. of Items: 1
Manufacturer:
Status: STORED FOR DISPOSAL
Contents: 2778 KG

Label: F151003
Serial No.:
PCB Type/Code: OTHER WASTE/LOW
Location:
Item/State: CTNR SOIL/GRAVEL/FULL
No. of Items: 1
Manufacturer:
Status: STORED FOR DISPOSAL
Contents: 70 KG

Site: ***SHELL CANADA PRODUCTS LTD***
MERIVALE RD OTTAWA ON

Database: ***PRT***

Location ID: 11000
Type: retail
Expiry Date: 1995-12-31
Capacity (L): 8280000
Licence #: 0022412017

Site: ***Price Costco Canada Inc.***
Parts 1 and 2, Plan 4R-7269, Lot 30, Concession A NEPEAN ON

Database: ***PTTW***

EBR Registry No: IA7E0542
Ministry Ref No: 28181
Notice Type: Instrument Decision
Notice Stage:
Notice Date: September 30, 1997
Proposal Date: April 28, 1997
Year: 1997
Decision Posted:
Exception Posted:
Section:
Act 1:
Act 2:
Site Location Map:
Instrument Type: (OWRA s. 34) - Permit to Take Water
Off Instrument Name:
Posted By:
Company Name: Price Costco Canada Inc.
Site Address:
Location Other:
Proponent Name:
Proponent Address: 15 Lesmill Road, North York Ontario, M3B 2T3
Comment Period:
URL:

Site Location Details:

Parts 1 and 2, Plan 4R-7269, Lot 30, Concession A NEPEAN

Site: ***MR GAS LTD***
HWY 17 ARNPRIOR OTTAWA ON K0A 2H0

Database: ***RST***

Headcode: 1186800
Headcode Desc: Service Stations-Gasoline, Oil & Natural Gas
Phone: 6138322880
List Name:
Description:

Site: ***CANADIAN TIRE CORPORATION LTD.***
SAWMILL CREEK RETAIL STORE OTTAWA CITY ON

Database: ***SPL***

Ref No:	42952	***Municipality No:***	20101
Year:		***Nature of Damage:***	
Incident Dt:	11/2/1990	***Discharger Report:***	
Dt MOE Arvl on Scn:		***Material Group:***	
MOE Reported Dt:	11/2/1990	***Impact to Health:***	
Dt Document Closed:		***Agency Involved:***	
Site No:			
MOE Response:			
Site County/District:			
Site Geo Ref Meth:			
Site District Office:			
Nearest Watercourse:			
Site Name:			
Site Address:			
Site Region:			
Site Municipality:	OTTAWA CITY		
Site Lot:			
Site Conc:			
Site Geo Ref Accu:			
Site Map Datum:			
Northing:			
Easting:			
Incident Cause:	OTHER CAUSE (N.O.S.)		
Incident Preceding Spill:			
Environment Impact:	POSSIBLE		
Health Env Consequence:			
Nature of Impact:	Water course or lake		
Contaminant Qty:			
System Facility Address:			
Client Name:			
Client Type:			
Source Type:			
Contaminant Code:			
Contaminant Name:			
Contaminant Limit 1:			
Contam Limit Freq 1:			
Contaminant UN No 1:			
Receiving Medium:	WATER		
Incident Reason:	OTHER		
Incident Summary:	CANADIAN TIRE-1000L. ANTIFREEZE TO SAWMILL CREEK:		
Activity Preceding Spill:			
Property 2nd Watershed:			
Property Tertiary Watershed:			
Sector Type:			
SAC Action Class:			
Call Report Locatn Geodata:			

Site: ***IMPERIAL OIL***
TANK TRUCK (CARGO) NEPEAN CITY ON

Database: ***SPL***

Ref No:	35439	***Municipality No:***	20104
Year:		***Nature of Damage:***	
Incident Dt:	5/29/1990	***Discharger Report:***	
Dt MOE Arvl on Scn:		***Material Group:***	
MOE Reported Dt:	5/29/1990	***Impact to Health:***	
Dt Document Closed:		***Agency Involved:***	
Site No:			
MOE Response:			
Site County/District:			
Site Geo Ref Meth:			
Site District Office:			
Nearest Watercourse:			
Site Name:			
Site Address:			
Site Region:			
Site Municipality:	NEPEAN CITY		
Site Lot:			
Site Conc:			

Site Geo Ref Accu:
Site Map Datum:
Northing:
Easting:
Incident Cause: CONTAINER OVERFLOW
Incident Preceding Spill:
Environment Impact: NOT ANTICIPATED
Health Env Consequence:
Nature of Impact:
Contaminant Qty:
System Facility Address:
Client Name:
Client Type:
Source Type:
Contaminant Code:
Contaminant Name:
Contaminant Limit 1:
Contam Limit Freq 1:
Contaminant UN No 1:
Receiving Medium: LAND
Incident Reason: ERROR
Incident Summary: IMPERIAL OIL - 10 L GASO- LINE TO CONCRETE. CLEAN UP COMPLETED.
Activity Preceding Spill:
Property 2nd Watershed:
Property Tertiary Watershed:
Sector Type:
SAC Action Class:
Call Report Locatn Geodata:

Site: ***ESSO PETROLEUM CANADA***
ESSO DISTRIBUTION STATION BULK STATION OTTAWA CITY ON

Database: ***SPL***

Ref No: 46877
Year:
Incident Dt: 2/21/1991
Dt MOE Arvl on Scn:
MOE Reported Dt: 2/21/1991
Dt Document Closed:
Site No:
MOE Response:
Site County/District:
Site Geo Ref Meth:
Site District Office:
Nearest Watercourse:
Site Name:
Site Address:
Site Region:
Site Municipality: OTTAWA CITY
Site Lot:
Site Conc:
Site Geo Ref Accu:
Site Map Datum:
Northing:
Easting:
Incident Cause: CONTAINER OVERFLOW
Incident Preceding Spill:
Environment Impact: NOT ANTICIPATED
Health Env Consequence:
Nature of Impact:
Contaminant Qty:
System Facility Address:
Client Name:
Client Type:
Source Type:
Contaminant Code:
Contaminant Name:
Contaminant Limit 1:
Contam Limit Freq 1:

Municipality No: 20101
Nature of Damage:
Discharger Report:
Material Group:
Impact to Health:
Agency Involved:

Contaminant UN No 1:
Receiving Medium: LAND
Incident Reason: ERROR
Incident Summary: ESSO DISTRIB. STATION - 50 L FURNACE OIL SPILLED TO LOADING DOCK. OV/FILL.
Activity Preceding Spill:
Property 2nd Watershed:
Property Tertiary Watershed:
Sector Type:
SAC Action Class:
Call Report Locatn Geodata:

Site: ***ESSO PETROLEUM CANADA***
TANK TRUCK (CARGO) OTTAWA CITY ON

Database: ***SPL***

Ref No: 47843
Year:
Incident Dt: 3/19/1991
Dt MOE Arvl on Scn:
MOE Reported Dt: 3/20/1991
Dt Document Closed:
Site No:
MOE Response:
Site County/District:
Site Geo Ref Meth:
Site District Office:
Nearest Watercourse:
Site Name:
Site Address:
Site Region:
Site Municipality: OTTAWA CITY
Site Lot:
Site Conc:
Site Geo Ref Accu:
Site Map Datum:
Northing:
Easting:
Incident Cause: PIPE/HOSE LEAK
Incident Preceding Spill:
Environment Impact: NOT ANTICIPATED
Health Env Consequence:
Nature of Impact:
Contaminant Qty:
System Facility Address:
Client Name:
Client Type:
Source Type:
Contaminant Code:
Contaminant Name:
Contaminant Limit 1:
Contam Limit Freq 1:
Contaminant UN No 1:
Receiving Medium: LAND
Incident Reason: ERROR
Incident Summary: ESSO HOME COMFORT - TANK TRUCK SPILLED APPROX 1 L.HEATING OIL ON GROUND
Activity Preceding Spill:
Property 2nd Watershed:
Property Tertiary Watershed:
Sector Type:
SAC Action Class:
Call Report Locatn Geodata:

Municipality No: 20101
Nature of Damage:
Discharger Report:
Material Group:
Impact to Health:
Agency Involved:

Site: ***ESSO PETROLEUM CANADA***
TRANSPORT TRUCK (CARGO) OTTAWA CITY ON

Database: ***SPL***

Ref No: 59519
Year:
Incident Dt: 11/7/1991

Municipality No: 20101
Nature of Damage:
Discharger Report:

Dt MOE Arvl on Scn:		***Material Group:***	
MOE Reported Dt:	11/7/1991	***Impact to Health:***	
Dt Document Closed:		***Agency Involved:***	
Site No:			
MOE Response:			
Site County/District:			
Site Geo Ref Meth:			
Site District Office:			
Nearest Watercourse:			
Site Name:			
Site Address:			
Site Region:			
Site Municipality:	OTTAWA CITY		
Site Lot:			
Site Conc:			
Site Geo Ref Accu:			
Site Map Datum:			
Northing:			
Easting:			
Incident Cause:	PIPE/HOSE LEAK		
Incident Preceding Spill:			
Environment Impact:	NOT ANTICIPATED		
Health Env Consequence:			
Nature of Impact:			
Contaminant Qty:			
System Facility Address:			
Client Name:			
Client Type:			
Source Type:			
Contaminant Code:			
Contaminant Name:			
Contaminant Limit 1:			
Contam Limit Freq 1:			
Contaminant UN No 1:			
Receiving Medium:	LAND		
Incident Reason:	ERROR		
Incident Summary:	ESSO-3 LITRES DIESEL FUELTO GRND UNDER LOADING RACK,COUPLING NOT CLOSED		
Activity Preceding Spill:			
Property 2nd Watershed:			
Property Tertiary Watershed:			
Sector Type:			
SAC Action Class:			
Call Report Locatn Geodata:			

Site: ***ESSO PETROLEUM CANADA***
SERVICE STATION NEPEAN CITY ON

Database: ***SPL***

Ref No:	65520	***Municipality No:***	20104
Year:		***Nature of Damage:***	
Incident Dt:	12/23/1991	***Discharger Report:***	
Dt MOE Arvl on Scn:		***Material Group:***	
MOE Reported Dt:	12/24/1991	***Impact to Health:***	
Dt Document Closed:		***Agency Involved:***	MCCR
Site No:			
MOE Response:			
Site County/District:			
Site Geo Ref Meth:			
Site District Office:			
Nearest Watercourse:			
Site Name:			
Site Address:			
Site Region:			
Site Municipality:	NEPEAN CITY		
Site Lot:			
Site Conc:			
Site Geo Ref Accu:			
Site Map Datum:			
Northing:			

Easting:
Incident Cause: CONTAINER OVERFLOW
Incident Preceding Spill:
Environment Impact: NOT ANTICIPATED
Health Env Consequence:
Nature of Impact:
Contaminant Qty:
System Facility Address:
Client Name:
Client Type:
Source Type:
Contaminant Code:
Contaminant Name:
Contaminant Limit 1:
Contam Limit Freq 1:
Contaminant UN No 1:
Receiving Medium: LAND
Incident Reason: ERROR
Incident Summary: ESSO/TRW PETROLEUM: 30 L GASOLINE TO GROUND WHEN TANK OVERFILLED
Activity Preceding Spill:
Property 2nd Watershed:
Property Tertiary Watershed:
Sector Type:
SAC Action Class:
Call Report Locatn Geodata:

Site: ***CANADIAN NATIONAL RAILWAY***
CN RAILLINE FROM BELLS CORNERS TO MERIVALE ROAD. TRAIN NEPEAN CITY ON

Database: ***SPL***

Ref No: 91652
Year:
Incident Dt: 9/25/1993
Dt MOE Arvl on Scn:
MOE Reported Dt: 9/25/1993
Dt Document Closed:
Site No:
MOE Response:
Site County/District:
Site Geo Ref Meth:
Site District Office:
Nearest Watercourse:
Site Name:
Site Address:
Site Region:
Site Municipality: NEPEAN CITY
Site Lot:
Site Conc:
Site Geo Ref Accu:
Site Map Datum:
Northing:
Easting:
Incident Cause: OTHER CONTAINER LEAK
Incident Preceding Spill:
Environment Impact: POSSIBLE
Health Env Consequence:
Nature of Impact: Soil contamination
Contaminant Qty:
System Facility Address:
Client Name:
Client Type:
Source Type:
Contaminant Code:
Contaminant Name:
Contaminant Limit 1:
Contam Limit Freq 1:
Contaminant UN No 1:
Receiving Medium: LAND / AIR
Incident Reason: UNKNOWN
Municipality No: 20104
Nature of Damage:
Discharger Report:
Material Group:
Impact to Health:
Agency Involved:

Incident Summary: CANADIAN NATIONAL RAILWAYFIRE AND DIESEL SPILL TO RAIL LINE.
Activity Preceding Spill:
Property 2nd Watershed:
Property Tertiary Watershed:
Sector Type:
SAC Action Class:
Call Report Locatn Geodata:

Site: ***ESSO PETROLEUM CANADA***
BULK STATION OTTAWA CITY ON

Database: ***SPL***

Ref No: 155190
Year:
Incident Dt: 5/1/1998
Dt MOE Arvl on Scn:
MOE Reported Dt: 5/1/1998
Dt Document Closed:
Site No:
MOE Response:
Site County/District:
Site Geo Ref Meth:
Site District Office:
Nearest Watercourse:
Site Name:
Site Address:
Site Region:
Site Municipality: OTTAWA CITY
Site Lot:
Site Conc:
Site Geo Ref Accu:
Site Map Datum:
Northing:
Easting:
Incident Cause: OTHER CAUSE (N.O.S.)
Incident Preceding Spill:
Environment Impact: NOT ANTICIPATED
Health Env Consequence:
Nature of Impact:
Contaminant Qty:
System Facility Address:
Client Name:
Client Type:
Source Type:
Contaminant Code:
Contaminant Name:
Contaminant Limit 1:
Contam Limit Freq 1:
Contaminant UN No 1:
Receiving Medium: LAND
Incident Reason: NEGLIGENCE (APPARENT)
Incident Summary: ESSO-156 L DIESEL TO LOT,LOADING ARM NOT IN TRUCKSCOMPARTMENT,PUMP STARTED.
Activity Preceding Spill:
Property 2nd Watershed:
Property Tertiary Watershed:
Sector Type:
SAC Action Class:
Call Report Locatn Geodata:

Municipality No: 20101
Nature of Damage:
Discharger Report:
Material Group:
Impact to Health:
Agency Involved:

Site: ***City of Ottawa***
Merivale Rd Southbound, just before Meadowlands Ottawa ON

Database: ***SPL***

Ref No: 4055-6XEUV6
Year:
Incident Dt:
Dt MOE Arvl on Scn:
MOE Reported Dt: 1/13/2007
Dt Document Closed: 4/11/2007

Municipality No:
Nature of Damage:
Discharger Report:
Material Group: Chemicals
Impact to Health:
Agency Involved:

Site No:
MOE Response: No Field Response
Site County/District:
Site Geo Ref Meth:
Site District Office:
Nearest Watercourse:
Site Name: Road and Catch basin<UNOFFICIAL>
Site Address:
Site Region:
Site Municipality: Ottawa
Site Lot:
Site Conc:
Site Geo Ref Accu:
Site Map Datum:
Northing:
Easting:
Incident Cause:
Incident Preceding Spill:
Environment Impact: Not Anticipated
Health Env Consequence:
Nature of Impact: Soil Contamination
Contaminant Qty: 40 L
System Facility Address:
Client Name: City of Ottawa
Client Type:
Source Type:
Contaminant Code: 27
Contaminant Name: COOLANT N.O.S.
Contaminant Limit 1:
Contam Limit Freq 1:
Contaminant UN No 1:
Receiving Medium: Land
Incident Reason:
Incident Summary: OC Transpo: bus leaked coolant in cb
Activity Preceding Spill:
Property 2nd Watershed:
Property Tertiary Watershed:
Sector Type: Other Motor Vehicle
SAC Action Class:
Call Report Locatn Geodata:

Site:
Hwy 17 where crosses South Indian Creek (Limoges Casselman Construction Site)<UNOFFICIAL> Ottawa ON

Database: ***SPL***

Ref No: 6723-75LPCT
Year:
Incident Dt:
Dt MOE Arvl on Scn:
MOE Reported Dt: 7/30/2007
Dt Document Closed: 8/30/2007
Site No:
Municipality No:
Nature of Damage:
Discharger Report:
Material Group: Oil
Impact to Health:
Agency Involved:
MOE Response: No Field Response
Site County/District:
Site Geo Ref Meth:
Site District Office:
Nearest Watercourse:
Site Name: Hwy 17 where crosses South Indian Creek
Site Address:
Site Region:
Site Municipality: Ottawa
Site Lot:
Site Conc:
Site Geo Ref Accu:
Site Map Datum:
Northing:
Easting:
Incident Cause:
Incident Preceding Spill:

Environment Impact: Confirmed
Health Env Consequence:
Nature of Impact: Surface Water Pollution
Contaminant Qty: 0.5 L
System Facility Address:
Client Name:
Client Type:
Source Type:
Contaminant Code: 15
Contaminant Name: HYDRAULIC OIL
Contaminant Limit 1:
Contam Limit Freq 1:
Contaminant UN No 1:
Receiving Medium: Water
Incident Reason:
Incident Summary: Dufferin Construction: 0.5 L hyd. oil to South Indian Creek
Activity Preceding Spill:
Property 2nd Watershed:
Property Tertiary Watershed:
Sector Type: Other
SAC Action Class:
Call Report Locatn Geodata:

Site: ***Esso Petroleum Canada, A Division of Imperial Oil Limited***
Nepean Ottawa ON

Database: ***SPL***

Ref No: 0874-78WNRU
Year:
Incident Dt:
Dt MOE Arvl on Scn:
MOE Reported Dt: 11/13/2007
Dt Document Closed: 11/16/2007
Site No:
MOE Response: No Field Response
Site County/District:
Site Geo Ref Meth:
Site District Office:
Nearest Watercourse:
Site Name: 1961 Merivale Rd<UNOFFICIAL>
Site Address:
Site Region:
Site Municipality: Ottawa
Site Lot:
Site Conc:
Site Geo Ref Accu:
Site Map Datum:
Northing:
Easting:
Incident Cause: Pipe Or Hose Leak
Incident Preceding Spill:
Environment Impact: Confirmed
Health Env Consequence:
Nature of Impact: soil contamiination
Contaminant Qty: 8 L
System Facility Address:
Client Name: Esso Petroleum Canada, A Division of Imperial Oil Limited
Client Type:
Source Type:
Contaminant Code: 13
Contaminant Name: DIESEL FUEL
Contaminant Limit 1:
Contam Limit Freq 1:
Contaminant UN No 1:
Receiving Medium: Land
Incident Reason: Equipment Failure
Incident Summary: Errentom Tanklines - 8L diesel to grd
Activity Preceding Spill:
Property 2nd Watershed:

Municipality No:
Nature of Damage:
Discharger Report:
Material Group: Oil
Impact to Health:
Agency Involved:

Property Tertiary Watershed:
Sector Type: Tank Truck
SAC Action Class:
Call Report Locatn Geodata:

Site: ***ONTARIO HYDRO***
MERIVALE RD TRANSFORMER STATION TRANSFORMER NEPEAN CITY ON

Database: ***SPL***

Ref No:	5847	***Municipality No:***	20104
Year:		***Nature of Damage:***	
Incident Dt:	6/29/1988	***Discharger Report:***	
Dt MOE Arvl on Scn:		***Material Group:***	
MOE Reported Dt:	6/29/1988	***Impact to Health:***	
Dt Document Closed:		***Agency Involved:***	
Site No:			
MOE Response:			
Site County/District:			
Site Geo Ref Meth:			
Site District Office:			
Nearest Watercourse:			
Site Name:			
Site Address:			
Site Region:			
Site Municipality:	NEPEAN CITY		
Site Lot:			
Site Conc:			
Site Geo Ref Accu:			
Site Map Datum:			
Northing:			
Easting:			
Incident Cause:	COOLING SYSTEM LEAK		
Incident Preceding Spill:			
Environment Impact:			
Health Env Consequence:			
Nature of Impact:			
Contaminant Qty:			
System Facility Address:			
Client Name:			
Client Type:			
Source Type:			
Contaminant Code:			
Contaminant Name:			
Contaminant Limit 1:			
Contam Limit Freq 1:			
Contaminant UN No 1:			
Receiving Medium:	LAND		
Incident Reason:	EQUIPMENT FAILURE		
Incident Summary:	ONT HYDRO - 10 L PYRANOL TO GROUND AT TRANSFORMER STATION.		
Activity Preceding Spill:			
Property 2nd Watershed:			
Property Tertiary Watershed:			
Sector Type:			
SAC Action Class:			
Call Report Locatn Geodata:			

Site:
lot 31 ON

Database: ***WWIS***

Well ID:	1534734	***Flowing (Y/N):***	
Construction Date:		***Flow Rate:***	
Use 1st:	Not Used	***Data Entry Status:***	
Use 2nd:		***Data Src:***	1
Final Well Status:	Not A Well	***Date Received:***	06/10/2004
Water Type:		***Selected Flag:***	TRUE
Casing Material:		***Abandonment Rec:***	
Audit No:	265833	***Contractor:***	6907
Tag:		***Form Version:***	2

Constructn Method:
Elevation (m):
Elevatn Reliabilty:
Depth to Bedrock:
Well Depth:
Overburden/Bedrock:
Pump Rate:
Static Water Level:
Clear/Cloudy:
Municipality: OTTAWA CITY
Site Info:

Owner:
County: OTTAWA-CARLETON
Lot: 031
Concession:
Concession Name:
Easting NAD83:
Northing NAD83:
Zone:
UTM Reliability:

Bore Hole Information

Bore Hole ID: 11097509
DP2BR:
Spatial Status:
Code OB:
Code OB Desc:
Open Hole:
Cluster Kind:
Date Completed: 05/31/2004
Remarks:
Location Method Desc: Not Applicable i.e. no UTM
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:

Elevation:
Elevrc:
Zone: 18
East83:
North83:
Org CS:
UTMRC: 9
UTMRC Desc: unknown UTM
Location Method: na

Overburden and Bedrock Materials Interval

Formation ID: 932942463
Layer: 1
Color:
General Color:
Material 1: 24
Material 1 Desc: PREV. DRILLED
Material 2:
Material 2 Desc:
Material 3:
Material 3 Desc:
Formation Top Depth: 0.0
Formation End Depth: 40.0
Formation End Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 961534734
Method Construction Code: B
Method Construction: Other Method
Other Method Construction:

Pipe Information

Pipe ID: 11101224
Casing No: 1
Comment:
Alt Name:

Results of Well Yield Testing

Pumping Test Method Desc:

Pump Test ID: 991534734
Pump Set At:
Static Level: 8.0
Final Level After Pumping:
Recommended Pump Depth:
Pumping Rate:
Flowing Rate:
Recommended Pump Rate:
Levels UOM: ft
Rate UOM: GPM
Water State After Test Code:
Water State After Test:
Pumping Test Method:
Pumping Duration HR:
Pumping Duration MIN:
Flowing: No

Site:
lot 31 ON

Database:
WWIS

Well ID: 1519740
Construction Date:
Use 1st: Domestic
Use 2nd:
Final Well Status: Water Supply
Water Type:
Casing Material:
Audit No:
Tag:
Constructn Method:
Elevation (m):
Elevatn Reliabilty:
Depth to Bedrock:
Well Depth:
Overburden/Bedrock:
Pump Rate:
Static Water Level:
Clear/Cloudy:
Municipality: NEPEAN TOWNSHIP
Site Info:

Flowing (Y/N):
Flow Rate:
Data Entry Status:
Data Src: 1
Date Received: 06/24/1985
Selected Flag: TRUE
Abandonment Rec:
Contractor: 3644
Form Version: 1
Owner:
County: OTTAWA-CARLETON
Lot: 031
Concession:
Concession Name:
Easting NAD83:
Northing NAD83:
Zone:
UTM Reliability:

Bore Hole Information

Bore Hole ID: 10041593
DP2BR:
Spatial Status:
Code OB:
Code OB Desc:
Open Hole:
Cluster Kind:
Date Completed: 04/01/1985
Remarks:
Location Method Desc: Not Applicable i.e. no UTM
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:

Elevation:
Elevrc:
Zone: 18
East83:
North83:
Org CS:
UTMRC: 9
UTMRC Desc: unknown UTM
Location Method: na

Overburden and Bedrock Materials Interval

Formation ID: 931042564
Layer: 1
Color: 2
General Color: GREY
Material 1: 05

Material 1 Desc: CLAY
Material 2:
Material 2 Desc:
Material 3:
Material 3 Desc:
Formation Top Depth: 0.0
Formation End Depth: 70.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 931042565
Layer: 2
Color: 2
General Color: GREY
Material 1: 14
Material 1 Desc: HARDPAN
Material 2: 11
Material 2 Desc: GRAVEL
Material 3:
Material 3 Desc:
Formation Top Depth: 70.0
Formation End Depth: 96.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 931042566
Layer: 3
Color: 2
General Color: GREY
Material 1: 11
Material 1 Desc: GRAVEL
Material 2:
Material 2 Desc:
Material 3:
Material 3 Desc:
Formation Top Depth: 96.0
Formation End Depth: 98.0
Formation End Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 961519740
Method Construction Code: 5
Method Construction: Air Percussion
Other Method Construction:

Pipe Information

Pipe ID: 10590163
Casing No: 1
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 930072632
Layer: 1
Material: 1
Open Hole or Material: STEEL
Depth From:
Depth To: 98.0

Casing Diameter: 6.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Results of Well Yield Testing

Pumping Test Method Desc: PUMP
Pump Test ID: 991519740
Pump Set At:
Static Level: 0.0
Final Level After Pumping: 20.0
Recommended Pump Depth: 25.0
Pumping Rate: 50.0
Flowing Rate:
Recommended Pump Rate: 10.0
Levels UOM: ft
Rate UOM: GPM
Water State After Test Code: 2
Water State After Test: CLOUDY
Pumping Test Method: 1
Pumping Duration HR: 1
Pumping Duration MIN: 0
Flowing: No

Draw Down & Recovery

Pump Test Detail ID: 934384358
Test Type:
Test Duration: 30
Test Level: 20.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 934894682
Test Type:
Test Duration: 60
Test Level: 20.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 934654898
Test Type:
Test Duration: 45
Test Level: 20.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 934108648
Test Type:
Test Duration: 15
Test Level: 20.0
Test Level UOM: ft

Water Details

Water ID: 933476799
Layer: 1
Kind Code: 1
Kind: FRESH
Water Found Depth: 98.0
Water Found Depth UOM: ft

Site:
lot 31 ON

Database:
WWIS

Well ID:	1526253	***Flowing (Y/N):***	
Construction Date:		***Flow Rate:***	
Use 1st:	Irrigation	***Data Entry Status:***	
Use 2nd:		***Data Src:***	1
Final Well Status:		***Date Received:***	06/26/1992
Water Type:		***Selected Flag:***	TRUE
Casing Material:		***Abandonment Rec:***	
Audit No:	64227	***Contractor:***	2425
Tag:		***Form Version:***	1
Constructn Method:		***Owner:***	
Elevation (m):		***County:***	OTTAWA-CARLETON
Elevatn Reliabilty:		***Lot:***	031
Depth to Bedrock:		***Concession:***	
Well Depth:		***Concession Name:***	
Overburden/Bedrock:		***Easting NAD83:***	
Pump Rate:		***Northing NAD83:***	
Static Water Level:		***Zone:***	
Clear/Cloudy:		***UTM Reliability:***	
Municipality:	NEPEAN TOWNSHIP		
Site Info:			

Bore Hole Information

Bore Hole ID:	10047971	***Elevation:***	
DP2BR:		***Elevrc:***	
Spatial Status:		***Zone:***	18
Code OB:		***East83:***	
Code OB Desc:		***North83:***	
Open Hole:		***Org CS:***	
Cluster Kind:		***UTMRC:***	9
Date Completed:	06/08/1992	***UTMRC Desc:***	unknown UTM
Remarks:		***Location Method:***	na
Location Method Desc:	Not Applicable i.e. no UTM		
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	931063641
Layer:	3
Color:	1
General Color:	WHITE
Material 1:	18
Material 1 Desc:	SANDSTONE
Material 2:	
Material 2 Desc:	
Material 3:	
Material 3 Desc:	
Formation Top Depth:	320.0
Formation End Depth:	400.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	931063639
Layer:	1
Color:	6
General Color:	BROWN

Material 1: 05
Material 1 Desc: CLAY
Material 2: 13
Material 2 Desc: BOULDERS
Material 3: 73
Material 3 Desc: HARD
Formation Top Depth: 0.0
Formation End Depth: 15.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 931063640
Layer: 2
Color: 2
General Color: GREY
Material 1: 26
Material 1 Desc: ROCK
Material 2: 18
Material 2 Desc: SANDSTONE
Material 3: 74
Material 3 Desc: LAYERED
Formation Top Depth: 15.0
Formation End Depth: 320.0
Formation End Depth UOM: ft

Annular Space/Abandonment Sealing Record

Plug ID: 933111589
Layer: 1
Plug From: 4.0
Plug To: 22.0
Plug Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 961526253
Method Construction Code: 4
Method Construction: Rotary (Air)
Other Method Construction:

Pipe Information

Pipe ID: 10596541
Casing No: 1
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 930083966
Layer: 1
Material: 1
Open Hole or Material: STEEL
Depth From:
Depth To: 22.0
Casing Diameter: 6.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Results of Well Yield Testing

Pumping Test Method Desc:
Pump Test ID: 991526253
Pump Set At:
Static Level: 30.0
Final Level After Pumping: 400.0
Recommended Pump Depth: 380.0
Pumping Rate: 12.0
Flowing Rate:
Recommended Pump Rate: 12.0
Levels UOM: ft
Rate UOM: GPM
Water State After Test Code: 2
Water State After Test: CLOUDY
Pumping Test Method:
Pumping Duration HR: 2
Pumping Duration MIN: 0
Flowing: No

Draw Down & Recovery

Pump Test Detail ID: 934390456
Test Type: Recovery
Test Duration: 30
Test Level: 125.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 934106822
Test Type: Recovery
Test Duration: 15
Test Level: 200.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 934651397
Test Type: Recovery
Test Duration: 45
Test Level: 60.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 934908595
Test Type: Recovery
Test Duration: 60
Test Level: 35.0
Test Level UOM: ft

Water Details

Water ID: 933485490
Layer: 1
Kind Code: 1
Kind: FRESH
Water Found Depth: 320.0
Water Found Depth UOM: ft

Site:
lot 31 ON

Database: ***WWIS***

Well ID: 1526254
Construction Date:
Use 1st: Irrigation
Flowing (Y/N):
Flow Rate:
Data Entry Status:

Use 2nd:
Final Well Status: Water Supply
Water Type:
Casing Material:
Audit No: 64228
Tag:
Constructn Method:
Elevation (m):
Elevatn Reliabilty:
Depth to Bedrock:
Well Depth:
Overburden/Bedrock:
Pump Rate:
Static Water Level:
Clear/Cloudy:
Municipality: NEPEAN TOWNSHIP
Site Info:

Data Src: 1
Date Received: 06/26/1992
Selected Flag: TRUE
Abandonment Rec:
Contractor: 2425
Form Version: 1
Owner:
County: OTTAWA-CARLETON
Lot: 031
Concession:
Concession Name:
Easting NAD83:
Northing NAD83:
Zone:
UTM Reliability:

Bore Hole Information

Bore Hole ID: 10047972
DP2BR:
Spatial Status:
Code OB:
Code OB Desc:
Open Hole:
Cluster Kind:
Date Completed: 06/09/1992
Remarks:
Location Method Desc: Not Applicable i.e. no UTM
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:

Elevation:
Elevrc:
Zone: 18
East83:
North83:
Org CS:
UTMRC: 9
UTMRC Desc: unknown UTM
Location Method: na

Overburden and Bedrock Materials Interval

Formation ID: 931063642
Layer: 1
Color: 6
General Color: BROWN
Material 1: 05
Material 1 Desc: CLAY
Material 2: 13
Material 2 Desc: BOULDERS
Material 3: 73
Material 3 Desc: HARD
Formation Top Depth: 0.0
Formation End Depth: 12.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 931063643
Layer: 2
Color: 2
General Color: GREY
Material 1: 15
Material 1 Desc: LIMESTONE
Material 2: 18
Material 2 Desc: SANDSTONE
Material 3: 74
Material 3 Desc: LAYERED

Formation Top Depth: 12.0
Formation End Depth: 310.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 931063644
Layer: 3
Color: 1
General Color: WHITE
Material 1: 18
Material 1 Desc: SANDSTONE
Material 2: 85
Material 2 Desc: SOFT
Material 3:
Material 3 Desc:
Formation Top Depth: 310.0
Formation End Depth: 380.0
Formation End Depth UOM: ft

Annular Space/Abandonment Sealing Record

Plug ID: 933111590
Layer: 1
Plug From: 0.0
Plug To: 22.0
Plug Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 961526254
Method Construction Code: 4
Method Construction: Rotary (Air)
Other Method Construction:

Pipe Information

Pipe ID: 10596542
Casing No: 1
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 930083967
Layer: 1
Material: 1
Open Hole or Material: STEEL
Depth From:
Depth To: 22.0
Casing Diameter: 6.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Results of Well Yield Testing

Pumping Test Method Desc:
Pump Test ID: 991526254
Pump Set At:
Static Level: 30.0
Final Level After Pumping: 380.0
Recommended Pump Depth: 300.0

Pumping Rate: 40.0
Flowing Rate:
Recommended Pump Rate: 40.0
Levels UOM: ft
Rate UOM: GPM
Water State After Test Code: 2
Water State After Test: CLOUDY
Pumping Test Method:
Pumping Duration HR: 2
Pumping Duration MIN: 0
Flowing: No

Draw Down & Recovery

Pump Test Detail ID: 934390457
Test Type:
Test Duration: 30
Test Level: 30.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 934106823
Test Type:
Test Duration: 15
Test Level: 200.0
Test Level UOM: ft

Water Details

Water ID: 933485491
Layer: 1
Kind Code: 1
Kind: FRESH
Water Found Depth: 360.0
Water Found Depth UOM: ft

Site:
lot 31 ON

Database:
WWIS

Well ID: 1528149
Construction Date:
Use 1st: Not Used
Use 2nd:
Final Well Status: Observation Wells
Water Type:
Casing Material:
Audit No: 149112
Tag:
Constructn Method:
Elevation (m):
Elevatn Reliabilty:
Depth to Bedrock:
Well Depth:
Overburden/Bedrock:
Pump Rate:
Static Water Level:
Clear/Cloudy:
Municipality: OTTAWA CITY
Site Info:

Flowing (Y/N):
Flow Rate:
Data Entry Status:
Data Src: 1
Date Received: 08/30/1994
Selected Flag: TRUE
Abandonment Rec:
Contractor: 6844
Form Version: 1
Owner:
County: OTTAWA-CARLETON
Lot: 031
Concession:
Concession Name:
Easting NAD83:
Northing NAD83:
Zone:
UTM Reliability:

Bore Hole Information

Bore Hole ID: 10049688
DP2BR:
Spatial Status:

Elevation:
Elevrc:
Zone: 18

Code OB:
Code OB Desc:
Open Hole:
Cluster Kind:
Date Completed: 07/27/1994
Remarks:
Location Method Desc: Not Applicable i.e. no UTM
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:

East83:
North83:
Org CS:
UTMRC: 9
UTMRC Desc: unknown UTM
Location Method: na

Overburden and Bedrock Materials Interval

Formation ID: 931068741
Layer: 5
Color: 2
General Color: GREY
Material 1: 05
Material 1 Desc: CLAY
Material 2: 74
Material 2 Desc: LAYERED
Material 3:
Material 3 Desc:
Formation Top Depth: 4.0
Formation End Depth: 20.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 931068737
Layer: 1
Color: 8
General Color: BLACK
Material 1: 00
Material 1 Desc: UNKNOWN TYPE
Material 2:
Material 2 Desc:
Material 3:
Material 3 Desc:
Formation Top Depth: 0.0
Formation End Depth: 2.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 931068740
Layer: 4
Color: 6
General Color: BROWN
Material 1: 08
Material 1 Desc: FINE SAND
Material 2: 11
Material 2 Desc: GRAVEL
Material 3:
Material 3 Desc:
Formation Top Depth: 3.0
Formation End Depth: 4.0
Formation End Depth UOM: ft

Overburden and Bedrock

Materials Interval

Formation ID: 931068738
Layer: 2
Color: 2
General Color: GREY
Material 1: 21
Material 1 Desc: GRANITE
Material 2:
Material 2 Desc:
Material 3:
Material 3 Desc:
Formation Top Depth: 2.0
Formation End Depth: 2.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 931068739
Layer: 3
Color: 6
General Color: BROWN
Material 1: 05
Material 1 Desc: CLAY
Material 2: 11
Material 2 Desc: GRAVEL
Material 3:
Material 3 Desc:
Formation Top Depth: 2.0
Formation End Depth: 3.0
Formation End Depth UOM: ft

Annular Space/Abandonment Sealing Record

Plug ID: 933113003
Layer: 1
Plug From: 3.0
Plug To: 7.0
Plug Depth UOM: ft

Annular Space/Abandonment Sealing Record

Plug ID: 933113004
Layer: 2
Plug From: 7.0
Plug To: 9.0
Plug Depth UOM: ft

Annular Space/Abandonment Sealing Record

Plug ID: 933113005
Layer: 3
Plug From: 9.0
Plug To: 20.0
Plug Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 961528149
Method Construction Code: 6
Method Construction: Boring

Other Method Construction:

Pipe Information

Pipe ID: 10598258
Casing No: 1
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 930086839
Layer: 1
Material: 5
Open Hole or Material: PLASTIC
Depth From:
Depth To: 20.0
Casing Diameter: 2.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Screen

Screen ID: 933326495
Layer: 1
Slot: 010
Screen Top Depth: 10.0
Screen End Depth: 20.0
Screen Material:
Screen Depth UOM: ft
Screen Diameter UOM: inch
Screen Diameter: 2.0

Site:
lot 30 con A ON

Database: ***WWIS***

Well ID: 1528530
Construction Date:
Use 1st: Domestic
Use 2nd:
Final Well Status: Water Supply
Water Type:
Casing Material:
Audit No: 153144
Tag:
Constructn Method:
Elevation (m):
Elevatn Reliabilty:
Depth to Bedrock:
Well Depth:
Overburden/Bedrock:
Pump Rate:
Static Water Level:
Clear/Cloudy:
Municipality: NEPEAN TOWNSHIP
Site Info:

Flowing (Y/N):
Flow Rate:
Data Entry Status:
Data Src: 1
Date Received: 07/13/1995
Selected Flag: TRUE
Abandonment Rec:
Contractor: 1558
Form Version: 1
Owner:
County: OTTAWA-CARLETON
Lot: 030
Concession: A
Concession Name:
Easting NAD83:
Northing NAD83:
Zone:
UTM Reliability:

Bore Hole Information

Bore Hole ID: 10050066
DP2BR:
Spatial Status:
Code OB:
Code OB Desc:
Open Hole:
Cluster Kind:

Elevation:
Elevrc:
Zone: 18
East83:
North83:
Org CS:
UTMRC: 9

Date Completed: 06/28/1995
Remarks:
Location Method Desc: Not Applicable i.e. no UTM
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:
UTMRC Desc: unknown UTM
Location Method: na

Overburden and Bedrock Materials Interval

Formation ID: 931069947
Layer: 2
Color: 2
General Color: GREY
Material 1: 05
Material 1 Desc: CLAY
Material 2:
Material 2 Desc:
Material 3:
Material 3 Desc:
Formation Top Depth: 8.0
Formation End Depth: 40.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 931069949
Layer: 4
Color: 2
General Color: GREY
Material 1: 28
Material 1 Desc: SAND
Material 2: 11
Material 2 Desc: GRAVEL
Material 3: 13
Material 3 Desc: BOULDERS
Formation Top Depth: 62.0
Formation End Depth: 109.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 931069946
Layer: 1
Color: 6
General Color: BROWN
Material 1: 05
Material 1 Desc: CLAY
Material 2:
Material 2 Desc:
Material 3:
Material 3 Desc:
Formation Top Depth: 0.0
Formation End Depth: 8.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 931069948
Layer: 3

Color: 3
General Color: BLUE
Material 1: 05
Material 1 Desc: CLAY
Material 2:
Material 2 Desc:
Material 3:
Material 3 Desc:
Formation Top Depth: 40.0
Formation End Depth: 62.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 931069950
Layer: 5
Color: 2
General Color: GREY
Material 1: 15
Material 1 Desc: LIMESTONE
Material 2:
Material 2 Desc:
Material 3:
Material 3 Desc:
Formation Top Depth: 109.0
Formation End Depth: 140.0
Formation End Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 961528530
Method Construction Code: 5
Method Construction: Air Percussion
Other Method Construction:

Pipe Information

Pipe ID: 10598636
Casing No: 1
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 930087503
Layer: 2
Material: 4
Open Hole or Material: OPEN HOLE
Depth From:
Depth To: 140.0
Casing Diameter: 6.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Casing

Casing ID: 930087502
Layer: 1
Material: 1
Open Hole or Material: STEEL
Depth From:
Depth To: 114.0
Casing Diameter: 6.0
Casing Diameter UOM: inch

Casing Depth UOM: ft

Results of Well Yield Testing

Pumping Test Method Desc: PUMP
Pump Test ID: 991528530
Pump Set At:
Static Level: 11.0
Final Level After Pumping: 30.0
Recommended Pump Depth: 75.0
Pumping Rate: 35.0
Flowing Rate:
Recommended Pump Rate: 5.0
Levels UOM: ft
Rate UOM: GPM
Water State After Test Code: 2
Water State After Test: CLOUDY
Pumping Test Method: 1
Pumping Duration HR: 1
Pumping Duration MIN: 0
Flowing: No

Draw Down & Recovery

Pump Test Detail ID: 934104700
Test Type: Draw Down
Test Duration: 15
Test Level: 135.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 934648841
Test Type: Draw Down
Test Duration: 45
Test Level: 60.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 934388325
Test Type: Draw Down
Test Duration: 30
Test Level: 100.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 934906444
Test Type: Draw Down
Test Duration: 60
Test Level: 30.0
Test Level UOM: ft

Water Details

Water ID: 933488248
Layer: 1
Kind Code: 5
Kind: Not stated
Water Found Depth: 118.0
Water Found Depth UOM: ft

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Well ID:	1534012	***Flowing (Y/N):***	
Construction Date:		***Flow Rate:***	
Use 1st:	Not Used	***Data Entry Status:***	
Use 2nd:		***Data Src:***	1
Final Well Status:	Abandoned-Supply	***Date Received:***	08/26/2003
Water Type:		***Selected Flag:***	TRUE
Casing Material:		***Abandonment Rec:***	
Audit No:	250702	***Contractor:***	1558
Tag:		***Form Version:***	1
Constructn Method:		***Owner:***	
Elevation (m):		***County:***	OTTAWA-CARLETON
Elevatn Reliabilty:		***Lot:***	031
Depth to Bedrock:		***Concession:***	A
Well Depth:		***Concession Name:***	
Overburden/Bedrock:		***Easting NAD83:***	
Pump Rate:		***Northing NAD83:***	
Static Water Level:		***Zone:***	
Clear/Cloudy:		***UTM Reliability:***	
Municipality:	NEPEAN TOWNSHIP		
Site Info:			

Bore Hole Information

Bore Hole ID:	10543127	***Elevation:***	
DP2BR:		***Elevrc:***	
Spatial Status:		***Zone:***	18
Code OB:		***East83:***	
Code OB Desc:		***North83:***	
Open Hole:		***Org CS:***	
Cluster Kind:		***UTMRC:***	9
Date Completed:	07/21/2003	***UTMRC Desc:***	unknown UTM
Remarks:		***Location Method:***	na
Location Method Desc:	Not Applicable i.e. no UTM		
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Method of Construction & Well Use

Method Construction ID:	961534012
Method Construction Code:	0
Method Construction:	Not Known
Other Method Construction:	

Pipe Information

Pipe ID:	11091697
Casing No:	1
Comment:	
Alt Name:	

Site: ***Database:*** ***WWIS***

lot 31 con A ON

Well ID:	1534013	***Flowing (Y/N):***	
Construction Date:		***Flow Rate:***	
Use 1st:	Not Used	***Data Entry Status:***	
Use 2nd:		***Data Src:***	1
Final Well Status:	Not A Well	***Date Received:***	08/26/2003
Water Type:		***Selected Flag:***	TRUE
Casing Material:		***Abandonment Rec:***	

Audit No:	250701	***Contractor:***	1558
Tag:		***Form Version:***	1
Constructn Method:		***Owner:***	
Elevation (m):		***County:***	OTTAWA-CARLETON
Elevatn Reliabilty:		***Lot:***	031
Depth to Bedrock:		***Concession:***	A
Well Depth:		***Concession Name:***	
Overburden/Bedrock:		***Easting NAD83:***	
Pump Rate:		***Northing NAD83:***	
Static Water Level:		***Zone:***	
Clear/Cloudy:		***UTM Reliability:***	
Municipality:	NEPEAN TOWNSHIP		
Site Info:			

Bore Hole Information

Bore Hole ID:	10543128	***Elevation:***	
DP2BR:		***Elevrc:***	
Spatial Status:		***Zone:***	18
Code OB:		***East83:***	
Code OB Desc:		***North83:***	
Open Hole:		***Org CS:***	
Cluster Kind:		***UTMRC:***	9
Date Completed:	07/21/2003	***UTMRC Desc:***	unknown UTM
Remarks:		***Location Method:***	na
Location Method Desc:	Not Applicable i.e. no UTM		
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Method of Construction & Well Use

Method Construction ID:	961534013
Method Construction Code:	0
Method Construction:	Not Known
Other Method Construction:	

Pipe Information

Pipe ID:	11091698
Casing No:	1
Comment:	
Alt Name:	

Appendix: Database Descriptions

Environmental Risk Information Services (ERIS) can search the following databases. The extent of historical information varies with each database and current information is determined by what is publicly available to ERIS at the time of update. ***Note:*** *Databases denoted with " * " indicates that the database will no longer be updated. See the individual database description for more information.*

Abandoned Aggregate Inventory: Provincial AAGR

The MAAP Program maintains a database of abandoned pits and quarries. Please note that the database is only referenced by lot and concession and city/town location. The database provides information regarding the location, type, size, land use, status and general comments.*

Government Publication Date: Sept 2002*

Aggregate Inventory: Provincial AGR

This database of licensed and permitted pits and quarries is maintained by the Ontario Ministry of Natural Resources and Forestry (MNRF), as regulated under the Aggregate Resources Act, R.S.O. 1990. Aggregate site data has been divided into active and inactive sites. Active sites may be further subdivided into partial surrenders. In partial surrenders, defined areas of a site are inactive while the rest of the site remains active.

Government Publication Date: Up to Nov 2023

Abandoned Mine Information System: Provincial AMIS

The Abandoned Mines Information System contains data on known abandoned and inactive mines located on both Crown and privately held lands. The information was provided by the Ministry of Northern Development and Mines (MNDM), with the following disclaimer: "the database provided has been compiled from various sources, and the Ministry of Northern Development and Mines makes no representation and takes no responsibility that such information is accurate, current or complete". Reported information includes official mine name, status, background information, mine start/end date, primary commodity, mine features, hazards and remediation.

Government Publication Date: 1800-Apr 2024

Anderson's Waste Disposal Sites: Private ANDR

The information provided in this database was collected by examining various historical documents which aimed to characterize the likely position of former waste disposal sites from 1860 to present. The research initiative behind the creation of this database was to identify those sites that are missing from the Ontario MOE Waste Disposal Site Inventory, as well as to provide revisions and corrections to the positions and descriptions of sites currently listed in the MOE inventory. In addition to historic waste disposal facilities, the database also identifies certain auto wreckers and scrap yards that have been extrapolated from documentary sources. Please note that the data is not warranted to be complete, exhaustive or authoritative. The information was collected for research purposes only.

Government Publication Date: 1860s-Present

Aboveground Storage Tanks: Provincial AST

Historical listing of aboveground storage tanks made available by the Department of Natural Resources and Forestry. Includes tanks used to hold water or petroleum. This dataset has been retired as of September 25, 2014 and will no longer be updated.

Government Publication Date: May 31, 2014

Automobile Wrecking & Supplies: Private AUWR

This database provides an inventory of known locations that are involved in the scrap metal, automobile wrecking/recycling, and automobile parts & supplies industry. Information is provided on the company name, location and business type.

Government Publication Date: 1999-Apr 30, 2024

Borehole: Provincial BORE

A borehole is the generalized term for any narrow shaft drilled in the ground, either vertically or horizontally. The information here includes geotechnical investigations or environmental site assessments, mineral exploration, or as a pilot hole for installing piers or underground utilities. Information is from many sources such as the Ministry of Transportation (MTO) boreholes from engineering reports and projects from the 1950 to 1990's in Southern Ontario. Boreholes from the Ontario Geological Survey (OGS) including The Urban Geology Analysis Information System (UGAIS) and the York Peel Durham Toronto (YPDT) database of the Conservation Authority Moraine Coalition. This database will include fields such as location, stratigraphy, depth, elevation, year drilled, etc. For all water well data or oil and gas well data for Ontario please refer to WWIS and OOGW.

Government Publication Date: 1875-Jul 2018

Certificates of Approval: Provincial CA

This database contains the following types of approvals: Air & Noise, Industrial Sewage, Municipal & Private Sewage, Waste Management Systems and Renewable Energy Approvals. The MOE in Ontario states that any facility that releases emissions to the atmosphere, discharges contaminants to ground or surface water, provides potable water supplies, or stores, transports or disposes of waste, must have a Certificate of Approval before it can operate lawfully. Fields include approval number, business name, address, approval date, approval type and status. This database will no longer be updated, as CofA's have been replaced by either Environmental Activity and Sector Registry (EASR) or Environmental Compliance Approval (ECA). Please refer to those individual databases for any information after Oct.31, 2011.

Government Publication Date: 1985-Oct 30, 2011*

Dry Cleaning Facilities: Federal CDRY

List of dry cleaning facilities made available by Environment and Climate Change Canada. Environment and Climate Change Canada's Tetrachloroethylene (Use in Dry Cleaning and Reporting Requirements) Regulations (SOR/2003-79) are intended to reduce releases of tetrachloroethylene to the environment from dry cleaning facilities.

Government Publication Date: Jan 2004-Dec 2022

Commercial Fuel Oil Tanks: Provincial CFOT

Locations of commercial underground fuel oil tanks. This is not a comprehensive or complete inventory of commercial fuel tanks in the province; this listing is a copy of records of registered commercial underground fuel oil tanks obtained under Access to Public Information.
Note that the following types of tanks do not require registration: waste oil tanks in apartments, office buildings, residences, etc.; aboveground gas or diesel tanks. Records are not verified for accuracy or completeness.

Government Publication Date: Oct 2023

Chemical Manufacturers and Distributors: Private CHEM

This database includes information from both a one time study conducted in 1992 and private source and is a listing of facilities that manufacture or distribute chemicals. The production of these chemical substances may involve one or more chemical reactions and/or chemical separation processes (i.e. fractionation, solvent extraction, crystallization, etc.).

Government Publication Date: 1999-Jan 31, 2020

Chemical Register: Private CHM

This database includes a listing of locations of facilities within the Province or Territory that either manufacture and/or distributes chemicals.

Government Publication Date: 1999-Apr 30, 2024

Compressed Natural Gas Stations: Private CNG

Canada has a network of public access compressed natural gas (CNG) refuelling stations. These stations dispense natural gas in compressed form at 3,000 pounds per square inch (psi), the pressure which is allowed within the current Canadian codes and standards. The majority of natural gas refuelling is located at existing retail gasoline that have a separate refuelling island for natural gas. This list of stations is made available by the Canadian Natural Gas Vehicle Alliance.

Government Publication Date: Dec 2012 -Nov 2023

Inventory of Coal Gasification Plants and Coal Tar Sites: Provincial COAL

This inventory includes both the "Inventory of Coal Gasification Plant Waste Sites in Ontario-April 1987" and the Inventory of Industrial Sites Producing or Using Coal Tar and Related Tars in Ontario-November 1988) collected by the MOE. It identifies industrial sites that produced and continue to produce or use coal tar and other related tars. Detailed information is available and includes: facility type, size, land use, information on adjoining properties, soil condition, site operators/occupants, site description, potential environmental impacts and historic maps available. This was a one-time inventory.*

Government Publication Date: Apr 1987 and Nov 1988*

Compliance and Convictions: Provincial CONV

This database summarizes the fines and convictions handed down by the Ontario courts beginning in 1989. Companies and individuals named here have been found guilty of environmental offenses in Ontario courts of law.

Government Publication Date: 1989-Mar 2024

Certificates of Property Use: Provincial CPU

This is a subset taken from Ontario's Environmental Registry (EBR) database. It will include CPU's on the registry such as (EPA s. 168.6) - Certificate of Property Use.

Government Publication Date: 1994 - Mar 31, 2024

Drill Hole Database: Provincial DRL

The Ontario Drill Hole Database contains information on more than 113,000 percussion, overburden, sonic and diamond drill holes from assessment files on record with the department of Mines and Minerals. Please note that limited data is available for southern Ontario, as it was the last area to be completed. The database was created when surveys submitted to the Ministry were converted in the Assessment File Research Image Database (AFRI) project. However, the degree of accuracy (coordinates) as to the exact location of drill holes is dependent upon the source document submitted to the MNDM. Levels of accuracy used to locate holes are: centering on the mining claim; a sketch of the mining claim; a 1:50,000 map; a detailed company map; or from submitted a "Report of Work".

Government Publication Date: 1886 - Aug 2023

Delisted Fuel Tanks: Provincial DTNK

List of fuel storage tank sites that were once found in - and have since been removed from - the list of fuel storage tanks made available by the regulatory agency under Access to Public Information.

Government Publication Date: Oct 2023

Environmental Activity and Sector Registry: Provincial EASR

On October 31, 2011, a smarter, faster environmental approvals system came into effect in Ontario. The EASR allows businesses to register certain activities with the ministry, rather than apply for an approval. The registry is available for common systems and processes, to which preset rules of operation can be applied. The EASR is currently available for: heating systems, standby power systems and automotive refinishing. Businesses whose activities aren't subject to the EASR may apply for an ECA (Environmental Compliance Approval), Please see our ECA database.

Government Publication Date: Oct 2011-Apr 30, 2024

Environmental Registry: Provincial EBR

The Environmental Registry lists proposals, decisions and exceptions regarding policies, Acts, instruments, or regulations that could significantly affect the environment. Through the Registry, thirteen provincial ministries notify the public of upcoming proposals and invite their comments. For example, if a local business is requesting a permit, license, or certificate of approval to release substances into the air or water; these are notified on the registry. Data includes: Approval for discharge into the natural environment other than water (i.e. Air) - EPA s. 9, Approval for sewage works - OWRA s. 53(1), and EPA s. 27 - Approval for a waste disposal site. For information regarding Permit to Take Water (PTTW), Certificate of Property Use (CPU) and (ORD) Orders please refer to those individual databases.

Government Publication Date: 1994 - Mar 31, 2024

Environmental Compliance Approval: Provincial ECA

On October 31, 2011, a smarter, faster environmental approvals system came into effect in Ontario. In the past, a business had to apply for multiple approvals (known as certificates of approval) for individual processes and pieces of equipment. Today, a business either registers itself, or applies for a single approval, depending on the types of activities it conducts. Businesses whose activities aren't subject to the EASR may apply for an ECA. A single ECA addresses all of a business's emissions, discharges and wastes. Separate approvals for air, noise and waste are no longer required. This database will also include Renewable Energy Approvals. For certificates of approval prior to Nov 1st, 2011, please refer to the CA database. For all Waste Disposal Sites please refer to the WDS database.

Government Publication Date: Oct 2011-Apr 30, 2024

Environmental Effects Monitoring: Federal EEM

The Environmental Effects Monitoring program assesses the effects of effluent from industrial or other sources on fish, fish habitat and human usage of fisheries resources. Since 1992, pulp and paper mills have been required to conduct EEM studies under the Pulp and Paper Effluent Regulations. This database provides information on the mill name, geographical location and sub-lethal toxicity data.

Government Publication Date: 1992-2007*

ERIS Historical Searches: Private EHS

ERIS has compiled a database of all environmental risk reports completed since March 1999. Available fields for this database include: site location, date of report, type of report, and search radius. As per all other databases, the ERIS database can be referenced on both the map and "Statistical Profile" page.

Government Publication Date: 1999-Mar 31, 2024

Environmental Issues Inventory System: Federal EIIS

The Environmental Issues Inventory System was developed through the implementation of the Environmental Issues and Remediation Plan. This plan was established to determine the location and severity of contaminated sites on inhabited First Nation reserves, and where necessary, to remediate those that posed a risk to health and safety; and to prevent future environmental problems. The EIIS provides information on the reserve under investigation, inventory number, name of site, environmental issue, site action (Remediation, Site Assessment), and date investigation completed.

Government Publication Date: 1992-2001*

Emergency Management Historical Event: Provincial EMHE

List of locations of historical occurrences of emergency events, including those assigned to the Ministry of Natural Resources by Order-In-Council (OIC) under the Emergency Management and Civil Protection Act, as well as events where MNR provided requested emergency response assistance. Many of these events will have involved community evacuations, significant structural loss, and/or involvement of MNR emergency response staff. These events fall into one of ten (10) type categories: Dam Failure; Drought / Low Water; Erosion; Flood; Forest Fire; Soil and Bedrock Instability; Petroleum Resource Center Event, EMO Requested Assistance, Continuity of Operations Event, Other Requested Assistance. EMHE record details are reproduced by ERIS under License with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2017.

Government Publication Date: Apr 30, 2022

Environmental Penalty Annual Report: Provincial EPAR

This database contains data from Ontario's annual environmental penalty report published by the Ministry of the Environment and Climate Change. These reports provide information on environmental penalties for land or water violations issued to companies in one of the nine industrial sectors covered by the Municipal Industrial Strategy for Abatement (MISA) regulations.

Government Publication Date: Jan 1, 2011 - Dec 31, 2022

List of Expired Fuels Safety Facilities: Provincial EXP

List of facilities and tanks for which there was once a fuel registration. This is not a comprehensive or complete inventory of expired tanks/tank facilities in the province; this listing is a copy of previously registered tanks and facilities obtained under Access to Public Information. Includes private fuel outlets, bulk plants, fuel oil tanks, gasoline stations, marinas, propane filling stations, liquid fuel tanks, piping systems, etc; includes tanks which have been removed from the ground.
Notes: registration was not required for private fuel underground/aboveground storage tanks prior to January 1990, nor for furnace oil tanks prior to May 1, 2002; registration is not required for waste oil tanks in apartments, office buildings, residences, etc., or aboveground gas or diesel tanks. Records are not verified for accuracy or completeness.

Government Publication Date: Oct 2023

Federal Convictions: Federal FCON

Environment Canada maintains a database referred to as the "Environmental Registry" that details prosecutions under the Canadian Environmental Protection Act (CEPA) and the Fisheries Act (FA). Information is provided on the company name, location, charge date, offence and penalty.

Government Publication Date: 1988-Jun 2007*

Contaminated Sites on Federal Land: Federal FCS

The Federal Contaminated Sites Inventory includes information on known federal contaminated sites under the custodianship of departments, agencies and consolidated Crown corporations as well as those that are being or have been investigated to determine whether they have contamination arising from past use that could pose a risk to human health or the environment. The inventory also includes non-federal contaminated sites for which the Government of Canada has accepted some or all financial responsibility. It does not include sites where contamination has been caused by, and which are under the control of, enterprise Crown corporations, private individuals, firms or other levels of government. Includes fire training sites and sites at which Per- and Polyfluoroalkyl Substances (PFAS) are a concern.

Government Publication Date: Jun 2000-Mar 2024

Fisheries & Oceans Fuel Tanks: Federal FOFT

Fisheries & Oceans Canada maintains an inventory of aboveground & underground fuel storage tanks located on Fisheries & Oceans property or controlled by DFO. Our inventory provides information on the site name, location, tank owner, tank operator, facility type, storage tank location, tank contents & capacity, and date of tank installation.

Government Publication Date: 1964-Sep 2019

Federal Identification Registry for Storage Tank Systems (FIRSTS): Federal FRST

A list of federally regulated Storage tanks from the Federal Identification Registry for Storage Tank Systems (FIRSTS). FIRSTS is Environment and Climate Change Canada's database of storage tank systems subject to the Storage Tank for Petroleum Products and Allied Petroleum Products Regulations. The main objective of the Regulations is to prevent soil and groundwater contamination from storage tank systems located on federal and aboriginal lands. Storage tank systems that do not have a valid identification number displayed in a readily visible location on or near the storage tank system may be refused product delivery.

Government Publication Date: Oct 31, 2021

Fuel Storage Tank: Provincial FST

List of registered private and retail fuel storage tanks. This is not a comprehensive or complete inventory of private and retail fuel storage tanks in the province; this listing is a copy of registered private and retail fuel storage tanks, obtained under Access to Public Information.
Notes: registration was not required for private fuel underground/aboveground storage tanks prior to January 1990, nor for furnace oil tanks prior to May 1, 2002; registration is not required for waste oil tanks in apartments, office buildings, residences, etc., or aboveground gas or diesel tanks. Records are not verified for accuracy or completeness.

Government Publication Date: Oct 2023

Fuel Storage Tank - Historic: Provincial FSTH

The Fuels Safety Branch of the Ontario Ministry of Consumer and Commercial Relations maintained a database of all registered private fuel storage tanks. Public records of private fuel storage tanks are only available since the registration became effective in September 1989. This information is now collected by the Technical Standards and Safety Authority.

Government Publication Date: Pre-Jan 2010*

Ontario Regulation 347 Waste Generators Summary: Provincial GEN

Regulation 347 of the Ontario EPA defines a waste generation site as any site, equipment and/or operation involved in the production, collection, handling and/or storage of regulated wastes. A generator of regulated waste is required to register the waste generation site and each waste produced, collected, handled, or stored at the site. This database contains the registration number, company name and address of registered generators including the types of hazardous wastes generated. It includes data on waste generating facilities such as: drycleaners, waste treatment and disposal facilities, machine shops, electric power distribution etc. This information is a summary of all years from 1986 including the most currently available data. Some records may contain, within the company name, the phrase "See & Use..." followed by a series of letters and numbers. This occurs when one company is amalgamated with or taken over by another registered company. The number listed as "See & Use", refers to the new ownership and the other identification number refers to the original ownership. This phrase serves as a link between the 2 companies until operations have been fully transferred.

Government Publication Date: 1986-Oct 31, 2022

Greenhouse Gas Emissions from Large Facilities: Federal GHG

List of greenhouse gas emissions from large facilities made available by Environment Canada. Greenhouse gas emissions in kilotonnes of carbon dioxide equivalents (kt CO2 eq).

Government Publication Date: 2013-Dec 2021

TSSA Historic Incidents: Provincial HINC

List of historic incidences of spills and leaks of diesel, fuel oil, gasoline, natural gas, propane, and hydrogen recorded by the TSSA in their previous incident tracking system. The TSSA's Fuels Safety Program administers the Technical Standards & Safety Act 2000, providing fuel-related safety services associated with the safe transportation, storage, handling and use of fuels such as gasoline, diesel, propane, natural gas and hydrogen. Under this Act, the TSSA regulates fuel suppliers, storage facilities, transport trucks, pipelines, contractors and equipment or appliances that use fuels. Records are not verified for accuracy or completeness. This is not a comprehensive or complete inventory of historical fuel spills and leaks in the province. This listing is a copy of the data captured at one moment in time and is hence limited by the record date provided here.

Government Publication Date: 2006-June 2009*

Indian & Northern Affairs Fuel Tanks: Federal IAFT

The Department of Indian & Northern Affairs Canada (INAC) maintains an inventory of aboveground & underground fuel storage tanks located on both federal and crown land. Our inventory provides information on the reserve name, location, facility type, site/facility name, tank type, material & ID number, tank contents & capacity, and date of tank installation.

Government Publication Date: 1950-Aug 2003*

Fuel Oil Spills and Leaks: Provincial INC

Listing of spills and leaks of diesel, fuel oil, gasoline, natural gas, propane, and hydrogen reported to the Spills Action Centre (SAC). This is not a comprehensive or complete inventory of fuel-related leaks, spills, and incidents in the province; this listing in a copy of incidents reported to the SAC, obtained under Access to Public Information. Includes incidents from fuel-related hazards such as spills, fires, and explosions. Records are not verified for accuracy or completeness.

Government Publication Date: 31 Oct, 2023

Landfill Inventory Management Ontario: Provincial LIMO

The Landfill Inventory Management Ontario (LIMO) database is updated every year, as the Ministry of the Environment, Conservation and Parks compiles new and updated information. Includes small and large landfills currently operating as well as those which are closed and historic. Operators of larger landfills provide landfill information for the previous operating year to the ministry for LIMO including: estimated amount of total waste received, landfill capacity, estimated total remaining landfill capacity, fill rates, engineering designs, reporting and monitoring details, size of location, service area, approved waste types, leachate of site treatment, contaminant attenuation zone and more. The small landfills include information such as site owner, site location and certificate of approval # and status.

Government Publication Date: Mar 31, 2022

Canadian Mine Locations: Private MINE

This information is collected from the Canadian & American Mines Handbook. The Mines database is a national database that provides over 290 listings on mines (listed as public companies) dealing primarily with precious metals and hard rocks. Listed are mines that are currently in operation, closed, suspended, or are still being developed (advanced projects). Their locations are provided as geographic coordinates (x, y and/or longitude, latitude). As of 2002, data pertaining to Canadian smelters and refineries has been appended to this database.

Government Publication Date: 1998-2009*

Mineral Occurrences: Provincial MNR

In the early 70's, the Ministry of Northern Development and Mines created an inventory of approximately 19,000 mineral occurrences in Ontario, in regard to metallic and industrial minerals, as well as some information on building stones and aggregate deposits. Please note that the "Horizontal Positional Accuracy" is approximately +/- 200 m. Many reference elements for each record were derived from field sketches using pace or chain/tape measurements against claim posts or topographic features in the area. The primary limiting factor for the level of positional accuracy is the scale of the source material. The testing of horizontal accuracy of the source materials was accomplished by comparing the plan metric (X and Y) coordinates of that point with the coordinates of the same point as defined from a source of higher accuracy.

Government Publication Date: 1846-Feb 2024

National Analysis of Trends in Emergencies System (NATES): Federal NATE

In 1974 Environment Canada established the National Analysis of Trends in Emergencies System (NATES) database, for the voluntary reporting of significant spill incidents. The data was to be used to assist in directing the work of the emergencies program. NATES ran from 1974 to 1994. Extensive information is available within this database including company names, place where the spill occurred, date of spill, cause, reason and source of spill, damage incurred, and amount, concentration, and volume of materials released.

Government Publication Date: 1974-1994*

Non-Compliance Reports: Provincial NCPL

The Ministry of the Environment provides information about non-compliant discharges of contaminants to air and water that exceed legal allowable limits, from regulated industrial and municipal facilities. A reported non-compliance failure may be in regard to a Control Order, Certificate of Approval, Sectoral Regulation or specific regulation/act.

Government Publication Date: Dec 31, 2022

National Defense & Canadian Forces Fuel Tanks: Federal NDFT

The Department of National Defense and the Canadian Forces maintains an inventory of all aboveground & underground fuel storage tanks located on DND lands. Our inventory provides information on the base name, location, tank type & capacity, tank contents, tank class, date of tank installation, date tank last used, and status of tank as of May 2001. This database will no longer be updated due to the new National Security protocols which have prohibited any release of this database.

Government Publication Date: Up to May 2001*

National Defense & Canadian Forces Spills: Federal NDSP

The Department of National Defense and the Canadian Forces maintains an inventory of spills to land and water. All spill sites have been classified under the "Transportation of Dangerous Goods Act - 1992". Our inventory provides information on the facility name, location, spill ID #, spill date, type of spill, as well as the quantity of substance spilled & recovered.

Government Publication Date: Mar 1999-Nov 2023

National Defence & Canadian Forces Waste Disposal Sites: Federal NDWD

The Department of National Defence and the Canadian Forces maintains an inventory of waste disposal sites located on DND lands. Where available, our inventory provides information on the base name, location, type of waste received, area of site, depth of site, year site opened/closed and status.

Government Publication Date: 2001-Apr 2007*

National Energy Board Pipeline Incidents: Federal NEBI

Locations of pipeline incidents from 2008 to present, made available by the Canada Energy Regulator (CER) - previously the National Energy Board (NEB). Includes incidents reported under the Onshore Pipeline Regulations and the Processing Plant Regulations related to pipelines under federal jurisdiction, does not include incident data related to pipelines under provincial or territorial jurisdiction.

Government Publication Date: 2008-Jun 30, 2021

National Energy Board Wells: Federal NEBP

The NEBW database contains information on onshore & offshore oil and gas wells that are outside provincial jurisdiction(s) and are thereby regulated by the National Energy Board. Data is provided regarding the operator, well name, well ID No./UWI, status, classification, well depth, spud and release date.

Government Publication Date: 1920-Feb 2003*

National Environmental Emergencies System (NEES): Federal NEES

In 2000, the Emergencies program implemented NEES, a reporting system for spills of hazardous substances. For the most part, this system only captured data from the Atlantic Provinces, some from Quebec and Ontario and a portion from British Columbia. Data for Alberta, Saskatchewan, Manitoba and the Territories was not captured. However, NEES is also a repository for previous Environment Canada spill datasets. NEES is composed of the historic datasets ' or Trends ' which dates from approximately 1974 to present. NEES Trends is a compilation of historic databases, which were merged and includes data from NATES (National Analysis of Trends in Emergencies System), ARTS (Atlantic Regional Trends System), and NEES. In 2001, the Emergencies Program determined that variations in reporting regimes and requirements between federal and provincial agencies made national spill reporting and trend analysis difficult to achieve. As a consequence, the department has focused efforts on capturing data on spills of substances which fall under its legislative authority only (CEPA and FA). As such, the NEES database will be decommissioned in December 2004.

Government Publication Date: 1974-2003*

National PCB Inventory: Federal NPCB

Environment Canada's National PCB inventory includes information on in-use PCB containing equipment in Canada including federal, provincial and private facilities. Federal out-of-service PCB containing equipment and PCB waste owned by the federal government or by federally regulated industries such as airlines, railway companies, broadcasting companies, telephone and telecommunications companies, pipeline companies, etc. are also listed. Although it is not Environment Canada's mandate to collect data on non-federal PCB waste, the National PCB inventory includes some information on provincial and private PCB waste and storage sites. Some addresses provided may be Head Office addresses and are not necessarily the location of where the waste is being used or stored.

Government Publication Date: 1988-2008*

National Pollutant Release Inventory 1993-2020: Federal NPR2

The National Pollutant Release Inventory (NPRI) is Canada's public inventory of pollutant releases (to air, water and land), disposals, and transfers for recycling. The inventory, managed by Environment and Climate Change Canada, tracks over 300 substances. Under the authority of the Canadian Environmental Protection Act (CEPA), owners or operators of facilities that meet published reporting requirements are required to report to the NPRI.

Government Publication Date: Sep 2020

National Pollutant Release Inventory - Historic: Federal NPRI

Environment Canada has defined the National Pollutant Release Inventory ("NPRI") as a federal government initiative designed to collect comprehensive national data regarding releases to air, water, or land, and waste transfers for recycling for more than 300 listed substances. This data holds historic records; current records are found in NPR2.

Government Publication Date: 1993-May 2017

Oil and Gas Wells: Private OGWE

The Nickle's Energy Group (publisher of the Daily Oil Bulletin) collects information on drilling activity including operator and well statistics. The well information database includes name, location, class, status and depth. The main Nickle's database is updated on a daily basis, however, this database is updated on a monthly basis. More information is available at www.nickles.com.

Government Publication Date: 1988-Feb 29, 2024

Ontario Oil and Gas Wells: Provincial OOGW

In 1998, the MNR handed over to the Ontario Oil, Gas and Salt Resources Corporation, the responsibility of maintaining a database of oil and gas wells drilled in Ontario. The OGSR Library has over 20,000+ wells in their database. Information available for all wells in the ERIS database include well owner/operator, location, permit issue date, and well cap date, license No., status, depth and the primary target (rock unit) of the well being drilled. All geology/stratigraphy table information, plus all water table information is also provide for each well record.

Government Publication Date: 1800-Aug 2023

Inventory of PCB Storage Sites: Provincial OPCB

The Ontario Ministry of Environment, Waste Management Branch, maintains an inventory of PCB storage sites within the province. Ontario Regulation 11/82 (Waste Management - PCB) and Regulation 347 (Generator Waste Management) under the Ontario EPA requires the registration of inactive PCB storage equipment and/or disposal sites of PCB waste with the Ontario Ministry of Environment. This database contains information on: 1) waste quantities; 2) major and minor sites storing liquid or solid waste; and 3) a waste storage inventory.

Government Publication Date: 1987-Oct 2004; 2012-Dec 2013

Orders: Provincial ORD

This is a subset taken from Ontario's Environmental Registry (EBR) database. It will include Orders on the registry such as (EPA s. 17) - Order for remedial work, (EPA s. 18) - Order for preventative measures, (EPA s. 43) - Order for removal of waste and restoration of site, (EPA s. 44) - Order for conformity with Act for waste disposal sites, (EPA s. 136) - Order for performance of environmental measures.

Government Publication Date: 1994 - Mar 31, 2024

Canadian Pulp and Paper: Private PAP

This information is part of the Pulp and Paper Canada Directory. The Directory provides a comprehensive listing of the locations of pulp and paper mills and the products that they produce.

Government Publication Date: 1999, 2002, 2004, 2005, 2009-2014

Parks Canada Fuel Storage Tanks: Federal PCFT

Canadian Heritage maintains an inventory of known fuel storage tanks operated by Parks Canada, in both National Parks and at National Historic Sites. The database details information on site name, location, tank install/removal date, capacity, fuel type, facility type, tank design and owner/operator.

Government Publication Date: 1920-Jan 2005*

Pesticide Register: Provincial PES

The Ontario Ministry of the Environment and Climate Change maintains a database of licensed operators and vendors of registered pesticides.

Government Publication Date: Oct 2011-Apr 30, 2024

NPRI Reporters - PFAS Substances: Federal PFCH

The National Pollutant Release Inventory (NPRI) is Canada's public inventory of releases, disposals, and transfers, tracking over 320 pollutants. Per - and polyfluoroalkyl substances (PFAS) are a group of over 4,700 human-made substances for which adverse environmental and health effects have been observed. This listing of PFAS substance reporters includes those NPRI facilities that reported substances that are found in either: a) the Comprehensive Global Database of PFASs compiled by the Organisation for Economic Co-operation and Development (OECD), b) the US Environmental Protection Agency (US EPA) Master List of PFAS Substances, c) the US EPA list of PFAS chemicals without explicit structures, or d) the US EPA list of PFAS structures (encompassing the largest set of structures having sufficient levels of fluorination to potentially impart PFAS-type properties).

Government Publication Date: Sep 2020

Potential PFAS Handlers from NPRI: Federal PFHA

The National Pollutant Release Inventory (NPRI) is Canada's public inventory of releases, disposals, and transfers, tracking over 320 pollutants. Per - and polyfluoroalkyl substances (PFAS) are a group of over 4,700 human-made substances for which adverse environmental and health effects have been observed. This list of potential PFAS handlers includes those NPRI facilities that reported business activity (NAICS code) included in the US Environmental Protection Agency (US EPA) list of Potential PFAS-Handling Industry Sectors, further described as operating in industry sectors where literature reviews indicate that PFAS may be handled and/or released. Inclusion of a facility in this listing does not indicate that PFAS are being manufactured, processed, used, or released by the facility - these are facilities that potentially handle PFAS based on their industrial profile.

Government Publication Date: Sep 2020

Pipeline Incidents: Provincial PINC

List of pipeline incidents (strikes, leaks, spills). This is not a comprehensive or complete inventory of pipeline incidents in the province; this listing in an historical copy of records previously obtained under Access to Public Information. Records are not verified for accuracy or completeness.

Government Publication Date: Feb 28, 2021

Private and Retail Fuel Storage Tanks: Provincial PRT

The Fuels Safety Branch of the Ontario Ministry of Consumer and Commercial Relations maintained a database of all registered private fuel storage tanks and licensed retail fuel outlets. This database includes an inventory of locations that have gasoline, oil, waste oil, natural gas and/or propane storage tanks on their property. The MCCR no longer collects this information. This information is now collected by the Technical Standards and Safety Authority (TSSA).

Government Publication Date: 1989-1996*

Permit to Take Water: Provincial PTTW

This is a subset taken from Ontario's Environmental Registry (EBR) database. It will include PTTW's on the registry such as OWRA s. 34 - Permit to take water.

Government Publication Date: 1994 - Mar 31, 2024

Ontario Regulation 347 Waste Receivers Summary: Provincial REC

Part V of the Ontario Environmental Protection Act ("EPA") regulates the disposal of regulated waste through an operating waste management system or a waste disposal site operated or used pursuant to the terms and conditions of a Certificate of Approval or a Provisional Certificate of Approval. Regulation 347 of the Ontario EPA defines a waste receiving site as any site or facility to which waste is transferred by a waste carrier. A receiver of regulated waste is required to register the waste receiving facility. This database represents registered receivers of regulated wastes, identified by registration number, company name and address, and includes receivers of waste such as: landfills, incinerators, transfer stations, PCB storage sites, sludge farms and water pollution control plants. This information is a summary of all years from 1986 including the most currently available data.

Government Publication Date: 1986-1990, 1992-2021

Record of Site Condition: Provincial RSC

The Record of Site Condition (RSC) is part of the Ministry of the Environment's Brownfields Environmental Site Registry. Protection from environmental cleanup orders for property owners is contingent upon documentation known as a record of site condition (RSC) being filed in the Environmental Site Registry. In order to file an RSC, the property must have been properly assessed and shown to meet the soil, sediment and groundwater standards appropriate for the use (such as residential) proposed to take place on the property. The Record of Site Condition Regulation (O. Reg. 153/04) details requirements related to site assessment and clean up. RSCs filed after July 1, 2011 will also be included as part of the new (O.Reg. 511/09). The Government of Ontario states that it is not responsible for the accuracy of the information in this Registry.

Government Publication Date: 1997-Sept 2001, Oct 2004-Apr 2024

Retail Fuel Storage Tanks: Private RST

This database includes an inventory of retail fuel outlet locations (including marinas) that have on their property gasoline, oil, waste oil, natural gas and / or propane storage tanks.

Government Publication Date: 1999-Apr 30, 2024

Scott's Manufacturing Directory: Private SCT

Scott's Directories is a data bank containing information on over 200,000 manufacturers across Canada. Even though Scott's listings are voluntary, it is the most comprehensive database of Canadian manufacturers available. Information concerning a company's address, plant size, and main products are included in this database.

Government Publication Date: 1992-Mar 2011*

Ontario Spills: Provincial SPL

List of spills and incidents made available by the Ministry of the Environment, Conservation and Parks. This database identifies information such as location (approximate), type and quantity of contaminant, date of spill, environmental impact, cause, nature of impact, etc. Information from 1988-2002 was part of the ORIS (Occurrence Reporting Information System). The SAC (Spills Action Centre) handles all spills reported in Ontario. Regulations for spills in Ontario are part of the MOE's Environmental Protection Act, Part X. The Ministry of the Environment, Conservation and Parks cites the coronavirus pandemic as an explanation for delays in releasing data pursuant to requests. This database includes spill incidents that occurred in Mar 2023-Feb 2024 in addition to those listed in the Government Publication Date.

Government Publication Date: 1988-Jan 2023; see description

Wastewater Discharger Registration Database: Provincial SRDS

Facilities that report either municipal treated wastewater effluent or industrial wastewater discharges under the Effluent Monitoring and Effluent Limits (EMEL) and Municipal/Industrial Strategy for Abatement Regulations. The Municipal/Industrial Strategy for Abatement (MISA) division of the Ontario Ministry of Environment keeps record of direct dischargers of toxic pollutants within nine sectors including: Electric Power Generation, Mining, Petroleum Refining, Organic Chemicals, Inorganic Chemicals, Pulp & Paper, Metal Casting, Iron & Steel, and Quarries.

Government Publication Date: 1990-Dec 31, 2021

Anderson's Storage Tanks: Private TANK

The information provided in this database was collected by examining various historical documents, which identified the location of former storage tanks, containing substances such as fuel, water, gas, oil, and other various types of miscellaneous products. Information is available in regard to business operating at tank site, tank location, permit year, permit & installation type, no. of tanks installed & configuration and tank capacity. Data contained within this database pertains only to the city of Toronto and is not warranted to be complete, exhaustive or authoritative. The information was collected for research purposes only.

Government Publication Date: 1915-1953*

Transport Canada Fuel Storage Tanks: Federal TCFT

List of fuel storage tanks currently or previously owned or operated by Transport Canada. This inventory also includes tanks on The Pickering Lands, which refers to 7,530 hectares (18,600 acres) of land in Pickering, Markham, and Uxbridge owned by the Government of Canada since 1972; properties on this land has been leased by the government since 1975, and falls under the Site Management Policy of Transport Canada, but is administered by Public Works and Government Services Canada. This inventory provides information on the site name, location, tank age, capacity and fuel type.

Government Publication Date: 1970 - Apr 2023

Variances for Abandonment of Underground Storage Tanks: Provincial VAR

Listing of variances granted for storage tank abandonment. This is not a comprehensive or complete inventory of tank abandonment variances in the province; this listing is a copy of tank abandonment variance records previously obtained under Access to Public Information. In Ontario, registered underground storage tanks must be removed within two years of disuse; if removal of a tank is not feasible, an application may be sought for a variance from this code requirement.
Records are not verified for accuracy or completeness.

Government Publication Date: Feb 28, 2022

Waste Disposal Sites - MOE CA Inventory: Provincial WDS

The Ontario Ministry of Environment, Waste Management Branch, maintains an inventory of known open (active or inactive) and closed disposal sites in the Province of Ontario. Active sites maintain a Certificate of Approval, are approved to receive and are receiving waste. Inactive sites maintain Certificate(s) of Approval but are not receiving waste. Closed sites are not receiving waste. The data contained within this database was compiled from the MOE's Certificate of Approval database. Locations of these sites may be cross-referenced to the Anderson database described under ERIS's Private Source Database section, by the CA number. All new Environmental Compliance Approvals handed out after Oct 31, 2011 for Waste Disposal Sites will still be found in this database.

Government Publication Date: Oct 2011-Apr 30, 2024

Waste Disposal Sites - MOE 1991 Historical Approval Inventory: Provincial WDSH

In June 1991, the Ontario Ministry of Environment, Waste Management Branch, published the "June 1991 Waste Disposal Site Inventory", of all known active and closed waste disposal sites as of October 30st, 1990. For each "active" site as of October 31st 1990, information is provided on site location, site/CA number, waste type, site status and site classification. For each "closed" site as of October 31st 1990, information is provided on site location, site/CA number, closure date and site classification. Locations of these sites may be cross-referenced to the Anderson database described under ERIS's Private Source Database section, by the CA number.

Government Publication Date: Up to Oct 1990*

Water Well Information System: Provincial WWIS

This database describes locations and characteristics of water wells found within Ontario in accordance with Regulation 903. It includes such information as coordinates, construction date, well depth, primary and secondary use, pump rate, static water level, well status, etc. Also included are detailed stratigraphy information, approximate depth to bedrock and the approximate depth to the water table.

Government Publication Date: Dec 31 2023

Definitions

Database Descriptions: This section provides a detailed explanation for each database including: source, information available, time coverage, and acronyms used. They are listed in alphabetic order.

Detail Report: This is the section of the report which provides the most detail for each individual record. Records are summarized by location, starting with the project property followed by records in closest proximity.

Distance: The distance value is the distance between plotted points, not necessarily the distance between the sites' boundaries. All values are an approximation.

Direction: The direction value is the compass direction of the site in respect to the project property and/or center point of the report.

Elevation: The elevation value is taken from the location at which the records for the site address have been plotted. All values are an approximation. Source: Google Elevation API.

Executive Summary: This portion of the report is divided into 3 sections:

'Report Summary'- Displays a chart indicating how many records fall on the project property and, within the report search radii.

'Site Report Summary'-Project Property'- This section lists all the records which fall on the project property. For more details, see the 'Detail Report' section.

'Site Report Summary-Surrounding Properties'- This section summarizes all records on adjacent properties, listing them in order of proximity from the project property. For more details, see the 'Detail Report' section.

Map Key: The map key number is assigned according to closest proximity from the project property. Map Key numbers always start at #1. The project property will always have a map key of '1' if records are available. If there is a number in brackets beside the main number, this will indicate the number of records on that specific property. If there is no number in brackets, there is only one record for that property.

The symbol and colour used indicates 'elevation': the red inverted triangle will dictate 'ERIS Sites with Lower Elevation', the yellow triangle will dictate 'ERIS Sites with Higher Elevation' and the orange square will dictate 'ERIS Sites with Same Elevation.'

Unplottables: These are records that could not be mapped due to various reasons, including limited geographic information. These records may or may not be in your study area, and are included as reference.

APPENDIX 9
Contingent and limiting conditions

This environmental assessment is subject to, but not limited to, the following conditions :

- The environmental assessment represents the condition of the site as observed during our site visit. The information contained herein is provided to the best of our knowledge and in light of the data available to *Groupe C. Laganière (1995) inc*. at the time of writing.

- As portions of this report are based on information or reports prepared by others, therefore, *Groupe C. Laganière (1995) inc*. cannot be held responsible for all the information provided in this report.

- *Groupe C. Laganière (1995) Inc*. disclaims all responsibility for any conclusions that may prove erroneous due to the deliberate concealment or unavailability of relevant information.

- The property visit was conducted in a manner ensuring the health and safety of personnel. Consequently, only safely accessible sites were visited according to the methodology described in the report.

- No finishing work, such as walls or ceilings, was removed, damaged, or destroyed to allow visual inspection behind them.

- No analysis or sampling of soil, surface water, groundwater, air, or construction materials was performed as part of this assessment, except as specifically requested and recorded in this report.

- The identification of certain substances or equipment that may contain them, such as polychlorinated biphenyls (PCBs), asbestos, lead, mold, and urea-formaldehyde foam insulation (UFFI), is based solely on visual clues or documents found during the file review. It is not based on laboratory analysis unless otherwise indicated in Chapter 1, "Introduction." These substances may still be present on the property, even though no visual evidence was found during the site visit. They may be located behind walls, under ceilings, or in air vents. Consequently, *Groupe C. Laganière (1995) Inc*. does not guarantee the absence of substances such as PCBs, asbestos, UFFI, lead, or mold.

- The identification of ozone-depleting substances, radon, and electromagnetic interference is excluded from Phase I ESA, as the identification of these substances or interference is deemed irrelevant or impractical.

- Adjoining properties and structures were observed from the study site or from publicly accessible routes.

- The environmental assessment of the property may not be used in conjunction with any other environmental site assessment or audit unless written consent has been obtained from *Groupe C. Laganière (1995) Inc*. This document must be considered as a whole, and no part of it may be used separately.

- The signatories of this document are not obligated to appear in court as experts in connection with this appraisal unless prior agreement has been reached with the client.

- Possession of this report or a copy does not confer the right to reproduce or publish it, nor the right of use by anyone other than the customer, without the written consent of *Groupe C. Laganière (1995) Inc*. Any use made of it by a third party, or any decision based on its contents taken by such a third party, shall remain the sole responsibility of that party.

- This report and its conclusions do not constitute legal advice.

- Since environmental contamination can be highly localized and heterogeneous, the conclusions in this report apply only to the locations tested. Site-wide conclusions are provided for informational purposes only and do not guarantee the absence or presence of contamination or sources of contamination at locations other than those audited.

- The presence or absence of contamination or sources of contamination described in this study should be considered valid only for the period during which the site visit was conducted. These findings may change due to natural phenomena or human activities undertaken subsequently on the site or adjacent sites.

APPENDIX 10
Substances requiring special attention

GROUPE
C. LAGANIÈRE

Due to public concern about health effects and environmental protection legislation, certain substances require special attention. These substances are described in the following sections. The information presented here is primarily sourced from the Health Canada website, along with other provincial and territorial entities' websites.

Asbestos

Asbestos is a fibrous mineral known for its insulating and fire-retardant properties. It was commonly used in building materials from the 1930s to the 1990s. Asbestos was primarily employed for thermal insulation and soundproofing in buildings and homes, as well as for fireproofing. Asbestos was found in materials such as:

- Cement and plaster;
- Industrial furnaces and heating systems;
- Building insulation;
- Floor and ceiling tiles;
- House siding;
- Automotive and truck brake pads;
- Vehicle transmission components, such as clutches.

Asbestos fibers pose a significant health risk when inhaled, potentially causing cancer and other respiratory diseases. The hazard arises when asbestos-containing materials are damaged, cut, or disturbed, releasing fibers into the air.

Since the Hazardous Products Act came into effect in Canada in 1980, the use of certain types of asbestos in building materials has been prohibited. Since 2018, Canadian regulations have banned the import, sale, and use of asbestos, as well as the manufacture, import, sale, and use of asbestos-containing products, with some exceptions. However, asbestos fibers may still be present in constructions and materials installed before these laws and regulations were enacted.

Materials that may contain asbestos include:

- Insulation
- Flockings
- Asbestos cement materials (siding panels, soffit panels, pipes, etc.)
- Plaster, stucco and other decorative finishes
- Vinyl floor tiles on cement backing and their adhesives
- Ceiling tiles and their adhesives and suspended ceiling panels
- Gypsum panels and joint compounds
- Asphalt roofing shingles and bitumen roofing board
- Miscellaneous insulation (boiler, ventilation duct) and vermiculite insulation

Materials that do not contain asbestos include :

- Wood, natural stone, marble, stoneware, glass, plastics and metals

- Gypsum wallboard and joint compounds manufactured by North American companies since January 1, 1980
- Flocklining installed in buildings and civil engineering structures since February 15, 1990
- Thermal insulation installed in buildings and civil engineering structures since May 20, 1999

PCBs

The use of polychlorinated biphenyls (PCBs) in the manufacture of electrical equipment, such as transformers, fluorescent lamp ballasts, and capacitors, was common until the late 1970s. They were also used in caulking and sealants, cutting oils, inks, and paint additives. PCBs are highly persistent in the environment.

Federal PCB Regulation, DORS/91-152, prohibits the import, sale, and manufacture of PCBs, as well as their use in electrical equipment installed after July 1, 1980. However, the use of existing equipment containing PCBs is still permitted.

Halocarbons

Halocarbons are halogenated compounds that deplete the ozone layer. They are used in refrigeration, air conditioning, and fire extinguishing systems, as well as in the manufacture of solvents. The import, manufacture, use, and sale of certain halocarbons have been regulated since the 1990s under the Regulation Respecting Substances That Deplete the Ozone Layer.

Urea formaldehyde-based insulating foam

Urea-formaldehyde foam insulation (UFFI) was commonly used in new and existing construction in Canada during the 1970s, until it was banned in 1980 under the Hazardous Products Act. It was used to insulate and improve the thermal efficiency of industrial and commercial buildings, as well as older homes.

UFFI can release formaldehyde gas both during and after curing. When exposed to water, it can degrade and release additional formaldehyde gas. Additionally, UFFI can promote mold growth.

Lead-based paint

Lead was formerly used in paint both as a pigment and to promote drying. Since 1976, the Hazardous Products Act has restricted the lead content in coatings to 0.5% (by weight), equivalent to 5000 mg/kg. In 1991, discussions between Health Canada and paint manufacturers led to the phase-out of lead in paints. By 2010, regulations for lead-containing consumer products were implemented in Canada, further reducing the allowable lead content to 90 mg/kg.

Paints produced before 1976 may contain lead in concentrations that are harmful to human health. However, these paints pose a risk primarily when they peel or flake, as the lead-containing particles could be ingested or inhaled.

Leaded petrol

Lead was first used as an additive in gasoline in the 1920s. However, from the 1970s onwards, the use of unleaded gasoline increased. Since 1990, the use of leaded gasoline in automobiles has been banned in Canada under the Canadian Environmental Protection Act.

Therefore, gasoline produced and sold before 1990 may contain lead in concentrations that are harmful to human health.

Radon

Radon is a radioactive gas that emanates from uranium or thorium in soil and rocks. It occurs naturally, but its concentrations can vary from region to region.

Radon can migrate through cracks in the ground and infiltrate buildings, such as through cracks in foundations, slabs, pipe joints, drains, or sumps. This gas tends to accumulate in low, poorly ventilated areas of buildings.

Inhalation of radon can cause lung cancer. Exposure to radon can be quantified using a dosimeter over a three-month period, ideally during the winter.

Mold

Molds are filamentous fungi that can grow on building materials in homes and other buildings. Mold growth is typically the result of a moisture problem, such as condensation on surfaces due to excessive humidity, water leaks, seepage through roof or foundation cracks, or flooding.

When mold is present, air quality can be affected as spores and mycelium fragments disperse into the air and can be inhaled. Inhalation of these particles can lead to respiratory problems and asthma.