



October 7, 2021

Imperial Oil Limited
505 Quarry Park Blvd. SE
P.O. Box 2480, Station M
Calgary, AB
T2P 3M9

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2021 Ground Water Monitoring and Sampling Program Report
Site Address: 1490 Richmond Road, Ottawa, Ontario
Project Number: 01093
Facility Type: Operating commercial retail plaza
Limitation of liability, scope of report and third-party reliance: Appendix A

Sampling Events: March and August 2021

1 SCOPE OF WORK

- The scope of work was completed to fulfill the monitoring requirements outlined in Section 4.2.9 of Certificate of Property Use (CPU) number 5225-ADDSRF-B, issued on March 6, 2018, to ensure protection of the occupants of the building on the subject property (1490 Richmond Road, Ottawa, ON). Ground water monitoring benchmarks (GWB) were developed in the Risk Assessment (RA) number 8605-7G8NBY, to ensure that the potential soil vapour intrusion risk, if any, to building occupants on the subject property is reflective of the current subsurface conditions. If the concentrations of the parameters selected in the RA show an upward trend in three consecutive ground water samples or the long-term monitoring shows a statistically relevant upward trend and are above the GWB and/or Regulation 153/04 Table 3 site condition standards (SCS), contingency plans must be applied, as described in the RA. The GWB are included in Schedule G of CPU 5225-ADDSRF-B. The GWB along with the Ontario Regulation 153/04 Table 3 standards for an industrial/commercial/community property use with coarse textured soils and non-potable ground water use were used to assess ground water data from the subject property.
- Monitor MW-38 on a semi-annual basis for subsurface vapour concentrations, water levels and the presence or absence of phase-separated liquid petroleum.
- Collect ground water samples from MW-38 and submit to the laboratory for analysis of benzene, carbon tetrachloride, chloroform, 1,4-dichlorobenzene, 1,2-dichloroethane, 1,1,2-trichloroethane, trichloroethylene and petroleum hydrocarbon fraction (PHC) F1 on a semi-annual basis.

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

2 RESULTS

- Ground Water Monitoring (Date - Depth to Ground Water Range; Ground Water Direction)
 - March 25, 2021 – 2.57 mbgs; northerly, estimated based on location of the Ottawa River (Figure 1 and Table 1)
 - August 27, 2021 – 3.44 mbgs; northerly, estimated based on location of the Ottawa River (Figure 2 and Table 1)
- Monitoring Well Headspace Vapour (Date - Range)
 - March 25, 2021 – non-detectable (Table 1)
 - August 27, 2021 – non-detectable (Table 1)
- Liquid Petroleum Occurrence (Date - Observations)
 - March 25, 2021 – No measurable liquid petroleum (Figure 3 and Table 1)
 - August 27, 2021 – No measurable liquid petroleum (Figure 3 and Table 1)
- Ground Water Analytical Exceedances (Date - Wells)
 - March 25, 2021 – MW-38 (Figure 3 and Table 2)
 - August 27, 2021 – MW-38 (Figure 3 and Table 3)

3 METHODOLOGY

Subsurface Vapour Concentrations

All measurements of petroleum vapours in the monitor riser were made with a RKI Eagle 2 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.

Combustible Gas Detector Calibrations

RKI Eagle 2 calibration is checked on a daily basis in the field using a standard gas comprised of a known concentration of hexane in air (15% LEL). If the instrument readings are within $\pm 10\%$ of the standard gas value, then the instrument is deemed to be calibrated, however if the readings are greater than $\pm 10\%$ of the standard gas value then the instrument is re-calibrated 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 MW-38 on March 25 and August 27, 2021. The 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 (turbidity, dissolved oxygen, conductivity, temperature, pH and oxidation reduction potential) were monitored until stable readings were achieved. These parameters are considered to be stable when three consecutive readings met the following conditions:

- Turbidity – within 10% for values greater than 5 nephelometric turbidity units (NTU), or three values are less than 5 NTU
- Dissolved oxygen – within 10% for values greater than 0.5 mg/L, or three values are less than 0.5 mg/L
- Conductivity – within 3%
- Temperature – $\pm 1^{\circ}\text{C}$
- pH – ± 0.1 unit
- Oxidation reduction potential – ± 10 millivolts

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.

Purge water collected from the monitor during sampling activities was disposed of at the Veolia facility in Ottawa, Ontario, a MECP approved waste hauler and receiver.

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 Bureau Veritas Laboratories Inc. (BV Labs), a Standards Council of Canada 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.

4 DISCUSSION

The selected monitor MW-38 was sampled during two separate events in 2021.

All ground water samples were within the applicable GWB and the applicable Table 3 SCS for all parameters analysed, except the following:

- Benzene which exceeds the Table 3 SCS, but is within the GWB during the March and August events

2021 Ground Water Monitoring and Sampling Program
1490 Richmond Road, Ottawa, Ontario
Imperial Site Number: 300977
Project Number: 01093
October 7, 2021

Trends

Based on analytical data from the last three consecutive sampling events (September 2020, March 2021 and August 2021, as shown on Figure 3), the following observations were made:

- The measured ground water concentrations for all parameters sampled in MW-38 do not show an upward trend in the last three consecutive sampling events.

Based on the current results and concentration trends observed over the last three sampling events, no potential risk of soil vapour intrusion into the existing building at 1490 Richmond Road was identified.

As per Section 4.2.12 of the CPU 5225-ADDSPF-B, a copy of an annual report documenting all activities in relation to Part 4 (Director Requirements) of the CPU and undertaken during the previous calendar year, is to be submitted to the Director by March 31st of each year.

5 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.



Mark McLean, B.A.Sc. (Eng.)
Project Manager
Environmental Services



Sana Khan, P.Eng.
Project Manager
Environmental Services

Cc:

Tanya Fernandes-Peters (EXP)
Jessica Sherrard (Imperial)
Kelvyn Tremblay (Imperial)

Attachments:

Figure 1 – Ground Water Elevation Plan (March 25, 2021)

Figure 2 – Ground Water Elevation Plan (August 27, 2021)

Figure 3 – Ground Water Analytical Results - Petroleum Related Parameters and Select Volatile Organic Compounds

Table 1 – Ground Water Monitoring and Elevation Data

Table 2 – Ground Water Chemical Analysis - Petroleum Related Parameters and Select Volatile Organic Compounds -
March 2021

*2021 Ground Water Monitoring and Sampling Program
1490 Richmond Road, Ottawa, Ontario
Imperial Site Number: 300977
Project Number: 01093
October 7, 2021*

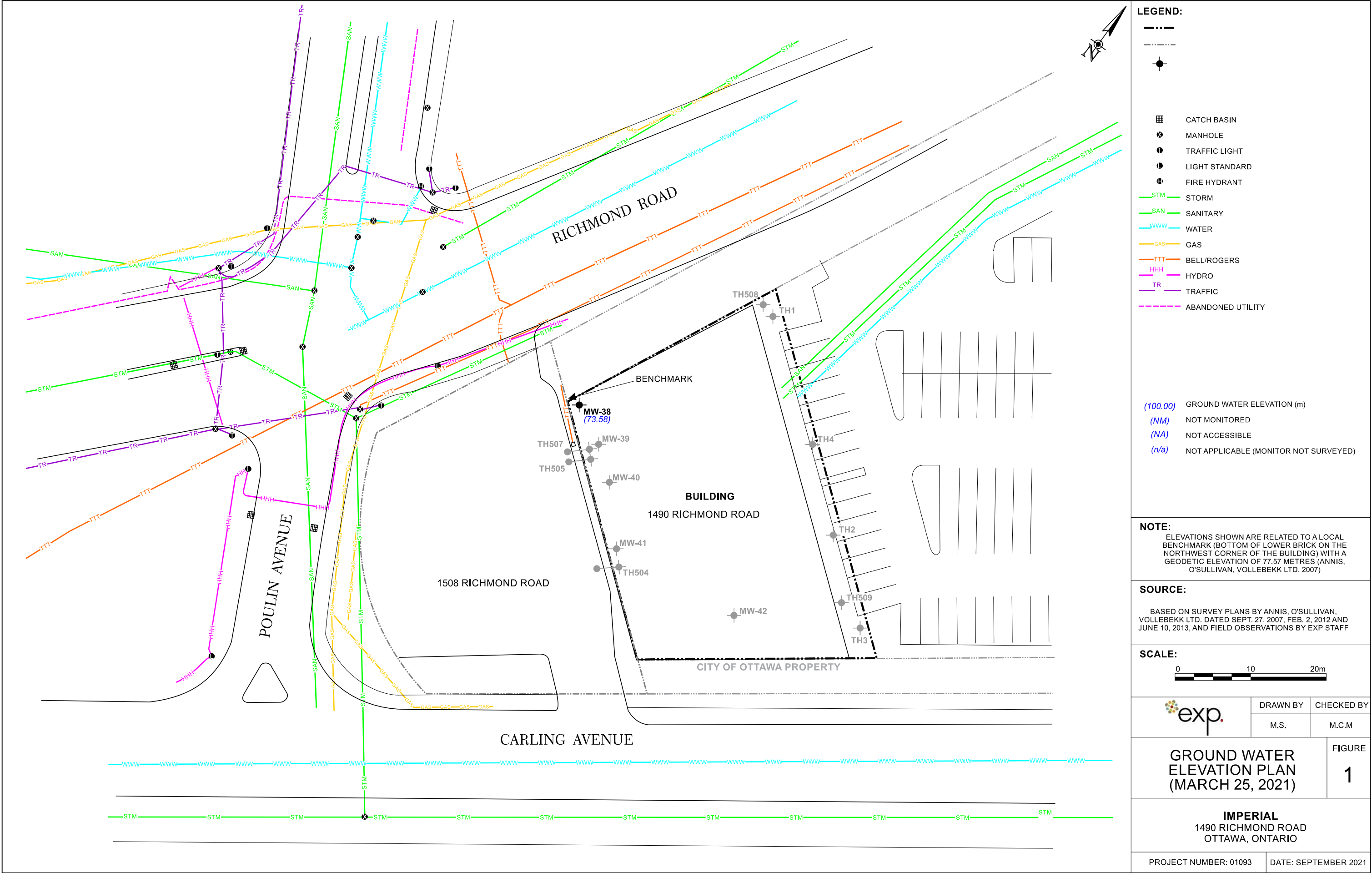
Table 3 – Ground Water Chemical Analysis - Petroleum Related Parameters and Select Volatile Organic Compounds - August 2021

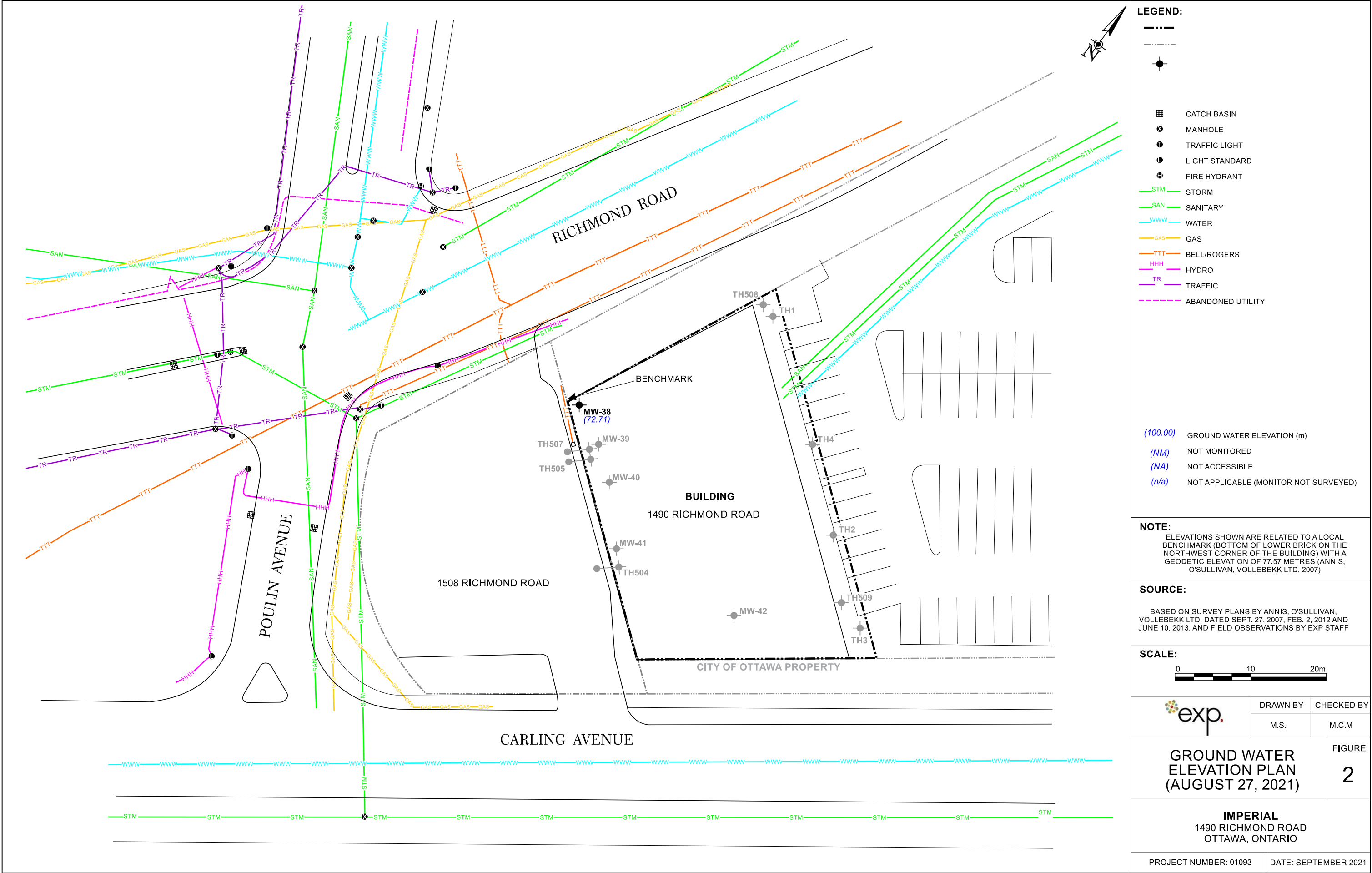
Appendix A – Limitation of Liability, Scope of Report and Third Party Reliance

Appendix B – Laboratory Certificates of Analysis

Appendix C – Quality Management, Control and Assurance

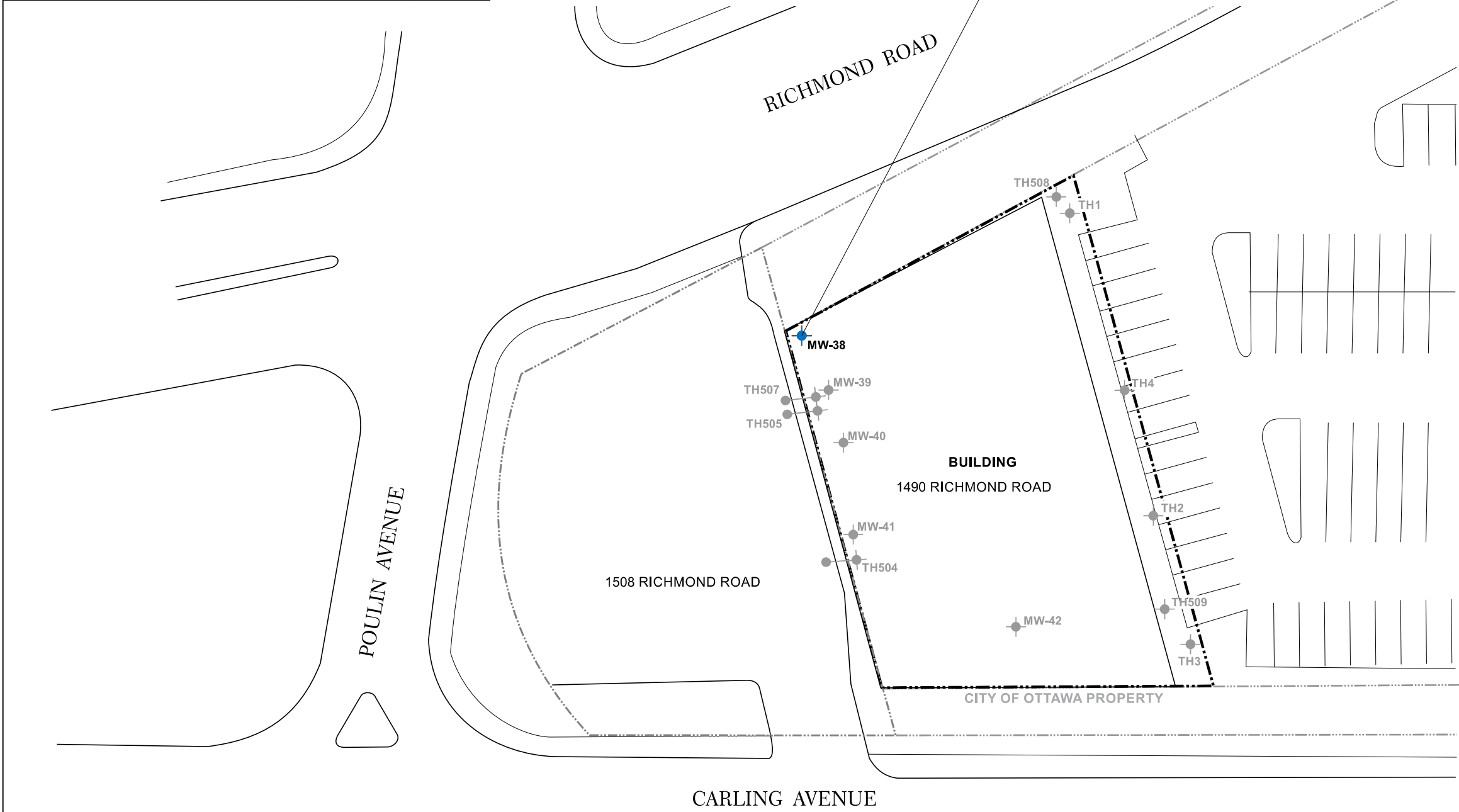
Figures





PARAMETER	ABBREVIATION	GROUND WATER MONITORING BENCHMARKS**	REG153/04 (2011) TABLE 3
BENZENE	B	2100	44
CARBON TETRACHLORIDE	CTC	<0.2	0.79
CHLOROFORM	CF	<2	2.4
1,4-DICHLOROBENZENE	1,4-DCB	<5	8
1,2-DICHLOROETHANE	1,2-DCA	<0.6	1.6
1,1,2-TRICHLOROETHANE	1,1,2-TCA	<0.5	4.7
TRICHLOROETHYLENE	TCE	0.3	1.6
F1 (C ₆ -C ₁₀) - BTEX	F1	890	750

MW38 Screen Interval: 1.8 to 4.8 mbgs									
DATE	B	CTC	CF	1,4-DCB	1,2-DCA	1,1,2-TCA	TCE	F1	
MAR15/18	2.6	<0.20	<0.20	<0.50	<0.50	<0.50	<0.20	<25	
SEP19/18	300	<0.20	<1.0	<2.5	<0.50	<2.5	<1.0	340	
MAR13/19	110	<0.20	<0.20	<0.50	<0.50	<0.50	<0.20	120	
JUL31/19	450	<0.20	<0.20	1.3	<0.50	<0.50	<0.20	270	
MAR25/20	<0.20	<0.19	<0.20	<0.40	<0.40	<0.40	<0.20	<25	
SEP24/20	160	<0.19	<0.20	0.55	<0.49	<0.40	<0.20	110	
MAR25/21	62	<0.19	<0.20	<0.40	<0.49	<0.40	<0.20	300	
AUG27/21	100	<0.19	<0.20	<0.40	<0.49	<0.40	<0.20	26	



LEGEND:

- SUBJECT PROPERTY BOUNDARY
- PROPERTY BOUNDARY
- TEST HOLE WITH MONITOR MW7 (AQUA TERRE, 1998) TH1 (BARENCO, 2007) TH500 SERIES (EXP, 2014)
- TEST HOLE WITH MONITOR (NOT PART OF CURRENT INVESTIGATION)
- MONITOR LOCATION WHERE MOST RECENT GROUND WATER SAMPLE MEETS GROUND WATER MONITORING BENCHMARKS AND **REG 153/04 TABLE 3** STANDARDS FOR ALL PARAMETERS THAT WERE ANALYSED
- MONITOR LOCATION WHERE MOST RECENT GROUND WATER SAMPLE EXCEEDS GROUND WATER MONITORING BENCHMARKS FOR AT LEAST ONE PARAMETER ANALYSED
- MONITOR LOCATION WHERE MOST RECENT GROUND WATER SAMPLE EXCEEDS REG 153/04 TABLE 3 STANDARDS FOR AT LEAST ONE PARAMETER
- MONITOR LOCATION WHERE NO GROUND WATER SAMPLE SUBMITTED FOR ANALYSIS DURING THE MOST RECENT GROUND WATER SAMPLING EVENT
- TEXT** EXCEEDANCES OF GROUND WATER MONITORING BENCHMARKS
- TEXT** EXCEEDANCES OF GROUND WATER **REG 153/04 TABLE 3** STANDARDS
- 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 COARSE TEXTURED SOILS IN A NON-POTABLE GROUND WATER CONDITION
- ** GROUND WATER MONITORING BENCHMARKS SHOWN ARE FROM SCHEDULE G OF CERTIFICATE OF PROPERTY USE 5225-ADDSRF-B

NOTE:

SOURCE:

BASED ON SURVEY PLANS BY ANNIS, O'SULLIVAN, VOLLEBEKK LTD, DATED SEPT. 27, 2007, FEB. 2, 2012 AND JUNE 10, 2013, AND FIELD OBSERVATIONS BY EXP STAFF

SCALE:

0 10 20m

	DRAWN BY	CHECKED BY
	M.S.	M.C.M

GROUND WATER ANALYTICAL RESULTS - PETROLEUM RELATED PARAMETERS AND SELECT VOLATILE ORGANIC COMPOUNDS	FIGURE 3
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IMPERIAL
1490 RICHMOND ROAD
OTTAWA, ONTARIO

PROJECT NUMBER: 01093	DATE: SEPTEMBER 2021
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Tables

GROUND WATER MONITORING AND ELEVATION DATA

1490 Richmond 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)
MW-38	76.10	76.15	1.8 to 4.8	15-Mar-18	nd	nd	2.76	73.39
				17-Sep-18	125	nd	3.37	72.78
				11-Mar-19	30	nd	3.40	72.75
				30-Jul-19	20	nd	3.01	73.14
				25-Mar-20	nd	nd	1.90	74.25
				24-Sep-20	10	nd	3.23	72.93
				25-Mar-21	nd	nd	2.57	73.58
				27-Aug-21	nd	nd	3.44	72.71

Note:

All measurements shown in metres (m), unless otherwise noted

Relative elevations shown above were determined from local benchmark (bottom of lower brick on the northwest corner of the building) with a geodetic elevation of 77.57 (Annis, O'Sullivan, Vollebakk Ltd., 2007)

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 <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

TH1 Series installed in 2007 (Barenco)

GROUND WATER CHEMICAL ANALYSIS - Petroleum Related Parameters and Select Volatile Organic Compounds

1490 Richmond Road, Ottawa, Ontario

March 2021 Sampling Event

Page 1 of 1

Sample Screen Interval (mbgs) Sample Date BV Labs I.D. BV Labs Job #	Monitor MW38 1.8 to 4.8 25-Mar-21 PEQ205 C182578	Ground Water Monitoring Benchmarks**	Ontario Regulation 153/04 Table 3 Ground Water Standards*
PARAMETERS			
<u>Volatile Organic Compounds</u>			
Benzene	62	2100	44
Carbon Tetrachloride	<0.19	<0.2	0.79
Chloroform	<0.20	<2	2.4
1,4-Dichlorobenzene	<0.40	<5	8
1,2-Dichloroethane	<0.49	<0.6	1.6
1,1,2-Trichloroethane	<0.40	<0.5	4.7
Trichloroethylene	<0.20	0.3	1.6
<u>Petroleum Hydrocarbons</u>			
F1 (C6 to C10 - BTEX)	300	890	750

Analysis by Bureau Veritas Laboratories Inc. (BV Labs)

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 BV Labs Job #)

* Standards shown are for all types of property use and coarse textured soils in a non-potable ground water condition

** Ground water monitoring benchmarks shown are from Schedule G of Certificate of Property Use 5225-ADDSRF-B

Exceedances of Ground Water Monitoring Benchmarks and/or Table 3 standards are shown in **bold**

GROUND WATER CHEMICAL ANALYSIS - Petroleum Related Parameters and Select Volatile Organic Compounds

1490 Richmond Road, Ottawa, Ontario

August 2021 Sampling Event

Page 1 of 1

Sample	Monitor MW38	Ground Water Monitoring Benchmarks**	Ontario Regulation 153/04 Table 3 Ground Water Standards*
Screen Interval (mbgs)	1.8 to 4.8		
Sample Date	27-Aug-21		
BV Labs I.D.	QNC414		
BV Labs Job #	C108001		
PARAMETERS			
<u>Volatile Organic Compounds</u>			
Benzene	100	2100	44
Carbon Tetrachloride	<0.19	<0.2	0.79
Chloroform	<0.20	<2	2.4
1,4-Dichlorobenzene	<0.40	<5	8
1,2-Dichloroethane	<0.49	<0.6	1.6
1,1,2-Trichloroethane	<0.40	<0.5	4.7
Trichloroethylene	<0.20	0.3	1.6
<u>Petroleum Hydrocarbons</u>			
F1 (C6 to C10 - BTEX)	26	890	750

Analysis by Bureau Veritas Laboratories Inc. (BV Labs)

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 BV Labs Job #)

* Standards shown are for all types of property use and coarse textured soils in a non-potable ground water condition

** Ground water monitoring benchmarks shown are from Schedule G of Certificate of Property Use 5225-ADDSRF-B

Exceedances of Ground Water Monitoring Benchmarks and/or 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 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.

Other than by Imperial, 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.



Attention: Sana Khan

EXP Energy Services Ltd.
220 Commerce Valley Dr. W
Suite 110
Markham, ON
CANADA L3T 0A8

Task Order#: 4410537879
Line Item: 10
Site#: JF.00446
Site Location: N/A;1508 RICHMOND ROAD, OTTAWA, ON
Project #: 01093
Your C.O.C. #: 818297-03-01

Report Date: 2021/04/01
Report #: R6578411
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C182578

Received: 2021/03/29, 16:09

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Laboratory Method	Analytical Method
Petroleum Hydro. CCME F1 & BTEX in Water	1	CAM SOP-00315	CCME PHC-CWS m
Volatile Organic Compounds in Water	1	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.

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.



Attention: Sana Khan

EXP Energy Services Ltd.
220 Commerce Valley Dr. W
Suite 110
Markham, ON
CANADA L3T 0A8

Task Order#: 4410537879

Line Item: 10

Site#: JF.00446

Site Location: N/A; 1508 RICHMOND ROAD, OTTAWA, ON

Project #: 01093

Your C.O.C. #: 818297-03-01

Report Date: 2021/04/01

Report #: R6578411

Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C182578

Received: 2021/03/29, 16:09

Encryption Key

Kyle Reinhart
CET LEAD-Air Toxics, Source
Evaluation
01 Apr 2021 15:10:27

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

BV Labs Job #: C182578

Report Date: 2021/04/01

EXP Energy Services Ltd.

Task Order#: 4410537879, Line Item: 10

Site#: JF.00446

Site Location: N/A; 1508 RICHMOND ROAD, OTTAWA, ON

Project #: 01093

VOLATILE ORGANICS BY GC/MS (WATER)

BV Labs ID		PEQ205		
Sampling Date		2021/03/25 17:00		
COC Number		818297-03-01		
	UNITS	MW-38	RDL	QC Batch
Benzene	ug/L	62	0.20	7273359
Carbon Tetrachloride	ug/L	<0.19	0.19	7273359
Chloroform	ug/L	<0.20	0.20	7273359
1,4-Dichlorobenzene	ug/L	<0.40	0.40	7273359
1,2-Dichloroethane	ug/L	<0.49	0.49	7273359
1,1,2-Trichloroethane	ug/L	<0.40	0.40	7273359
Trichloroethylene	ug/L	<0.20	0.20	7273359
Instrument				
Surrogate Recovery (%)				
4-Bromofluorobenzene	%	107		7273359
D4-1,2-Dichloroethane	%	107		7273359
D8-Toluene	%	94		7273359
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				



BUREAU
VERITAS

BV Labs Job #: C182578
Report Date: 2021/04/01

EXP Energy Services Ltd.
Task Order#: 4410537879, Line Item: 10
Site#: JF.00446
Site Location: N/A; 1508 RICHMOND ROAD, OTTAWA, ON
Project #: 01093

PETROLEUM HYDROCARBONS (CCME)

BV Labs ID		PEQ205		
Sampling Date		2021/03/25 17:00		
COC Number		818297-03-01		
	UNITS	MW-38	RDL	QC Batch
F1 (C6-C10)	ug/L	580	25	7275924
F1 (C6-C10) - BTEX	ug/L	300	25	7275924
Extraction Surrogate Recovery (%)				
D10-o-Xylene	%	104		7275924
Instrument Surrogate Recovery (%)				
1,4-Difluorobenzene	%	95		7275924
4-Bromofluorobenzene	%	105		7275924
D4-1,2-Dichloroethane	%	110		7275924
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				



BUREAU
VERITAS

BV Labs Job #: C182578
Report Date: 2021/04/01

EXP Energy Services Ltd.
Task Order#: 4410537879, Line Item: 10
Site#: JF.00446
Site Location: N/A;1508 RICHMOND ROAD, OTTAWA, ON
Project #: 01093

TEST SUMMARY

BV Labs ID: PEQ205
Sample ID: MW-38
Matrix: Water

Collected: 2021/03/25
Relinquished: 2021/03/29
Received: 2021/03/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7275924	N/A	2021/04/01	Ravinder Gaidhu
Volatile Organic Compounds in Water	GC/MS	7273359	N/A	2021/03/31	Blair Gannon



GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	1.0°C
Package 2	0.3°C

Sample PEQ205 [MW-38] : F1 BTEX analysis: The BTEX results used for the F1-BTEX calculation were obtained from Headspace-GC analysis.

Results relate only to the items tested.



QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7273359	BG1	Method Blank	4-Bromofluorobenzene	2021/03/31		98	%	70 - 130
			D4-1,2-Dichloroethane	2021/03/31		107	%	70 - 130
			D8-Toluene	2021/03/31		93	%	70 - 130
			Benzene	2021/03/31	<0.20		ug/L	
			Carbon Tetrachloride	2021/03/31	<0.19		ug/L	
			Chloroform	2021/03/31	<0.20		ug/L	
			1,4-Dichlorobenzene	2021/03/31	<0.40		ug/L	
			1,2-Dichloroethane	2021/03/31	<0.49		ug/L	
			1,1,2-Trichloroethane	2021/03/31	<0.40		ug/L	
			Trichloroethylene	2021/03/31	<0.20		ug/L	
7275924	RGA	Method Blank	1,4-Difluorobenzene	2021/03/31		101	%	70 - 130
			4-Bromofluorobenzene	2021/03/31		100	%	70 - 130
			D10-o-Xylene	2021/03/31		106	%	70 - 130
			D4-1,2-Dichloroethane	2021/03/31		113	%	70 - 130
			F1 (C6-C10)	2021/03/31	<25		ug/L	
			F1 (C6-C10) - BTEX	2021/03/31	<25		ug/L	
7273359	BG1	LCS	4-Bromofluorobenzene	2021/03/31		104	%	70 - 130
			D4-1,2-Dichloroethane	2021/03/31		101	%	70 - 130
			D8-Toluene	2021/03/31		104	%	70 - 130
			Benzene	2021/03/31		92	%	70 - 130
			Carbon Tetrachloride	2021/03/31		95	%	70 - 130
			Chloroform	2021/03/31		96	%	70 - 130
			1,4-Dichlorobenzene	2021/03/31		105	%	70 - 130
			1,2-Dichloroethane	2021/03/31		94	%	70 - 130
			1,1,2-Trichloroethane	2021/03/31		97	%	70 - 130
			Trichloroethylene	2021/03/31		102	%	70 - 130
7275924	RGA	LCS	1,4-Difluorobenzene	2021/03/31		95	%	70 - 130
			4-Bromofluorobenzene	2021/03/31		104	%	70 - 130
			D10-o-Xylene	2021/03/31		96	%	70 - 130
			D4-1,2-Dichloroethane	2021/03/31		99	%	70 - 130
			F1 (C6-C10)	2021/03/31		99	%	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.



BUREAU
VERITAS

BV Labs Job #: C182578
Report Date: 2021/04/01

EXP Energy Services Ltd.
Task Order#: 4410537879, Line Item: 10
Site#: JF.00446
Site Location: N/A; 1508 RICHMOND ROAD, OTTAWA, ON
Project #: 01093

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Anastassia Hamanov, 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.

Page 9 of 9

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: EXP Energy Services Ltd.

Sampling Date: March 25, 2021

Location: 1490 Richmond Road, Ottawa, ON

Laboratory : Bureau Veritas Laboratories Inc.

Consultant Project Number: 01093

Sample Submission Number: C182578

Are All Laboratory QC 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)?:

Not required

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)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by: Muhammad Sheikh
(Name)

Ahsan S
(Signature)

Date: September 28, 2021



Attention: Sana Khan

EXP Energy Services Ltd.
220 Commerce Valley Dr. W
Suite 110
Markham, ON
CANADA L3T 0A8

Task Order#: 4410537879
Line Item: 10
Site#: JF.00446
Site Location: N/A;1508 RICHMOND ROAD, OTTAWA, ON
Project #: 01093
Your C.O.C. #: 818297-01-01

Report Date: 2021/04/05

Report #: R6582224

Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C182576

Received: 2021/03/29, 16:09

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
Volatile Organic Compounds in Water	2	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.

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.



Attention: Sana Khan

EXP Energy Services Ltd.
220 Commerce Valley Dr. W
Suite 110
Markham, ON
CANADA L3T 0A8

Task Order#: 4410537879

Line Item: 10

Site#: JF.00446

Site Location: N/A; 1508 RICHMOND ROAD, OTTAWA, ON

Project #: 01093

Your C.O.C. #: 818297-01-01

Report Date: 2021/04/05

Report #: R6582224

Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C182576

Received: 2021/03/29, 16:09

Encryption Key

Kyle Reinhart
CET LEAD-Air Toxics, Source
Evaluation
05 Apr 2021 17:14:16

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.



VOLATILE ORGANICS BY GC/MS (WATER)

BV Labs ID		PEQ202	PEQ203		
Sampling Date		2021/03/25 17:30	2021/03/25 18:30		
COC Number		818297-01-01	818297-01-01		
	UNITS	F.BLANK	TRIP BLANK	RDL	QC Batch
Benzene	ug/L	<0.20	<0.20	0.20	7275536
Carbon Tetrachloride	ug/L	<0.19	<0.19	0.19	7275536
Chloroform	ug/L	<0.20	<0.20	0.20	7275536
1,4-Dichlorobenzene	ug/L	<0.40	<0.40	0.40	7275536
1,2-Dichloroethane	ug/L	<0.49	<0.49	0.49	7275536
1,1,2-Trichloroethane	ug/L	<0.40	<0.40	0.40	7275536
Trichloroethylene	ug/L	<0.20	<0.20	0.20	7275536
Instrument					
Surrogate Recovery (%)					
4-Bromofluorobenzene	%	94	93		7275536
D4-1,2-Dichloroethane	%	107	106		7275536
D8-Toluene	%	91	92		7275536
RDL = Reportable Detection Limit					
QC Batch = Quality Control Batch					



BUREAU
VERITAS

BV Labs Job #: C182576
Report Date: 2021/04/05

EXP Energy Services Ltd.
Task Order#: 4410537879, Line Item: 10
Site#: JF.00446
Site Location: N/A; 1508 RICHMOND ROAD, OTTAWA, ON
Project #: 01093

PETROLEUM HYDROCARBONS (CCME)

BV Labs ID		PEQ202	PEQ203		
Sampling Date		2021/03/25 17:30	2021/03/25 18:30		
COC Number		818297-01-01	818297-01-01		
	UNITS	F.BLANK	TRIP BLANK	RDL	QC Batch
F1 (C6-C10)	ug/L	<25	<25	25	7276225
F1 (C6-C10) - BTEX	ug/L	<25	<25	25	7276225
Extraction Surrogate Recovery (%)					
D10-o-Xylene	%	94	97		7276225
Instrument Surrogate Recovery (%)					
1,4-Difluorobenzene	%	102	103		7276225
4-Bromofluorobenzene	%	90	93		7276225
D4-1,2-Dichloroethane	%	96	95		7276225
RDL = Reportable Detection Limit QC Batch = Quality Control Batch					



BUREAU
VERITAS

BV Labs Job #: C182576
Report Date: 2021/04/05

EXP Energy Services Ltd.
Task Order#: 4410537879, Line Item: 10
Site#: JF.00446
Site Location: N/A; 1508 RICHMOND ROAD, OTTAWA, ON
Project #: 01093

TEST SUMMARY

BV Labs ID: PEQ202
Sample ID: F.BLANK
Matrix: Water

Collected: 2021/03/25
Relinquished: 2021/03/29
Received: 2021/03/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7276225	N/A	2021/03/31	Haibin Wu
Volatile Organic Compounds in Water	GC/MS	7275536	N/A	2021/04/01	Chandni Khawas

BV Labs ID: PEQ203
Sample ID: TRIP BLANK
Matrix: Water

Collected: 2021/03/25
Relinquished: 2021/03/29
Received: 2021/03/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7276225	N/A	2021/03/31	Haibin Wu
Volatile Organic Compounds in Water	GC/MS	7275536	N/A	2021/04/01	Chandni Khawas



GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	1.0°C
Package 2	0.3°C

Results relate only to the items tested.



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BV Labs Job #: C182576
Report Date: 2021/04/05

EXP Energy Services Ltd.
Task Order#: 4410537879, Line Item: 10
Site#: JF.00446
Site Location: N/A;1508 RICHMOND ROAD, OTTAWA, ON
Project #: 01093

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7275536	CKH	Method Blank	4-Bromofluorobenzene	2021/04/01		98	%	70 - 130
			D4-1,2-Dichloroethane	2021/04/01		109	%	70 - 130
			D8-Toluene	2021/04/01		91	%	70 - 130
			Benzene	2021/04/01	<0.20		ug/L	
			Carbon Tetrachloride	2021/04/01	<0.19		ug/L	
			Chloroform	2021/04/01	<0.20		ug/L	
			1,4-Dichlorobenzene	2021/04/01	<0.40		ug/L	
			1,2-Dichloroethane	2021/04/01	<0.49		ug/L	
			1,1,2-Trichloroethane	2021/04/01	<0.40		ug/L	
			Trichloroethylene	2021/04/01	<0.20		ug/L	
7276225	H_W	Method Blank	1,4-Difluorobenzene	2021/03/31		102	%	70 - 130
			4-Bromofluorobenzene	2021/03/31		89	%	70 - 130
			D10-o-Xylene	2021/03/31		94	%	70 - 130
			D4-1,2-Dichloroethane	2021/03/31		94	%	70 - 130
			F1 (C6-C10)	2021/03/31	<25		ug/L	
			F1 (C6-C10) - BTEX	2021/03/31	<25		ug/L	
7275536	CKH	LCS	4-Bromofluorobenzene	2021/04/01		104	%	70 - 130
			D4-1,2-Dichloroethane	2021/04/01		102	%	70 - 130
			D8-Toluene	2021/04/01		104	%	70 - 130
			Benzene	2021/04/01		95	%	70 - 130
			Carbon Tetrachloride	2021/04/01		100	%	70 - 130
			Chloroform	2021/04/01		99	%	70 - 130
			1,4-Dichlorobenzene	2021/04/01		101	%	70 - 130
			1,2-Dichloroethane	2021/04/01		97	%	70 - 130
			1,1,2-Trichloroethane	2021/04/01		97	%	70 - 130
			Trichloroethylene	2021/04/01		106	%	70 - 130
7276225	H_W	LCS	1,4-Difluorobenzene	2021/03/31		100	%	70 - 130
			4-Bromofluorobenzene	2021/03/31		96	%	70 - 130
			D10-o-Xylene	2021/03/31		91	%	70 - 130
			D4-1,2-Dichloroethane	2021/03/31		87	%	70 - 130
			F1 (C6-C10)	2021/03/31		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.



BUREAU
VERITAS

BV Labs Job #: C182576
Report Date: 2021/04/05

EXP Energy Services Ltd.
Task Order#: 4410537879, Line Item: 10
Site#: JF.00446
Site Location: N/A; 1508 RICHMOND ROAD, OTTAWA, ON
Project #: 01093

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.



DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: EXP Energy Services Ltd.

Sampling Date: March 25, 2021

Location: 1490 Richmond Road, Ottawa, ON

Laboratory : Bureau Veritas Laboratories Inc.

Consultant Project Number: 01093

Sample Submission Number: C182576

Are All Laboratory QC 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 were 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

Is data considered to be reliable (Yes/No)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by: Muhammad Sheikh
(Name)

Ahsan S
(Signature)

Date: September 28, 2021



Attention: Sana Khan

EXP Energy Services Ltd.
220 Commerce Valley Dr. W
Suite 110
Markham, ON
CANADA L3T 0A8

Task Order#: 4410537879
Line Item: 10
Site#: JF.00446
Site Location: 1508 RICHMOND ROAD, OTTAWA, ON
Project #: 01093
Your C.O.C. #: 842317-03-01

Report Date: 2021/09/07
Report #: R6799718
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C108001

Received: 2021/08/30, 18:00

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Laboratory Method	Analytical Method
Petroleum Hydro. CCME F1 & BTEX in Water	1	CAM SOP-00315	CCME PHC-CWS m
Volatile Organic Compounds in Water	1	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.

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.



Attention: Sana Khan

EXP Energy Services Ltd.
220 Commerce Valley Dr. W
Suite 110
Markham, ON
CANADA L3T 0A8

Task Order#: 4410537879

Line Item: 10

Site#: JF.00446

Site Location: 1508 RICHMOND ROAD, OTTAWA, ON

Project #: 01093

Your C.O.C. #: 842317-03-01

Report Date: 2021/09/07

Report #: R6799718

Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C108001

Received: 2021/08/30, 18:00

Encryption Key

Gina Baybayan
Project Manager
07 Sep 2021 13:16:55

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

BV Labs Job #: C108001

Report Date: 2021/09/07

EXP Energy Services Ltd.

Task Order#: 4410537879, Line Item: 10

Site#: JF.00446

Site Location: 1508 RICHMOND ROAD, OTTAWA, ON

Project #: 01093

VOLATILE ORGANICS BY GC/MS (WATER)

BV Labs ID		QNC414		
Sampling Date		2021/08/27 12:00		
COC Number		842317-03-01		
	UNITS	MW-38	RDL	QC Batch
Benzene	ug/L	100	0.20	7553166
Carbon Tetrachloride	ug/L	<0.19	0.19	7553166
Chloroform	ug/L	<0.20	0.20	7553166
1,4-Dichlorobenzene	ug/L	<0.40	0.40	7553166
1,2-Dichloroethane	ug/L	<0.49	0.49	7553166
1,1,2-Trichloroethane	ug/L	<0.40	0.40	7553166
Trichloroethylene	ug/L	<0.20	0.20	7553166
Instrument Surrogate Recovery (%)				
4-Bromofluorobenzene	%	92		7553166
D4-1,2-Dichloroethane	%	106		7553166
D8-Toluene	%	91		7553166
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				



BUREAU
VERITAS

BV Labs Job #: C108001

Report Date: 2021/09/07

EXP Energy Services Ltd.

Task Order#: 4410537879, Line Item: 10

Site#: JF.00446

Site Location: 1508 RICHMOND ROAD, OTTAWA, ON

Project #: 01093

PETROLEUM HYDROCARBONS (CCME)

BV Labs ID		QNC414		
Sampling Date		2021/08/27 12:00		
COC Number		842317-03-01		
	UNITS	MW-38	RDL	QC Batch
F1 (C6-C10)	ug/L	120	25	7556828
F1 (C6-C10) - BTEX	ug/L	26	25	7556828
Extraction Surrogate Recovery (%)				
D10-o-Xylene	%	110		7556828
Instrument Surrogate Recovery (%)				
1,4-Difluorobenzene	%	101		7556828
4-Bromofluorobenzene	%	97		7556828
D4-1,2-Dichloroethane	%	100		7556828
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				



BUREAU
VERITAS

BV Labs Job #: C108001

Report Date: 2021/09/07

EXP Energy Services Ltd.

Task Order#: 4410537879, Line Item: 10

Site#: JF.00446

Site Location: 1508 RICHMOND ROAD, OTTAWA, ON

Project #: 01093

TEST SUMMARY

BV Labs ID: QNC414

Sample ID: MW-38

Matrix: Water

Collected: 2021/08/27

Relinquished: 2021/08/30

Received: 2021/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7556828	N/A	2021/09/03	Domnica Andronesco
Volatile Organic Compounds in Water	GC/MS	7553166	N/A	2021/09/02	Ancheol Jeong



BUREAU
VERITAS

BV Labs Job #: C108001

Report Date: 2021/09/07

EXP Energy Services Ltd.

Task Order#: 4410537879, Line Item: 10

Site#: JF.00446

Site Location: 1508 RICHMOND ROAD, OTTAWA, ON

Project #: 01093

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	9.0°C
-----------	-------

Sample QNC414 [MW-38] : F1 BTEX analysis :The BTEX results used for the F1-BTEX calculation were obtained from Headspace-GC analysis

Results relate only to the items tested.



BUREAU
VERITAS

BV Labs Job #: C108001

Report Date: 2021/09/07

EXP Energy Services Ltd.

Task Order#: 4410537879, Line Item: 10

Site#: JF.00446

Site Location: 1508 RICHMOND ROAD, OTTAWA, ON

Project #: 01093

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7553166	AJG	Method Blank	4-Bromofluorobenzene	2021/09/02		93	%	70 - 130
			D4-1,2-Dichloroethane	2021/09/02		104	%	70 - 130
			D8-Toluene	2021/09/02		93	%	70 - 130
			Benzene	2021/09/02	<0.20		ug/L	
			Carbon Tetrachloride	2021/09/02	<0.19		ug/L	
			Chloroform	2021/09/02	<0.20		ug/L	
			1,4-Dichlorobenzene	2021/09/02	<0.40		ug/L	
			1,2-Dichloroethane	2021/09/02	<0.49		ug/L	
			1,1,2-Trichloroethane	2021/09/02	<0.40		ug/L	
			Trichloroethylene	2021/09/02	<0.20		ug/L	
7556828	DAN	Method Blank	1,4-Difluorobenzene	2021/09/03		102	%	70 - 130
			4-Bromofluorobenzene	2021/09/03		90	%	70 - 130
			D10-o-Xylene	2021/09/03		108	%	70 - 130
			D4-1,2-Dichloroethane	2021/09/03		98	%	70 - 130
			F1 (C6-C10)	2021/09/03	<25		ug/L	
			F1 (C6-C10) - BTEX	2021/09/03	<25		ug/L	
7553166	AJG	LCS	4-Bromofluorobenzene	2021/09/02		100	%	70 - 130
			D4-1,2-Dichloroethane	2021/09/02		99	%	70 - 130
			D8-Toluene	2021/09/02		106	%	70 - 130
			Benzene	2021/09/02		93	%	70 - 130
			Carbon Tetrachloride	2021/09/02		100	%	70 - 130
			Chloroform	2021/09/02		101	%	70 - 130
			1,4-Dichlorobenzene	2021/09/02		114	%	70 - 130
			1,2-Dichloroethane	2021/09/02		97	%	70 - 130
			1,1,2-Trichloroethane	2021/09/02		103	%	70 - 130
			Trichloroethylene	2021/09/02		106	%	70 - 130
7556828	DAN	LCS	1,4-Difluorobenzene	2021/09/03		98	%	70 - 130
			4-Bromofluorobenzene	2021/09/03		104	%	70 - 130
			D10-o-Xylene	2021/09/03		103	%	70 - 130
			D4-1,2-Dichloroethane	2021/09/03		97	%	70 - 130
			F1 (C6-C10)	2021/09/03		96	%	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.



BUREAU
VERITAS

BV Labs Job #: C108001

Report Date: 2021/09/07

EXP Energy Services Ltd.

Task Order#: 4410537879, Line Item: 10

Site#: JF.00446

Site Location: 1508 RICHMOND ROAD, OTTAWA, ON

Project #: 01093

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.

Page 9 of 9

DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: EXP Energy Services Ltd.

Sampling Date: August 27, 2021

Location: 1490 Richmond Road, Ottawa, ON

Laboratory : Bureau Veritas Laboratories Inc.

Consultant Project Number: 01093

Sample Submission Number: C108001

Are All Laboratory QC 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)?:

Not required

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)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by: Muhammad Sheikh
(Name)

Ahsan S
(Signature)

Date: September 28, 2021



Attention: Sana Khan

EXP Energy Services Ltd.
220 Commerce Valley Dr. W
Suite 110
Markham, ON
CANADA L3T 0A8

Task Order#: 4410537879
Line Item: 10
Site#: JF.00446
Site Location: 1508 RICHMOND ROAD, OTTAWA, ON
Project #: 01093
Your C.O.C. #: 842300-03-01

Report Date: 2021/09/08
Report #: R6801511
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BV LABS JOB #: C107999

Received: 2021/08/30, 18:00

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
Volatile Organic Compounds in Water	2	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.

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.



Attention: Sana Khan

EXP Energy Services Ltd.
220 Commerce Valley Dr. W
Suite 110
Markham, ON
CANADA L3T 0A8

Task Order#: 4410537879

Line Item: 10

Site#: JF.00446

Site Location: 1508 RICHMOND ROAD, OTTAWA, ON

Project #: 01093

Your C.O.C. #: 842300-03-01

Report Date: 2021/09/08

Report #: R6801511

Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BV LABS JOB #: C107999

Received: 2021/08/30, 18:00

Encryption Key

Gina Baybayan
Project Manager
08 Sep 2021 13:44:21

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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BV Labs Job #: C107999

Report Date: 2021/09/08

EXP Energy Services Ltd.

Task Order#: 4410537879, Line Item: 10

Site#: JF.00446

Site Location: 1508 RICHMOND ROAD, OTTAWA, ON

Project #: 01093

BTEX/F1-F2 IN WATER (WATER)

BV Labs ID		QNC411	QNC412		
Sampling Date		2021/08/27 13:30	2021/08/27 14:30		
COC Number		842300-03-01	842300-03-01		
	UNITS	F.BLANK	TRIP BLANK	RDL	QC Batch
F1 (C6-C10)	ug/L	<25	<25	25	7557207
F1 (C6-C10) - BTEX	ug/L	<25	<25	25	7557207
Extraction Surrogate Recovery (%)					
D10-o-Xylene	%	89	101		7557207
Instrument Surrogate Recovery (%)					
1,4-Difluorobenzene	%	99	96		7557207
4-Bromofluorobenzene	%	98	96		7557207
D4-1,2-Dichloroethane	%	111	104		7557207
RDL = Reportable Detection Limit					
QC Batch = Quality Control Batch					



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BV Labs Job #: C107999
Report Date: 2021/09/08

EXP Energy Services Ltd.
Task Order#: 4410537879, Line Item: 10
Site#: JF.00446
Site Location: 1508 RICHMOND ROAD, OTTAWA, ON
Project #: 01093

VOLATILE ORGANICS BY GC/MS (WATER)

BV Labs ID		QNC411	QNC412		
Sampling Date		2021/08/27 13:30	2021/08/27 14:30		
COC Number		842300-03-01	842300-03-01		
	UNITS	F.BLANK	TRIP BLANK	RDL	QC Batch
Benzene	ug/L	<0.20	<0.20	0.20	7553166
Carbon Tetrachloride	ug/L	<0.19	<0.19	0.19	7553166
Chloroform	ug/L	<0.20	<0.20	0.20	7553166
1,4-Dichlorobenzene	ug/L	<0.40	<0.40	0.40	7553166
1,2-Dichloroethane	ug/L	<0.49	<0.49	0.49	7553166
1,1,2-Trichloroethane	ug/L	<0.40	<0.40	0.40	7553166
Trichloroethylene	ug/L	<0.20	<0.20	0.20	7553166
Instrument					
Surrogate Recovery (%)					
4-Bromofluorobenzene	%	91	90		7553166
D4-1,2-Dichloroethane	%	108	108		7553166
D8-Toluene	%	92	91		7553166
RDL = Reportable Detection Limit					
QC Batch = Quality Control Batch					



BV Labs Job #: C107999
Report Date: 2021/09/08

EXP Energy Services Ltd.
Task Order#: 4410537879, Line Item: 10
Site#: JF.00446
Site Location: 1508 RICHMOND ROAD, OTTAWA, ON
Project #: 01093

TEST SUMMARY

BV Labs ID: QNC411
Sample ID: F.BLANK
Matrix: Water

Collected: 2021/08/27
Relinquished: 2021/08/30
Received: 2021/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7557207	N/A	2021/09/03	Domnica Andronesco
Volatile Organic Compounds in Water	GC/MS	7553166	N/A	2021/09/02	Ancheol Jeong

BV Labs ID: QNC412
Sample ID: TRIP BLANK
Matrix: Water

Collected: 2021/08/27
Relinquished: 2021/08/30
Received: 2021/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	7557207	N/A	2021/09/03	Domnica Andronesco
Volatile Organic Compounds in Water	GC/MS	7553166	N/A	2021/09/02	Ancheol Jeong



GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	9.0°C
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Revised Report (2021/09/08). Results have been split into separate report per client request. Selected VOCs and F2 not included in this report.

Results relate only to the items tested.



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BV Labs Job #: C107999
Report Date: 2021/09/08

EXP Energy Services Ltd.
Task Order#: 4410537879, Line Item: 10
Site#: JF.00446
Site Location: 1508 RICHMOND ROAD, OTTAWA, ON
Project #: 01093

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7553166	AJG	Method Blank	4-Bromofluorobenzene	2021/09/02		93	%	70 - 130
			D4-1,2-Dichloroethane	2021/09/02		104	%	70 - 130
			D8-Toluene	2021/09/02		93	%	70 - 130
			Benzene	2021/09/02	<0.20		ug/L	
			Carbon Tetrachloride	2021/09/02	<0.19		ug/L	
			Chloroform	2021/09/02	<0.20		ug/L	
			1,4-Dichlorobenzene	2021/09/02	<0.40		ug/L	
			1,2-Dichloroethane	2021/09/02	<0.49		ug/L	
			1,1,2-Trichloroethane	2021/09/02	<0.40		ug/L	
			Trichloroethylene	2021/09/02	<0.20		ug/L	
7557207	DAN	Method Blank	1,4-Difluorobenzene	2021/09/03		96	%	70 - 130
			4-Bromofluorobenzene	2021/09/03		97	%	70 - 130
			D10-o-Xylene	2021/09/03		100	%	70 - 130
			D4-1,2-Dichloroethane	2021/09/03		103	%	70 - 130
			F1 (C6-C10)	2021/09/03	<25		ug/L	
7553166	AJG	LCS	F1 (C6-C10) - BTEX	2021/09/03	<25		ug/L	
			4-Bromofluorobenzene	2021/09/02		100	%	70 - 130
			D4-1,2-Dichloroethane	2021/09/02		99	%	70 - 130
			D8-Toluene	2021/09/02		106	%	70 - 130
			Benzene	2021/09/02		93	%	70 - 130
			Carbon Tetrachloride	2021/09/02		100	%	70 - 130
			Chloroform	2021/09/02		101	%	70 - 130
			1,4-Dichlorobenzene	2021/09/02		114	%	70 - 130
			1,2-Dichloroethane	2021/09/02		97	%	70 - 130
			1,1,2-Trichloroethane	2021/09/02		103	%	70 - 130
7557207	DAN	LCS	Trichloroethylene	2021/09/02		106	%	70 - 130
			1,4-Difluorobenzene	2021/09/03		90	%	70 - 130
			4-Bromofluorobenzene	2021/09/03		104	%	70 - 130
			D10-o-Xylene	2021/09/03		80	%	70 - 130
			D4-1,2-Dichloroethane	2021/09/03		104	%	70 - 130
			F1 (C6-C10)	2021/09/03		111	%	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.



BUREAU
VERITAS

BV Labs Job #: C107999

Report Date: 2021/09/08

EXP Energy Services Ltd.

Task Order#: 4410537879, Line Item: 10

Site#: JF.00446

Site Location: 1508 RICHMOND ROAD, OTTAWA, ON

Project #: 01093

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.



DATA QUALITY REVIEW CHECKLIST - IMPERIAL OIL PROJECTS

Consultant: EXP Energy Services Ltd.

Sampling Date: August 27, 2021

Location: 1490 Richmond Road, Ottawa, ON

Laboratory : Bureau Veritas Laboratories Inc.

Consultant Project Number: 01093

Sample Submission Number: C107999

Are All Laboratory QC 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 were 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

Is data considered to be reliable (Yes/No)?: Yes

If answer is "No", describe and provide rationale:

Data Reviewed by: Muhammad Sheikh
(Name)

Ahsan S
(Signature)

Date: September 28, 2021

Appendix C – Quality Management, Control and Assurance



QUALITY MANAGEMENT, CONTROL AND ASSURANCE

1 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 which sets out specific data quality requirements. Any non-compliance with this contract will be reported in the completed certificate of analysis with any data quality items noted in the general comments section of the report.

2 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 or bottles with Teflon-lined lids containing an appropriate preservative, where required
- 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.

3 Laboratory Quality Assurance/Quality Control

All laboratory analyses were completed by the Mississauga facility of Bureau Veritas Laboratories Inc. (BV Labs). This 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*”. BV Labs 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 BV Labs based on the assurance from BV Labs 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 and Conservation and Parks (MECP) 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.

4 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 two field blanks and two trip blanks for benzene, carbon tetrachloride, chloroform, 1,4-dichlorobenzene, 1,2-dichloroethane, 1,1,2-trichloroethane, trichloroethylene, and PHC F1.

The ground water trip blank and field blank data were compared to the alert limits and are provided in Table C-1. 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.

GROUND WATER CHEMICAL ANALYSIS - Petroleum Related Parameters and Select Volatile Organic Compounds

Field Blank and Trip Blank

1490 Richmond Road, Ottawa, Ontario

Sample Sample Date BV Labs I.D. BV Labs Job #	F.BLANK 25-Mar-21 PEQ202 C182576	TRIP BLANK 25-Mar-21 PEQ203 C182576	F.BLANK 27-Aug-21 QNC411 C1O7999	TRIP BLANK 27-Aug-21 QNC412 C1O7999			Alert Limit
PARAMETERS							
<u>Volatile Organic Compounds</u>							
Benzene	<0.20	<0.20	<0.20	<0.20			1X RDL
Carbon Tetrachloride	<0.19	<0.19	<0.19	<0.19			1X RDL
Chloroform	<0.20	<0.20	<0.20	<0.20			1X RDL
1,4-Dichlorobenzene	<0.40	<0.40	<0.40	<0.40			1X RDL
1,2-Dichloroethane	<0.49	<0.49	<0.49	<0.49			1X RDL
1,1,2-Trichloroethane	<0.40	<0.40	<0.40	<0.40			1X RDL
Trichloroethylene	<0.20	<0.20	<0.20	<0.20			1X RDL
<u>Petroleum Hydrocarbons</u>							
F1 (C6 to C10 - BTEX)	<25	<25	<25	<25			1X RDL

Analysis by Bureau Veritas Laboratories Inc. (BV Labs)

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 BV Labs Job #)

Exceedances of alert limits are shown in **bold**