Hydrogeological Study Report
Proposed Retail Fuel Outlet
1618, 1622 Roger Stevens Drive
Kars, Ontario K0A 2E0

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Prepared for:
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LIST OF ACRONYMS

AWWA	American Water Works Association
bgs	Below ground surface
CFU	Colony Forming Units
DST	DST Consulting Engineers Inc.
HP	Horsepower
I.D.	Inner diameter
L	Litres
Lpm	Litres per minute
m	Metre
M^2	Square metre
M^3	Cubic metre
min	Minute
mg/L	Milligram per litre, equivalent to one part per million
MOECC	Ontario Ministry of the Environment and Climate Change
MW	Monitoring Well
NTU	Nephelometric Turbidity Unit
PIN	Parcel Identification Number
PW	Pumping Well
SC	Specific Capacity
ON	Ontario
TCU	True Colour Units
TDS	Total Dissolved Solids
TSS	Total Suspended Solids
US	United States
µg/L	Microgram per litre, equivalent to one part per billion

1 INTRODUCTION

DST Consulting Engineers Inc. (DST) was retained by Parkland Fuel Corporation on behalf of Invecta Development (Ottawa) Corporation ("Invecta" or "proponent") to conduct a hydrogeological study at the property located at 1622 Roger Stevens Drive (Regional Road 6), in Kars, Ontario (the "Site"). The Site location is presented in Figure 1 (Appendix A).

The subject Site is located on the south side of the Roger Stevens Drive on the part of Lot 21, Concession 1 (Part 1, Plan 5R-4485, and PIN 39130135), former Township of North Gower, now the City of Ottawa and measures approximately 0.4 ha in size. At the time of this study, the Site was developed with a single-storey commercial building located on the central portion of the Site, and a two-storey residential dwelling located on the southeast portion of the Site. Asphalt paved parking lot was situated to the north and east of the commercial building (Figure 2, Appendix A). Reportedly the residence was serviced by a buried domestic water well and a septic system. The commercial and residential buildings were not occupied during the hydrogeological study. The Site is currently zoned as RC2.

The remaining exterior areas consisted of landscaped and vegetated areas. The Site is bounded by a funeral home (Tubman Funeral Homes) to the east, residential lands to the north. The Site is surrounded to the south and west by a more substantial property measuring 3.6 ha (1618, Roger Stevens Drive, part of Lot 21 and Concession 1) is also owned by the proponent and currently zoned as DR1. The proposed septic system for the proposed retail fuel outlet development will extend onto this property (Figure 2, Appendix A). The nearest surface water body is Stevens Creek located approximately 158 m southwest of the Site.

It is understood that the proposed retail fuel outlet will include a one-storey retail store with no basement level including a quick service restaurant, a gas pump island with an overhead canopy, underground storage tanks, an asphalt-paved parking lot, and a raised septic system to be installed in the larger southern parcel owned by the proponent. It is proposed that the new retail fuel outlet will be privately serviced with groundwater supply well and septic system (Figure 2, Appendix A).

1.1 Objectives and Scope of Work

The aim of the hydrogeological study was to construct a new groundwater supply well to meet the daily water supply demand of the proposed retail fuel outlet at the Site. The hydrogeological study investigation involved the following activities.

- Collection, review, and analysis of the Site and surrounding area background information;
- supervision of water supply well construction at the location identified by proponent engineering design team;
- assessment of groundwater quality and quantity; and
- recommendations on the safe yield for the new water supply well.

2 STUDY METHODOLOGY

This hydrogeological study was completed in general accordance with the Ontario Ministry of the Environment and Climate Change (MOECC) procedure D 5-5: Technical Guideline for Private Wells: Water Supply Assessment (August 1996).

Methodologies or procedures applied to carry out the key hydrogeological study tasks are described in this Section.

2.1 Background Information Review

DST reviewed readily available maps, reports, and records providing information pertinent to the geological and hydrogeological setting of the Site and surrounding areas. The list of available reports and drawings for the Site is as follows:

- *Environmental Impact Assessment (May 1, 2018) – Initial Report, Proposed Retail Fuel Outlet,* Prepared by Kilgour Associates Ltd. (Terrapex).
- *Site Servicing and Grading Plans (May 1, 2018), prepared by blueprint2build.*
- *Final Phase II Environmental Site Assessment (April 6, 2018),* Prepared by Terrapex Environmental Limited (Ltd.) (Terrapex).
- *Draft On-Site Sewage Treatment and Disposal Sytem Design Drawings (April 1, 2018),* Prepared by WSP.
- *Final Draft Geotechnical Due Diligence Investigation Report (March 15, 2018), Proposed Retail Fuel Outlet,* Prepared by Alston Associates (Alston).

The hydrogeological study for the proposed development requires background information on the Site and surrounding area physical and hydrogeological setting. The background information on the Site and surrounding area physical setting would describe the physical system (i.e., surface topography, drainage, geology, and stratigraphy) in terms of parameters that do not change with time. The background information on the Site and surrounding area hydrogeological setting would describe the occurrence, distribution, and flow of groundwater in the porous, unconsolidated materials and fractured bedrock. The background information review phase of this hydrogeological study involved an extensive review of the readily available literature and data to develop a conceptual understanding of the important aspects of the physical and hydrogeological system within the Site and surrounding area. Literature and data sources used to develop the conceptual understanding of the Site and surrounding area are referenced or cited throughout this report.

2.2 Installation of a New Water Supply Well

Prior to carrying out the well drilling program, the well location was laid out in the field by DST and cleared of existing underground utility services by the relevant agencies. The well PW01-18 (152 mm I.D.) was constructed using an air rotary percussion hammer on May 29, 2018, and soil sampling was not possible with this type of well construction method. The overburden and top two metres of the bedrock was cased with a 152 mm (I.D.) steel pipe to a depth of 20.28 metres

(m) below ground surface (bgs). The well casing was pressure grouted with high early cement to seal the annulus. The water supply well PW01-18 was completed as an open hole in the bedrock.

Table 2-1: Well Construction Details – PW01-18

Well ID	Depth (m bgs)	Length of Casing (m bgs)	Stick-up Height (m)	Approximate Depth to the Bedrock Interface (m bgs)	Open Cased Stratigraphic Unit
PW01-18	54.86	20.28	1.025	18.28	Dolostones of Paleozoic Oxford Formation

Note: m bgs - metres below ground surface

The new water supply well was developed on May 30, 2018 by compressed air surging and over pumping to remove all debris. After the completion of well development, the well was chlorinated per the MOECC protocol and was left undisturbed for at least 72 hours. The well was installed and developed by Bourgeois Well Drilling Ltd. of Chrysler, Ontario.

2.3 Aquifer Testing and Groundwater Sampling Program

To assess the quantity and quality of groundwater available for the proposed development, the new water supply well PW01-18 was subjected to a constant rate pumping test for a period of six hours on June 5, 2018. The constant rate pumping test was conducted using a Schaefer ¾ HP electric submersible powered by a portable generator. The submersible pump was placed approximately three metres above the well bottom in the close proximity of the possible major water-bearing zones to use maximum available drawdown. The well was pumped at a constant rate of 25 Litres per minute (Lpm) based on the results of well yield test completed by the driller.

The pumping test was initiated with a static water level and was performed at a fixed pumping rate. During the pumping test, water well measurements were made on a regular basis to manually and electronically monitor the drawdown of the water level in PW01-18 and shallow overburden monitoring wells MW106 and MW108 (observation wells) in response to pumping at a constant rate. Immediately following the pumping test, water level recovery was monitored in PW01-18 and observation wells until 100% recovery.

In addition to monitoring groundwater level changes over the time, barometric pressure was monitored using a Solinst™ baro-logger.

Groundwater pumped during the test was discharged to a down-gradient location to ensure that artificial recharge did not occur.

A total of two (2) groundwater samples (PW01-18 A and PW01-18 B) were collected at 3-hour and 6-hour marks during the six-hour aquifer testing program. The groundwater samples were submitted to Maxxam Analytics Inc. (Maxxam) in Mississauga, Ontario, for analysis of inorganic, general chemistry, nutrients, metal, and microbiological parameters by approved methodologies.

Maxxam is accredited by the Standards Council of Canada according to protocols provided by the Canadian Association of Environmental Analytical Laboratories (CAEAL) and employs in-house quality assurance and quality control programs to govern sample analysis including the analysis of method blanks, spiked blanks, and the analysis of duplicates (10%) for each sample batch.

3 PHYSICAL SETTING

3.1 Site Physiography and Drainage

Based on the available physiographic mapping, the Site is located within North Gower Drumlin field. This physiographic region features drumlins and till plains of gently undulating to moderately sloping topography (Chapman and Putnam, 1984).

Based on the available topographic maps, the Site is located at an elevation of approximately 90 m above mean sea level (AMSL). The regional topography appears to slope downwards towards Stevens Creek to the southwest. Based on site observations, the Site topography is mostly flat, with gentle slopes downward from south to north and east to west. A localized 2.5 m steep elevation change towards the large neighboring property parcel owned by the proponent.

3.2 Site Surficial and Bedrock Geology

According to the Ontario Geological Survey surficial geology map (OGS, 2010), the surficial geology underlying the eastern portion of the Site is stone-poor, sandy silt to silt sand-textured till on Paleozoic terrain, and the surficial geology underlying the western portion of the Site is fine-textured glaciomarine deposits consisting of silt and clay, minor sand and gravel.

The overburden materials encountered during the Alston Geotechnical Investigation generally consisted of the following:

- **Topsoil**: Topsoil was encountered at varying thicknesses ranging from approximately 40 mm to 102 mm;
- **Fill Materials**: Fill materials of varying compositions were encountered at the Site. Sandy gravel with trace silt materials was encountered at two locations from depths ranging from 0.6 to 3.6 m bgs. Brownish black sand with some silt and trace organics was encountered at one location between 1.4 and 2.2 m bgs. Subbase materials consisting of sand and gravel under asphalt paved areas depths ranging from 0.1 to 0.6 m bgs;
- **Native Silty Sand**: Native deposits of dark brown, brown, and grey silty sand with some to trace gravel were generally encountered underlying the topsoil or fill materials and extended to the final extent of the boreholes.

According to the Ontario Geological Survey surficial geology map (OGS, 2010), the Site overburden materials are underlain by dolostones of Paleozoic Oxford Formation.

3.3 Regional Hydrogeology

A critical feature of hydrogeological importance is the Kars Esker Complex (Esker), which originates approximately three km west of Long Island, Manotick and covers parts of former Township of North Gower. The Esker is about 21 km in length, generally trending NW to SE, and is comprised of gravel and other coarse-textured geological materials. The Esker has a greater thickness than the surficial deposits to either side and appears as an elongated hill or as drumlins on the landscape. The Esker overlies the Paleozoic bedrock. Wells tapping into the Esker core comprised of gravel, and the coarse sand matrix is high yielding with specific capacities ranging from 6 to 149 Litres per minute (Lpm) per m (Geo-Analysis, 1994). Based on the review of available physiographic, surficial geology, and MOECC water well records for the Site and surrounding area, there is evidence to suggest that the subject Site is underlain by a broad sandy Esker carapace with some gravel. A review of the MOECC water well records within 250 m of the Site suggests that less than 10% of wells are tapping this overburden aquifer (Appendix B) and it is possible that aquifer potential of this carapace material is poor. It should be noted that wells in this overburden unit are more likely susceptible than bedrock wells to septic contamination.

The Esker carapace within the Site and surrounding area overlies Paleozoic Oxford Formation comprised primarily of dolostone. The Paleozoic Oxford Formation is the uppermost bedrock unit within the Site and surrounding area including the former Township of North Gower and it is the primary source of groundwater for domestic wells in the area. The total depth for wells tapping the Oxford Formation within the surrounding area varies approximately from 20 m to greater than 50 m (refer to Appendix B). Regionally, aquifer development in the Oxford Formation is highly variable. Theoretical yields of wells range from less than 40 Lpm to greater than 450 Lpm (Geo-Analysis, 1994). It is considered optimistic to assign such a significant potential to this Formation on a regional scale. A review of MOECC water well records within the 250 m of the Site suggests that wells with yields of up to 50 Lpm can be expected in the Oxford Formation.

3.4 Site Hydrogeology

A groundwater table was observed during the geotechnical investigation at depths between 0.28 m bgs to 1.85 m bgs on March 14, 2018, with shallow groundwater northwesterly flow direction towards Stevens Creek (Alston, 2018). Highest groundwater level (approximately 0.28 m bgs) was reported in the monitoring well MW107 located on the southeast portion of the Site (Figure 3, Appendix A). Based on the results of grain size analyses completed during the geotechnical investigation (refer to Appendix E), the permeability of the Esker carapace materials underlying the fill at the Site ranged 10^{-3} cm/s to 10^{-5} cm/s indicating moderate to low hydraulic conductivity (Alston, 2018).

A groundwater level of 5.545 m bgs was observed in the bedrock water supply well PW01-18 on June 5, 2018. Groundwater levels in the shallow overburden monitoring wells MW106 and MW108 located immediately south of the bedrock water supply well varied from 2.09 m bgs (MW108) to 1.515 m bgs (MW107) on June 8, 2018. Comparison of groundwater levels observed

in bedrock water supply well and overburden monitoring wells in conjunction with the hydraulic conductivity estimates presented in the Alston geotechnical investigation report (Alston, 2018) suggests the potential for downward hydraulic gradient within the Site. The less permeable silty sand overburden materials within the Site likely flank the Kars Esker core and serve as recharge and storage reservoirs to the high transmissivity Esker gravel core. It is noted that less permeable silty sand materials within the Site are unlikely to provide a high transmissivity pathway for recharge derived from the Site to the dolostone bedrock aquifer.

Based on the review of MOECC water well records and other readily available information, the water supply well PW01-18 was completed to a depth of 54.86 m bgs with possible significant water-bearing zones (based on the water found depth interpretation) at 48.86 m bgs in the dolostones of Oxford Formation. Table 3-1 presents key well characteristics for the bedrock water supply well PW01-18.

Table 3-1: Well Characteristics – PW01-18

Well ID	Depth (m bgs)	Length of Casing (m bgs)	Stick-up Height (m)	Approximate Depth to the Bedrock Interface (m bgs)	Water Bearing Zones (m bgs)	Water Level (m bgs)
PW01-18	54.86	20.28	1.025	18.28	48.86	5.545

Note: m bgs - metres below ground surface

It is noted that the conservation authorities in eastern Ontario have classified the coarse-textured Esker core and carapace materials exposed on the surface as significant groundwater recharge areas or groundwater recharge areas with the intent to protect the groundwater recharge to the Esker aquifer. A review of the regional scale Mississippi-Rideau Source Protection Region final groundwater recharge areas map could not determine if the Site is located within the bounds of significant groundwater recharge areas. A review of the geotechnical investigation results indicates that the coarse-textured Esker core and carapace materials were not exposed on the surface. Additionally, the new groundwater supply well extracts water primarily from the dolostone aquifer, and groundwater levels in shallow groundwater wells MW106 and MW108 screened native soil materials did not fluctuate in response to the pump testing of the bedrock well. Therefore, it is unlikely that the bedrock water supply well will any impact on the storage or recharge characteristics of the Esker carapace or core materials.

3.4.1 Aquifer Testing Program

On June 5, 2018, a six-hour constant rate pumping test of the new water supply well PW01-18 was undertaken. The well PW01-18 was undertaken at a rate of 25 Lpm (36,000 L/day) based on the results of initial one-hour yield test completed on May 30, 1018. Groundwater drawdown and recovery measurements were recorded manually and electronically in the wells PW01-18, MW106, and MW108. Drawdown and recovery graphs are provided in Figure D-1 in Appendix D.

A total drawdown of 7.78 m was measured. After the first three hours, the well PW01-18 appeared to be approaching steady-state conditions. The well PW01-18 recovered to 100% of the static groundwater level within 30 minutes after the end of pumping phase. Observed drawdown equal approximately to 15 percent of the total available drawdown. Groundwater levels in the shallow overburden wells MW106 and MW108 did not show any measurable changes in groundwater levels in response to the pumping test (refer to Figure D-1, Appendix D).

The objective of the constant rate pumping tests carried out as part of the hydrogeological study is to estimate transmissivity and storativity of the dolostone aquifer intercepted in the well PW01-18. Transmissivity describes the ability of the aquifer to transmit groundwater throughout its entire saturated thickness. The storage coefficient or storativity is the volume of water released from storage with respect to the change in head (water level) and surface area of the aquifer. Transmissivity and storativity of the aquifer are typically determined from a pumping test using the levels of groundwater drawdown over time.

Estimates of aquifer parameters were obtained by matching mathematical models (type curves) to time and groundwater displacement data collected in PW01-18 during the constant-rate pumping test.

Following table presents the estimates of aquifer transmissivity and storativity based on the pumping test data. The results of the aquifer test analysis are shown in Appendix D.

Table 3-2: Estimates of Aquifer Transmissivity and Storativity

Well ID	Screened Stratigraphic Unit	Storativity (dimensionless) [1]	Transmissivity (m^2/day)[1]	Data Analysis Method
PW01-18	Paleozoic dolostone bedrock	0.4252	9.4	Theis Recovery

Note:

1 Aquifer test analysis was carried out using the Aqtesolv Version 4.5.

Well yield is the rate of water withdrawal that a well can supply over a period of time. Alternatively, well yield is the maximum pumping rate that can be achieved without increasing the drawdown in the well. In order to determine theoretical well yield for the well PW01-18, the specific capacity of the well should be determined from the constant-rate pumping test data. The specific capacity of a well is normally estimated as follows:

$$SC = Q/S$$

Where SC = Specific Capacity (m^3/day/m)
Q = discharge or pumping rate (m^3/day)
s = drawdown (m)

The theoretical well yield or maximum pumping rate can be estimated by multiplying the specific capacity by maximum available drawdown. It is necessary to apply a 30% safety factor, utilizing only 70% of the available drawdown, when estimating the theoretical well yield for the well PW01-18.

Following table presents the estimates of specific capacity and theoretical well yield for the well PW01-18.

Table 3-3: Estimates of Specific Capacity and Theoretical Safe Yield

Well No.	Pumping Rate (m^3/day)[1]	Drawdown (m)[1]	Specific Capacity (m^3/day/m)	Maximum Available Drawdown (m)[1]	Theoretical Well Yield (m^3/day)
PW01-18	36	7.78	4.27	29.07	124.14

The aquifer response to the estimated daily theoretical well yield of 124 m^3/day is yet to be field tested. Additionally, groundwater extraction rates greater than 50, 000 L/day or 50 m^3/day would require a MOECC Category III Permit To Take Water. Therefore, a maximum pumping rate of 49 m^3/day or 49,000 L/day (34 Lpm) is recommended.

3.5 Groundwater Quality

Based on the available information, there is no potential for the construction of domestic water supply wells in the Esker carapace overburden materials within the Site. As part of the Phase II ESA, groundwater samples were collected from four shallow overburden monitoring wells for the laboratory analysis of petroleum hydrocarbons and volatile organic compounds to evaluate potential impacts from the past land uses. Laboratory analysis indicated that concentrations of petroleum hydrocarbons and volatile organic compounds in groundwater did not exceed the applicable MOECC Table 2 Site Condition Standards (Refer to Appendix F).

The groundwater quality of the new bedrock water supply well PW01-18 was analytically determined by collecting samples during the six-hour aquifer testing program conducted on June 5, 2018. A total of two (2) groundwater samples (PW01-18 A and PW01-18 B) were collected at 3-hour and 6-hour marks during the six-hour aquifer testing program. Groundwater sampling results were compared to the standards and objectives specified in the Ontario Drinking Water Quality Standards (ODWQS) (MOECC, 2006) and the maximum treatability limits included in the MOECC Procedure D 5-5.

Laboratory certificates of analysis and the summary table comparing reported concentrations to the applicable standards, objectives, and treatability limits are included in Appendix C of this report. With the exception of hardness and turbidity, reported concentrations of other parameters met the ODWQS. The following is a summary of key observations relevant to the groundwater treatment and raw groundwater quality:

- **Alkalinity (Total):** Alkalinity in the range of 30 mg/L to 100 mg/L is acceptable for the operational efficiency of most water treatment systems. However, alkalinity (as $CaCO_3$) was detected in groundwater samples at a concentration of 220 mg/L below the operational guideline value of 500 mg/L.

- **Chloride:** Higher than normal levels of chloride (>250 mg/L) in water would likely cause corrosion and shorten the life of plumbing and piping associated with the treatment systems (AWWA, 2010). Chloride concentration in groundwater samples varied from 110

mg/L (PW01-18 A) to 86 mg/L (PW01-18 B) and reported the concentration of chloride in groundwater did not exceed the objective level and treatability limit of 250 mg/L.

- **Hardness (as $CaCo_3$):** Hardness in groundwater samples varied from 250 mg/L (PW01-18 A) to 240 mg/L (PW01-18 B). Reported concentrations of hardness exceeded the operational guideline value range of 80 to 100 mg/L. The degree of hardness of water may be classified in terms of its calcium carbonate concentration as follows: soft, 0 to <60 mg/L; medium hard, 60 to <120 mg/L; hard, 120 to < 180 mg/L; and very hard, 180 mg/L and above (AWWA, 2010). When the water with relatively high hardness is heated, excessive scaling of water pipes and valves can result. A water softener treatment may be utilized to lower the level of hardness. It should be noted that a water softener using sodium based brine could result in elevated levels of sodium in the water supply.

- **Iron:** Iron in groundwater samples detected was at concentrations varying from 1.6 mg/L (PW01-18 A) to 0.3 mg/L (PW01-18 B) and detected concentrations were below the aesthetic objective and treatability limit.

- **Manganese:** Manganese at concentrations higher than 0.05 mg/L may cause staining of the treatment system piping and vessels (AWWA, 2010). Manganese in groundwater samples was detected at concentrations varying from 0.021 (PW01-18 A) to 0.011 mg/L (PW01-18 B) below the aesthetic objective of 0.05 mg/L and treatability limit of 1 mg/L.

- **Microbiological Parameters:** No microbiological exceedances were reported for the groundwater samples collected on June 5, 2018. However, concentrations of free residual chlorine at 3-hour and 6-hour marks varied from 0.2 mg/L (PW01-18 A) to 0.05 mg/L (PW01-18 B) during the aquifer test program indicating the persistence of chlorine residual from the shock chlorination. It is noted that with continued pumping the free residual chlorine levels decreased significantly at the end of the pump test.

- **Nitrate and Nitrite (as N):** The maximum acceptable concentration of nitrates in drinking water is 10 mg/L as nitrogen. Nitrates are present in water (particularly groundwater) because of decay of plant or animal material, the use of agricultural fertilizers, domestic sewage or treated wastewater contamination, or geological formations containing soluble nitrogen compounds. The presence of nitrate and nitrite in groundwater samples at concentrations lower than the laboratory method detection limit is not a treatment or operational issue.

- **pH:** pH of water influences the rate of chemical reaction and the degree to which many chemical reactions occur (AWWA, 2010). For example, the treatment efficiency of chlorine disinfection decreases in waters with pH levels above 8.5. Reported values of pH in groundwater samples were within the acceptable ODWQS range and varied from 8 (PW01-18 A) to 8.01 (PW01-18 B).

- **Sulphide (as H2S):** Sulphide (as H2S) was detected at concentrations lower than the laboratory method detection limit of <0.020 mg/L.

- **Tannins and Lignins:** Tannins and lignins are natural organic compounds and primary sources of humic substances in water. Humic substances are the end product of decaying organic matter (AWWA, 2010). Tannins and Lignins were at concentrations lower than the laboratory method detection limit of <0.2 mg/L; therefore, the low-levels of tannins and lignins in the sump water are unlikely to reduce the efficiency of treatment systems.

- **Total Dissolved Solids:** Total Dissolved Solids (TDS) is composed of calcium, magnesium, sodium, potassium, carbonate, bicarbonate, chloride, sulphate and nitrate. TDS in groundwater samples was detected at concentrations varying from 440 mg/L (PW01-18 A) to 410 mg/L (PW01-18 B) below the aesthetic objective of 500 mg/L.

- **Turbidity**: Excessive levels of turbidity (> 5 NTU) in water can affect water treatment efficiency. Reported values of pH in groundwater samples varied from 12 NTU (PW01-18 A) to 2.9 NTU (PW01-18 B). It is noted that with continued pumping the turbidity levels decreased to 2.9 NTU (I.e., less than the aesthetic objective) by the end of the pump test.

The proponent intends to implement a drinking water treatment train comprised of water softener, 3,000 to 5,000 US Gallon underground storage potable water tank, twin 5-micron filters, dual ultraviolet disinfection systems, water meters, and reverse osmosis units (if required).

The results from water quality and quantity assessment of the well PW01-18 indicate that acceptable quality and quantity of groundwater supply can be obtained for the proposed development. The observed water quality issues such as elevated hardness and turbidity issues can be addressed by installation of treatment train proposed by the proponent.

4 DESIGN CONSIDERATIONS

This section design considerations for the transformation of the well PW01-18 into an operational water supply well. Please note that the design considerations for the above ground raised septic system was developed by WSP, and pertinent septic system design drawings are included in Appendix G.

General criteria for the transformation of the test well PW01-8 into an operational water supply well, is as follows:

- If a well house and a treatment system to be constructed, the well casing height above the finished grade shall be determined based on the design for the system.

- The well shall be provided with a downturned screened vent and a provision to measure static water level. Well vents that are integral with the well cap are acceptable so long as they are screened and face downward.

- Electrical conduit connections on the well cap shall be threaded to prevent the entrance of insects and water.

- Pitless adaptors or pitless units shall be lead-free and conform to a standard acceptable under the Ontario wells regulation 903 (as amended).

- A submersible well pump shall not have a mercury seal, nor shall any other components of the well construction contain mercury.

- Submersible pump and other associated components shall be selected based on the provincial design guidelines, storage, and treatment requirements.

- Each well shall be provided with a smooth nose (no threads on spigot) sample tap for collecting raw water samples.

- The sample tap can be located in a valve pit or other location which is accessible and protected from freezing.

- The sample tap shall be located prior to any pressure tanks or treatment units.

- The belowground water service pipe, between the well and the treatment plant or distribution system, shall be sufficiently buried to prevent it from freezing.

- The belowground water service pipe, between the well and the treatment plant, shall be maintained under system pressure at all times.
- The belowground water service pipe, between the well and the treatment plant or distribution system, shall be certified for potable water use by either the National Sanitation Foundation or American Water Works Association.

5 CONCLUSION AND RECOMMENDATIONS

Based on the preceding discussion and findings, DST offers following conclusion and recommendations.

- Based on the review of available physiographic, surficial geology, and MOECC water well records for the Site and surrounding area, there is evidence to suggest that the subject Site is underlain by a broad sandy Esker carapace with some gravel. A review of the MOECC water well records within 250 m of the Site suggests that less than 10% of wells are tapping this overburden aquifer (Appendix B) and it is possible that aquifer potential

of this carapace material is poor. It should be noted that wells in this overburden unit are more likely susceptible than bedrock wells to septic contamination. Therefore, a new water supply well (PW01-18) was completed to a depth of 54.86 m bgs in the Paleozoic bedrock aquifer

- A total drawdown of 7.78 m was measured during six-hour pump testing of a new water supply well PW01-19 at 25 Lpm. After the first three hours, the well PW01-18 appeared to be approaching steady-state conditions. The well PW01-18 recovered to 100% of the static groundwater level within 30 minutes after the end of pumping phase. Observed drawdown equal approximately to 15 percent of the total available drawdown. Groundwater levels in the shallow overburden wells MW106 and MW108 did not show any measurable changes in groundwater levels in response to the pumping test (refer to Figure D-1, Appendix D).

- With the exception of hardness and turbidity, reported concentrations of another inorganic, general chemistry, nutrient, and metal parameters met the Ontario Drinking Water Quality Standards (2006). However, concentrations of free residual chlorine at 3-hour and 6-hour marks varied from 0.2 mg/L (PW01-18 A) to 0.05 mg/L (PW01-18 B) during the aquifer test program indicating the persistence of chlorine residual from the shock chlorination. It is noted that with continued pumping the free residual chlorine levels decreased significantly at the end of the pump test. An additional round of sampling to confirm the microbiological results is recommended.

- The aquifer response to the estimated daily theoretical well yield of 124 m^3/day is yet to be field tested. Additionally, groundwater extraction rates greater than 50, 000 L/day or 50 m^3/day would require a MOECC Category III Permit To Take Water. Therefore, a maximum pumping rate of 49 m^3/day or 49,000 L/day (34 Lpm) is recommended.

- The results from water quality and quantity assessment of the well PW01-18 indicate that acceptable quality and quantity of groundwater supply can be obtained for the proposed development. The observed water quality issues such as elevated hardness and turbidity issues can be addressed by installation of treatment train proposed by the proponent.

6 CLOSURE AND LIMITATIONS

The information, conclusions, recommendations, and opinion regarding groundwater supply and treatment given herein are specifically for this project, Invecta, and for the scope of work described herein. It may not be sufficient for other uses. DST does not accept responsibility for use by third parties.

The data, conclusions, and recommendations which are presented in this report, and the quality thereof, are based on a scope of work authorized by Invicta. Note, however, that no scope of work, no matter how exhaustive, can identify all contaminants or all conditions above and below

ground. For example, conditions between test holes may differ from those encountered in the investigation, and observed or measured conditions may change with time. This report, therefore, cannot warranty that all conditions on or off the site are represented by those identified at specific locations.

Any recommendations, conclusions, and opinion regarding groundwater supply and treatment provided that are based on conditions or assumptions reported herein will inherently include any uncertainty associated with those conditions or assumptions. In fact, many aspects involving professional judgment such as groundwater quality, quantity, and treatment contain a degree of uncertainty which cannot be eliminated. This uncertainty should be managed by periodic review and refinement as additional information becomes available.

Note also that standards, guidelines, and practices related to groundwater quality, quantity, and treatment supporting this document may change with time. Those which were applied at the time of this assignment may be obsolete or unacceptable at a later date.

The scope of work may not be sufficient to determine all of the factors that may affect the construction methods and costs. Contractors bidding on this project or undertaking construction should, therefore, make their own interpretation of the factual information presented and draw their own conclusions as to how the conditions may affect their work.

Any results from an analytical laboratory by other consultants reported herein have been carried out by others, and DST cannot warranty their accuracy.

We trust this report meets your present requirements and appreciate this opportunity to provide environmental consulting services to you. If you have any questions or comments, please contact the undersigned.

For **DST CONSULTING ENGINEERS INC.**

Sonny Sundaram, Ph.D., P.Geo.
Senior Hydrogeologist, Associate

Eric Domingue, M.A.Sc., P.Eng.
Senior Principal

LICENSED PROFESSIONAL ENGINEER
S. VOORE
100106796
oct 11, 2018
PROVINCE OF ONTARIO

Sam Voore, M.Eng., P.Eng., MBA
Senior Environmental Engineer, Associate

7 REFERENCES

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APPENDIX A
FIGURES

Note

1. This drawing shall be read in conjunction with the associated technical report.

Revision	Date	Issue	Approval
0	21/06/18	Final	

Client: **Invecta Development Corporation**

Site: **1622 Roger Stevens Drive, Kars, Ontario**

DST consulting engineers

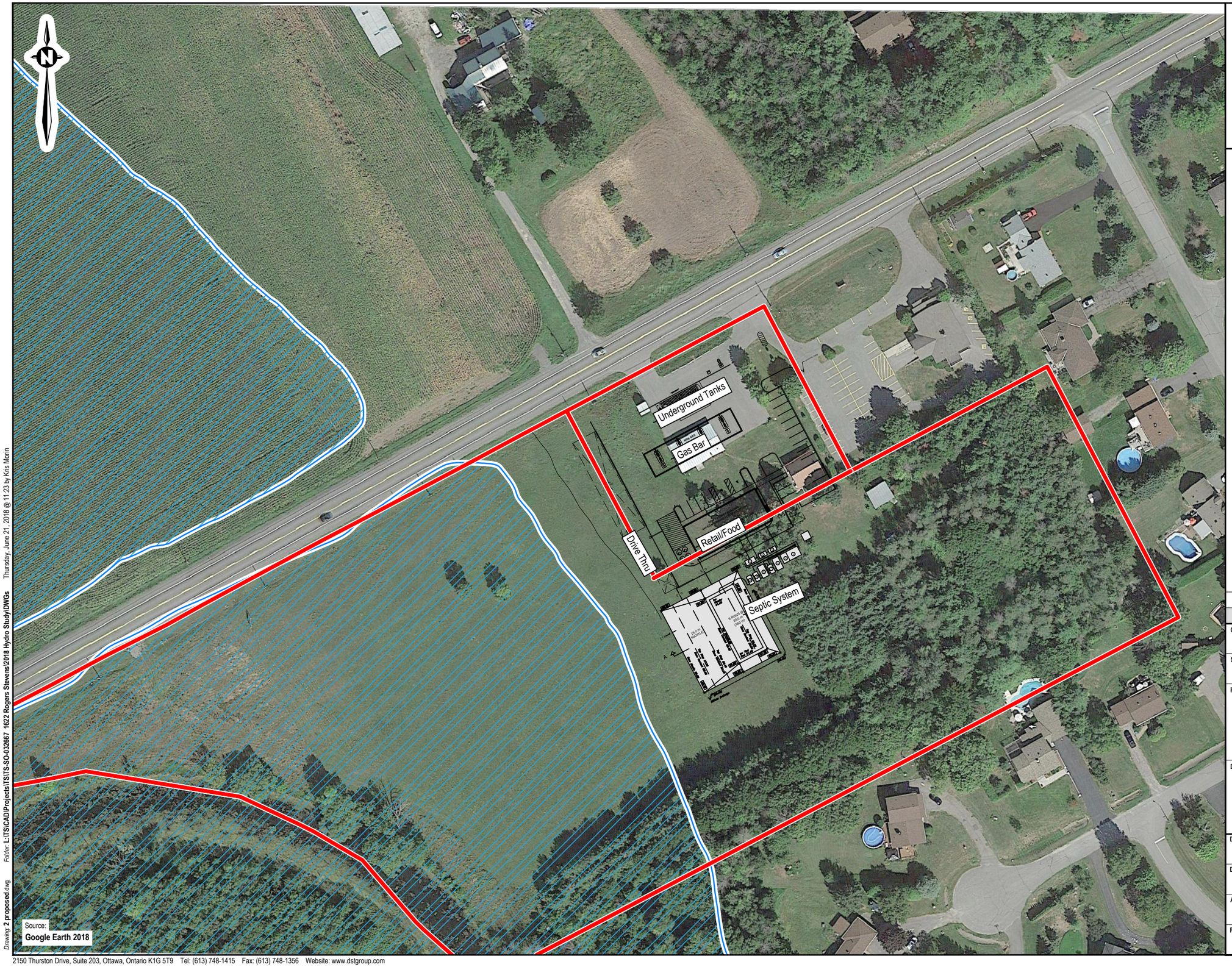
Report Title: **Hydrogeological Study**

Drawing Title: **Site Location Map**

Designed By: S.S.	Date: June 21, 2018
Drawn By: K.M.	Project No.: TS-SO-032667
Approved By: S.V.	Figure No.: 1
Scale: As shown	

Drawing: 1 site location.dwg Folder: L:\TS\CAD\Projects\TS\TS-SO-032667 1622 Rogers Stevens\2018 Hydro Study\DWGs Tuesday, June 12, 2018 @ 09:45 by Kris Morin

2150 Thurston Drive, Suite 203, Ottawa, Ontario K1G 5T9 Tel: (613) 748-1415 Fax: (613) 748-1356 Website: www.dstgroup.com



DST consulting engineers

Note

1. This drawing shall be read in conjunction with the associated technical report.
2. Proposed site features based on drawings provided by Blueprint2Build (May 1, 2018).

Legend

Approximate Property Line

Flood Plain

1:1 250

0 10 20 30 40 50 m

0 1:1 5 cm

Scale accurate when printed at 100% using paper size ANSI full bleed B (11.0 x 17.0 Inches)

0	21/06/18	Final	
Revision	Date	Issue	Approval

Client
Invecta Development Corporation

Site
1622 Roger Stevens Drive, Kars, Ontario

Report Title
Hydrogeological Study

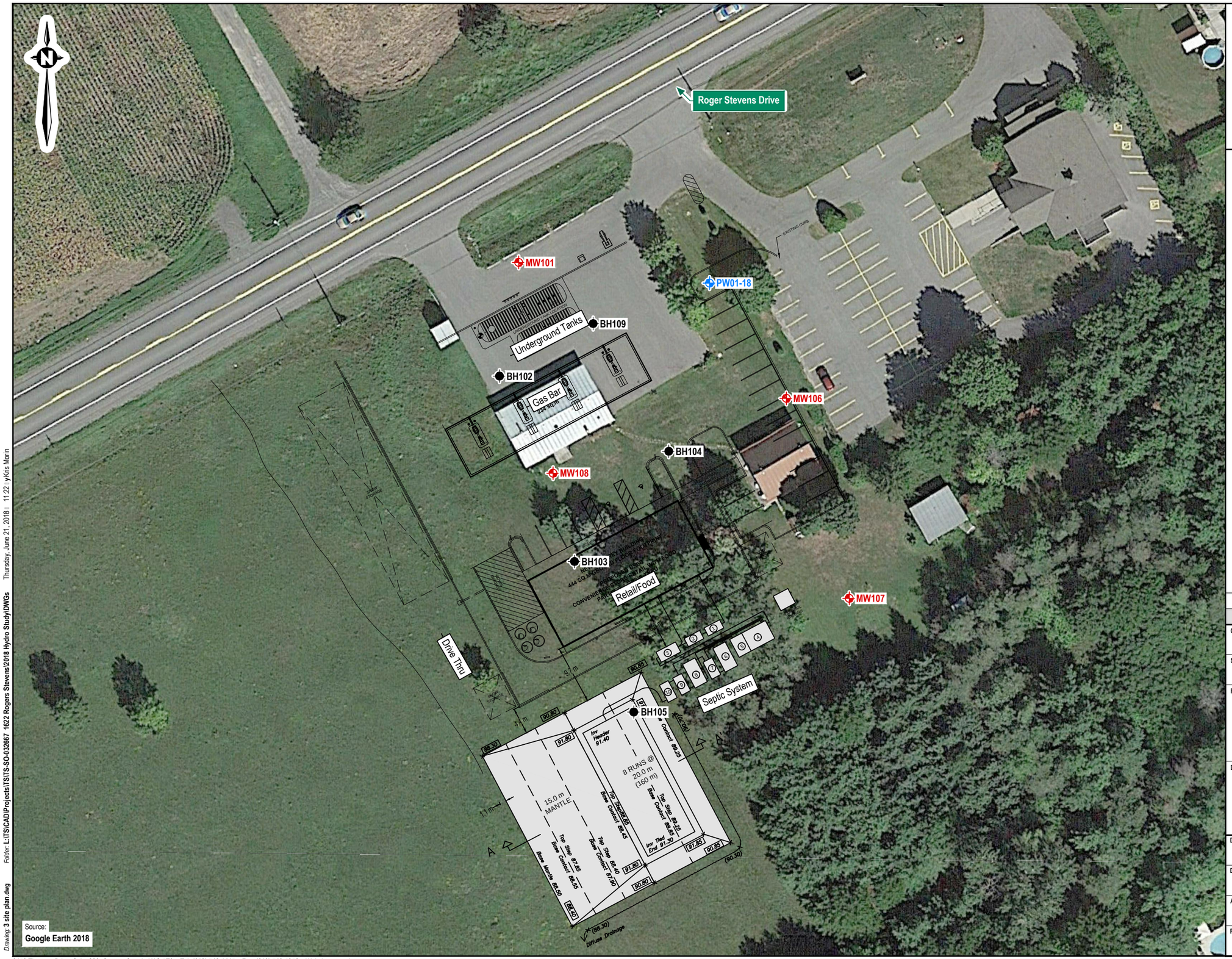
Drawing Title
Proposed Development

Designed By	Scale
S.S.	As shown
Drawn By	**Date**
K.M.	June 21, 2018
Approved By	**Project No.**
S.V.	TS-SO-032667

Figure No.
2

Drawing: 2 proposed.dwg Folder: L:\TS\CAD\Projects\TS\TS-SO-032667 1622 Rogers Stevens\2018 Hydro Study\DWGs Thursday, June 21, 2018 @ 11:23 by Kris Morin

2150 Thurston Drive, Suite 203, Ottawa, Ontario K1G 5T9 Tel: (613) 748-1415 Fax: (613) 748-1356 Website: www.dstgroup.com



Drawing: 3 site plan.dwg Folder: L:\TS\CAD\Projects\TS\TS-SO-032667 1622 Rogers Stevens\2018 Hydro Study\DWGs Thursday, June 21, 2018 11:22 yKris Morin

DST consulting engineers

Note

1. This drawing shall be read in conjunction with the associated technical report.
2. Proposed site features based on drawings provided by Blueprint2Build (May 1, 2018).

Legend

- Approximate Property Line
- Location of borehole (Terrapex, 2018)
- Location of monitoring well (Terrapex, 2018)
- Location of bedrock water supply well (DST, 2018)

1:600

0 10 20 30 m

0 1:1 5 cm

Scale accurate when printed at 100% using paper size ANSI full bleed B (11.0 x 17.0 Inches)

Revision	Date	Issue	Approval
0	21/06/18	Final	

Client
Invecta Development Corporation

Site
1622 Roger Stevens Drive, Kars, Ontario

Report Title
Hydrogeological Study

Drawing Title
Site Plan

Designed By	Scale
S.S.	As shown
Drawn By	**Date**
K.M.	June 21, 2018
Approved By	**Project No.**
S.V.	TS-SO-032667

Figure No. 3

2150 Thurston Drive, Suite 203, Ottawa, Ontario K1G 5T9 Tel: (613) 748-1415 Fax: (613) 748-1356 Website: www.dstgroup.com

APPENDIX B
RELEVANT MOECC WATER WELL RECORDS

Table B-1 - MOECC Water Well Records Summary Table

MOECC Well ID	Stratigraphic Description	Stratigraphic Layer Top Depth (m)	Stratigraphic Layer Top Depth (m)	Well Completion Date	Water Found Depth (m)	Stratigraphy of Water Found Depth (m)
1506739	Gravel, Sand	0	24.1	24-Jul-61	48.5	Dolostone
	Dolostone	24.1	48.5			
1516290	Clay	0	1.8	09-Nov-77	25.0	Dolostone
	Sand	1.8	4.6			
	Hardpan	4.6	22.3			
	Dolostone	22.3	30.5			
1517223	Clay	0	9.1	10-Dec-79	21.3	Dolostone
	Hardpan	9.1	18.9			
	Dolostone	18.9	21.3			
1517698	Hardpan	0	19.5	12-Oct-81	20.1	Dolostone
	Sand, Gravel	19.5	19.8			
	Dolostone	19.8	20.4			
1518799	Sand	0	1.8	16-Jun-83	18.0	Dolostone
	Clay	1.8	13.7			
	Dolostone	13.7	19.5			
1518800	Sand, Gravel	0	14.3	16-Jun-83	18.6	Dolostone
	Dolostone	14.3	19.5			
1519176	Sand	0	0.6	12-Jun-84	13.7	Gravel, Sand
	Sand, Clay	0.6	2.7			
	Sand, Gravel	2.7	12.8			
	Gravel, Sand	12.8	13.7			
1519335	Clay	0	2.1	14-Sep-84	30.5	Dolostone
	Hardpan	2.1	23.2			
	Dolostone	23.2	32.0			
1519762	Clay	0	3.0	24-May-85	35.1	Dolostone
	Hardpan	3.0	20.7			
	Gravel	20.7	23.5			
	Dolostone	23.5	36.6			
1519763	Hardpan	0	18.3	23-May-85	38.1	Dolostone
	Gravel	18.3	23.8			
	Dolostone	23.8	38.1			
1520094	Clay	0	4.6	02-Jul-85	36.6	Dolostone
	Hardpan	4.6	25.9			
	Dolostone	25.9	38.1			
1520365	Clay	0	3.7	28-Oct-85	12.5	Gravel
	Gravel	3.7	12.5			
1520368	Clay	0	1.8	23-Oct-85	29.6	Dolostone
	Sandy Clay	1.8	6.1			
	Sand	6.1	12.2			
	Sand, Gravel	12.2	20.1			
	Hardpan	20.1	21.9			
	Dolostone	21.9	35.1			
1521252	Clay	0	5.5	11-Nov-86	21.3	Dolostone
	Gravel	5.5	15.5			
	Dolostone	15.5	21.6			
1521258	Sandy Clay	0	3.7	15-May-86	15.8	Dolostone
	Sand	3.7	9.1			
	Sand & Gravel	9.1	14.6			
	Dolostone	14.6	16.8			
1521260	Clay	0	2.4	03-Oct-86	25.0	Dolostone
	Sandy Clay	2.4	7.6			
	Sand & Gravel	7.6	18.9			
	Hardpan	18.9	21.3			
	Dolostone	21.3	27.4			
1521261	Topsoil	0	0.9	02-Oct-86	28.3	Dolostone
	Loam	0.9	3.0			
	Sand	3.0	5.5			
	Sand & Gravel	5.5	15.5			
	Dolostone	15.5	30.5			
1521270	Clay	0	4.9	11-Aug-86	24.4	Dolostone
	Sand & Gravel	4.9	19.8			
	Dolostone	19.8	27.4			
1521897	Hardpan	0	16.8	30-Jun-87	62.8	Dolostone
	Sand & Gravel	16.8	20.7			
	Dolostone	20.7	64.0			
1522077	Gravel	0	12.2	09-Sep-87	12.2	Gravel
1522082	Gravel	0	17.1	08-Apr-87	17.1	Gravel
1522363	Fill	0	0.9	23-Dec-87	39.0	Dolostone
	Sand	0.9	4.9			
	Clay	4.9	16.8			
	Boulders	16.8	18.6			
	Silt	18.6	19.8			
	Dolostone	19.8	47.2			
1524994	Clay	0	19.8	29-Aug-90	32.9	Sandstone
	Sandstone	19.8	37.2			
1526364	Clay	0	23.2	23-Jul-92	52.1	Dolostone
	Dolostone	23.2	54.9			
1526539	Clay	0	25.0	01-Sep-92	57.0	Dolostone
	Dolostone	25.0	57.9			
1528986	Sandy Clay	0	5.8	02-Jun-96	16.5	Dolostone
	Clay & Stones	5.8	14.3			
	Dolostone	14.3	17.1			
1530982	Sandy Clay	0	5.5	18-Nov-99	19.5	Dolostone
	Clay & Boulders	5.5	7.6			
	Clay & Stones	7.6	17.1			
	Dolostone	17.1	21.3			
1532139	Topsoil	0	2.1	25-Jul-01	21.3	Dolostone
	Sand	2.1	18.9			
	Dolostone	18.9	22.9			
1532561	Sand	0	17.4	12-Oct-01	53.6	Dolostone
	Dolostone	17.4	61.0			
7122571	Clay	0	19.2	26-Feb-09	26.21	Dolostone
	Dolostone	19.2	50.3			
7127263	Topsoil	0	0.61	07-Sep-09	41.8	Dolostone
	Clay	0.61	19.5			
	Dolostone	19.51	48.8			

GP

UTM | 18 |Z | 4 4 8 2 0 5 |E   31G49

Cd 5 |R | 5 0 0 0 2 2 0 |N

Elev. 4 | 2 | 0 3 0 0 |

Basin | 2 5 | |

(3)

GROUND WATER BRANCH
15 AUG 15 1961 No. 739
ONTARIO WATER RESOURCES COMMISSION

The Ontario Water Resources Commission Act

WATER WELL RECORD

County or District Carleton Township, Village, Town or City North Gower

Con. 1 Lot PT (21) NE Date completed 24 (day) July (month) 1961 (year)

[redacted] dress Kars Ont

Casing and Screen Record

Inside diameter of casing 2

Total length of casing 81

Type of screen —

Length of screen —

Depth to top of screen —

Diameter of finished hole 2

Pumping Test

Static level 27

Test-pumping rate 5 G.P.M.

Pumping level 40

Duration of test pumping 3 hr

Water clear or cloudy at end of test Cloudy

Recommended pumping rate 5 G.P.M.

with pump setting of 40 feet below ground surface

Well Log / Water Record

Overburden and Bedrock Record	From ft.	To ft.	Depth(s) at which water(s) found	Kind of water (fresh, salty, sulphur)
Bolders Gravel & Sand	0	79	159	Fresh
Lime Stone grey	79	159		

For what purpose(s) is the water to be used? House

Is well on upland, in valley, or on hillside? Hillside

Drilling or Boring Firm J R. Corsette

Address 1510 Baseline Rd. Ottawa

Licence Number 246

Name of Driller or Borer Same

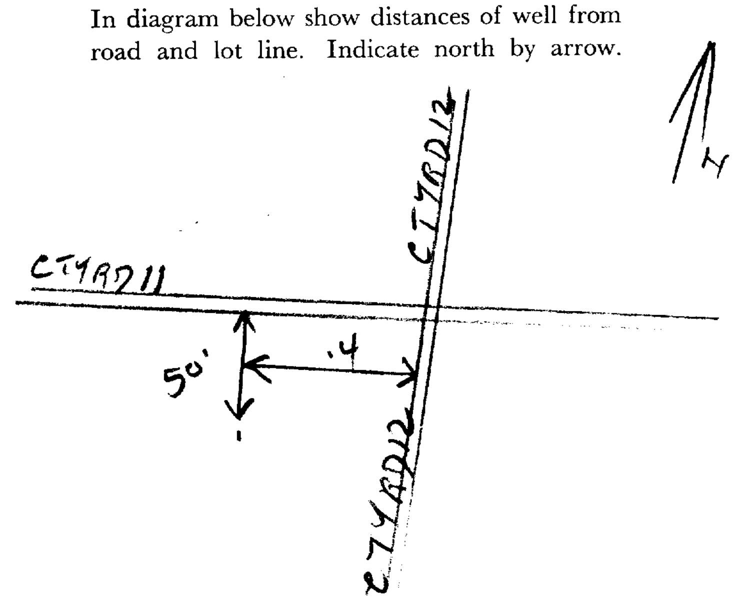
Address

Date July 24/61

J R Corsette
(Signature of Licensed Drilling or Boring Contractor)

Location of Well

In diagram below show distances of well from road and lot line. Indicate north by arrow.



Form 7 15M Sets 60-5930

OWRC COPY

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 — 1518800 — MUNICIP. — CON.

[redacted]

COUNTY OR DISTRICT: Kenora
TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: Rideau
CON., BLOCK, TRACT, SURVEY, ETC: 1
LOT: 21
DATE COMPLETED: DAY 16 MO 6 YR 83

21 — U.T.M. — NORTHING — RC. — ELEVATION — RC. — BASIN CODE

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
	Sand & gravel			0	47
grey	limestone			47	64

31

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
68	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6¼	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	188	0	51
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.) — DIAMETER INCHES — LENGTH FEET
MATERIAL AND TYPE — DEPTH TO TOP OF SCREEN FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT LEAD PACKER ETC.)
10-13	14-17	
18-21	22-25	
26-29	30-33	

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☒ PUMP 2 ☐ BAILER
PUMPING RATE: 20 GPM
DURATION OF PUMPING: HOURS — MINS 30

STATIC LEVEL	WATER LEVEL END OF PUMPING
10 FEET	20 FEET

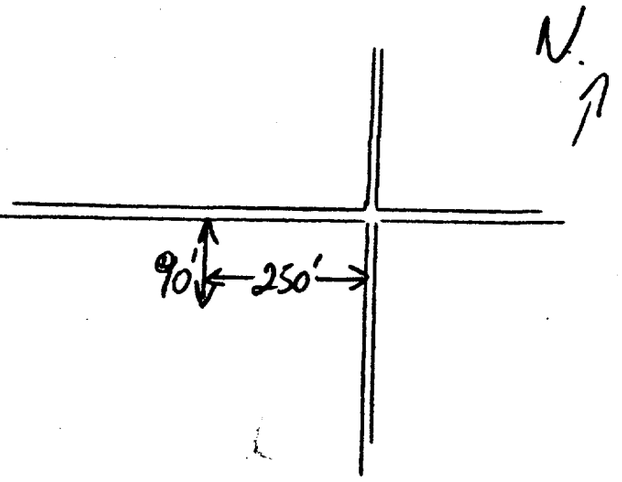
WATER LEVELS DURING: 1 ☒ PUMPING 2 ☐ RECOVERY

15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
20 FEET	20 FEET	FEET	FEET

IF FLOWING, GIVE RATE: GPM
PUMP INTAKE SET AT: FEET
WATER AT END OF TEST: 1 ☒ CLEAR 2 ☐ CLOUDY
RECOMMENDED PUMP TYPE: ☒ SHALLOW ☐ DEEP
RECOMMENDED PUMP SETTING: 30 FEET
RECOMMENDED PUMPING RATE: 20 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS

FINAL STATUS OF WELL

1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED

WATER USE

1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING ☐ OTHER 9 ☐ NOT USED

METHOD OF DRILLING

1 ☐ CABLE TOOL 2 ☒ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☐ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: Air-Rock Drilling LTD. — LICENCE NUMBER: 1119
ADDRESS: RR # 2 Jasper Ont.
NAME OF DRILLER OR BORER: Wallace Desautniers — LICENCE NUMBER: 1119
SIGNATURE OF CONTRACTOR: Wallace Desautniers
SUBMISSION DATE: DAY 20 MO 1 YR 84

MINISTRY OF THE ENVIRONMENT COPY

OFFICE USE ONLY

DATA SOURCE — CONTRACTOR — DATE RECEIVED — 140284
DATE OF INSPECTION — INSPECTOR
REMARKS

CSSIES

FORM NO. 0506—4—77 FORM 7

MINISTRY OF THE ENVIRONMENT
The Ontario Water Resources Act

WATER WELL RECORD

Ontario

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11 | 1516290 | MUNICIP 15004 | CON. CON | 01

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
Carleton	Rideau (North Gower)	1	022

OWNER (SURNAME FIRST)	ADDRESS	DATE COMPLETED
Jim McGill Constr. ~~Ltd.~~	R.R. # 3 Kemptivlle, Ontario	DAY 09 MO 11 YR 77

21 | Davidson | ZONE 18 | EASTING 448310 | NORTHING 4977990 | S | 0295 | S | 26 | ELEVATION CODE

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
brown	clay		packed	0	6
brown	sand	boulders	packed	6	15
brown	hardpan	boulders	packed	15	50
grey	hardpan	boulders & gravel	packed	50	73
grey	limestone			73	100

31 | 0006605791 | 0015628137 9 | 0050614 13 7 9 | 0073214 13 11 | 0100215

32

41 WATER RECORD

WATER FOUND AT FEET	KIND OF WATER
00 82	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
00 96	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
~~6~~	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ ~~OPEN HOLE~~	188	0	~~76~~ 0076
06			76	~~100~~
06	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE			0100
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET

MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT LEAD PACKER, ETC.)

71 PUMPING TEST

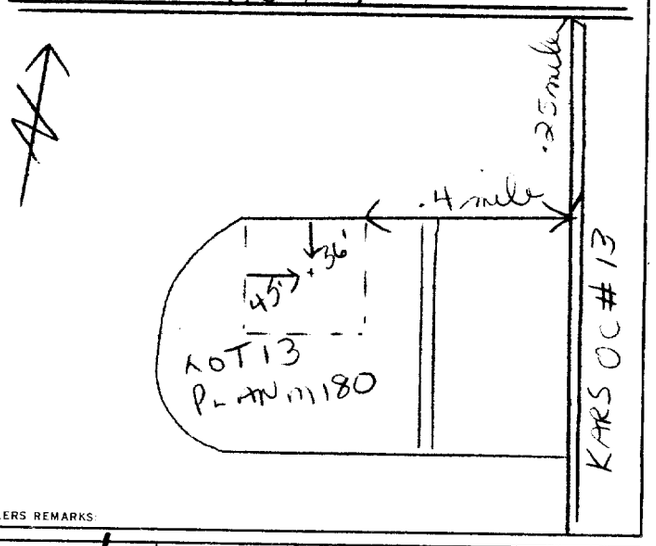
PUMPING TEST METHOD: 1 ☒ PUMP 2 ☐ BAILER
PUMPING RATE: 0007 GPM
DURATION OF PUMPING: 01 HOURS 00 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
030 FEET	075 FEET	1 ☒ PUMPING 2 ☐ RECOVERY	075 FEET	075 FEET	075 FEET	075 FEET

IF FLOWING GIVE RATE: GPM
PUMP INTAKE SET AT: FEET
WATER AT END OF TEST: 1 ☐ CLEAR 2 ☒ CLOUDY
RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP
RECOMMENDED PUMP SETTING: 075 FEET
RECOMMENDED PUMPING RATE: 0005 GPM
GPM / FT. SPECIFIC CAPACITY

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS:

FINAL STATUS OF WELL	1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED
WATER USE 01	1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED
METHOD OF DRILLING 5	1 ☐ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☒ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: Capital Water Supply Ltd. | LICENCE NUMBER: 1558
ADDRESS: Box 490 Stittsville, Ontario
NAME OF DRILLER OR BORER: W. Kavanagh | LICENCE NUMBER:
SIGNATURE OF CONTRACTOR: W. Kavanagh | SUBMISSION DATE: DAY 10 MO 11 YR 77

OFFICE USE ONLY

DATA SOURCE: 1 | CONTRACTOR: 1558 | DATE RECEIVED: 211277
DATE OF INSPECTION: JUNE 6/78 | INSPECTOR: DN
REMARKS: 2 STOREY WOOD SIDED NEW 2 STOREY HOUSE - DOUBLE GARAGE
P ✓
WI

MINISTRY OF THE ENVIRONMENT COPY

FORM 7 MOE 07-091

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

31G49

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 1517223 MUNICIP. 15004 CON. CGN 01

COUNTY OR DISTRICT: Carleton | TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: Richeau (North Gower) | CON., BLOCK, TRACT, SURVEY, ETC: Con 1 | LOT: 021

[redacted] RR#1, Kars Ont. K0A 2E0 | DATE COMPLETED: DAY 10 MO 12 YR 79

UTM: 00299 | RC: 4 | ELEVATION: 0300 | RC: 4 | BASIN CODE: 26

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
grey	clay	boulders		0	30
grey	hardpan	boulders		30	62
grey	limestone			62	70

MOE VF-19

31 0930205 13 | 0062214 13 | 0070 215

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0070	1 ☑ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
06 04	1 ☑ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	.188	0	0045 0062
06 04	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☑ OPEN HOLE		0	0070 045
	1 ☑ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE		45	70

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET
MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN FEET	

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☑ PUMP 2 ☐ BAILER | PUMPING RATE: 005 GPM | DURATION OF PUMPING: 01 HOURS 00 MINS

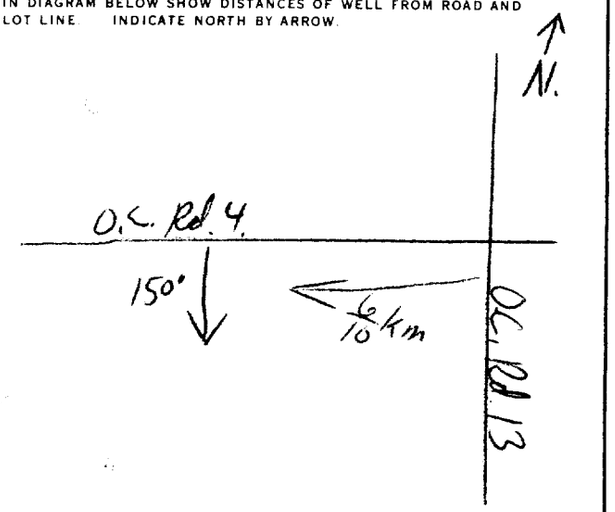
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☒ PUMPING 2 ☐ RECOVERY	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
022 FEET	045 FEET		045 FEET	045 FEET	045 FEET	045 FEET

IF FLOWING, GIVE RATE: GPM | PUMP INTAKE SET AT: FEET | WATER AT END OF TEST: 1 ☐ CLEAR 2 ☑ CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☑ DEEP | RECOMMENDED PUMP SETTING: 045 FEET | RECOMMENDED PUMP RATE: 005 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS

FINAL STATUS OF WELL 54: 1 ☑ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED

WATER USE 55-56: 01 — 1 ☑ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF DRILLING 57: 5 — 1 ☐ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☑ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: Henry Mains Well Drilling | LICENCE NUMBER: 3644

ADDRESS: Box 326, Richmond Ont.

NAME OF DRILLER OR BORER: Henry Mains | LICENCE NUMBER:

SIGNATURE OF CONTRACTOR: Henry Mains | SUBMISSION DATE: DAY 13 MO 12 YR 79

OFFICE USE ONLY

DATA SOURCE 58: 1 | CONTRACTOR 59-62: 3644 | DATE RECEIVED 63-68: 08 01 80

DATE OF INSPECTION | INSPECTOR: Kn.

REMARKS: CSS.88

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506—4—77

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

31G49

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

1517698 MUNICIP 15004 CON. CON 01

COUNTY OR DISTRICT: Ottawa Carleton
TOWNSHIP BOROUGH CITY TOWN VILLAGE: Eardley North Gower
CON BLOCK TRACT SURVEY ETC: Craig Salmon Subdivision
LOT: 21
DATE COMPLETED: DAY 12 MO Oct YR 81
[redacted] Ont.
UTM 00199 RC 44 ELEVATION 0300 RC 4 BASIN CODE 26

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
Grey	hard pan	stone Boulders		0	64
Grey	sand gravel			64	65
Grey	limestone	Rock	Hard.	65	67

31 00642141213 00652281 1 00672151273

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0066	1 ☑ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
06	1 ☑ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	188	0	0065
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET

MATERIAL AND TYPE | DEPTH TO TOP OF SCREEN FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT LEAD PACKER ETC.)
10-13	14-17	
18-21	22-25	
26-29	30-33	

71 PUMPING TEST

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
1 ☐ PUMP 2 ☑ BAILER	0018 GPM	01 HOURS 00 MINS

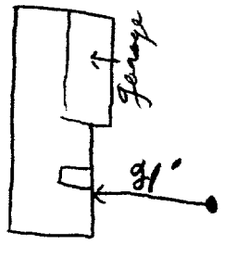
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING (1 ☑ PUMPING 2 ☐ RECOVERY)	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
012 FEET	030 FEET		026 FEET	026 FEET	028 FEET	030 FEET

IF FLOWING GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST
GPM	67 FEET	1 ☐ CLEAR 2 ☑ CLOUDY

RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
☐ SHALLOW ☑ DEEP	050 FEET	0010 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE INDICATE NORTH BY ARROW



Plan M277
Lot 40

DRILLERS REMARKS

FINAL STATUS OF WELL

1 ☑ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED POOR QUALITY 7 ☐ UNFINISHED

WATER USE 01

1 ☑ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF DRILLING 1

1 ☑ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☐ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: Maurice Cayen Ltd. | LICENCE NUMBER: 1517
ADDRESS: Casselman Ont.
NAME OF DRILLER OR BORER | LICENCE NUMBER
SIGNATURE OF CONTRACTOR: Maurice Cayen | SUBMISSION DATE DAY MO YR

OFFICE USE ONLY

DATA SOURCE 1 | CONTRACTOR 1517 | DATE RECEIVED 11 01 82
DATE OF INSPECTION | INSPECTOR
REMARKS

CSS/GS

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FORM NO. 0506—4—77 FORM 7

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

1519335

1. PRINT ONLY IN SPACES PROVIDED
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11

MUNICIP. | CON.

COUNTY OR DISTRICT: Carleton
TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: Rideau (North Gower)
CON. BLOCK, TRACT, SURVEY, ETC.: Craigholm, Con 1,
LOT: Pt 21
OWNER: [redacted]
ADDRESS: RR#1, Kars Ont. K0E 2E0
DATE COMPLETED: DAY 14 MO 9 YR 84

NORTHING | RC. | ELEVATION | RC. | BASIN CODE | II | III | IV

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
grey	clay			0	7
grey	hardpan	stones		7	65
grey	hardpan			65	~~86~~
grey	limestone			76	84
grey	broken rock			84	100
grey	limestone			100	105

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
100	1 ☒ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6¼	1 ☒ STEEL; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☐ OPEN HOLE	188	0	78
6	1 ☐ STEEL; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☒ OPEN HOLE		78	105
	1 ☐ STEEL; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER (INCHES)	LENGTH (FEET)

MATERIAL AND TYPE | DEPTH TO TOP OF SCREEN (FEET)

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☒ PUMP 2 ☐ BAILER
PUMPING RATE: 15 GPM
DURATION OF PUMPING: 1 HOURS 0 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☐ PUMPING 2 ☐ RECOVERY	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
20 FEET	60 FEET		60 FEET	60 FEET	60 FEET	60 FEET

IF FLOWING, GIVE RATE: GPM
PUMP INTAKE SET AT: FEET
WATER AT END OF TEST: 1 ☐ CLEAR 2 ☒ CLOUDY
RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP
RECOMMENDED PUMP SETTING: 60 FEET
RECOMMENDED PUMPING RATE: 10 GPM

FINAL STATUS OF WELL

1 ☒ WATER SUPPLY; 2 ☐ OBSERVATION WELL; 3 ☐ TEST HOLE; 4 ☐ RECHARGE WELL; 5 ☐ ABANDONED, INSUFFICIENT SUPPLY; 6 ☐ ABANDONED, POOR QUALITY; 7 ☐ UNFINISHED

WATER USE

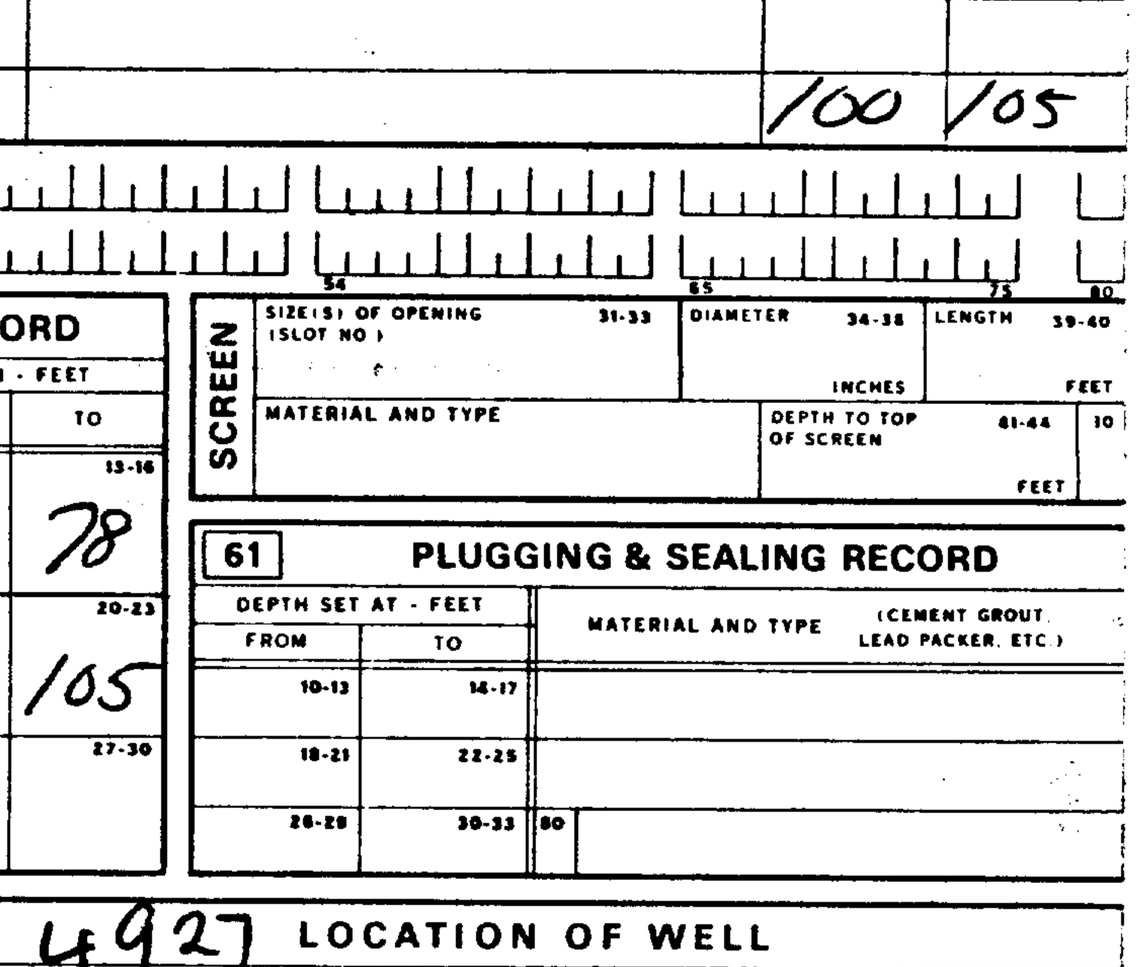
1 ☒ DOMESTIC; 2 ☐ STOCK; 3 ☐ IRRIGATION; 4 ☐ INDUSTRIAL; ☐ OTHER; 5 ☐ COMMERCIAL; 6 ☐ MUNICIPAL; 7 ☐ PUBLIC SUPPLY; 8 ☐ COOLING OR AIR CONDITIONING; 9 ☐ NOT USED

METHOD OF DRILLING

1 ☐ CABLE TOOL; 2 ☐ ROTARY (CONVENTIONAL); 3 ☐ ROTARY (REVERSE); 4 ☐ ROTARY (AIR); 5 ☒ AIR PERCUSSION; 6 ☐ BORING; 7 ☐ DIAMOND; 8 ☐ JETTING; 9 ☐ DRIVING

4927 LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS:

CONTRACTOR

NAME OF WELL CONTRACTOR: Henry Mains Well Drilling — LICENCE NUMBER: 3644
ADDRESS: BR 326, Richmond Ont.
NAME OF DRILLER OR BORER — LICENCE NUMBER
SIGNATURE OF CONTRACTOR
SUBMISSION DATE: DAY 15 MO. 9 YR. 84

OFFICE USE ONLY

DATA SOURCE | CONTRACTOR | DATE RECEIVED 29 10 84
DATE OF INSPECTION | INSPECTOR
REMARKS

CSS:FS

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FORM NO. 0506—4—77 FORM 7

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 — 1519335 — MUNICIP. 5004 — CON.

COUNTY OR DISTRICT: [redacted] — TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: S. Gower (Mott Corner) — CON., BLOCK, TRACT, SURVEY, ETC.: Craighton Con 1 — LOT: Pt 21

[redacted] 241 Kars Ont K0E 2E0 — DATE COMPLETED: DAY 14 MO 9 YR 84

RC — ELEVATION — RC — BASIN CODE

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
grey	Clay			0	7
grey	hardpan	stone		7	65
grey	hardpan			65	76
grey	limestone			76	84
grey	broken rock			84	100
grey	limestone			100	105

31

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
100	1 ☒ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6¼	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	188	0	78
6	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE		78	105
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE OF OPENING (SLOT NO.) — DIAMETER — LENGTH (INCHES / FEET)

MATERIAL AND TYPE — DEPTH TO TOP OF SCREEN (FEET)

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☒ PUMP 2 ☐ BAILER — PUMPING RATE: 15 GPM — DURATION OF PUMPING: 1 HOURS 0 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☐ PUMPING 2 ☐ RECOVERY	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
20 FEET	60 FEET		60 FEET	60 FEET	60 FEET	60 FEET

IF FLOWING, GIVE RATE — GPM — PUMP INTAKE SET AT — FEET — WATER AT END OF TEST: 1 ☐ CLEAR 2 ☒ CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP — RECOMMENDED PUMP SETTING: 60 FEET — RECOMMENDED PUMPING RATE: 10 GPM

FINAL STATUS OF WELL

1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED

WATER USE

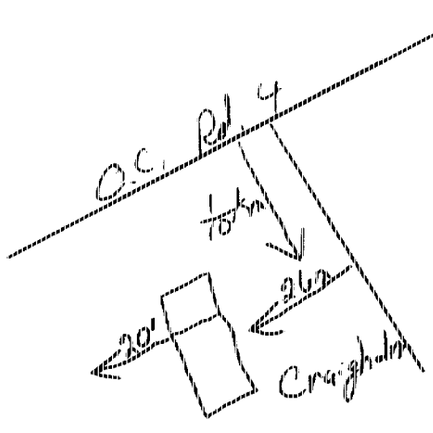
1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF DRILLING

1 ☐ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☒ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING

4927 LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS

CONTRACTOR

NAME OF WELL CONTRACTOR: Kenny Marine Water Drilling — LICENCE NUMBER: 3695

ADDRESS: RR 3 Box 326, Richmond Ont.

NAME OF DRILLER OR BORER: [redacted] — LICENCE NUMBER:

SIGNATURE OF CONTRACTOR: [redacted] — SUBMISSION DATE: DAY 15 MO 9 YR 84

OFFICE USE ONLY

DATA SOURCE: 3644 — DATE RECEIVED: 84 10 84

DATE OF INSPECTION — INSPECTOR

REMARKS: CSS 88

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506—4—77 FORM 7

Ministry of the Environment
Ontario

12 Sobeau Crt Lot

The Ontario Water Resources Act

WATER WELL RECORD

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 1520365

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
Ottawa-Carleton	Rideau	Conc. 1	21/22

[redacted]

Ken Crump Ltd.; Osgoode, Ont. K0A 2W0

DATE COMPLETED: DAY 28 MO 10 YR 85

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
Brown	Clay	Boulders		0	12
Gray	Gravel & Boulders		Packed	12	41

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
41	1 ☒ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6¼	1 ☒ STEEL; 2 ☐ GALVANIZED; 1 ☐ CONCRETE; 4 ☐ OPEN HOLE	.188	0	41
	1 ☐ STEEL; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☒ OPEN HOLE			
	1 ☐ STEEL; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET
MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN FEET	

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
1 ☒ PUMP 2 ☐ BAILER	10 GPM	1 HOURS ___ MINS

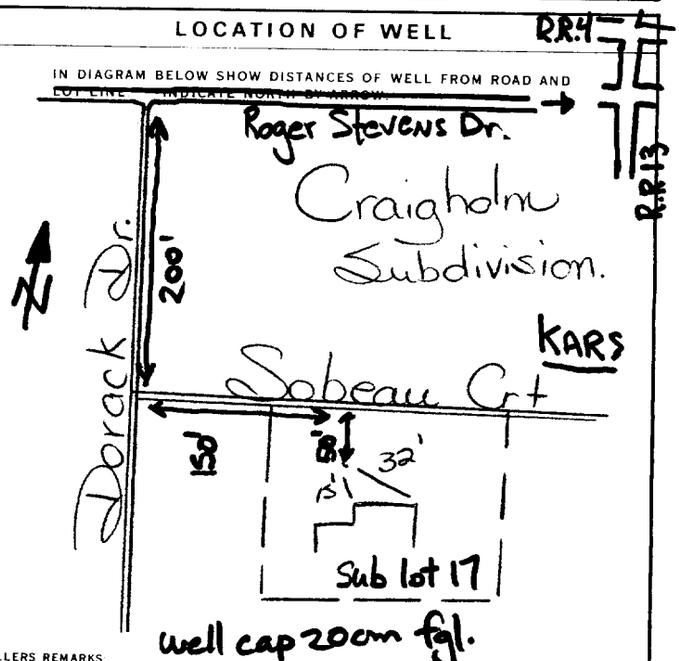
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
8 FEET	20 FEET	1 ☒ PUMPING 2 ☐ RECOVERY	20 FEET	20 FEET	20 FEET	20 FEET

IF FLOWING, GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST
GPM	20 FEET	1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
☒ SHALLOW ☐ DEEP	30 FEET	5 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS: well cap 20cm fgl.

FINAL STATUS OF WELL

1 ☒ WATER SUPPLY; 2 ☐ OBSERVATION WELL; 3 ☐ TEST HOLE; 4 ☐ RECHARGE WELL; 5 ☐ ABANDONED, INSUFFICIENT SUPPLY; 6 ☐ ABANDONED, POOR QUALITY; 7 ☐ UNFINISHED

WATER USE

1 ☒ DOMESTIC; 2 ☐ STOCK; 3 ☐ IRRIGATION; 4 ☐ INDUSTRIAL; ☐ OTHER; 5 ☐ COMMERCIAL; 6 ☐ MUNICIPAL; 7 ☐ PUBLIC SUPPLY; 8 ☐ COOLING OR AIR CONDITIONING; 9 ☐ NOT USED

METHOD OF DRILLING

1 ☐ CABLE TOOL; 2 ☐ ROTARY (CONVENTIONAL); 3 ☐ ROTARY (REVERSE); 4 ☐ ROTARY (AIR); 5 ☒ AIR PERCUSSION; 6 ☐ BORING; 7 ☐ DIAMOND; 8 ☐ JETTING; 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: Capital Water Supply Ltd. — LICENCE NUMBER: 1558

ADDRESS: Box 490; Stittsville, Ont. K0A 3G0

NAME OF DRILLER OR BORER: S. Miller — LICENCE NUMBER:

SIGNATURE OF CONTRACTOR: W. Kavanagh — SUBMISSION DATE: DAY 29 MO 10 YR 85

OFFICE USE ONLY

DATA SOURCE | CONTRACTOR | DATE RECEIVED 21 01 86

DATE OF INSPECTION | INSPECTOR

REMARKS

ss.85

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506—4—77 FORM 7

Ontario — Ministry of the Environment

Measurements recorded in: [X] Metric [ ] Imperial

Well Tag No. **A 080826**

Well Record

Regulation 903 Ontario Water Resources Act

Page of

[redacted]

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
1605 Mardick Court	Rideau	21	1

County/District/Municipality	City/Town/Village	Province	Postal Code
Ottawa / Carleton	Kars	Ontario	K0A2E0

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	18	445845	5000843	4M 439	

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
Black	Topsoil		Soft	0	.61
~~Brown~~ Brown	Clay	Stones	Packed	.61	4.88
Grey	Clay	Stones	Packed	4.88	19.51
Grey	Limestone		Hard	19.51	33.53
Grey	Limestone		Hard Fractured	33.53	37.19
Grey	Limestone		Hard	37.19	48.77

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
21.49	18.29	Cement Pressure Grouted	.16
18.29	0	Bentonite Pressure Grouted	.813

Method of Construction

[ ] Cable Tool [ ] Diamond
[X] Rotary (Conventional) [ ] Jetting
[ ] Rotary (Reverse) [ ] Driving
[ ] Boring [ ] Digging
[X] Air percussion
[ ] Other, specify

Well Use

[ ] Public [ ] Commercial [ ] Not used
[X] Domestic [ ] Municipal [ ] Dewatering
[ ] Livestock [ ] Test Hole [ ] Monitoring
[ ] Irrigation [X] 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
15.88	Steel	.48	0	21.49
25.08	Open Hole		0	21.49
15.55	Open Hole		21.49	48.77

Construction Record - Screen

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

Status of Well

[X] 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	Other, specify
	[ ]	[ ] Fresh [ ] Untested	
41.76 (m/ft)	[ ]	[ ] Fresh [X] Untested	
	[ ]	[ ] Fresh [ ] Untested	

Hole Diameter

Depth (m/ft) From	Depth (m/ft) To	Diameter (cm/in)
0	21.49	25.08
21.49	48.77	15.55

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Splash Well Drilling	4877

Business Address (Street Number/Name)	Municipality
PO Box 1083	Prescott

Province	Postal Code	Business E-mail Address
ON	K0E1T0	

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
6139254885	Ferguson, Todd

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
7478	Todd Ferguson	2009 07 31

Results of Well Yield Testing

After test of well yield, water was:
[X] Clear and sand free
[ ] Other, specify

If pumping discontinued, give reason:

Pump intake set at (m/ft): 42.67

Pumping rate (l/min / GPM): 80.22

Duration of pumping: 1 hrs + 0 min

Final water level end of pumping (m/ft): 9.40

If flowing give rate (l/min / GPM):

Recommended pump depth (m/ft): 24.38

Recommended pump rate (l/min / GPM): 68.25

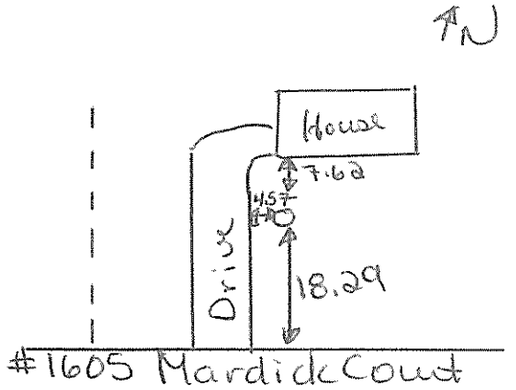
Well production (l/min / GPM):

Disinfected? [X] Yes [ ] No

Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level	5.37		9.40
1	6.89	1	9.13
2	7.48	2	7.50
3	7.84	3	7.09
4	8.03	4	6.82
5	8.21	5	6.55
10	8.66	10	5.86
15	8.91	15	5.49
20	9.07	20	5.40
25	9.24	25	5.38
30	9.32	30	5.37
40	9.34	40	
50	9.37	50	
60	9.40	60	

Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Well owner's information package delivered	Date Package Delivered	Ministry Use Only
[X] Yes [ ] No	2009 07 20	Audit No. Z 91784
	Date Work Completed	AUG 13 2009
	2009 07 09	Received

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 — 1518799 — MUNICIP. — CON.

COUNTY OR DISTRICT: Ottawa-Carleton [redacted] | TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: Rideau | CON., BLOCK, TRACT, SURVEY, ETC: 1 | LOT: 21 | ADDRESS: Kars Ont. | DATE COMPLETED: DAY 16 MO 6 YR 8

21 — UTM ZONE — EASTING — NORTHING — RC. — ELEVATION — RC. — BASIN CODE

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
	Sand			0	6
	clay			6	45
grey	Limestone			45	64

31 — 32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
59	1 ☒ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6¼	1 ☒ STEEL; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☐ OPEN HOLE	188	0	49
	1 ☐ STEEL; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☐ OPEN HOLE			
	1 ☐ STEEL; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER (INCHES)	LENGTH (FEET)

MATERIAL AND TYPE | DEPTH TO TOP OF SCREEN (FEET)

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)
10-13	14-17	
18-21	22-25	
26-29	30-33	

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☒ PUMP 2 ☐ BAILER

PUMPING RATE: 20 GPM

DURATION OF PUMPING: ____ HOURS 30 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☒ PUMPING 2 ☐ RECOVERY			
		15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
10 FEET	20 FEET	20 FEET	20 FEET	FEET	FEET

IF FLOWING, GIVE RATE: GPM

PUMP INTAKE SET AT: FEET

WATER AT END OF TEST: 1 ☒ CLEAR 2 ☐ CLOUDY

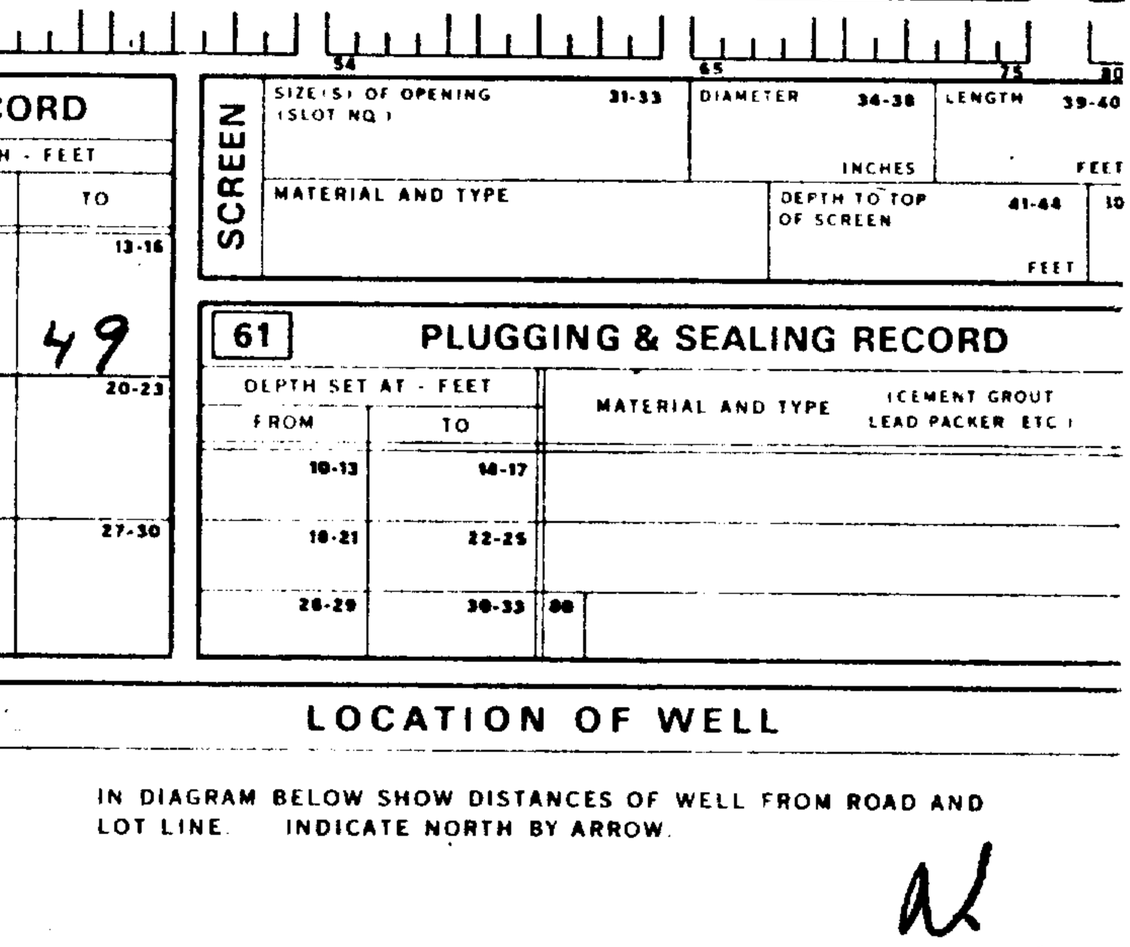
RECOMMENDED PUMP TYPE: ☒ SHALLOW ☐ DEEP

RECOMMENDED PUMP SETTING: 30 FEET

RECOMMENDED PUMPING RATE: 20 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS

FINAL STATUS OF WELL

1 ☒ WATER SUPPLY; 2 ☐ OBSERVATION WELL; 3 ☐ TEST HOLE; 4 ☐ RECHARGE WELL; 5 ☐ ABANDONED, INSUFFICIENT SUPPLY; 6 ☐ ABANDONED, POOR QUALITY; 7 ☐ UNFINISHED

WATER USE

1 ☒ DOMESTIC; 2 ☐ STOCK; 3 ☐ IRRIGATION; 4 ☐ INDUSTRIAL; ☐ OTHER; 6 ☐ COMMERCIAL; 8 ☒ MUNICIPAL; 7 ☐ PUBLIC SUPPLY; 8 ☒ COOLING OR AIR CONDITIONING; 9 ☐ NOT USED

METHOD OF DRILLING

1 ☐ CABLE TOOL; 2 ☒ ROTARY (CONVENTIONAL); 3 ☐ ROTARY (REVERSE); 4 ☐ ROTARY (AIR); 5 ☐ AIR PERCUSSION; 6 ☐ BORING; 7 ☐ DIAMOND; 8 ☐ JETTING; 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: Air-Rock Drilling Ltd. — LICENCE NUMBER: 1119

ADDRESS: RR # 2 Jasper Ont

NAME OF DRILLER OR BORER: Wallace DeSaulniers — LICENCE NUMBER: 1119

SIGNATURE OF CONTRACTOR: Wallace DeSaulniers — SUBMISSION DATE: DAY 20 MO 1 YR 84

OFFICE USE ONLY

DATA SOURCE | CONTRACTOR | 140284

DATE OF INSPECTION | INSPECTOR

REMARKS

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FORM NO. 0506—4—77 FORM 7

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Ontario

The Ontario Water Resources Act

WATER WELL RECORD

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1521252

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
Ottawa-Carleton	Rideau	Conc. 1	21

[redacted]

Ken Crump Ltd., Osgoode, Ont. K0A 2W0

DATE COMPLETED: DAY 11 MO 11 YR 86

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
Brown	Sandy	Clay Boulders		0	18
Gray	Hardpan	Boulders & Gravel		18	51
Gray	Limestone			51	75

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
70	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6¼	XX STEEL 2 GALVANIZED 3 CONCRETE 4 OPEN HOLE	.188	0	53
6	4 ☒ OPEN HOLE		53	75

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET
MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN FEET	

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
1 ☒ PUMP 2 ☐ BAILER	20 GPM	1 HOURS ___ MINS

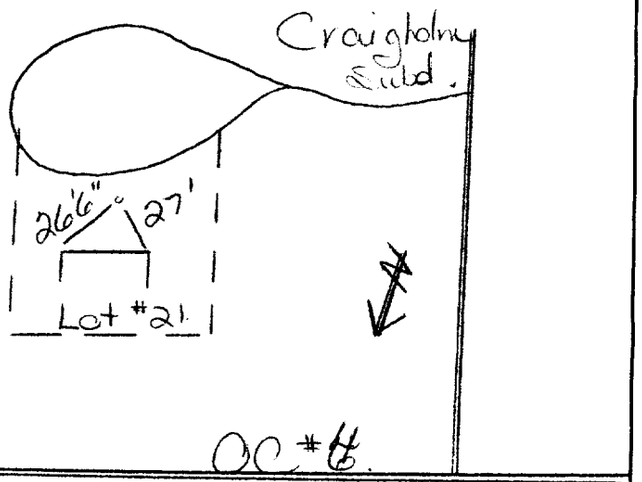
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
12 FEET	25 FEET	1 ☒ PUMPING 2 ☐ RECOVERY	25 FEET	25 FEET	25 FEET	25 FEET

IF FLOWING, GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST
GPM	25 FEET	1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
☐ SHALLOW ☒ DEEP	50 FEET	5 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS: 04572

FINAL STATUS OF WELL

1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED

WATER USE

1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF DRILLING

1 ☐ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☒ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: Capital Water Supply Ltd. — LICENCE NUMBER: 1558

ADDRESS: Box 490; Stittsville, Ont. K0A 3G0

NAME OF DRILLER OR BORER: S. Miller — LICENCE NUMBER:

SIGNATURE OF CONTRACTOR: W Kuvarax — SUBMISSION DATE: DAY 12 MO 11 YR 86

OFFICE USE ONLY

DATA SOURCE | CONTRACTOR | DATE RECEIVED 060287

DATE OF INSPECTION | INSPECTOR

REMARKS

SSSIBC

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Ministry of the Environment
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The Ontario Water Resources Act

WATER WELL RECORD

31649

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11 (1 2) 1519176 MUNICIP 15004 (10 14) CON Con N (15 22) 01 (23 24)

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT (25-27)
Ottawa-Carleton	Rideau	Conc. 1 (Plan 4R1858)	21 & 22

[redacted]: 843; Manotick, Ontario. K0A 2N0

DATE COMPLETED (48-53): DAY 12 MO 06 YR 84

RING (24) RC (25) ELEVATION (26) RC (30) BASIN CODE (31) I II III IV (47)

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
Brown	Sand		Fill	0	2
Brown	Sand	Clay	Packed	2	9
Gray	Sand	Gravel & Boulders	Packed	9	42
Gray	Gravel	Sand	Packed	42	45

31

32 (1 2 10 14 15 21 32 43 54 65 75 80)

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
45' (10-13)	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL (14)
(15-18)	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL (19)
(20-23)	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL (24)
(25-28)	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL (29)
(30-33)	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL (34) (80)

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6¼ (10-11)	1 ☒ STEEL (12) 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	188	0	44 (13-16)
6 (17-18)	1 ☐ STEEL (19) 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE		44	45 (20-23)
(24-25)	1 ☐ STEEL (26) 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			(27-30)

SCREEN

SIZE(S) OF OPENING (SLOT NO.) (31-33)	DIAMETER (34-38) INCHES	LENGTH (39-40) FEET
MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN (41-44) FEET	(30)

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)
(10-13)	(14-17)	
(18-21)	(22-25)	
(26-29)	(30-33) (80)	

71 PUMPING TEST

PUMPING TEST METHOD (10)	PUMPING RATE (11-14)	DURATION OF PUMPING (15-16 HOURS / 17-18 MINS)
1 ☒ PUMP 2 ☐ BAILER	20 GPM	1 HOURS

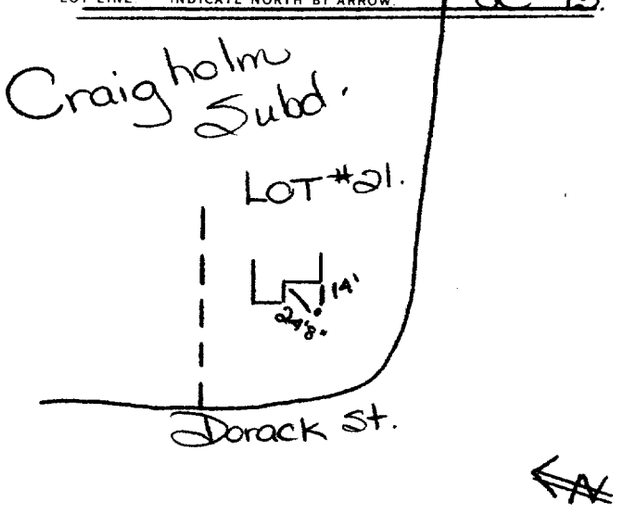
STATIC LEVEL (19-21)	WATER LEVEL END OF PUMPING (22-24)	WATER LEVELS DURING (25) 1 ☒ PUMPING 2 ☐ RECOVERY	15 MINUTES (26-28)	30 MINUTES (29-31)	45 MINUTES (32-34)	60 MINUTES (35-37)
9 FEET	18 FEET		18 FEET	18 FEET	18 FEET	18 FEET

IF FLOWING, GIVE RATE (38-41)	PUMP INTAKE SET AT	WATER AT END OF TEST (42)	RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING (43-45)	RECOMMENDED PUMPING RATE (46-49)
GPM	FEET	1 ☒ CLEAR 2 ☐ CLOUDY	☒ SHALLOW ☐ DEEP	20 FEET	5 GPM

(50-53)

3070 LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW. QC #13.



DRILLERS REMARKS

FINAL STATUS OF WELL (54)
1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED

WATER USE (55-56)
1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF DRILLING (57)
1 ☐ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☒ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: Capital Water Supply ltd. — LICENCE NUMBER: 1558

ADDRESS: Box 490; Stittsville, Ontario. K0A 3G0

NAME OF DRILLER OR BORER: W. Kavanagh — LICENCE NUMBER:

SIGNATURE OF CONTRACTOR: W. Kavanagh — SUBMISSION DATE: DAY 13 MO 06 YR 84

MINISTRY OF THE ENVIRONMENT COPY

OFFICE USE ONLY

DATA SOURCE (58) — CONTRACTOR (59-62): 1558 — DATE RECEIVED (63-68): 07 08 84 (69-70)

DATE OF INSPECTION — INSPECTOR

REMARKS

WDE

SSSGS

FORM NO. 0506—4—77 FORM 7

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 1521270

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
Ottawa-Carleton	Rideau	Conc. 1	21/22

OWNER (SURNAME FIRST)	ADDRESS	DATE COMPLETED
Hans & Jo Const.	R. R. # 3; North Gower, Ont. K0A 1T0	DAY 11 MO 08 YR 86

21 ZONE EASTING NORTHING FC ELEVATION FC BASIC CODE

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
Brown	Clay			0	16
Gray	Sand & Gravel	Boulders		16	65
Gray	Limestone			65	90

31
32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
80	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6¼	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	.188	0	69
6	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE		69	90
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET

MATERIAL AND TYPE | DEPTH TO TOP OF SCREEN FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

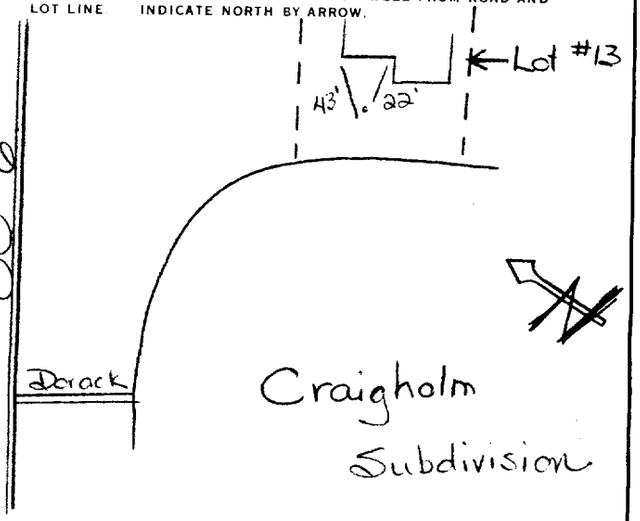
PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
1 ☒ PUMP 2 ☐ BAILER	50 GPM	1 HOURS ___ MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
10 FEET	20 FEET	1 ☒ PUMPING 2 ☐ RECOVERY	20 FEET	20 FEET	20 FEET	20 FEET

IF FLOWING, GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST	RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
GPM	20 FEET	1 ☒ CLEAR 2 ☐ CLOUDY	☐ SHALLOW ☒ DEEP	60 FEET	5 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS:

FINAL STATUS OF WELL	1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED
WATER USE	1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED
METHOD OF DRILLING	1 ☐ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☒ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR	LICENCE NUMBER
Capital Water Supply Ltd.	1558

ADDRESS: Box 490; Stittsville, Ontario. K0A 3G0

NAME OF DRILLER OR BORER	LICENCE NUMBER
S. Miller	

SIGNATURE OF CONTRACTOR: W Kavanagh

SUBMISSION DATE: DAY 12 MO 08 YR 86

OFFICE USE ONLY

DATA SOURCE	CONTRACTOR	DATE RECEIVED
		060287

DATE OF INSPECTION | INSPECTOR

REMARKS

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WATER WELL RECORD

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 — 1519762 — MUNICIP. 15004 — CON. CON 101

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
Ottawa-Carleton	Rideau	Conc. 1	21

[redacted] Forman Ave.; Ottawa, Ont. K2C 1A8

DATE COMPLETED: DAY 24 MO 05 YR 85

G — RC — ELEVATION — RC — BASIN CODE

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
Brown	Clay		Packed	0	10
Gray	Hardpan	Boulders	Packed	10	68
Gray	Gravel & Boulders		Packed	68	77
Gray	Limestone		Medium	77	120

31

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
115'	1 ☒ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6 1/4	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	.188	0	79
5 13/16	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE		79	120
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET

MATERIAL AND TYPE — DEPTH TO TOP OF SCREEN FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
1 ☒ PUMP 2 ☐ BAILER	30 GPM	1 HOURS ___ MINS

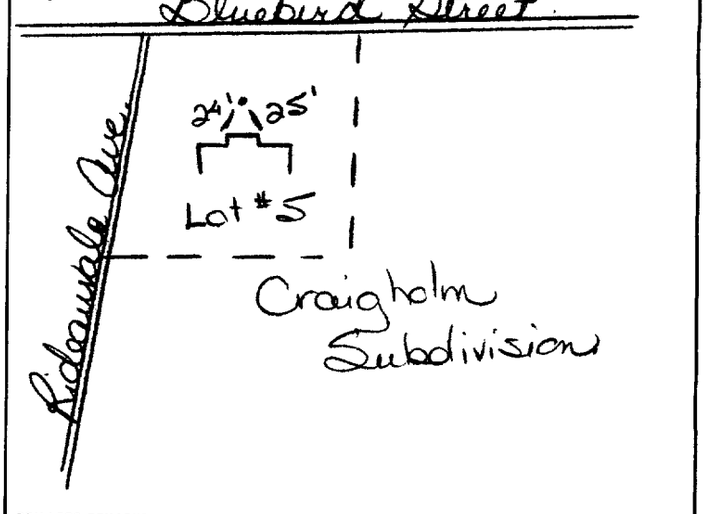
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
5 FEET	20 FEET	1 ☒ PUMPING 2 ☐ RECOVERY	20 FEET	20 FEET	20 FEET	20 FEET

IF FLOWING, GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST
GPM	20 FEET	1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
☐ SHALLOW ☒ DEEP	30 FEET	5 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS:

FINAL STATUS OF WELL

1 ☒ WATER SUPPLY; 2 ☐ OBSERVATION WELL; 3 ☐ TEST HOLE; 4 ☐ RECHARGE WELL; 5 ☐ ABANDONED, INSUFFICIENT SUPPLY; 6 ☐ ABANDONED POOR QUALITY; 7 ☐ UNFINISHED

WATER USE

1 ☒ DOMESTIC; 2 ☐ STOCK; 3 ☐ IRRIGATION; 4 ☐ INDUSTRIAL; ☐ OTHER; 5 ☐ COMMERCIAL; 6 ☐ MUNICIPAL; 7 ☐ PUBLIC SUPPLY; 8 ☐ COOLING OR AIR CONDITIONING; 9 ☐ NOT USED

METHOD OF DRILLING

1 ☐ CABLE TOOL; 2 ☐ ROTARY (CONVENTIONAL); 3 ☐ ROTARY (REVERSE); 4 ☐ ROTARY (AIR); 5 ☒ AIR PERCUSSION; 6 ☐ BORING; 7 ☐ DIAMOND; 8 ☐ JETTING; 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: Capital Water Supply Ltd. — LICENCE NUMBER: 1558

ADDRESS: Box 490; Stittsville, Ont. K0A 3G0

NAME OF DRILLER OR BORER: S. Miller — LICENCE NUMBER:

SIGNATURE OF CONTRACTOR: [signature] — SUBMISSION DATE: DAY 27 MO 05 YR 85

OFFICE USE ONLY

DATA SOURCE — CONTRACTOR 1558 — DATE RECEIVED 10 06 85

DATE OF INSPECTION — INSPECTOR

REMARKS

WDE

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506—4—77 FORM 7

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

1. PRINT ONLY IN SPACES PROVIDED
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11 — 1519763 — MUNICIP. 1502 — CON. CON 01

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
Ottawa-Carleton	Rideau	Conc. 1	21

[redacted] notick, Ont. K0A 2N0

DATE COMPLETED: DAY 23 MO 05 YR 85

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
Brown	Hardpan	Boulders	Packed	0	22
Gray	Hardpan	Boulders	Packed	22	60
Gray	Gravel & Boulders		Packed	60	78
Gray	Limestone		Medium Hard	78	125

31

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
125'	1 ☒ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6 1/4	1 ☒ STEEL; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☐ OPEN HOLE	.188	0	81½
5 13/16	1 ☐ STEEL; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☒ OPEN HOLE		81½	125
	1 ☐ STEEL; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER (INCHES)	LENGTH (FEET)

MATERIAL AND TYPE — DEPTH TO TOP OF SCREEN (FEET)

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

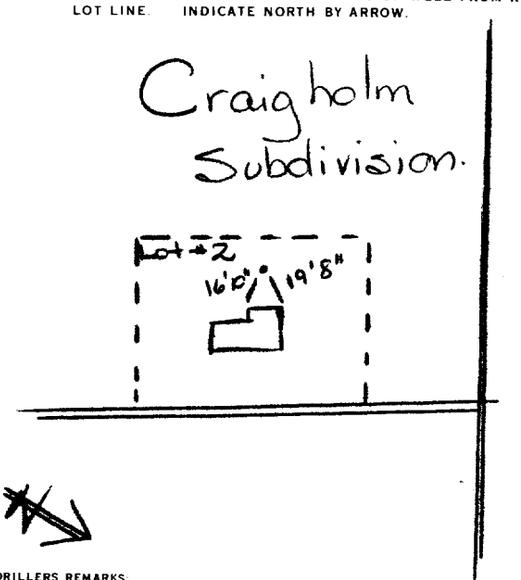
PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
1 ☒ PUMP 2 ☐ BAILER	10 GPM	1 HOURS ___ MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
40 FEET	60 FEET	1 ☒ PUMPING 2 ☐ RECOVERY	60 FEET	60 FEET	60 FEET	60 FEET

IF FLOWING, GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST	RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
GPM	60 FEET	1 ☒ CLEAR 2 ☐ CLOUDY	☐ SHALLOW ☒ DEEP	75 FEET	5 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS:

FINAL STATUS OF WELL

1 ☒ WATER SUPPLY; 2 ☐ OBSERVATION WELL; 3 ☐ TEST HOLE; 4 ☐ RECHARGE WELL; 5 ☐ ABANDONED, INSUFFICIENT SUPPLY; 6 ☐ ABANDONED, POOR QUALITY; 7 ☐ UNFINISHED

WATER USE

1 ☒ DOMESTIC; 2 ☐ STOCK; 3 ☐ IRRIGATION; 4 ☐ INDUSTRIAL; ☐ OTHER; 5 ☐ COMMERCIAL; 6 ☐ MUNICIPAL; 7 ☐ PUBLIC SUPPLY; 8 ☐ COOLING OR AIR CONDITIONING; 9 ☐ NOT USED

METHOD OF DRILLING

1 ☐ CABLE TOOL; 2 ☐ ROTARY (CONVENTIONAL); 3 ☐ ROTARY (REVERSE); 4 ☐ ROTARY (AIR); 5 ☒ AIR PERCUSSION; 6 ☐ BORING; 7 ☐ DIAMOND; 8 ☐ JETTING; 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: Capital Water Supply Ltd. — LICENCE NUMBER: 1558

ADDRESS: Box 490; Stittsville, Ont. K0A 3G0

NAME OF DRILLER OR BORER: S. Miller — LICENCE NUMBER:

SIGNATURE OF CONTRACTOR: W. Kavanagh — SUBMISSION DATE: DAY 24 MO. 05 YR. 85

OFFICE USE ONLY

DATA SOURCE — CONTRACTOR 1558 — DATE RECEIVED 10 06 85

DATE OF INSPECTION — INSPECTOR

REMARKS: WDE

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Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

OTTAWA-CARLETON

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11

1522363

MUNICIP 15

CON.

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC	LOT
RIDEAU	Ottawa-Carleton	Conc. 1 Pt. # 4M-46	21

OWNER (SURNAME FIRST)	ADDRESS	DATE COMPLETED
Lindia Const.		DAY 23 MO 12 YR 87

21

ZONE | EASTING | NORTHING | ELEVATION | BASIN CODE

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
Brown	Fill		Packed	0	3'
Brown	Sand	Clay	Packed	3'	11'
Brown	Sand		Packed	11'	16'
Grey	Clay	Silt Sand Layers	wet	16	55'
Grey	Boulders		Packed	55	61'
Grey	Silt		wet	61'	65'
Grey	limestone	Black limestone	Hard	65'	128'
Grey	limestone	Quartz Layers	Hard	128'	155'

31

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
128'	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
147	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6 1/4"	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	.188	0	66
6"	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE 5 ☐ PLASTIC		66'	155
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET
MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN FEET	

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT, SAND PACKER, ETC.)
0	65	Cement Grout

71 PUMPING TEST

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
1 ☒ PUMP 2 ☐ BAILER	15 GPM	2 HOURS ___ MINS

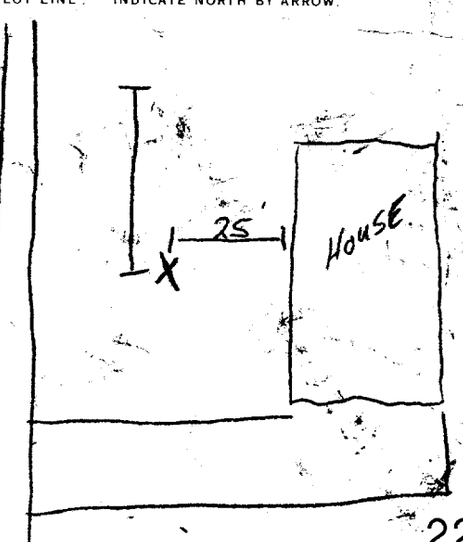
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
5 FEET	80 FEET	1 ☒ PUMPING 2 ☐ RECOVERY	80 FEET	80 FEET	80 FEET	80 FEET

IF FLOWING, GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST
GPM	80 FEET	1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
☐ SHALLOW ☒ DEEP	80 FEET	8 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS

22062

FINAL STATUS OF WELL

1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 8 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED 9 ☐ DEWATERING

WATER USE

1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF CONSTRUCTION

1 ☐ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☒ ROTARY (AIR) 5 ☐ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING ☐ DIGGING ☐ OTHER

CONTRACTOR

NAME OF WELL CONTRACTOR	WELL CONTRACTOR'S LICENCE NUMBER
Valley Drilling Co. Ltd	5222
ADDRESS	
P.O. Box 1437 Carp, Ont	
NAME OF WELL TECHNICIAN	WELL TECHNICIAN'S LICENCE NUMBER
Bill Blesson	T-0190
SIGNATURE OF TECHNICIAN/CONTRACTOR	SUBMISSION DATE DAY ___ MO ___ YR ___

OFFICE USE ONLY

DATA SOURCE	CONTRACTOR	DATE RECEIVED
	5222	JUN 21 1988
DATE OF INSPECTION	INSPECTOR	
REMARKS		

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FORM NO. 0506 (11/86) FORM 9

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

11

1520368

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COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
Ottawa-Carleton	Rideau	Con. 1 Lot 21 Craigholm Subd.	Sub 4

[redacted]
1322 Pinecrest Rd.; Ottawa, Ont. K2C 3E6

DATE COMPLETED: DAY 23 MO 10 YR 85

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
Brown	Clay			0	6
Brown	Sandy Clay			6	20
Gray	Sand	Boulders		20	40
Gray	Sand, Gravel	Boulders		40	66
Gray	Hardpan			66	72
Gray	Limestone			72	115

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
97	☒ FRESH ☐ SULPHUR ☐ SALTY ☐ MINERAL
110	☒ FRESH ☐ SULPHUR ☐ SALTY ☐ MINERAL
	☐ FRESH ☐ SULPHUR ☐ SALTY ☐ MINERAL
	☐ FRESH ☐ SULPHUR ☐ SALTY ☐ MINERAL
	☐ FRESH ☐ SULPHUR ☐ SALTY ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6¼	☒ STEEL ☐ GALVANIZED ☐ CONCRETE ☐ OPEN HOLE	.188	0	75
6	☐ STEEL ☐ GALVANIZED ☐ CONCRETE ☒ OPEN HOLE		75	115
	☐ STEEL ☐ GALVANIZED ☐ CONCRETE ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET
MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN FEET	

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT LEAD PACKER ETC.)

71 PUMPING TEST

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
1 ☒ PUMP 2 ☐ BAILER	10 GPM	1 HOURS ___ MINS

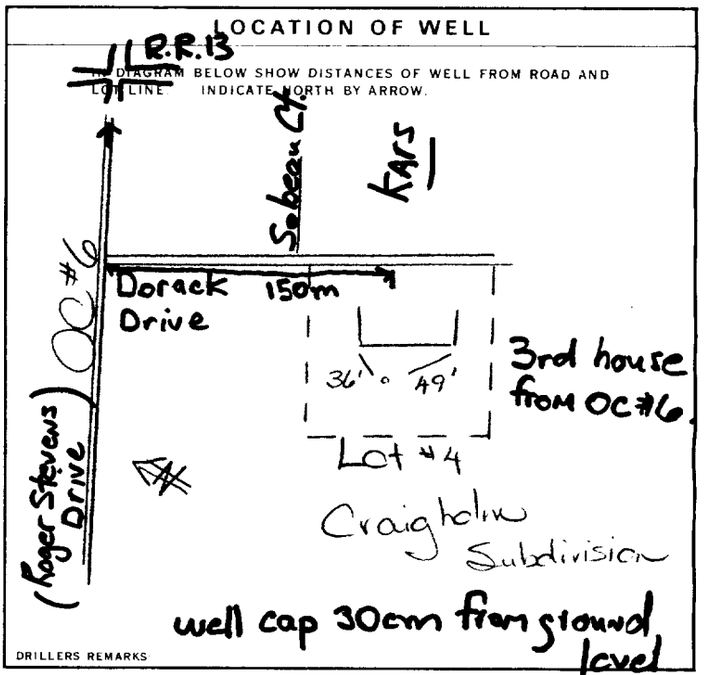
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
15 FEET	50 FEET	1 ☒ PUMPING 2 ☐ RECOVERY	50 FEET	50 FEET	50 FEET	50 FEET

IF FLOWING, GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST
GPM	50 FEET	1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
☐ SHALLOW ☒ DEEP	75 FEET	5 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS

FINAL STATUS OF WELL

☒ 1 WATER SUPPLY ☐ 2 OBSERVATION WELL ☐ 3 TEST HOLE ☐ 4 RECHARGE WELL ☐ 5 ABANDONED, INSUFFICIENT SUPPLY ☐ 6 ABANDONED, POOR QUALITY ☐ 7 UNFINISHED

WATER USE

☒ 1 DOMESTIC ☐ 2 STOCK ☐ 3 IRRIGATION ☐ 4 INDUSTRIAL ☐ OTHER ☐ 5 COMMERCIAL ☐ 6 MUNICIPAL ☐ 7 PUBLIC SUPPLY ☐ 8 COOLING OR AIR CONDITIONING ☐ 9 NOT USED

METHOD OF DRILLING

☐ 1 CABLE TOOL ☐ 2 ROTARY (CONVENTIONAL) ☐ 3 ROTARY (REVERSE) ☐ 4 ROTARY (AIR) ☒ 5 AIR PERCUSSION ☐ 6 BORING ☐ 7 DIAMOND ☐ 8 JETTING ☐ 9 DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR	LICENCE NUMBER
Capital Water Supply Ltd.	1558

ADDRESS: Box 490; Stittsville, Ontario. K0A 3G0

NAME OF DRILLER OR BORER	LICENCE NUMBER
S. Miller	

SIGNATURE OF CONTRACTOR: W Kawarsky

SUBMISSION DATE: DAY 26 MO 10 YR 85

OFFICE USE ONLY

DATA SOURCE | CONTRACTOR | DATE RECEIVED 21 01 86

DATE OF INSPECTION | INSPECTOR

REMARKS

CSS-65

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Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

1521260

1. PRINT ONLY IN SPACES PROVIDED
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COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT	DATE COMPLETED
Ottawa Carleton	Rideau	Conc. 1	21	DAY 03 MO 10 YR 86

[redacted] u Valley Drive; Kars, Ont. K0A 2E0

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
Brown	Clay			0	8
Brown	Sandy Clay			8	25
Gray	Sand & Gravel	Boulders		25	62
Gray	Hardpan	Boulders		62	70
Gray	Limestone			70	90

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
82	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6 1/4	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	.188	0	72½
5 13/16	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE		72½	90
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET
MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN FEET	

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT LEAD PACKER, ETC.)

71 PUMPING TEST

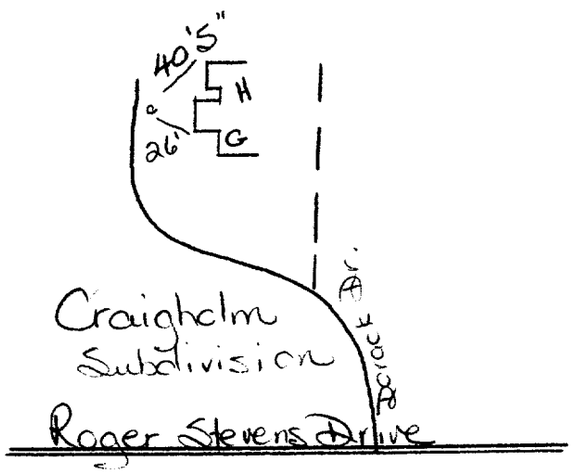
PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
1 ☒ PUMP 2 ☐ BAILER	10 GPM	1 HOURS ____ MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
15 FEET	50 FEET	1 ☒ PUMPING 2 ☐ RECOVERY	50 FEET	50 FEET	50 FEET	50 FEET

IF FLOWING, GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST	RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
GPM	50 FEET	1 ☒ CLEAR 2 ☐ CLOUDY	☐ SHALLOW ☒ DEEP	70 FEET	5 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS:

FINAL STATUS OF WELL

1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED

WATER USE

1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF DRILLING

1 ☐ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☒ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR	LICENCE NUMBER
Capital Water Supply Ltd.	1558
ADDRESS	
Box 490; Stittsville, Ont. K0A 3G0	
NAME OF DRILLER OR BORER	LICENCE NUMBER
S. Miller	
SIGNATURE OF CONTRACTOR	SUBMISSION DATE
W Kawanagh	DAY 03 MO. 09 YR. 86

MINISTRY OF THE ENVIRONMENT COPY

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DATA SOURCE	CONTRACTOR	DATE RECEIVED
		060287
DATE OF INSPECTION	INSPECTOR	
REMARKS		

CSS, GS

FORM NO. 0506—4—77 FORM 7

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 1521897

MUNICIP CON

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON. BLOCK, TRACT, SURVEY, ETC.	LOT
Ottawa-Carleton	Rideau	Conc. 1	21

[redacted] Maple Ave.; Manotick, Ont. K0A 2N0

DATE COMPLETED: DAY 30 MO 06 YR 87

ELEVATION RC BASIN CODE

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
Brown	Hardpan	Boulders	Packed	0	18
Gray	Hardpan	Boulders		18	55
Gray	Sand & Gravel			55	68
Gray	Limestone		Medium	68	210

31

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
206	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6¼	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	.188	0	71½
6	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE		71½	210
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET
MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN FEET	

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
1 ☒ PUMP 2 ☐ BAILER	30 GPM	1 HOURS ___ MINS

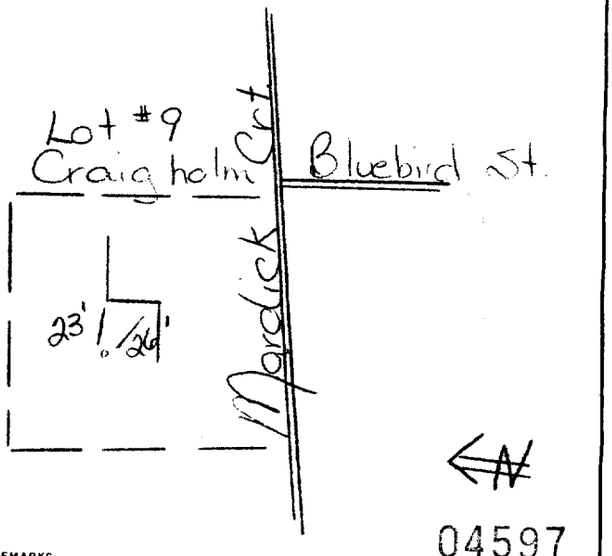
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING (1 ☐ PUMPING 2 ☐ RECOVERY)	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
35 FEET	70 FEET		70 FEET	70 FEET	70 FEET	70 FEET

IF FLOWING, GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST
GPM	FEET	1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
☐ SHALLOW ☒ DEEP	90 FEET	5 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



04597

DRILLERS REMARKS:

FINAL STATUS OF WELL

1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED

WATER USE

1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF DRILLING

1 ☐ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☒ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: Capital Water Supply Ltd. — LICENCE NUMBER: 1558

ADDRESS: Box 490; Stittsville, Ont. K0A 3G0

NAME OF DRILLER OR BORER: S. Miller — LICENCE NUMBER:

SIGNATURE OF CONTRACTOR: W. Kawanagh — SUBMISSION DATE: DAY 30 MO 06 YR 87

OFFICE USE ONLY

DATA SOURCE | CONTRACTOR | DATE RECEIVED: OCT 0 1 1987

DATE OF INSPECTION | INSPECTOR

REMARKS

CSS/GS

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FORM NO. 0506—4—77 FORM 7

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

OTTAWA - CARLETON N. GOWER 1522077

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11

MUNICIP CON

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
Carleton	Rideau (North Gower)	Con I	Pt 21

OWNER (SURNAME FIRST)	ADDRESS	DATE COMPLETED
Tensen Construction	RR#3, Merrickville K0G1N0	DAY 4 MO 4 YR. 87

21 ZONE EASTING NORTHING RC ELEVATION RC BASIN CODE

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
grey	gravel	stones		0	40

31

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
40	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6¼	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	.188	0	40
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET

MATERIAL AND TYPE DEPTH TO TOP OF SCREEN FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)
10-13	14-17	Pressure cement grouted
18-21	22-25	
26-29	30-33	

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☒ PUMP 2 ☐ BAILER

PUMPING RATE: 30 GPM DURATION OF PUMPING: 1 HOURS 0 MINS

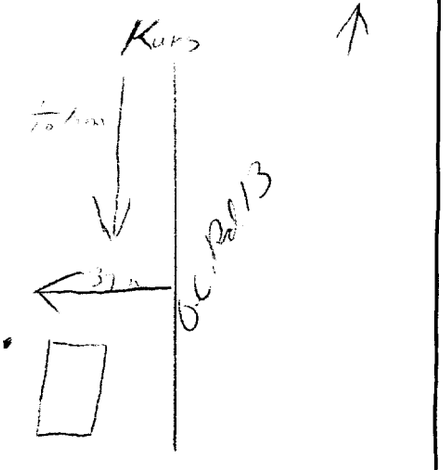
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☐ PUMPING 2 ☐ RECOVERY			
		15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
20 FEET	30 FEET	30 FEET	30 FEET	30 FEET	30 FEET

IF FLOWING, GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST
GPM	FEET	1 ☐ CLEAR 2 ☒ CLOUDY

RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
☒ SHALLOW ☐ DEEP	30 FEET	15 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS: 08651

54 FINAL STATUS OF WELL

1 ☐ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☒ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED

55 56 WATER USE

1 ☐ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING ☐ OTHER discharge heat pump ☐ NOT USED

METHOD OF DRILLING

1 ☐ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☒ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING 3644

CONTRACTOR

NAME OF WELL CONTRACTOR	LICENCE NUMBER
K Mains Well Drilling	3644

ADDRESS: Box 326, Richmond Ont

NAME OF DRILLER OR BORER LICENCE NUMBER

SIGNATURE OF CONTRACTOR SUBMISSION DATE DAY MO. YR.

OFFICE USE ONLY

RECEIVED: JAN 13 1988

REMARKS: CSS.GS

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Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

OTTAWA-CARLETON N. GOWER 1522082

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11

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
Carleton	Rideau (North Gower)	Con 1	Pt 21

OWNER (SURNAME FIRST)	ADDRESS	DATE COMPLETED
Tensen Const.	RR#3 Merrickville K0G 1N0	DAY 8 MO 9 YR. 87

21 ZONE EASTING NORTHING ELEVATION BASIN CODE

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
grey	gravel	stone		0	56

31

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
56	1 ☒ FRESH 2 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6 1/4	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	.188	0	56
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET

MATERIAL AND TYPE | DEPTH TO TOP OF SCREEN FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)
10-13	14-17	pressure cement grouted
18-21	22-25	
26-29	30-33	

71 PUMPING TEST

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
1 ☒ PUMP 2 ☐ BAILER	50 GPM	1 HOURS 0 MINS

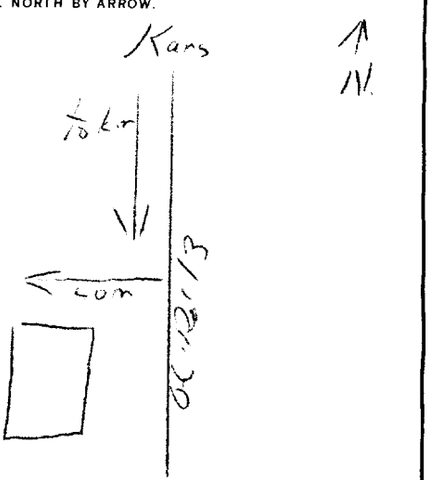
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING (1 ☐ PUMPING 2 ☐ RECOVERY)	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
22 FEET	35 FEET		35 FEET	35 FEET	35 FEET	35 FEET

IF FLOWING, GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST
GPM	FEET	1 ☐ CLEAR 2 ☒ CLOUDY

RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
☐ SHALLOW ☒ DEEP	35 FEET	15 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS: 08649

FINAL STATUS OF WELL

1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED

WATER USE

1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING ☐ NOT USED

METHOD OF DRILLING

1 ☐ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☒ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR	LICENCE NUMBER
A. Mains Well Drilling	3644

ADDRESS: Box 326, Richmond Ont

NAME OF DRILLER OR BORER | LICENCE NUMBER

SIGNATURE OF CONTRACTOR | SUBMISSION DATE: DAY 10 MO 9 YR. 87

OFFICE USE ONLY

WELL ID | CONFIRMED | DATE RECEIVED: JAN 13 1988

LOT | CON | INSPECTOR

REMARKS: CBS, ES

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FORM NO. 0506—4—77 FORM 7

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

1. PRINT ONLY IN SPACES PROVIDED
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11 1524994 MUNICIP 15004 CON. CON 01

COUNTY OR DISTRICT: Ottawa-Carleton
TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: Osgoode
CON. BLOCK, TRACT, SURVEY ETC: Con #1 Schlot 13 Plan M26 LOT 21
[redacted] 609 Kemptville
DATE COMPLETED: DAY 29 MO 8 YR 90
OVERBURDEN: RC ELEVATION: RC BASIN CODE: Stream Kemptville

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
Brown	Clay	Stones	Packed	0	15
Grey	Clay	Stones	Packed	15	65
Broken	Sandstone		Hard	65	122

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
108	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
8 3/4	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE 5 ☐ PLASTIC		0	68
6 1/4	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	.188	0	68
6 1/8	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE 5 ☐ PLASTIC		68	122

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET
MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN FEET	

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)
68	0	Cement Grout

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☐ PUMP 2 ☐ BAILER — PUMPING RATE: 15 GPM — DURATION OF PUMPING: 1 HOURS 0 MINS

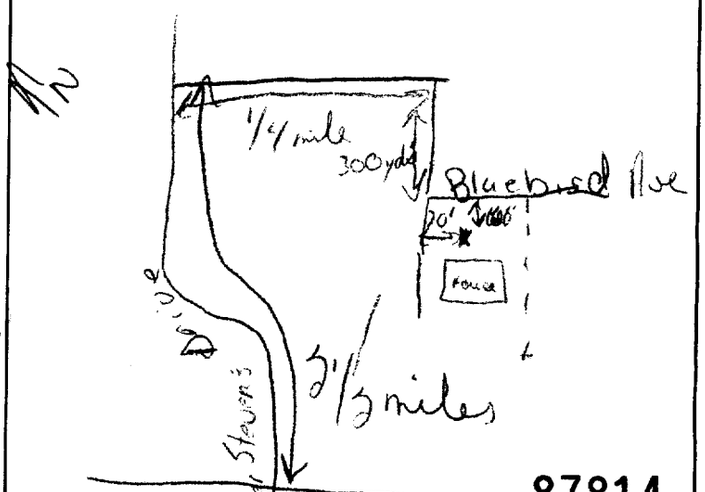
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☒ PUMPING 2 ☐ RECOVERY	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
40 FEET	100 FEET		100 FEET	100 FEET	100 FEET	100 FEET

IF FLOWING, GIVE RATE: GPM — PUMP INTAKE SET AT: 116 FEET — WATER AT END OF TEST: 1 ☐ CLEAR 2 ☒ CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP — RECOMMENDED PUMP SETTING: 110 FEET — RECOMMENDED PUMPING RATE: 12 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



87814

DRILLERS REMARKS:

FINAL STATUS OF WELL (54)
1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED ☐ DEWATERING

WATER USE (55-56)
1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF CONSTRUCTION (57)
1 ☐ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☒ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING ☐ DIGGING ☐ OTHER

CONTRACTOR

NAME OF WELL CONTRACTOR: Splash Well Drilling — WELL CONTRACTOR'S LICENCE NUMBER: 4877
ADDRESS: Box 1083 Prescott
NAME OF WELL TECHNICIAN: Todd Ferguson — WELL TECHNICIAN'S LICENCE NUMBER: T-0178
SIGNATURE OF TECHNICIAN/CONTRACTOR: Todd Ferguson — SUBMISSION DATE: DAY 31 MO 8 YR 90

OFFICE USE ONLY

DATA SOURCE (58) — CONTRACTOR (59-62): 4877 — DATE RECEIVED (63-68): SEP 06 1990
DATE OF INSPECTION — INSPECTOR
REMARKS

CSS: ES

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Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 — 1526364 — MUNICIP. 1500A — CON. CON 91

COUNTY OR DISTRICT: Carleton
TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: Rideau (North Gower)
CON., BLOCK, TRACT, SURVEY, ETC.: Con 1
LOT: 21

OWNER (SURNAME FIRST): Tulman Funeral Homes
ADDRESS: 403, Richmond Rd Ottawa K2A 0E9
DATE COMPLETED: DAY 23 MO 7 YR 92

21 — UTM ZONE — EASTING — NORTHING — RC — ELEVATION — RC — BASIN CODE (I, II, III, IV)

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
grey	clay hardpan	stones & gravel		0	76
grey	limestone			76	180

31

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
171	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
178	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6¼	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	.188	0	80
6	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE 5 ☐ PLASTIC		80	180
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER (INCHES)	LENGTH (FEET)

MATERIAL AND TYPE: — DEPTH TO TOP OF SCREEN (FEET):

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)
10-13	14-17	cement grouted
18-21	22-25	
26-29	30-33	

71 PUMPING TEST

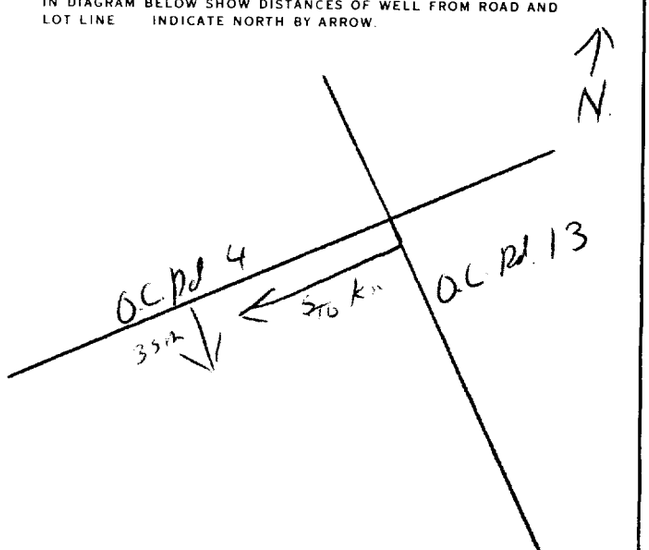
PUMPING TEST METHOD: 1 ☒ ~~PUMP~~ Air 2 ☐ BAILER
PUMPING RATE: 100 GPM
DURATION OF PUMPING: 1 HOURS 0 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
30 FEET	75 FEET	1 ☐ PUMPING 2 ☒ RECOVERY	31 FEET	30 FEET	30 FEET	30 FEET

IF FLOWING, GIVE RATE: — GPM
PUMP INTAKE SET AT: — FEET
WATER AT END OF TEST: 1 ☐ CLEAR 2 ☒ CLOUDY
RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP
RECOMMENDED PUMP SETTING: 75 FEET
RECOMMENDED PUMPING RATE: 20 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS: 111857

FINAL STATUS OF WELL

1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED ☐ DEWATERING

WATER USE

1 ☐ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☒ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF CONSTRUCTION

1 ☐ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☒ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING ☐ DIGGING ☐ OTHER

CONTRACTOR

NAME OF WELL CONTRACTOR: D. Mann Well Drilling
WELL CONTRACTOR'S LICENCE NUMBER: 3644
ADDRESS: Box 326, Richmond Ont
NAME OF WELL TECHNICIAN:
WELL TECHNICIAN'S LICENCE NUMBER: T-0064
SIGNATURE OF TECHNICIAN/CONTRACTOR:
SUBMISSION DATE: DAY 25 MO 7 YR 92

OFFICE USE ONLY

DATA SOURCE: — CONTRACTOR: 3644 — DATE RECEIVED: JUL 29 1992
DATE OF INSPECTION: — INSPECTOR:
REMARKS:

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FORM NO. 0506 (11/86) FORM 9

Ontario Ministry of the Environment

The Ontario Water Resources Act
WATER WELL RECORD

Print only in spaces provided.
Mark correct box with a checkmark, where applicable.

11 — 1532139 — Municipality 15004 — Con. CON 01

County or District	Township/Borough/City/Town/Village	Con block tract survey, etc.	Lot
Ottawa carleton	Rideau	1	20-21

[redacted]

Address: 1284 Ridgemont Ave. Ottawa,Ontario

Date completed: 25 day 7 month 01 year

21 — UTM — Northing — RC — Elevation — RC — K1V 6E3 Basin Code — ii — iii — iv

LOG OF OVERBURDEN AND BEDROCK MATERIALS (see instructions)

General colour	Most common material	Other materials	General description	Depth - feet From	Depth - feet To
Brown	Soil			0	7
Brown	Sand		Wet	7	38
Gray	Sand		Wet	38	62
Gray	Limestone			62	75
	Note;	Casing was left 1.5 feet above ground level			
		at time of drilling			

31

32

41 WATER RECORD

Water found at - feet	Kind of water
70	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas
NOT TESTED	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas
	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas
	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas
	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas

51 CASING & OPEN HOLE RECORD

Inside diam inches	Material	Wall thickness inches	Depth - feet From	Depth - feet To
6 1/4	1 ☒ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic	.188	0	66.5
6	1 ☐ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☒ Open hole 5 ☐ Plastic		66.5	75
	1 ☐ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic			

SCREEN

Sizes of opening (Slot No.)	Diameter inches	Length feet

Material and type — Depth at top of screen feet

61 PLUGGING & SEALING RECORD

☒ Annular space ☐ Abandonment

Depth set at - feet From	Depth set at - feet To	Material and type (Cement grout, bentonite, etc.)
40	0	Grouted - Bentonite (3)

71 PUMPING TEST

Pumping test method: 1 ☒ Pump 2 ☐ Bailer

Pumping rate: 10 GPM — Duration of pumping: 1 Hours ... Mins

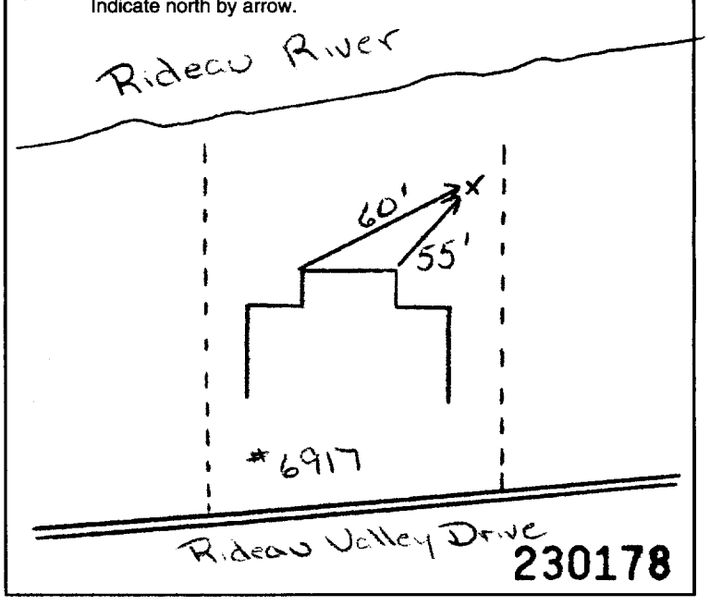
Static level	Water level end of pumping	Water levels during: 1 ☒ Pumping 2 ☐ Recovery			
		15 minutes	30 minutes	45 minutes	60 minutes
4'6" feet	20 feet	65 feet	30 feet	30 feet	30 feet

If flowing give rate	Pump intake set at	Water at end of test
GPM	feet	☐ Clear ☒ Cloudy

Recommended pump type	Recommended pump setting	Recommended pump rate
☒ Shallow ☐ Deep	30 feet	5 GPM

LOCATION OF WELL

In diagram below show distances of well from road and lot line. Indicate north by arrow.



230178

FINAL STATUS OF WELL

1 ☒ Water supply 2 ☐ Observation well 3 ☐ Test hole 4 ☐ Recharge well 5 ☐ Abandoned, insufficient supply 6 ☐ Abandoned, poor quality 7 ☐ Abandoned (Other) 8 ☐ Dewatering 9 ☐ Unfinished 10 ☐ Replacement well

WATER USE

1 ☒ Domestic 2 ☐ Stock 3 ☐ Irrigation 4 ☐ Industrial 5 ☐ Commercial 6 ☐ Municipal 7 ☐ Public supply 8 ☐ Cooling & air conditioning 9 ☐ Not use 10 ☐ Other

METHOD OF CONSTRUCTION

1 ☐ Cable tool 2 ☐ Rotary (conventional) 3 ☐ Rotary (reverse) 4 ☒ Rotary (air) 5 ☒ Air percussion 6 ☐ Boring 7 ☐ Diamond 8 ☐ Jetting 9 ☐ Driving 10 ☐ Digging 11 ☐ Other

Name of Well Contractor	Well Contractor's Licence No.
Capital Water Supply Ltd.	1558

Address: P.O. Box 490 Stittsville, Ontario K2S 1A6

Name of Well Technician	Well Technician's Licence No.
S. Miller	T0097

Signature of Technician/Contractor

Submission date: day 26 mo 7 yr 01

MINISTRY USE ONLY

Data source — Contractor: 1558 — Date received: AUG 21 2001

Date of inspection — Inspector

Remarks: CSS.EST

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Ministry of Environment and Energy
Ontario

The Ontario Water Resources Act
WATER WELL RECORD

Print only in spaces provided.
Mark correct box with a checkmark, where applicable.

11 (1 2) **1528986**

Municipality (10–14): 15004 Con. (15–22 23 24): CON 01

County or District: [redacted]

Township/Borough/City/Town/Village: Rideau

Con block tract survey, etc.: 1

Lot (25–27): 20

Address: 6549 2nd lineSRd Kars

Date completed (48–53): 2 day 6 month 96 year

21 (2) Northing (10–24) RC (25) Elevation (26–30) RC (31) Basin Code (47) i ii iii iv

LOG OF OVERBURDEN AND BEDROCK MATERIALS (see instructions)

General colour	Most common material	Other materials	General description	Depth – feet From	Depth – feet To
BROWN	Sandy Clay & Boulders		PACKED	0	19
GREY	Clay &	Stones	HARD PAN	19	47
GREY	Limestone		MED HARD	47	56
			49½' OF 6¼" casing + 2' = 51' of Casing		
			1 Heavy DRIVE Shoe		
			1 well Cap		
			15 Bags OF Cement		
			B.M		

31 (12 13 21)
32 (32 43)

41 WATER RECORD

Water found at – feet	Kind of water
54 (6 15)	1 ☐ Fresh 3 ☐ Sulphur 14; 2 ☐ Salty 4 ☒ Minerals; 6 ☐ Gas
(15–18)	1 ☐ Fresh 3 ☐ Sulphur 19; 2 ☐ Salty 4 ☐ Minerals; 6 ☐ Gas
(20–23)	1 ☐ Fresh 3 ☐ Sulphur 24; 2 ☐ Salty 4 ☐ Minerals; 6 ☐ Gas
(25–28)	1 ☐ Fresh 3 ☐ Sulphur 29; 2 ☐ Salty 4 ☐ Minerals; 6 ☐ Gas
(30–33)	1 ☐ Fresh 3 ☐ Sulphur 34; 2 ☐ Salty 4 ☐ Minerals; 6 ☐ Gas (60)

51 CASING & OPEN HOLE RECORD

Inside diam inches	Material	Wall thickness inches	Depth – feet From	Depth – feet To
6¼ (10 11)	1 ☒ Steel 12; 2 ☐ Galvanized; 3 ☐ Concrete; 4 ☒ Open hole; 5 ☐ Plastic	.188	0	48½ (13–17)
5⅞ (11)			48½	56
(17–18)	1 ☐ Steel 19; 2 ☐ Galvanized; 3 ☐ Concrete; 4 ☐ Open hole; 5 ☐ Plastic			(20–23)
(24–25)	1 ☐ Steel 26; 2 ☐ Galvanized; 3 ☐ Concrete; 4 ☐ Open hole; 5 ☐ Plastic			(27–30)

SCREEN

Sizes of opening (Slot No.) (31–33)	Diameter (34–38) inches	Length (39 40) feet
Material and type	Depth at top of screen (41–44) feet	(30)

61 PLUGGING & SEALING RECORD

☐ Annular space ☐ Abandonment

Depth set at – feet From	Depth set at – feet To	Material and type (Cement grout, bentonite, etc.)
0 (10 13)	22 (14 17)	Cement Grout
(18–21)	(22–25)	
(26–29)	(30–33) (80)	

71 PUMPING TEST

Pumping test method (18): 1 ☐ Pump 2 ☒ Bailer

Pumping rate (11 14): 30 GPM

Duration of pumping (15 16 Hours, 17 18 Mins): 1 Hours

Static level (19–21): 11 feet

Water level end of pumping (22–24): 17 feet

Water levels during (25): 1 ☐ Pumping 2 ☐ Recovery

15 minutes (26–28)	30 minutes (29–31)	45 minutes (32–34)	60 minutes (35–37)
17 feet	17 feet	17 feet	17 feet

If flowing give rate (38–41): GPM

Pump intake set at: feet

Water at end of test (42): ☐ Clear ☒ Cloudy

Recommended pump type: ☐ Shallow ☒ Deep

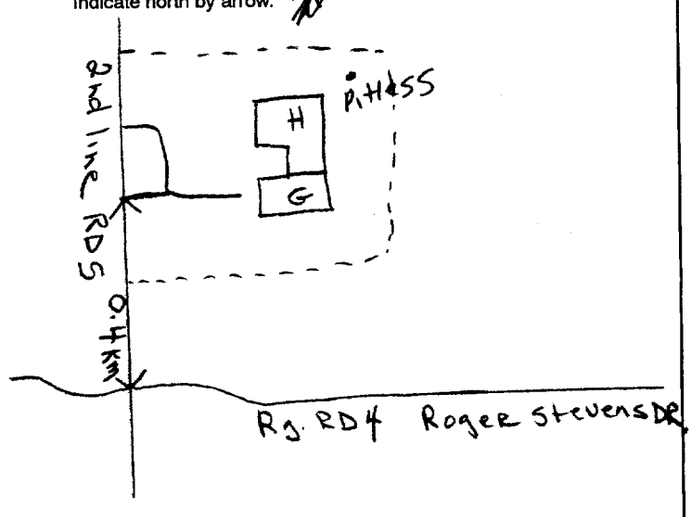
Recommended pump setting (43–45): 40 feet

Recommended pump rate (46–49): 10 GPM

(50–53)

LOCATION OF WELL

In diagram below show distances of well from road and lot line. Indicate north by arrow.



163146

FINAL STATUS OF WELL (54)

1 ☒ Water supply; 2 ☐ Observation well; 3 ☐ Test hole; 4 ☐ Recharge well; 5 ☐ Abandoned, insufficient supply; 6 ☐ Abandoned, poor quality; 7 ☐ Abandoned (Other); 8 ☐ Dewatering; 9 ☐ Unfinished; 10 ☐ Replacement well

WATER USE (55 56)

1 ☒ Domestic; 2 ☐ Stock; 3 ☐ Irrigation; 4 ☐ Industrial; 5 ☐ Commercial; 6 ☐ Municipal; 7 ☐ Public supply; 8 ☐ Cooling & air conditioning; 9 ☐ Not used; 10 ☐ Other

METHOD OF CONSTRUCTION (57)

1 ☒ Cable tool; 2 ☐ Rotary (conventional); 3 ☐ Rotary (reverse); 4 ☐ Rotary (air); 5 ☐ Air percussion; 6 ☐ Boring; 7 ☐ Diamond; 8 ☐ Jetting; 9 ☐ Driving; 10 ☐ Digging; 11 ☐ Other

Name of Well Contractor: B. MOORE WELL DRILLING
Well Contractor's Licence No.: 6455

Address: 5496 main st. OSGOODE ON K0A 2W0

Name of Well Technician: Bob MOORE
Well Technician's Licence No.: T-0319

Signature of Technician/Contractor: Bob Moore
Submission date: day 3 mo 6 yr 96

MINISTRY USE ONLY

Data source (58)
Contractor (59–62): 6455
Date received (63–68): JUN 10 1996 (80)
Date of inspection
Inspector
Remarks

CSS.ES

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Ontario **Ministry of the Environment**

The Ontario Water Resources Act

WATER WELL RECORD

Print only in spaces provided.
Mark correct box with a checkmark, where applicable.

11 — 1530982 — Municipality 15004 — Con. CON 01

County or District	Township/Borough/City/Town/Village	Con block tract survey, etc.	Lot
Carleton	Rideau	1 PR 4R-14414	PT 20

Address: 1621 Roger Steven's DR. KARSON

Date completed: 18 day 11 month 99 year

Northing — RC — Elevation — RC — Basin Code — UTM

LOG OF OVERBURDEN AND BEDROCK MATERIALS (see instructions)

General colour	Most common material	Other materials	General description	Depth - feet From	Depth - feet To
BROWN	Sandy Clay		thick	0	18
GREY	Clay & Boulders		PACKED	18	25
GREY	Clay & Stones		HARD Pan	25	43
BROWN	Clay, stones + BROKEN		slabs of Limestone	43	56
GREY	Limestone		MED HARD	56	70
		58' of 6¼" casing			
		1 well Cap			
		1 DRIVE shoe			
		10 Bags of Cement			

WATER RECORD

Water found at - feet	Kind of water
64	2 Salty, 4 Minerals

CASING & OPEN HOLE RECORD

Inside diam inches	Material	Wall thickness inches	Depth - feet From	Depth - feet To
6¼	1 Steel, 4 Open hole	.188	0	57
5 7/8	1 Steel, 4 Open hole		57	70

SCREEN

Sizes of opening (Slot No.)	Diameter inches	Length feet

Material and type: — Depth at top of screen feet:

PLUGGING & SEALING RECORD

X Annular space ☐ Abandonment

Depth set at - feet From	Depth set at - feet To	Material and type (Cement grout, bentonite, etc.)
0	25	Cement Grout

PUMPING TEST

Pumping test method: 2 Bailer — Pumping rate: 30 GPM — Duration of pumping: 1 Hours ... Mins

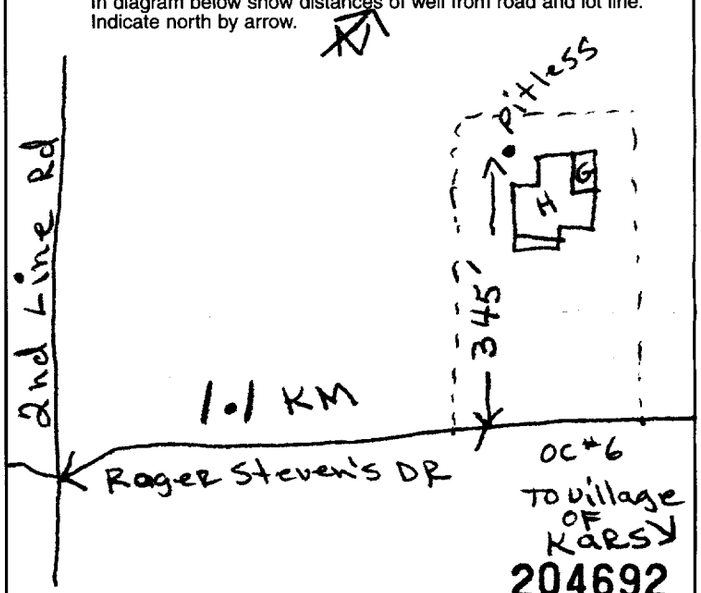
Static level	Water level end of pumping	Water levels during: 1 Pumping, 2 Recovery	15 minutes	30 minutes	45 minutes	60 minutes
18 feet	30 feet		30 feet	30 feet	30 feet	30 feet

If flowing give rate: GPM — Pump intake set at: feet — Water at end of test: X Clear ☐ Cloudy

Recommended pump type: ☐ Shallow X Deep — Recommended pump setting: 40 feet — Recommended pump rate: 10 GPM

LOCATION OF WELL

In diagram below show distances of well from road and lot line. Indicate north by arrow.



204692

FINAL STATUS OF WELL

1 X Water supply; 2 ☐ Observation well; 3 ☐ Test hole; 4 ☐ Recharge well; 5 ☐ Abandoned, insufficient supply; 6 ☐ Abandoned, poor quality; 7 ☐ Abandoned (Other); 8 ☐ Dewatering; 9 ☐ Unfinished; 10 ☐ Replacement well

WATER USE

1 X Domestic; 2 ☐ Stock; 3 ☐ Irrigation; 4 ☐ Industrial; 5 ☐ Commercial; 6 ☐ Municipal; 7 ☐ Public supply; 8 ☐ Cooling & air conditioning; 9 ☐ Not use; 10 ☐ Other

METHOD OF CONSTRUCTION

1 X Cable tool; 2 ☐ Rotary (conventional); 3 ☐ Rotary (reverse); 4 ☐ Rotary (air); 5 ☐ Air percussion; 6 ☐ Boring; 7 ☐ Diamond; 8 ☐ Jetting; 9 ☐ Driving; 10 ☐ Digging; 11 ☐ Other

Name of Well Contractor	Well Contractor's Licence No.
B. MOORE WELL DRILLING	6455
Address	
Box 436 OSGOODE ON. K0A 2W0	
Name of Well Technician	**Well Technician's Licence No.**
Bob Moore	T-0319
Signature of Technician/Contractor	**Submission date**
Bob Moore	day 19 mo 11 yr 99

MINISTRY USE ONLY

Data source	Contractor	Date received
	6455	DEC 2 9 1999
Date of inspection	Inspector	
Remarks		CSS.ES0

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Ontario **Ministry of the Environment**

The Ontario Water Resources Act
WATER WELL RECORD

1532561

Print only in spaces provided.
Mark correct box with a checkmark, where applicable.

11 Plan M-277 Municipality 15004 Con. CON 01 Sublot 12

County or District: Ottawa Carleton
Township/Borough/City/Town/Village: Rideau
Con | block | tract | survey, etc.: 1
Lot: 21 22
Address: Kars, Ont
Date completed: 12 day 10 month 01 year

21 | UTM | Northing | RC | Elevation | RC | Basin Code | ii | iii | iv

LOG OF OVERBURDEN AND BEDROCK MATERIALS (see instructions)

General colour	Most common material	Other materials	General description	Depth - feet From	Depth - feet To
	Sand	gravel		0	57
grey	limestone			57	200

31
32

41 WATER RECORD

Water found at - feet	Kind of water	
176	1 Fresh, 2 Salty, 3 Sulphur, 4 Minerals, 5 Gas	14
350	1 Fresh, 2 Salty, 3 Sulphur, 4 Minerals, 6 Gas	19
	1 Fresh, 2 Salty, 3 Sulphur, 4 Minerals, 6 Gas	24
	1 Fresh, 2 Salty, 3 Sulphur, 4 Minerals, 6 Gas	29
	1 Fresh, 2 Salty, 3 Sulphur, 4 Minerals, 6 Gas	34

60

51 CASING & OPEN HOLE RECORD

Inside diam inches	Material	Wall thickness inches	Depth - feet From	Depth - feet To
6¼	1 Steel, 2 Galvanized, 3 Concrete, 4 Open hole, 5 Plastic	188	0	63
8¾	1 Steel, 2 Galvanized, 3 Concrete, 4 Open hole, 5 Plastic		0	61
6	1 Steel, 2 Galvanized, 3 Concrete, 4 Open hole, 5 Plastic		61	200

SCREEN

Sizes of opening (Slot No.)	Diameter inches	Length feet

Material and type | Depth at top of screen feet | 30

61 PLUGGING & SEALING RECORD

Annular space ☐ Abandonment

Depth set at - feet From	Depth set at - feet To	Material and type (Cement grout, bentonite, etc.)
2	63	cement grout

80

71 PUMPING TEST

Pumping test method: 1 Pump, 2 Bailer
Pumping rate: 8 GPM
Duration of pumping: Hours Mins
25 Water levels during: 1 Pumping, Recovery

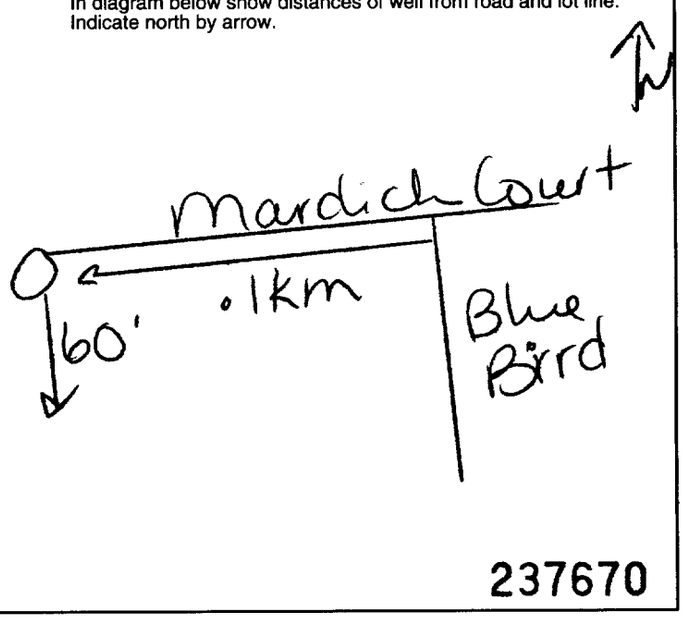
Static level	Water level end of pumping	15 minutes	30 minutes	45 minutes	60 minutes
36 feet	140 feet	44 feet	36 feet	36 feet	36 feet

If flowing give rate: GPM
Pump intake set at: feet
Water at end of test: ☐ Clear, Cloudy
Recommended pump type: ☐ Shallow, Deep
Recommended pump setting: 140 feet
Recommended pump rate: 8 GPM

50-53

LOCATION OF WELL

In diagram below show distances of well from road and lot line. Indicate north by arrow.



237670

FINAL STATUS OF WELL 54

1 Water supply, 2 Observation well, 3 Test hole, 4 Recharge well, 5 Abandoned, insufficient supply, 6 Abandoned, poor quality, 7 Abandoned (Other), 8 Dewatering, 9 Unfinished, 10 Replacement well

WATER USE 55-56

1 Domestic, 2 Stock, 3 Irrigation, 4 Industrial, 5 Commercial, 6 Municipal, 7 Public supply, 8 Cooling & air conditioning, 9 Not use, 10 Other

METHOD OF CONSTRUCTION 57

1 Cable tool, 2 Rotary (conventional), 3 Rotary (reverse), 4 Rotary (air), Air percussion, 6 Boring, 7 Diamond, 8 Jetting, 9 Driving, 10 Digging, 11 Other

Name of Well Contractor: Air Rock Drilling Ltd
Well Contractor's Licence No.: 1119
Address: RR#2 Jasper, ONT
Name of Well Technician: Shannon Purcell
Well Technician's Licence No.: T2122
Signature of Technician/Contractor:
Submission date: 30 day 10 mo 01 yr

MINISTRY USE ONLY

Data source 58 | Contractor 1119 59-62 | Date received JAN 08 2002 63-68 80
Date of inspection | Inspector
Remarks: CSS.ES2

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Ontario — Ministry of the Environment

Measurements recorded in: ☐ Metric ☐ Imperial

Well Tag No. (If... A 080871

Well Record

Regulation 903 Ontario Water Resources Act

Page ____ of ____

Well Owner's Information

[redacted]

1619 Mardick Court | Rideau | #21 | #1

County/District/Municipality: Ottawa/Carleton

City/Town/Village: Kars

Province: Ontario

Postal Code: K0A2E0

UTM Coordinates: Zone 18 | Easting 448358 | Northing 5000345 | NAD 8 3

Municipal Plan and Sublot Number:

Other:

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
Brown	Clay	Boulders	Packed	0	3.66
Grey	Clay	Boulders	Packed	3.66	19.20
Grey	Limestone		Hard	19.20	50.29

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
20.88	9.144	Cement Pressure Grouted	.49
9.144	Ø	Bentonite Pressure Grouted	.33

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
15.88	Steel	.48	0	20.88

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
☐ Other, specify

Water Details

Water found at Depth 26.21 (m/ft) 18.21m ☐ Gas ☐ Other, specify — Kind of Water: ☐ Fresh ☐ Untested

Water found at Depth 35.05 (m/ft) 68.85m ☐ Gas ☐ Other, specify — Kind of Water: ☐ Fresh ☐ Untested

Water found at Depth 46.33 (m/ft) 136.51m ☐ Gas ☐ Other, specify — Kind of Water: ☐ Fresh ☐ Untested

Hole Diameter

Depth (m/ft) From	Depth (m/ft) To	Diameter (cm/in)
0	20.88	25.08
20.88	50.29	15.40

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): 45.7

Pumping rate (l/min / GPM): 81.9

Duration of pumping: 1 hrs + 0 min

Final water level end of pumping (m/ft): 8.59

If flowing give rate (l/min / GPM):

Recommended pump depth (m/ft): 36.58

Recommended pump rate (l/min / GPM): 45.5

Well production (l/min / GPM):

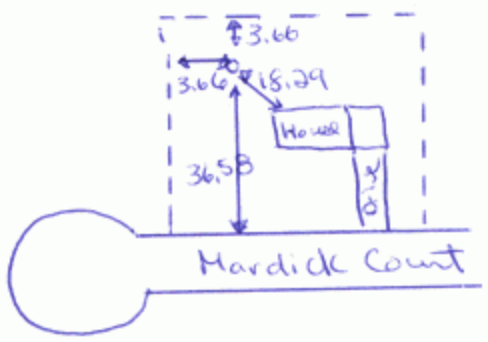
Disinfected? ☒ Yes ☐ No

Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level	8.36		8.59
1	8.70	1	8.36
2	8.72	2	
3	8.72	3	
4	8.72	4	
5	8.72	5	
10	8.70	10	
15	8.69	15	
20	8.68	20	
25	8.665	25	
30	8.65	30	
40	8.63	40	
50	8.61	50	
60	8.59	60	

Map of Well Location

Please provide a map below following instructions on the back.

4N



Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor: Splash Well Drilling

Well Contractor's Licence No.: 4877

Business Address (Street Number/Name): POBOX 1083

Municipality: Prescott

Province: ON

Postal Code: K0E1T0

Business E-mail Address:

Bus. Telephone No. (inc. area code): 6139254885

Name of Well Technician (Last Name, First Name): Ferguson, Todd

Well Technician's Licence No.: T478

Signature of Technician and/or Contractor: Todd Ferguson

Date Submitted: Y Y Y Y M M D D

Well owner's information package delivered: ☐ Yes ☐ No

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

Date Work Completed: 2009 04 26

Ministry Use Only

Audit No. Z 91745

Received MAY 04 2009

0506E (12/2007)

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APPENDIX C
GROUNDWATER SAMPLING RESULTS (PW01-18)

Table C-1 Water Quality Analysis Results
1622 Roger Stevens Drive, Kars, Ontario
Parkland Fuel Corporation
TS-SO-032667

Parameter	Units	RDL	Criteria			PW01-18	
Sample ID			Ontario Drinking Water Quality Standards[1]	Type of Objective	Treatability Limits[2]	*PW-01-18A*	*PW-01-18B*
Sample Date & Time						05-June-2018 12:37 PM	05-June-2018 3:37 PM
Microbiological Parameters							
E. Coli	CFU/100 mL	NA	0	MAC	--	0	0
Faecal Coliforms	CFU/100 m	NA	--	--	--	0	0
Faecal Streptococcus	CFU/100 mL	NA	--	--	--	<10	<10
Total Coliforms	CFU/100 mL	NA	0	MAC	--	0	0
Background	CFU/100 mL	NA	--	--	--	16	0
Heterotrophic Plate Count	CFU/mL	NA	--	--	--	9	4
General Inoganics							
Alkalinity, total	mg/L	1.0	500	OG	--	220	220
Ammonia as N	mg/L	0.050	--	--	--	0.14	0.13
Colour	TCU	2	5	AO	7	<2	<2
Conductivity	uS/cm	1.0	--	--	--	790	710
Dissolved Organic Carbon	mg/L	0.50	5	AO	10	0.73	0.73
Hardness	mg/L	1.0	80 - 100	OG	--	250	240
Ion Balance	% Difference	NA	--	--	--	3.03	3.23
pH	pH Units	NA	6.5 - 8.5	--	--	8.00	8.01
Phenols	mg/L	0.0010	--	--	--	<0.0010	<0.0010
Tannins & Lignins	mg/L	0.2	--	--	--	<0.2	<0.2
Total Dissolved Solids	mg/L	1.0	500	AO	--	440	410
Total Kjeldhal Nitrogen	mg/L	0.10	--	--	--	0.14	0.17
Turbidity	NTU	0.1	5	AO	--	12	2.9
Anions							
Chloride	mg/L	1.0	250	AO	250	110	86
Fluoride	mg/L	0.10	1.5	MAC	--	0.50	0.50
Nitrate as N	mg/L	0.10	10	MAC	--	<0.10	<0.10
Nitrite as N	mg/L	0.010	1	MAC	--	<0.010	<0.010
Orthophosphate	mg/L	0.010	--		--	<0.010	0.010
Sulphide as H_2S	mg/L	0.020	0.05	AO	--	<0.020	<0.020
Sulphate	mg/L	1.0	500	AO	500	39	38
Metals							
Calcium	mg/L	0.2	--	--	--	46	44
Iron	mg/L	0.1	0.30	AO	5 to 10	1.6	0.33
Magnesium	mg/L	0.05	--	--	--	32	31
Manganese	mg/L	0.002	0.05	AO	1.0	0.021	0.011
Mercury	mg/L	0.0001	0.001	MAC	--	<0.0001	<0.0001
Potassium	mg/L	0.2	--	--	--	4.9	4.5
Sodium	mg/L	0.1	200	AO	200	60	53
Field Readings							
Free Chlorine Residual	mg/L	NA	NA	NA	--	0.2	0.05

Notes:

1 - Ontario Regulation 169/03: Ontario Drinking Water Quality Standards
2 - Maximum Concentration Considered Reasonably Treatable according to Procedure D-5-5 Private Wells: Water Supply Assessment
3 - Refer to
RDL - Reportable Detection Limit
NA - Not Applicable
MAC - Maximum Allowable Concentration
OG - Operational Guideline
AO - Aesthetic Objective
-- No standard value
Concentration exceeds the Ontario Drinking Water Quality Standards

Maxxam
A Bureau Veritas Group Company

Your Project #: TSSO 032667
Site Location: .
Your C.O.C. #: 667775-01-01

Attention: Sonny Sundaram

DST Consulting Engineers Inc
Ottawa - Standing Offer
2150 Thurston Dr
Unit 203
Ottawa, ON
CANADA K1G 5T9

Report Date: 2018/06/11
Report #: R5229923
Version: 3 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8D5531
Received: 2018/06/05, 16:15

Sample Matrix: Water
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Alkalinity (1)	2	N/A	2018/06/07	CAM SOP-00448	SM 23 2320 B m
Carbonate, Bicarbonate and Hydroxide (1)	2	N/A	2018/06/07	CAM SOP-00102	APHA 4500-CO2 D
Chloride by Automated Colourimetry (1)	2	N/A	2018/06/07	CAM SOP-00463	EPA 325.2 m
Colour (1)	2	N/A	2018/06/07	CAM SOP-00412	SM 23 2120C m
Conductivity (1)	2	N/A	2018/06/07	CAM SOP-00414	SM 23 2510 m
Dissolved Organic Carbon (DOC) (1, 2)	2	N/A	2018/06/06	CAM SOP-00446	SM 23 5310 B m
Fluoride (1)	2	2018/06/06	2018/06/07	CAM SOP-00449	SM 23 4500-F C m
Hardness (calculated as CaCO3) (1)	2	N/A	2018/06/07	CAM SOP 00102/00408/00447	SM 2340 B
Mercury (1)	2	2018/06/06	2018/06/06	CAM SOP-00453	EPA 7470A m
Metals Analysis by ICPMS (as received) (1, 3)	2	N/A	2018/06/07	CAM SOP-00447	EPA 6020B m
Ion Balance (% Difference) (1)	2	N/A	2018/06/07		
Anion and Cation Sum (1)	2	N/A	2018/06/07		
Total Coliforms/ E. coli, CFU/100mL (1)	2	N/A	2018/06/06	CAM SOP-00551	MOE E3407
Fecal coliform, (CFU/100mL) (1)	2	N/A	2018/06/06	CAM SOP-00552	SM 9222D
Fecal streptococcus,(CFU/100mL) (1)	2	N/A	2018/06/06	CAM SOP-00511	MOELSB E3371;SM9230C
Heterotrophic plate count, (CFU/mL) (1)	2	N/A	2018/06/06	CAM SOP-00512	SM 9215B
Total Ammonia-N (1)	2	N/A	2018/06/07	CAM SOP-00441	EPA GS I-2522-90 m
Nitrate (NO3) and Nitrite (NO2) in Water (1, 4)	2	N/A	2018/06/07	CAM SOP-00440	SM 23 4500-NO3I/NO2B
pH (1)	2	N/A	2018/06/07	CAM SOP-00413	SM 4500H+ B m
Phenols (4AAP) (1)	2	N/A	2018/06/06	CAM SOP-00444	OMOE E3179 m
Orthophosphate (1)	2	N/A	2018/06/07	CAM SOP-00461	EPA 365.1 m
Sat. pH and Langelier Index (@ 20C) (1)	2	N/A	2018/06/07		
Sat. pH and Langelier Index (@ 4C) (1)	2	N/A	2018/06/07		
Sulphate by Automated Colourimetry (1)	2	N/A	2018/06/07	CAM SOP-00464	EPA 375.4 m
Sulphide (1)	2	N/A	2018/06/07	CAM SOP-00455	SM 23 4500-S G m
Tannins & Lignins (1)	2	N/A	2018/06/06	CAM SOP-00410	SM 23 5550 B m
Total Dissolved Solids (TDS calc) (1)	2	N/A	2018/06/07		
Total Kjeldahl Nitrogen in Water (1)	2	2018/06/06	2018/06/06	CAM SOP-00938	OMOE E3516 m

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Your Project #: TSSO 032667
Site Location: .
Your C.O.C. #: 667775-01-01

Attention: Sonny Sundaram

DST Consulting Engineers Inc
Ottawa - Standing Offer
2150 Thurston Dr
Unit 203
Ottawa, ON
CANADA K1G 5T9

Report Date: 2018/06/11
Report #: R5229923
Version: 3 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8D5531
Received: 2018/06/05, 16:15

Sample Matrix: Water
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Turbidity (1)	2	N/A	2018/06/06	CAM SOP-00417	SM 23 2130 B 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.

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) This test was performed by Maxxam Analytics Mississauga
(2) Dissolved Organic Carbon (DOC) present in the sample should be considered as non-purgeable DOC.
(3) Metals analysis was performed on the sample 'as received'.
(4) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.

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CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8D5531
Received: 2018/06/05, 16:15

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Jonathan Urben, Senior Project Manager
Email: jurben@maxxam.ca
Phone# (613) 274-0573

==========

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 #: B8D5531
Report Date: 2018/06/11

DST Consulting Engineers Inc
Client Project #: TSSO 032667
Site Location: .

RCAP - COMPREHENSIVE (DRINKING WATER)

Maxxam ID		GWN570			GWN570			GWN571		
Sampling Date		2018/06/05 12:37			2018/06/05 12:37			2018/06/05 15:37		
COC Number		667775-01-01			667775-01-01			667775-01-01		
	UNITS	PW01-18 A	RDL	QC Batch	PW01-18 A Lab-Dup	RDL	QC Batch	PW01-18 B	RDL	QC Batch
Calculated Parameters										
Anion Sum	me/L	8.27	N/A	5566599				7.62	N/A	5566599
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	220	1.0	5566596				220	1.0	5566596
Calculated TDS	mg/L	440	1.0	5566602				410	1.0	5566602
Carb. Alkalinity (calc. as CaCO3)	mg/L	2.0	1.0	5566596				2.1	1.0	5566596
Cation Sum	me/L	7.79	N/A	5566599				7.14	N/A	5566599
Hardness (CaCO3)	mg/L	250	1.0	5566597				240	1.0	5566597
Ion Balance (% Difference)	%	3.03	N/A	5566598				3.23	N/A	5566598
Langelier Index (@ 20C)	N/A	0.549		5566600				0.544		5566600
Langelier Index (@ 4C)	N/A	0.301		5566601				0.295		5566601
Saturation pH (@ 20C)	N/A	7.45		5566600				7.47		5566600
Saturation pH (@ 4C)	N/A	7.70		5566601				7.72		5566601
Inorganics										
Total Ammonia-N	mg/L	0.14	0.050	5567050	0.11	0.050	5567050	0.13	0.050	5567050
Conductivity	umho/cm	790	1.0	5567647				710	1.0	5567647
Dissolved Organic Carbon	mg/L	0.73	0.50	5567045				0.73	0.50	5567045
Orthophosphate (P)	mg/L	<0.010	0.010	5567640				0.010	0.010	5567640
pH	pH	8.00		5567644				8.01		5567644
Dissolved Sulphate (SO4)	mg/L	39	1.0	5567632				38	1.0	5567632
Alkalinity (Total as CaCO3)	mg/L	220	1.0	5567646				220	1.0	5567646
Dissolved Chloride (Cl)	mg/L	110	1.0	5567622				86	1.0	5567622
Nitrite (N)	mg/L	<0.010	0.010	5567619				<0.010	0.010	5567619
Nitrate (N)	mg/L	<0.10	0.10	5567619				<0.10	0.10	5567619
Metals										
. Aluminum (Al)	ug/L	190	5.0	5566675				82	5.0	5566675
. Antimony (Sb)	ug/L	<0.50	0.50	5566675				<0.50	0.50	5566675
. Arsenic (As)	ug/L	2.1	1.0	5566675				1.8	1.0	5566675
. Barium (Ba)	ug/L	120	2.0	5566675				110	2.0	5566675
. Beryllium (Be)	ug/L	<0.50	0.50	5566675				<0.50	0.50	5566675
. Boron (B)	ug/L	99	10	5566675				99	10	5566675
. Cadmium (Cd)	ug/L	<0.10	0.10	5566675				<0.10	0.10	5566675
. Calcium (Ca)	ug/L	46000	200	5566675				44000	200	5566675
. Chromium (Cr)	ug/L	<5.0	5.0	5566675				<5.0	5.0	5566675

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

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Maxxam Job #: B8D5531
Report Date: 2018/06/11

DST Consulting Engineers Inc
Client Project #: TSSO 032667
Site Location: .

RCAP - COMPREHENSIVE (DRINKING WATER)

Maxxam ID		GWN570			GWN570			GWN571		
Sampling Date		2018/06/05 12:37			2018/06/05 12:37			2018/06/05 15:37		
COC Number		667775-01-01			667775-01-01			667775-01-01		
	UNITS	PW01-18 A	RDL	QC Batch	PW01-18 A Lab-Dup	RDL	QC Batch	PW01-18 B	RDL	QC Batch
. Cobalt (Co)	ug/L	<0.50	0.50	5566675				<0.50	0.50	5566675
. Copper (Cu)	ug/L	1.3	1.0	5566675				<1.0	1.0	5566675
. Iron (Fe)	ug/L	1600	100	5566675				330	100	5566675
. Lead (Pb)	ug/L	2.0	0.50	5566675				0.79	0.50	5566675
. Magnesium (Mg)	ug/L	32000	50	5566675				31000	50	5566675
. Manganese (Mn)	ug/L	21	2.0	5566675				11	2.0	5566675
. Molybdenum (Mo)	ug/L	7.6	0.50	5566675				7.0	0.50	5566675
. Nickel (Ni)	ug/L	1.5	1.0	5566675				<1.0	1.0	5566675
. Potassium (K)	ug/L	4900	200	5566675				4500	200	5566675
. Selenium (Se)	ug/L	<2.0	2.0	5566675				<2.0	2.0	5566675
. Silicon (Si)	ug/L	8600	50	5566675				8300	50	5566675
. Silver (Ag)	ug/L	<0.10	0.10	5566675				<0.10	0.10	5566675
. Sodium (Na)	ug/L	60000	100	5566675				53000	100	5566675
. Strontium (Sr)	ug/L	830	1.0	5566675				770	1.0	5566675
. Thallium (Tl)	ug/L	<0.050	0.050	5566675				<0.050	0.050	5566675
. Titanium (Ti)	ug/L	20	5.0	5566675				<5.0	5.0	5566675
. Uranium (U)	ug/L	1.5	0.10	5566675				1.2	0.10	5566675
. Vanadium (V)	ug/L	<0.50	0.50	5566675				<0.50	0.50	5566675
. Zinc (Zn)	ug/L	<5.0	5.0	5566675				<5.0	5.0	5566675

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B8D5531
Report Date: 2018/06/11

DST Consulting Engineers Inc
Client Project #: TSSO 032667
Site Location: .

RCAP - COMPREHENSIVE (DRINKING WATER)

Maxxam ID		GWN571		
Sampling Date		2018/06/05 15:37		
COC Number		667775-01-01		
	UNITS	**PW01-18 B Lab-Dup**	**RDL**	**QC Batch**
Inorganics				
Conductivity	umho/cm	710	1.0	5567647
Orthophosphate (P)	mg/L	0.010	0.010	5567640
pH	pH	7.99		5567644
Dissolved Sulphate (SO4)	mg/L	37	1.0	5567632
Alkalinity (Total as CaCO3)	mg/L	220	1.0	5567646
Dissolved Chloride (Cl)	mg/L	85	1.0	5567622
Nitrite (N)	mg/L	<0.010	0.010	5567619
Nitrate (N)	mg/L	<0.10	0.10	5567619

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B8D5531
Report Date: 2018/06/11

DST Consulting Engineers Inc
Client Project #: TSSO 032667
Site Location: .

RESULTS OF ANALYSES OF WATER

Maxxam ID		GWN570			GWN570			GWN571		
Sampling Date		2018/06/05 12:37			2018/06/05 12:37			2018/06/05 15:37		
COC Number		667775-01-01			667775-01-01			667775-01-01		
	UNITS	PW01-18 A	RDL	QC Batch	PW01-18 A Lab-Dup	RDL	QC Batch	PW01-18 B	RDL	QC Batch
Inorganics										
Colour	TCU	<2	2	5566976				<2	2	5566976
Fluoride (F-)	mg/L	0.50	0.10	5567680				0.50	0.10	5567680
Total Kjeldahl Nitrogen (TKN)	mg/L	0.14	0.10	5567030				0.17	0.10	5567030
Phenols-4AAP	mg/L	<0.0010	0.0010	5566650	<0.0010	0.0010	5566650	<0.0010	0.0010	5566650
Sulphide	mg/L	<0.020	0.020	5568848				<0.020	0.020	5568848
Tannins & Lignins	mg/L	<0.2	0.2	5566811				<0.2	0.2	5566811
Turbidity	NTU	12	0.1	5566694				2.9	0.1	5566694

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

Maxxam ID		GWN571		
Sampling Date		2018/06/05 15:37		
COC Number		667775-01-01		
	UNITS	PW01-18 B Lab-Dup	RDL	QC Batch
Inorganics				
Colour	TCU	<2	2	5566976
Fluoride (F-)	mg/L	0.49	0.10	5567680
Total Kjeldahl Nitrogen (TKN)	mg/L	0.15	0.10	5567030
Sulphide	mg/L	<0.020	0.020	5568848
Tannins & Lignins	mg/L	<0.2	0.2	5566811

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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DST Consulting Engineers Inc
Client Project #: TSSO 032667
Site Location: .

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		GWN570	GWN571		
Sampling Date		2018/06/05 12:37	2018/06/05 15:37		
COC Number		667775-01-01	667775-01-01		
	UNITS	PW01-18 A	PW01-18 B	RDL	QC Batch
Metals					
Mercury (Hg)	ug/L	<0.1	<0.1	0.1	5566662

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8D5531
Report Date: 2018/06/11

DST Consulting Engineers Inc
Client Project #: TSSO 032667
Site Location: .

MICROBIOLOGY (WATER)

Maxxam ID		GWN570	GWN571		
Sampling Date		2018/06/05 12:37	2018/06/05 15:37		
COC Number		667775-01-01	667775-01-01		
	UNITS	PW01-18 A	PW01-18 B	RDL	QC Batch
Microbiological					
Fecal coliform	CFU/100mL	0	0	N/A	5568002
Fecal streptococcus	CFU/100mL	<10	<10	10	5568336
Heterotrophic plate count	CFU/mL	9	4	N/A	5567509
Background	CFU/100mL	16	0	N/A	5567471
Total Coliforms	CFU/100mL	0	0	N/A	5567471
Escherichia coli	CFU/100mL	0	0	N/A	5567471

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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Maxxam Job #: B8D5531
Report Date: 2018/06/11

DST Consulting Engineers Inc
Client Project #: TSSO 032667
Site Location: .

TEST SUMMARY

Maxxam ID: GWN570
Sample ID: PW01-18 A
Matrix: Water

Collected: 2018/06/05
Shipped:
Received: 2018/06/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	5567646	N/A	2018/06/07	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	5566596	N/A	2018/06/07	Automated Statchk
Chloride by Automated Colourimetry	KONE	5567622	N/A	2018/06/07	Alina Dobreanu
Colour	SPEC	5566976	N/A	2018/06/07	Viorica Rotaru
Conductivity	AT	5567647	N/A	2018/06/07	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	5567045	N/A	2018/06/06	Nimarta Singh
Fluoride	ISE	5567680	2018/06/06	2018/06/07	Surinder Rai
Hardness (calculated as CaCO3)		5566597	N/A	2018/06/07	Automated Statchk
Mercury	CV/AA	5566662	2018/06/06	2018/06/06	Ron Morrison
Metals Analysis by ICPMS (as received)	ICP/MS	5566675	N/A	2018/06/07	Matthew Ritenburg
Ion Balance (% Difference)	CALC	5566598	N/A	2018/06/07	Automated Statchk
Anion and Cation Sum	CALC	5566599	N/A	2018/06/07	Automated Statchk
Total Coliforms/ E. coli, CFU/100mL	PL	5567471	N/A	2018/06/06	Farhana Rahman
Fecal coliform, (CFU/100mL)	PL	5568002	N/A	2018/06/06	Farhana Rahman
Fecal streptococcus,(CFU/100mL)	PL	5568336	N/A	2018/06/06	Sirimathie Aluthwala
Heterotrophic plate count, (CFU/mL)	PL	5567509	N/A	2018/06/06	Sirimathie Aluthwala
Total Ammonia-N	LACH/NH4	5567050	N/A	2018/06/07	Parminder Sangha
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	5567619	N/A	2018/06/07	Chandra Nandlal
pH	AT	5567644	N/A	2018/06/07	Surinder Rai
Phenols (4AAP)	TECH/PHEN	5566650	N/A	2018/06/06	Zahid Soikot
Orthophosphate	KONE	5567640	N/A	2018/06/07	Alina Dobreanu
Sat. pH and Langelier Index (@ 20C)	CALC	5566600	N/A	2018/06/07	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	5566601	N/A	2018/06/07	Automated Statchk
Sulphate by Automated Colourimetry	KONE	5567632	N/A	2018/06/07	Alina Dobreanu
Sulphide	ISE/S	5568848	N/A	2018/06/07	Gnana Thomas
Tannins & Lignins	SPEC	5566811	N/A	2018/06/06	Viorica Rotaru
Total Dissolved Solids (TDS calc)	CALC	5566602	N/A	2018/06/07	Automated Statchk
Total Kjeldahl Nitrogen in Water	SKAL	5567030	2018/06/06	2018/06/06	Rajni Tyagi
Turbidity	AT	5566694	N/A	2018/06/06	Tahir Anwar

Maxxam ID: GWN570 Dup
Sample ID: PW01-18 A
Matrix: Water

Collected: 2018/06/05
Shipped:
Received: 2018/06/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Ammonia-N	LACH/NH4	5567050	N/A	2018/06/07	Parminder Sangha
Phenols (4AAP)	TECH/PHEN	5566650	N/A	2018/06/06	Zahid Soikot

Maxxam ID: GWN571
Sample ID: PW01-18 B
Matrix: Water

Collected: 2018/06/05
Shipped:
Received: 2018/06/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	5567646	N/A	2018/06/07	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	5566596	N/A	2018/06/07	Automated Statchk

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Maxxam Job #: B8D5531
Report Date: 2018/06/11

DST Consulting Engineers Inc
Client Project #: TSSO 032667
Site Location: .

TEST SUMMARY

Maxxam ID: GWN571
Sample ID: PW01-18 B
Matrix: Water

Collected: 2018/06/05
Shipped:
Received: 2018/06/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chloride by Automated Colourimetry	KONE	5567622	N/A	2018/06/07	Alina Dobreanu
Colour	SPEC	5566976	N/A	2018/06/07	Viorica Rotaru
Conductivity	AT	5567647	N/A	2018/06/07	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	5567045	N/A	2018/06/06	Nimarta Singh
Fluoride	ISE	5567680	2018/06/06	2018/06/07	Surinder Rai
Hardness (calculated as CaCO3)		5566597	N/A	2018/06/07	Automated Statchk
Mercury	CV/AA	5566662	2018/06/06	2018/06/06	Ron Morrison
Metals Analysis by ICPMS (as received)	ICP/MS	5566675	N/A	2018/06/07	Matthew Ritenburg
Ion Balance (% Difference)	CALC	5566598	N/A	2018/06/07	Automated Statchk
Anion and Cation Sum	CALC	5566599	N/A	2018/06/07	Automated Statchk
Total Coliforms/ E. coli, CFU/100mL	PL	5567471	N/A	2018/06/06	Farhana Rahman
Fecal coliform, (CFU/100mL)	PL	5568002	N/A	2018/06/06	Farhana Rahman
Fecal streptococcus,(CFU/100mL)	PL	5568336	N/A	2018/06/06	Sirimathie Aluthwala
Heterotrophic plate count, (CFU/mL)	PL	5567509	N/A	2018/06/06	Sirimathie Aluthwala
Total Ammonia-N	LACH/NH4	5567050	N/A	2018/06/07	Parminder Sangha
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	5567619	N/A	2018/06/07	Chandra Nandlal
pH	AT	5567644	N/A	2018/06/07	Surinder Rai
Phenols (4AAP)	TECH/PHEN	5566650	N/A	2018/06/06	Zahid Soikot
Orthophosphate	KONE	5567640	N/A	2018/06/07	Alina Dobreanu
Sat. pH and Langelier Index (@ 20C)	CALC	5566600	N/A	2018/06/07	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	5566601	N/A	2018/06/07	Automated Statchk
Sulphate by Automated Colourimetry	KONE	5567632	N/A	2018/06/07	Alina Dobreanu
Sulphide	ISE/S	5568848	N/A	2018/06/07	Gnana Thomas
Tannins & Lignins	SPEC	5566811	N/A	2018/06/06	Viorica Rotaru
Total Dissolved Solids (TDS calc)	CALC	5566602	N/A	2018/06/07	Automated Statchk
Total Kjeldahl Nitrogen in Water	SKAL	5567030	2018/06/06	2018/06/06	Rajni Tyagi
Turbidity	AT	5566694	N/A	2018/06/06	Tahir Anwar

Maxxam ID: GWN571 Dup
Sample ID: PW01-18 B
Matrix: Water

Collected: 2018/06/05
Shipped:
Received: 2018/06/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	5567646	N/A	2018/06/07	Surinder Rai
Chloride by Automated Colourimetry	KONE	5567622	N/A	2018/06/07	Alina Dobreanu
Colour	SPEC	5566976	N/A	2018/06/07	Viorica Rotaru
Conductivity	AT	5567647	N/A	2018/06/07	Surinder Rai
Fluoride	ISE	5567680	2018/06/06	2018/06/07	Surinder Rai
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	5567619	N/A	2018/06/07	Chandra Nandlal
pH	AT	5567644	N/A	2018/06/07	Surinder Rai
Orthophosphate	KONE	5567640	N/A	2018/06/07	Alina Dobreanu
Sulphate by Automated Colourimetry	KONE	5567632	N/A	2018/06/07	Alina Dobreanu
Sulphide	ISE/S	5568848	N/A	2018/06/07	Gnana Thomas
Tannins & Lignins	SPEC	5566811	N/A	2018/06/06	Viorica Rotaru
Total Kjeldahl Nitrogen in Water	SKAL	5567030	2018/06/06	2018/06/06	Rajni Tyagi

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Report Date: 2018/06/11

DST Consulting Engineers Inc
Client Project #: TSSO 032667
Site Location: .

GENERAL COMMENTS

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

Package 1	10.0°C

Sample GWN571 [PW01-18 B] : ortho-Phosphate > Total Phosphorus: Both values fall within the method uncertainty for duplicates and are likely equivalent.

Results relate only to the items tested.

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Report Date: 2018/06/11

QUALITY ASSURANCE REPORT

DST Consulting Engineers Inc
Client Project #: TSSO 032667
Site Location: .

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
5566650	Phenols-4AAP	2018/06/06	94	80 - 120	96	80 - 120	<0.0010	mg/L	NC	20		
5566662	Mercury (Hg)	2018/06/06	100	75 - 125	96	80 - 120	<0.1	ug/L	NC	20		
5566675	. Aluminum (Al)	2018/06/07	105	80 - 120	98	80 - 120	<5.0	ug/L				
5566675	. Antimony (Sb)	2018/06/07	113	80 - 120	101	80 - 120	<0.50	ug/L				
5566675	. Arsenic (As)	2018/06/07	106	80 - 120	98	80 - 120	<1.0	ug/L				
5566675	. Barium (Ba)	2018/06/07	104	80 - 120	97	80 - 120	<2.0	ug/L				
5566675	. Beryllium (Be)	2018/06/07	103	80 - 120	97	80 - 120	<0.50	ug/L				
5566675	. Boron (B)	2018/06/07	98	80 - 120	92	80 - 120	<10	ug/L				
5566675	. Cadmium (Cd)	2018/06/07	110	80 - 120	99	80 - 120	<0.10	ug/L				
5566675	. Calcium (Ca)	2018/06/07	NC	80 - 120	95	80 - 120	<200	ug/L				
5566675	. Chromium (Cr)	2018/06/07	103	80 - 120	94	80 - 120	<5.0	ug/L				
5566675	. Cobalt (Co)	2018/06/07	107	80 - 120	98	80 - 120	<0.50	ug/L				
5566675	. Copper (Cu)	2018/06/07	107	80 - 120	101	80 - 120	<1.0	ug/L				
5566675	. Iron (Fe)	2018/06/07	108	80 - 120	102	80 - 120	<100	ug/L	NC	20		
5566675	. Lead (Pb)	2018/06/07	105	80 - 120	96	80 - 120	<0.50	ug/L				
5566675	. Magnesium (Mg)	2018/06/07	NC	80 - 120	101	80 - 120	<50	ug/L				
5566675	. Manganese (Mn)	2018/06/07	104	80 - 120	99	80 - 120	<2.0	ug/L	NC	20		
5566675	. Molybdenum (Mo)	2018/06/07	112	80 - 120	99	80 - 120	<0.50	ug/L				
5566675	. Nickel (Ni)	2018/06/07	103	80 - 120	97	80 - 120	<1.0	ug/L				
5566675	. Potassium (K)	2018/06/07	111	80 - 120	101	80 - 120	<200	ug/L				
5566675	. Selenium (Se)	2018/06/07	108	80 - 120	98	80 - 120	<2.0	ug/L				
5566675	. Silicon (Si)	2018/06/07	104	80 - 120	98	80 - 120	<50	ug/L				
5566675	. Silver (Ag)	2018/06/07	105	80 - 120	98	80 - 120	<0.10	ug/L				
5566675	. Sodium (Na)	2018/06/07	NC	80 - 120	93	80 - 120	<100	ug/L				
5566675	. Strontium (Sr)	2018/06/07	104	80 - 120	98	80 - 120	<1.0	ug/L				
5566675	. Thallium (Tl)	2018/06/07	105	80 - 120	94	80 - 120	<0.050	ug/L				
5566675	. Titanium (Ti)	2018/06/07	106	80 - 120	100	80 - 120	<5.0	ug/L				
5566675	. Uranium (U)	2018/06/07	105	80 - 120	94	80 - 120	<0.10	ug/L				
5566675	. Vanadium (V)	2018/06/07	106	80 - 120	97	80 - 120	<0.50	ug/L				
5566675	. Zinc (Zn)	2018/06/07	105	80 - 120	99	80 - 120	<5.0	ug/L				
5566694	Turbidity	2018/06/06			100	85 - 115	<0.1	NTU	0.23	20		

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QUALITY ASSURANCE REPORT(CONT'D)

DST Consulting Engineers Inc
Client Project #: TSSO 032667
Site Location: .

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
5566811	Tannins & Lignins	2018/06/06	118	80 - 120	97	80 - 120	<0.2	mg/L	NC	20		
5566976	Colour	2018/06/07			100	80 - 120	<2	TCU	NC	25		
5567030	Total Kjeldahl Nitrogen (TKN)	2018/06/06	100	80 - 120	104	80 - 120	<0.10	mg/L	13	20	99	80 - 120
5567045	Dissolved Organic Carbon	2018/06/06	96	80 - 120	97	80 - 120	<0.50	mg/L	0.34	20		
5567050	Total Ammonia-N	2018/06/07	100	75 - 125	101	80 - 120	<0.050	mg/L	NC	20		
5567619	Nitrate (N)	2018/06/07	103	80 - 120	103	80 - 120	<0.10	mg/L	NC	20		
5567619	Nitrite (N)	2018/06/07	99	80 - 120	99	80 - 120	<0.010	mg/L	NC	20		
5567622	Dissolved Chloride (Cl)	2018/06/07	97	80 - 120	101	80 - 120	<1.0	mg/L	1.2	20		
5567632	Dissolved Sulphate (SO4)	2018/06/07	NC	75 - 125	104	80 - 120	<1.0	mg/L	1.5	20		
5567640	Orthophosphate (P)	2018/06/07	108	75 - 125	99	80 - 120	<0.010	mg/L	3.9	25		
5567644	pH	2018/06/07			102	98 - 103			0.23	N/A		
5567646	Alkalinity (Total as CaCO3)	2018/06/07			95	85 - 115	<1.0	mg/L	0.27	20		
5567647	Conductivity	2018/06/07			100	85 - 115	<1.0	umho/cm	0	25		
5567680	Fluoride (F-)	2018/06/07	99	80 - 120	96	80 - 120	<0.10	mg/L	2.4	20		
5568848	Sulphide	2018/06/07	97	80 - 120	100	80 - 120	<0.020	mg/L	NC	20		

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.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

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.

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).

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Report Date: 2018/06/11

DST Consulting Engineers Inc
Client Project #: TSSO 032667
Site Location: .

VALIDATION SIGNATURE PAGE

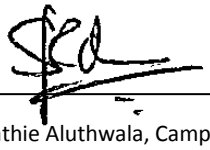
The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Cristina Carriere

Cristina Carriere, Scientific Service Specialist

Farhana Rahman

Farhana Rahman



Sirimathie Aluthwala, Campobello Micro

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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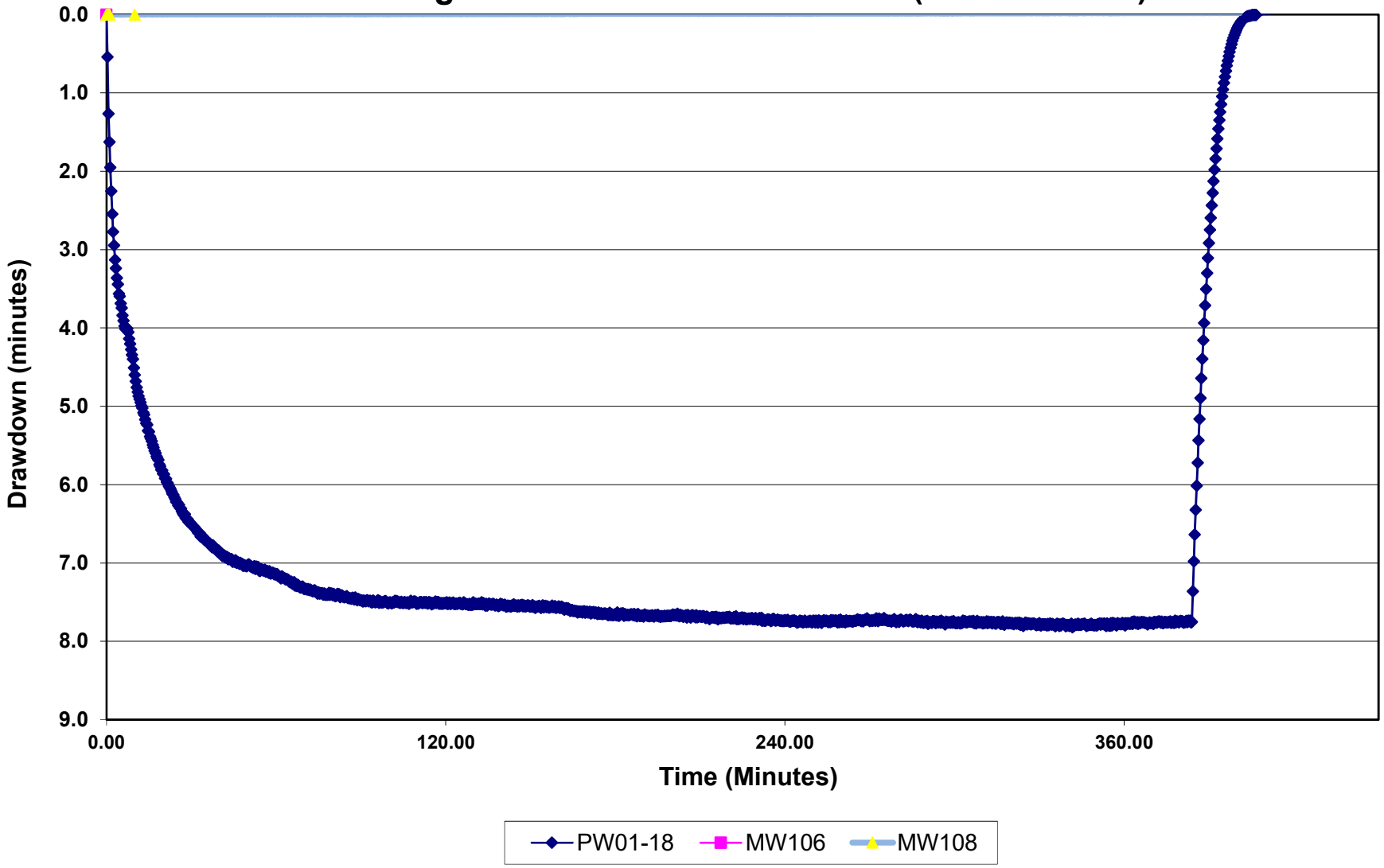
APPENDIX D
AQUIFER TEST DATA AND ANALYSIS (PW01-18)

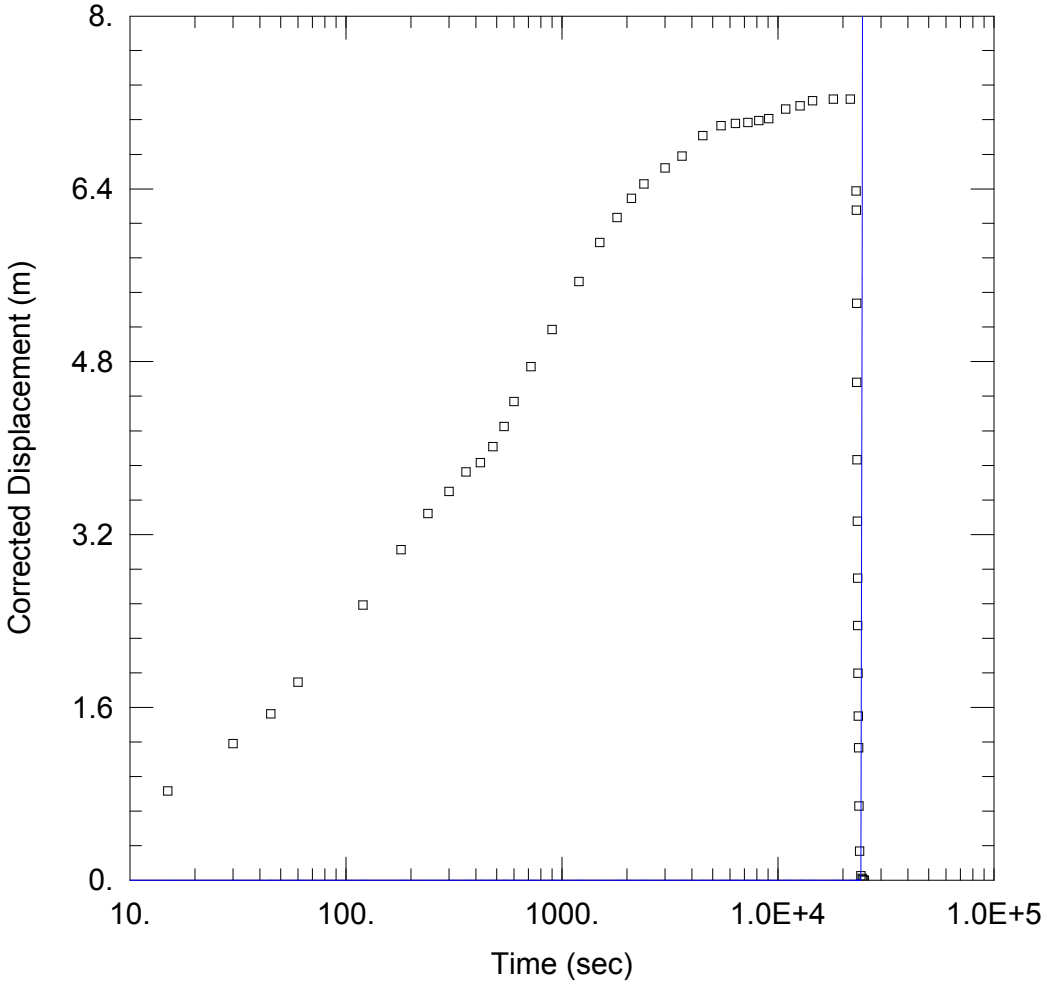
Table E-1 : Aquifer Test Data Summary

Pumping Well ID:	PW01-18	**Depth of Pump (m):** 51.81
Installed Depth of Well (m):	54.86	
Diameter of Well (mm):	152.4	
Casing Length (m):	21	**Pumping Rate (L/min):** 25
Meas. Point Stick-up (m):	1.025	**Test Duration (min):** 418
Depth to Static Water (m bgs):	5.545	

Clock Time (Hr:Min)	Time Since 1) Pumping Began or 2) Pumping Stopped (Min)	DRAWDOWN/RECOVERY		Comments
		Depth to Water (m bgs)	Pumping Drawdown (m)	
9:36	0	5.545	0	Pump Started - Drawdown
9:36	0.25	6.375	0.83	
9:36	0.5	6.825	1.28	
9:36	0.75	7.105	1.56	
9:37	1	7.41	1.865	
9:38	2	8.155	2.61	
9:39	3	8.695	3.15	
9:40	4	9.05	3.505	
9:41	5	9.27	3.725	
9:42	6	9.465	3.92	
9:43	7	9.555	4.01	
9:44	8	9.715	4.17	
9:45	9	9.92	4.375	
9:46	10	10.17	4.625	
9:48	12	10.525	4.98	
9:51	15	10.905	5.36	
9:56	20	11.4	5.855	
10:01	25	11.805	6.26	
10:06	30	12.065	6.52	
10:11	35	12.27	6.725	
10:16	40	12.42	6.875	
10:26	50	12.59	7.045	
10:36	60	12.715	7.17	
10:51	75	12.935	7.39	
11:07	90	13.04	7.495	
11:22	105	13.065	7.52	
11:37	120	13.075	7.53	
11:52	135	13.095	7.55	
12:07	150	13.117	7.572	
12:37	180	13.22	7.675	
13:07	210	13.255	7.71	
13:37	240	13.31	7.765	
14:37	300	13.325	7.78	
15:37	360	13.325	7.78	
16:00	383	13.325	7.78	Pump Stopped - Recovery
16:00	383.25	12.775	7.23	
16:00	383.5	12.555	7.01	
16:00	383.75	12.345	6.8	
16:01	384	12.145	6.6	
16:02	365	11.175	5.63	
16:03	386	10.365	4.82	
16:04	387	9.585	4.04	
16:05	388	8.975	3.43	
16:06	389	8.415	2.87	
16:07	390	7.955	2.41	
16:08	391	7.495	1.95	
16:09	392	7.085	1.54	
16:10	393	6.785	1.24	
16:12	395	6.235	0.69	
16:15	398	5.815	0.27	
16:20	403	5.585	0.04	
16:25	408	5.56	0.015	
16:30	413	5.55	0.005	
16:35	418	5.545	0	

Figure D-1- Drawdown Vs. Time
1622 Roger Stevens Drive - PW01-18 (05-June-2018)





WELL TEST ANALYSIS

Data Set: C:\...\PW01-18 HydroGeo Data and Calculation.aqt
Date: 06/11/18 Time: 16:22:05

PROJECT INFORMATION

Company: DST Consulting Engineers
Client: Invicta
Project: TS-SO-032667
Location: Kars, ON
Test Well: PW01-18
Test Date: June 5, 2018

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
PW01-18	0	0

Observation Wells

Well Name	X (m)	Y (m)
PW01-18	0	0

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 9.434 m ^{2}/day
S = 0.42524

APPENDIX E
GEOTECHNICAL INVESTIGATION REPORT (TERRAPEX, 2018)

GEOTECHNICAL DUE DILIGENCE INVESTIGATION REPORT

PROPOSED RETAIL FUEL OUTLET

1622 ROGER STEVENS DRIVE

KARS, ONTARIO K0A 2E0

REPORT REF. NO. CB1057.00
September 24, 2018

Prepared For:
Parkland Fuel Corporation

Prepared By:
Alston Associates
a division of Terrapex Environmental Ltd.
Toronto

Distribution:

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CONTENTS

APPENDICES

1 INTRODUCTION

Alston Associates (**AA**), the geotechnical division of Terrapex Environmental Ltd. (Terrapex) has been retained by Parkland Fuel Corporation (Parkland) to carry out a geotechnical due diligence study for the proposed construction of a retail fuel outlet, septic system and pavement design at 1622 Roger Stevens Drive, Kars, Ontario.

The property is located on the south side of Roger Stevens Drive and measures approximately 6,400 m^2 in size. It is currently occupied by a single-storey building and a two-storey residential dwelling, with the remainder of the site being covered with asphalt, trees and grass. The site slopes gradually from South to North and East to West, with a localized 2.5 m steep elevation change from the west edge of the asphalt and single-storey building down onto the adjacent farmer's field. The site is bounded by a funeral home (Tubman Funeral Homes) to the east, residential lands to the north and south and agricultural land to the west. The location of the site with the proposed development and borehole/monitoring well locations is shown on Terrapex drawing Figure 1, "*Borehole Location Plan*" enclosed in Appendix B.

It is understood that the proposed retail fuel outlet will include a one-storey retail store with no basement level, a gas pump island with an overhead canopy, underground storage tanks, an asphalt-paved parking lot, and a septic system to be installed in the southern section of the site.

The purpose of this study was to characterize the underlying soil and groundwater conditions of the site, to determine the relevant geotechnical properties of encountered soils and to prepare design recommendations pertaining to building foundations, excavation, backfilling considerations, surface support structures and asphaltic concrete pavement.

This report presents the results of the investigation performed in accordance with the general terms of reference outlined above and is intended for the guidance of the client and the design engineers only. It is assumed that the design will be in accordance with the applicable building codes and standards.

2 FIELDWORK

The fieldwork for this study was carried out on February 22 and 23, 2018 by Terrapex and consisted of advancing nine boreholes, denoted as MW101, BH102 through BH105, MW106 through MW108, and BH109, and one sounding by Dynamic Cone Penetration Test (DCPT), denoted as BH110. The geotechnical boreholes were sampled to depths ranging from 1.8 to 6.1 m below ground surface (bgs). The DCPT sounding was advanced without soil sampling to a depth of 10.7 m bgs. The locations of these boreholes are based on the preliminary layout of the gas station that was provided by Parkland and they are shown on Figure 1, "*Borehole Location Plan",* in Appendix B.

A monitoring well was installed within each of the completed boreholes MW101, MW106, MW107 and MW108. All monitoring wells were developed using disposable plastic bailers to ensure groundwater can flow in and out of the well freely. The construction of these wells are shown on the borehole log sheets enclosed in Appendix C. A representative from Terrapex returned to the site on March 15, 2018 to measure the groundwater levels in the monitoring wells.

Standard Penetration Tests (SPT) were carried out in accordance with American Society for Testing and Materials (ASTM) D-1586 in the course of advancing the sampled boreholes to take representative soil samples and to measure the standard penetration index (N-values) to characterize the condition of the various soil materials. The number of blows of the automatic-trip hammer required to drive the split spoon sampler to 0.3 m depth is recorded and these are presented on the logs as N-values. Results of the SPT are shown on the borehole logs enclosed in Appendix C of this report.

During the drilling program, auger refusal was encountered in six of the boreholes by possible large cobbles or boulders. When auger refusal was encountered at shallow depths, the drill rig was repositioned about 1.0 m away from the original location and subsequently augured to our desired depth. Auger refusal was encountered in BH103, BH104, BH105, MW107, MW108 and BH109.

The purpose of performing DCPT was to measure the equivalent penetration index values in the subsoil units in order to determine the penetration resistance of the subsoil at greater depths where soil sampling was not carried out. The DCPT involves advancing a cone with an outside diameter of 50 mm into the ground using standard penetration test (DPSH) energy. The number of blows of the striking hammer required to drive the cone through successive 300 mm depth increments was recorded and these are presented as penetration index values on the borehole BH110 log from 3.1 to 10.7 m bgs, enclosed in Appendix C of this report.

Observations were made of the groundwater conditions occurring in the boreholes, in the course of their advancement.

On September 19, 2018, Terrapex surveyed the positions and elevations (tops of the well standpipes, as well as the ground surfaces) of the newly installed monitoring wells relative to a temporary site benchmark (TBM). A survey nail located on a utility pole at the northeast corner of the Site was selected as the TBM, which had a geodetic elevation of 92.48 m. As documented on the *Topographic Plan of Survey of Part of Lot 21, Concession 1, Geographic Township of North Gower, City of Ottawa*, by Farley, Smith and Denis Surveying Ltd., 2017, the TBM elevation was derived from the vertical benchmark 0011986U011.

The fieldwork for this study was supervised by a field technician from Terrapex who arranged for the locates of buried services; effected the drilling, sampling and in-situ testing; defined strata interface depths; measured groundwater levels; and prepared field borehole log sheets.

3 LABORATORY TESTING

The soil samples recovered from the boreholes were transported to our laboratory for detailed examination, soil classification and laboratory testing. Water content tests were conducted on all soil samples retained from Boreholes MW101, BH102, BH103B and MW106. The results of the classification and water contents are presented on the borehole log sheets attached in Appendix C. It is noted that selected soil samples retrieved from the boreholes were laboratory-tested for environmental purposes. While the environmental sampling locations are noted in the borehole logs, environmental analytical results and discussions are not part of the scope of work of this report and therefore, they are not included herein.

Grain size analysis ASTM D422 (sieve) were carried out on the following three (3) soil samples:

- Borehole MW101 at 5.5 m depth (sample 9).
- Borehole BH103 at 1.5 m depth (sample 2).
- Borehole BH102 at 2.3 m depth (sample 3).

Grain size analysis ASTM D422 (sieve and hydrometer) were carried out on the following two (2) soil samples:

- Borehole BH105 at 2.3 m depth (sample 3).
- Borehole MW107 at 1.5 m depth (sample 2).

The results of the grain size analyses are presented in Appendix D of this report.

Two representative samples of the subsurface soils obtained from the anticipated foundation depth was submitted to Maxxam Analytics for chemical analytical testing (pH and soluble sulphate content); to determine if the subsurface concrete is to be designed for sulphate attack. Chemical analytical test results are presented in Appendix E of this report.

4 SITE AND SUBSURFACE CONDITIONS

The following sections provide a brief description of the site and subsurface soil and groundwater conditions encountered during our field test program.

4.1 Site Description

The property is located at 1622 Roger Stevens Drive, Kars, Ontario, approximately 1.2 km east of Highway 416. It is rectangular in shape and measures approximately 6,400 m^2 in size. The property is currently occupied by a single storey building and a two storey residential dwelling, with the remainder of the site being covered with asphalt, trees and grass. The site is bounded by a funeral home (Tubman Funeral Homes) to the east, residential lands to the north and south and agricultural lands to the west.

The proposed retail store to be located south of the existing one story building with the proposed gasoline pump island located north of the building. In general, the site slopes gradually from South to North and East to west, with a localized 2.5 m steep elevation change from the west edge of the asphalt and single storey building down onto the adjacent farmer's field. The slope extends from the south edge of Roger Stevens Drive approximately 47.0 m and gradually tapers off to the west.

The preliminary layout of the proposed retail fuel outlet and borehole locations are shown on Figure 1, "Borehole Location Plan", as presented in Appendix B herein.

4.2 Subsurface soil conditions

Details of the subsurface conditions contacted in the boreholes are given on the individual borehole logs enclosed in Appendix C. A brief description of the subsoil units and groundwater conditions are given in the following subsections.

It should be noted that the boundaries of soil types indicated on the borehole logs are inferred from non-continuous soil sampling and observations made during drilling. These boundaries are intended to reflect transition zones for the purpose of geotechnical design, and therefore, should not be construed as exact planes of geological change. Due to the frost penetration we were unable to recover surficial split spoon samples, samples were collected from auger cuttings within the top 0.61-0.76 m of each borehole.

The subsurface stratigraphy as revealed in the boreholes comprises of a surficial layer of topsoil in boreholes located within the grassed areas of the property; the surficial layer of the boreholes located within the paved areas of the site (MW101, BH102 and BH109) comprises of a sand and gravel fill. These surficial layers are underlain by a native silty sand to sand with some to trace organics. The silty sand to sand with some to trace organics deposit is underlain by a native silty sand to sand, some to trace embedded gravel which extends beyond the sampled depth of the boreholes. On March 15, 2018, the groundwater levels were measured in the monitoring wells at depths between 0.08 m bgs (MW107) to 2.80 m bgs (MW108); these groundwater measurements correspond to about elevation 92.38 to 88.59 m.

4.2.1 Topsoil

Topsoil was encountered in boreholes BH103, BH104, BH105, MW106, MW107 and MW108. The thickness of the topsoil in boreholes BH103 and MW108 were measured as 102 mm and 40 mm, respectively. It should be noted that the topsoil thickness will vary between boreholes and may be thicker than that found at the boreholes.

4.2.2 Fill

Sandy gravel with trace silt fill material was found in MW101 at depths between 0.6 to 3.6 m bgs and in BH102 between 0.6 and 1.4 m bgs. BH102 contained a brownish black sand some silt trace organics fill deposit between 1.4 and 2.2 m bgs. Samples of the subbase material from underside of the asphaltic concrete were collected from the augers between the depths of 0.1 and 0.6 m and were classified as a sand and gravel.

4.2.3 Native Silty Sand, some to trace gravel [SM]

Underlying the surficial topsoil layer is natural deposit of a dark brown, brown and grey native silty sand with some to trace gravel. The silty sand with some to trace gravel deposit extends beyond the sampled depth of all the boreholes. Near the surface, in the upper 0.6 to 1.8 m of the deposit, the silty sand is dark brown to brown and contains trace to some organic material at the locations of BH103, BH104, BH105, MW106 and MW108.

The silty sand with some to trace gravel changes from brown to a grey at depths ranging from 4.9 to 5.3 m bgs in MW101m BH102, MW106, and MW108.

Standard penetration test N-values obtained from this layer ranged from 2 to 56 blows per 300 mm of penetration to indicate a compactness condition ranging from loose to dense. The compactness of the soil is variable in this deposit possibly due to the inclusions of cobbles/boulders which were encountered in six (6) locations during the drilling program, resulting in auger refusal and relocating the drill rig 1.0 m away from original location. Auger refusal on possible cobbles or boulders occurred in;

- BH103 at a depth of 4.4 m bgs;

- BH104 at a depth of 1.8 m bgs;
- BH105 at a depth of 3.7 m bgs;
- MW107 at a depth of 3.7 m bgs;
- MW108 at a depth of 2.9 m bgs;
- BH109 at a depth of 3.7 m bgs.

The loose condition is only encountered in the grey saturated silty sand, some to trace gravel deposit in MW106 at a depth of 4.7 m bgs.

Some of the high blow counts recorded are likely the result of encountering larger cobbles or boulders. The balance of the silty sand, some to trace gravel deposit is in a compact condition.

Grain size analyses were carried out on five (5) representative samples of the silty sand, some to trace gravel soil. The material in this layer is classified as SM, in accordance with the Unified Soil Classification System (USCS). The test results are enclosed in Appendix D, and summarized below.

Borehole No.	Sample Number)	Sample Depth (mbgs)	Sample Description	Gravel %	Sand %	Silt %	Clay %	Coefficient of Permeability, k(1) (cm/sec)
BH101	6	3.7 to 4.4	SAND some gravel some silt	15	73	12	-	
BH102	3	2.2 to 2.8	SILTY SAND trace gravel	9	78	22	-	
BH104	2	1.5 to 2.1	SILTY SAND some gravel	14	51	35	-	
BH105	3	2.2 to 2.8	SILTY SAND some gravel	12	57	31	-	10^{-3} to 10^{-5}
MW107	2	1.5 to 2.1	SILTY SAND some gravel	11	49	40	-	10^{-3} to 10^{-5}

Note: (1) References from Terzaghi and Peck "Soil Mechanics in Engineering Practice". John Wiley and Sons, Inc. (1967)

Water contents measured on samples of the silty sand range from approximately 9 to 16 percent by weight.

4.3 Groundwater

Observations of groundwater conditions were made in the installed monitoring wells on February 23 and March 15, 2018.

Groundwater was encountered in all the monitoring wells. Upon completion of the fieldwork the groundwater was measured at depths ranging from 0.10 to 2.80 m bgs in the monitoring wells. On March 15, 2018, the groundwater levels were measured in the monitoring wells at depths between 0.08 m bgs (MW107) to 2.80 m bgs (MW108); these groundwater measurements correspond to about elevation 92.38 and 88.59.

The silty sand with some to trace gravel has medium to low conductivities and the groundwater yield from these soils is expected to be moderate.

It should be noted that groundwater levels are subject to seasonal fluctuations. A higher groundwater table condition will likely develop in the spring and following significant rainfall events.

4.4 Soundings by Dynamic Cone Penetration Tests (DCPT)

Borehole BH110 was extended beyond the sampled depth by advancing by Dynamic cone penetration tests (DCPT) to a depth of 10.7 m bgs. The DCPT measured equivalent N-values ranging between 10 and 83; more specifically, equivalent N-values of less than 30 were found to extend to a depth of 6.5 m bgs and equivalent N-values of less than 50 were found to extend to a depth of 10.7 m bgs, with N-values of greater than 60 where possible boulders were encountered.

4.5 Chemical Characterization of Sub-Soil

Two soil samples were submitted for chemical testing; one sample was selected from MW102 at a depth of 3.0 m bgs (sample 4) and one sample was selected from BH103 at a depth of 1.5 m bgs (sample 2). The samples were submitted to Maxxam Analytics for determination of pH index and sulphate content.

The test results revealed that the pH index in MW102-4 was 7.85 and 7.93 in BH103-2. The water-soluble sulphate content of the soil sample is 0.0054 % in both samples.

The pH content of the tested sample has a weak alkalinity. The concentration of water-soluble sulphate content of the tested samples is below the CSA standard of 0.1% water-soluble sulphate (Table 12 CSA A23.1, Requirements for Concrete Subjected to Sulphate Attack). Special concrete mixes against sulphate attack is therefore not required for the sub-surface concrete of the proposed buildings.

The test results are included in the Certificate of Analysis provided by Maxxam Analytics; contained in Appendix E of this report.

5 DISCUSSION AND RECOMMENDATIONS

It is understood that the subject property is to be developed as a retail fuel outlet consisting of a one-storey retail store with no basement level, a gas pump island with overhead canopy, underground storage tanks, an asphalt-paved parking lot, and a septic system to be placed in the southern portion of the site. It is anticipated that there will be some modifications in site grading, but this has not been established at the time of the issuance of this report.

This investigation has revealed that below the surficial topsoil layer the site is underlain in general by a moist, brown and grey native silty sand some to trace gravel with occasional boulders. A loose condition is present in the upper 1.5 m of topsoil and native silty sand some organics soil; below this depth the silty sand some to trace gravel soil is generally loose to compact with occasional very dense areas where possible large cobbles or boulders were encountered. Below of the asphaltic concrete is a moist, compact sand and gravel fill

which varies in depths up to 3.6 m bgs in MW101; below this depth the silty sand some to trace gravel deposit was encountered.

The groundwater levels were measured on March 15, 2018 in the monitoring wells at depths between 0.08 m bgs (MW107) to 2.80 m bgs (MW108); these groundwater measurements correspond to about elevation 92.38 to 88.59 m. The groundwater flows in a northwesterly direction from the southern end of the site with higher ground elevations towards Roger Stevens Drive. It should be noted that considerable rain and snow melt had occurred during the time of monitoring and may affect the groundwater readings.

The DCPT sounding revealed a compact soil below a depth of 3.2 m bgs.

On the basis of the fieldwork, laboratory tests and other pertinent information supplied by the client, the following comments and recommendations are made.

It should be understood that the comments are to be considered preliminary, and should be reviewed by **AA** when detailed designs are finalized.

5.1 Excavations and Dewatering

Excavation of the soils at this site can be carried out using standard hydraulic excavators. We note that based on our subsurface investigation, numerous cobbles/boulders were encountered within the native silty sand, some to trace gravel layer. Removal of the cobbles/boulders may be required if they are interfering with foundation construction at subgrade level.

All excavations must be carried out in accordance with Occupational Health and Safety Act (OHSA). The sand and gravel fill material and the native silty sand with some to trace gravel above the groundwater table are classified as Type 3 soil and below the groundwater table are classified as Type 4 soil. Slopes of sidewalls in excavations should be cut back at an angle of 1 horizontal to 1 vertical (45 degrees) above the groundwater and at an angle of 3 horizontal to 1 vertical below the groundwater table.

The silty sand some to trace gravel soils positioned below the groundwater table are expected to remain vertical for a short period of time, however if walls are left exposed the soil will begin to crack and splay into the trench. In order to safely and effectively construct an excavation, the groundwater table should be lowered below the proposed base of the excavation.

The groundwater table must be lowered prior to excavating for footing foundations and services.

Based on the results of the grain size analyses, the coefficient of permeability of the silty sand soil is estimated to range between 10^{-3} and 10^{-5} cm/second considered to be of medium to low hydraulic conductivity. The groundwater yield from this deposit is expected to be low to moderate. For shallow localized excavations which extend to depths of up to 0.3 m below the groundwater level, dewatering should not be an issue. Where excavations are required to extend more than 0.3 m below the groundwater table, it may be possible to use deep filtered sumps to provide the required dewatering in order to maintain basal stability as well as dry working conditions. The dewatering system should be designed and installed by specialist dewatering contractor experienced in this field.

Where workers must enter excavations, the excavation must be dry and, the excavation side-walls must be suitably sloped and/or braced in accordance with the Occupational Health and Safety Act and Regulations for Construction Projects.

In the event that the dewatering quantities will exceed 50,000 litres per day it will be necessary to obtain a Permit to Take Water (PTTW).

5.2 Reuse of On-site Excavated Soils as Compacted Backfill

The existing on-site native silty sand, some to trace gravel soil is considered suitable for reuse as backfill material provided any topsoil, organic or other unsuitable materials are excluded from the backfill, and the backfill materials' water content is within 2 percent of its optimum moisture content as determined by Standard Proctor test.

The water contents of the native silty sand, some to trace gravel soil range between 9 and 16 percent; which is close to the materials' optimum moisture content (about 11 percent). Wet soils should be dried sufficiently in order to achieve the specified degree of compaction. Spreading of the material in a wide area and air drying will be required to achieve the specified compaction of the material. The lift thickness for compaction and the water content of the soils must be properly controlled during the backfilling. The silty sand some to trace gravel soils should be effectively compacted with heavy vibratory smooth drum roller.

It is recommended that service trench excavations may be backfilled with on-site suitable native soils such that at least 95% of Standard Proctor Maximum Dry Density (SPMDD) is obtained in the lower zone of the subgrade and 98% of SPMDD for the upper 1 m of the subgrade.

5.3 Foundation Design

The proposed structures within the fuel outlet are the one-storey retail store with no basement level, a gas pump island with overhead canopy, and underground storage tanks (assuming bottom of the tanks is at about 4 m bgs). The subsurface conditions at these locations are represented by Boreholes BH103 and BH104 for the retail store, BH102 and BH109 for the gas pump island, and MW101 for the underground storage tank. Based on the subsurface investigation results and the proposed structures, shallow foundation system appears to be feasible to support the three structures.

5.3.1 Foundations for the Retail Store and Gas Pump Island

The soil profile at the site consists of a surficial topsoil layer underlain by a native silty sand, some to trace gravel soil. The upper layer (about 0.75 m thick) of the silty sand soil deposit is found to be loose, dark brown and contains some organic material; below this upper organic layer the silty sand some to trace gravel soil is generally loose to compact with occasional boulders positioned at random and unpredictable depths. Groundwater is situated at about 2.80 m bgs (or elevation 88.59 m) below the location of the proposed retail store and gas pump island in the vicinity of borehole MW108.

Conventional spread and strip footings may be used to support the proposed retail store and gas pump island. Refer to Section 5.1 Excavations and Dewatering for recommendations pertaining to foundation excavations

and dewatering.

The on-site fill material is considered as unsuitable bearing material for the proposed structure. The proposed foundations must be founded on the loose to compact native silty sand with some to trace gravel. Conventional spread and strip footings may be designed for an allowable bearing resistance at Serviceability Limit States (SLS) of 100 kPa, and a factored geotechnical bearing resistances at Ultimate Limit States (ULS) of 150 kPa. Subgrade preparation should include the removal of topsoil, fill material, any weak, softened and disturbed soils. All exterior footings and footings in unheated areas should be provided with at least 1.8 m of soil cover or equivalent artificial thermal insulation for frost protection purposes.

The total and differential settlements of foundations designed in accordance with the bearing resistance values recommended in the above sub-sections should not exceed the conventional limits of 25 mm and 19 mm, respectively.

Due to variations in the consistency of the founding soils and/or softening caused by excavation disturbance and/or seasonal frost effects, all footing subgrade preparation must be witnessed by the Geotechnical Engineer prior to placing foundation concrete to ensure that the soil exposed at the excavation base is consistent with the design geotechnical bearing resistance. Larger cobbles or boulders encountered within the excavation base must to be removed.

The foundations of the overhead canopy columns of the gas pump island should be designed to resist uplift forces from wind loads. The recommended ultimate bond stress between the canopy column foundation and the soil is 50 kPa.

5.3.2 Slab-on-Grade

The floor slab for the proposed retail store and gas pump island will be supported on the native silty sand some to trace gravel which is adequate to support a slab-on-grade construction. Subgrade preparation should include the removal of topsoil, fill material, any weak, softened and disturbed soils. After removal of all unsuitable materials, the subgrade should then be proof-rolled with heavy rubber tired equipment. The proof-rolling operation should be witnessed by the Geotechnical Engineer. Any soft or wet subgrade areas which deflect significantly should be sub-excavated and replaced with suitable approved earth fill material compacted to at least 98% of SPMDD.

Where new fill is required to raise the grade, excavated native material from the site may be used, provided the material is free from topsoil, organic or deleterious matter. The fill material should not be frozen and should not be too wet for efficient compaction (moisture content at optimum or 2 percent greater than optimum). The fill placement should not be performed during winter months when freezing temperatures occur persistently or intermittently. All fill placed below the slab on grade areas of the buildings must be placed in thin lifts of 150 mm thickness or less.

It is recommended that a combined moisture barrier and a levelling course, having a minimum thickness of 150 mm and comprised of free draining material using Granular A be provided as a base for the slab-on-grade. Granular materials should meet OPSS 1010 specifications. The base material should be compacted to 98 percent of its SPMDD. Alternatively, 19 mm clear stone (OPSS 1004) may be used and compacted by vibration to a dense state, with filter fabric separating the clear stone and the subgrade soils.

Provided the subgrade, under-floor fill and granular base are prepared in accordance with the above recommendations, the Modulus of Subgrade Reaction (Ks) for floor slab design will be 20 MPa/m.

The soils at this site are susceptible to frost effects which would have the potential to deform hard landscaping adjacent to the buildings. At locations where the buildings are expected to have flush entrances, care must be taken in detailing the exterior slabs / sidewalks, providing insulation / drainage / non-frost susceptible backfill to maintain the flush threshold during freezing weather conditions.

Perimeter and under floor drainage will not be required provided that the floor slab of the building is a minimum of 150 mm above the exterior grade.

5.3.3 Foundations for the Underground Storage Tanks

The foundation recommendations for the underground storage tanks are based on the assumption that the bottom of the tanks will be situated at about 4 m bgs. The native sand with some gravel and silt is encountered at this depth and this material is considered as suitable bearing material. A concrete mat foundation appears to be feasible to support the underground storage tanks and to minimize the amount of differential settlement of the foundation. The mat may be designed for an allowable bearing resistance at Serviceability Limit States (SLS) of 200 kPa, and a factored geotechnical bearing resistances at Ultimate Limit States (ULS) of 300 kPa. The Modulus of Subgrade Reaction (Ks) for the mat design will be 20 MPa/m.

5.3.4 Subgrade Protection

The native soils are susceptible to disturbance when wet, so construction scheduling should consider the amount of excavation left exposed to the elements, during foundation preparation.

Rainwater or groundwater seepage entering the foundation excavation must be pumped away (not allowed to pond). The foundation subgrade soils should be protected from freezing, inundation and equipment traffic at all times.

The native soils tend to weather and deteriorate rapidly on exposure to atmosphere or surface water. **AA** recommends that footings placed on the exposed soil should be poured on the same day as they are excavated, after removal of all unsuitable founding materials and approval of the bearing surface. Alternatively, a concrete mud slab could be used to protect a bearing surface where footing construction is to be delayed.

If construction proceeds during freezing weather conditions, adequate temporary frost protection for the footing bases and concrete must be provided.

5.4 Service Trenches

The loose to compact native silty sand some to trace gravel soils would require some improvement in order to provide a suitable support for the pipelines; this may be accomplished by compacting the loose soils to no less than 98 % of SPMDD provided the trench is dry. Alternatively, the granular bedding may be reinforced with a high strength woven geotextile. This should consist of material with a wide width tensile strength of 200kN/m in both directions such as TenCate Geolon® PET 200S or approved equal. The recommended

geotextile should fully enclose the bedding, below the invert of the pipeline.

Watermain positioned to rest on the improved native soils should be restrained at the connection points along the pipeline.

The type of bedding depends mainly on the quality of the subgrade immediately below the invert levels and particularly on the shear strength of the subgrade.

Conventional Class 'B' bedding is recommended for the underground utilities. Bedding materials can be well graded, granular material such as Granular 'A' (sand and gravel) or 19 mm Crusher Run Limestone; all granular materials should meet the OPSS 1010 specifications provided the base of the trench excavation is dry enough to effect compaction. All granular bedding materials must be compacted to at least 98% of SPMDD.

The use of unprotected no-fines material such as "clear stone" or "high performance bedding" for pipe bedding and trench backfill is not recommended for the site. The saturated silty fine sand soils which lie at invert elevation and which will enclose the bedding are expected to invade any no-fines material resulting in subsidence of the adjacent ground.

Pipe bedding and backfill for flexible pipes should be undertaken in accordance with OPSD 802.010. Pipe embedment and cover for rigid pipes should be undertaken in accordance with OPSD 802.030.

Where disturbance of the trench base has occurred, for example as a result of groundwater seepage or construction traffic, the disturbed soils must be sub-excavated and replaced with suitably compacted bedding material.

Sand cover material should be placed as backfill to at least 300 mm above the top of pipe for the full width of the trench excavation. Placement of additional granular material (thickness dictated by the type of compaction equipment) as required or use of smaller compaction equipment for the first few lifts of native material above the pipe will probably be necessary to prevent damage to the pipe during the trench backfill compaction.

The soils used to backfill the utility trenches should be compacted to no less than 95% SPMDD in the lower zone of the subgrade and 98% of SPMDD for the upper 1 m of the subgrade.

In areas of narrow trenches or confined spaces such as around manholes, catchbasins, etc., the use of aggregate fill such as Granular 'B' Type I (OPSS 1010) is required if there is to be post-construction grade integrity.

5.5 Pavement Thickness

We understand that the pavement will be used for parking light vehicles and occasional delivery tractor-trailer trucks. The entrances and sections of the pavement should be reconstructed to support these loads.

The condition of the subgrade soils should be improved in order to be considered suitable to support a

conventional pavement structure. Given the frost susceptibility and drainage characteristics of the subgrade soils, the following pavement structure designs are recommended for light and heavy duty pavement structures:

Table No. 1. Recommended Asphaltic Concrete Pavement Structure Design

Pavement Layer	Compaction Requirements	Light Duty Pavement Minimum Component Thickness	Heavy Duty Pavement Minimum Component Thickness
Surface Course Asphaltic Concrete	as per OPSS 310	40 mm Hot-Laid HL3	50 mm Hot-Laid HL3
Binder Course Asphaltic Concrete	as per OPSS 310	40 mm Hot-Laid HL8	60 mm Hot-Laid HL8
Granular Base	100% SPMDD*	150 mm Granular 'A' or 19 mm Crusher Run Limestone	150 mm Granular 'A' or 19 mm Crusher Run Limestone
Granular Subbase	100% SPMDD*	200 mm Granular 'B' Type II	400 mm Granular 'B' Type II

* Note: Standard Proctor Maximum Dry Density (ASTM-D698).

The subgrade must be compacted to at least 98% of SPMDD for at least the upper 600 mm and 95% below this level. The granular pavement structure materials should be placed in lifts not exceeding 150 mm thick and be compacted to a minimum of 100% SPMDD. Asphaltic concrete materials should be rolled and compacted as per OPSS 310. The granular and asphaltic concrete pavement materials and their placement should conform to OPSS 310, 501, 1010 and 1150, and the pertinent Municipality specifications. Further, it is recommended that the Municipality's specifications should be referred to for use of higher grades of asphalt cement for asphaltic concrete where applicable, particularly in the areas of expected heavy truck traffic.

The long-term performance of the proposed pavement structure is highly dependent upon the subgrade support conditions. Stringent construction control procedures should be maintained to ensure that uniform subgrade moisture and density conditions are achieved. In addition, the need for adequate drainage cannot be over-emphasized. The finished pavement surface and underlying subgrade should be free of depressions and should be crowned and sloped (at minimum of 3% for both the pavement surface and the subgrade) to provide effective drainage. Surface water should not be allowed to pond adjacent to the outside edges of pavement areas. Sub-drains or drainage ditches must be provided to facilitate effective and assured drainage of the pavement structures as required to intercept excess subsurface moisture and minimize subgrade softening. The invert of sub-drains should be maintained at least 0.3 m below subgrade level.

Additional comments on the construction of pavement areas are as follows:

- As part of the subgrade preparation, proposed pavement areas should be stripped of topsoil, unsuitable earth fill, organic soils and other obvious objectionable material. Fill required to raise the

grades to design elevations should be free of organic material and at a moisture content which will permit compaction to the specified densities. The subgrade should be properly shaped, crowned, and then proof-rolled. Soft or spongy subgrade areas should be sub-excavated and properly replaced with suitable approved backfill compacted to 98% of SPMDD.

- The most severe loading conditions on pavement areas and the subgrade may occur during construction during wet and un-drained conditions. Consequently, special provisions such as restricted lanes, half-loads during paving etc., may be required, especially if construction is carried out during unfavorable weather.

    - Proof-rolling of the subgrade must be carried out and witnessed by **AA** personnel for final recommendations of sub-base thicknesses.

5.6 Septic System

It is our understanding that a septic bed is to be installed in the vicinity of boreholes MW107 and BH105 located within the southern portion of the site. The soil located within the boreholes is native silty sand with trace gravel. Groundwater level is at about 0.3 m bgs; this corresponds to an elevation of about elevation 92.16 m.

To determine the Coefficient of Permeability (k), soil samples were selected for grain size analysis from depths ranging from 2.3-2.9 m bgs in BH 105 (sample 3) and 1.5-1.9 m bgs in MW107 (sample 2). The grain size analysis carried out on BH105 sample 3 and MW107 sample 2 classified the soil samples as SM (Silty sands, silt sand mixtures) based on the Unified Soil Classification; the result of these tests are presented in appendix D as Figure No. F4G and F5G. The grain size analysis was carried out in accordance with ASTM D422.

We were able to calculate an approximate coefficient of permeability k, based on the D_{10} value determined from the grain size analysis. The percolation times are estimated based on the Unified Soil Classification and the empirical charts provided in the Ontario Building Code's *MMAH Supplementary Standard SB-6 Percolation Time and Soil Descriptions*.

The table below provides an approximate coefficient of permeability and estimated percolation time for BH105 sample 3 and MW107 sample 2.

Sample Number	Approximate Coefficient of Permeability (k)	Estimated Percolation Time based on Unified Soil Classification (Percolation Time T-mins/cm)	Comments
BH105-3	K= 10^{-3} to 10^{-5} cm/s	8 to 20	Medium to low permeability
MW107-2	K= 10^{-3} to 10^{-5} cm/s	8 to 20	Medium to low permeability

5.7 Earthquake Design Parameters

The Ontario Building Code (2012) stipulates the methodology for earthquake design analysis, as set out in Subsection 4.18.7. The determination of the type of analysis is predicated on the importance of the structure,

the spectral response acceleration and the site classification.

The parameters for determination of the Site Classification for Seismic Site Response are set out in Table 4.1.8.4.A of the Ontario Building Code (2012). The classification is based on the determination of the average shear wave velocity in the top 30 meters of the site stratigraphy, where shear wave velocity (Vs) measurements have been taken. In the absence of such measurements, the classification is estimated on the basis of empirical analysis of undrained shear strength or penetration resistance. The applicable penetration resistance is that which has been corrected to a rod energy efficiency of 60 percent of the theoretical maximum or the (N_{60}) value.

Based on the borehole information and the DCPT sounding, the subsurface stratigraphy generally comprises of a loose to compact native silty sand some to trace gravel becoming dense below a depth of 9.5 m bgs. Based on the above, the site designation for seismic analysis is Class D according to Table 4.1.8.4.A from the quoted code.

The site specific 5 percent damped spectral acceleration coefficients, and the peak ground acceleration factors are provided in the 2012 Ontario Building Code - Supplementary Standard SB-1 (August 15, 2006), Table 1.2, Ottawa, Ontario.

6 LIMITATIONS OF REPORT

The Limitations of Report, as quoted in Appendix 'A', are an integral part of this report.

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APPENDIX A
LIMITATIONS OF REPORT

limitations of report

The conclusions and recommendations in this report are based on information determined at the inspection locations. Soil and groundwater conditions between and beyond the test holes may differ from those encountered at the test hole locations, and conditions may become apparent during construction which could not be detected or anticipated at the time of the soil investigation.

The design recommendations given in this report are applicable only to the project described in the text, and then only if constructed substantially in accordance with details of alignment and elevations stated in the report. Since all details of the design may not be known to us, in our analysis certain assumptions had to be made as set out in this report. The actual conditions may, however, vary from those assumed, in which case changes and modifications may be required to our recommendations.

This report was prepared for Parkland Fuel Corporation by Alston Associates. The material in it reflects Alston Associates judgement in light of the information available to it at the time of preparation. Any use which a Third Party makes of this report, or any reliance on decisions which the Third Party may make based on it, are the sole responsibility of such Third Parties.

We recommend, therefore, that we be retained during the final design stage to review the design drawings and to verify that they are consistent with our recommendations or the assumptions made in our analysis. We recommend also that we be retained during construction to confirm that the subsurface conditions throughout the site do not deviate materially from those encountered in the test holes. In cases where these recommendations are not followed, the company's responsibility is limited to accurately interpreting the conditions encountered at the test holes, only.

The comments given in this report on potential construction problems and possible methods are intended for the guidance of the design engineer, only. The number of inspection locations may not be sufficient to determine all the factors that may affect construction methods and costs. The contractors bidding on this project or undertaking the construction should, therefore, make their own interpretation of the factual information presented and draw their own conclusions as to how the subsurface conditions may affect their work.

APPENDIX B

FIGURE 1: BOREHOLE LOCATION PLAN

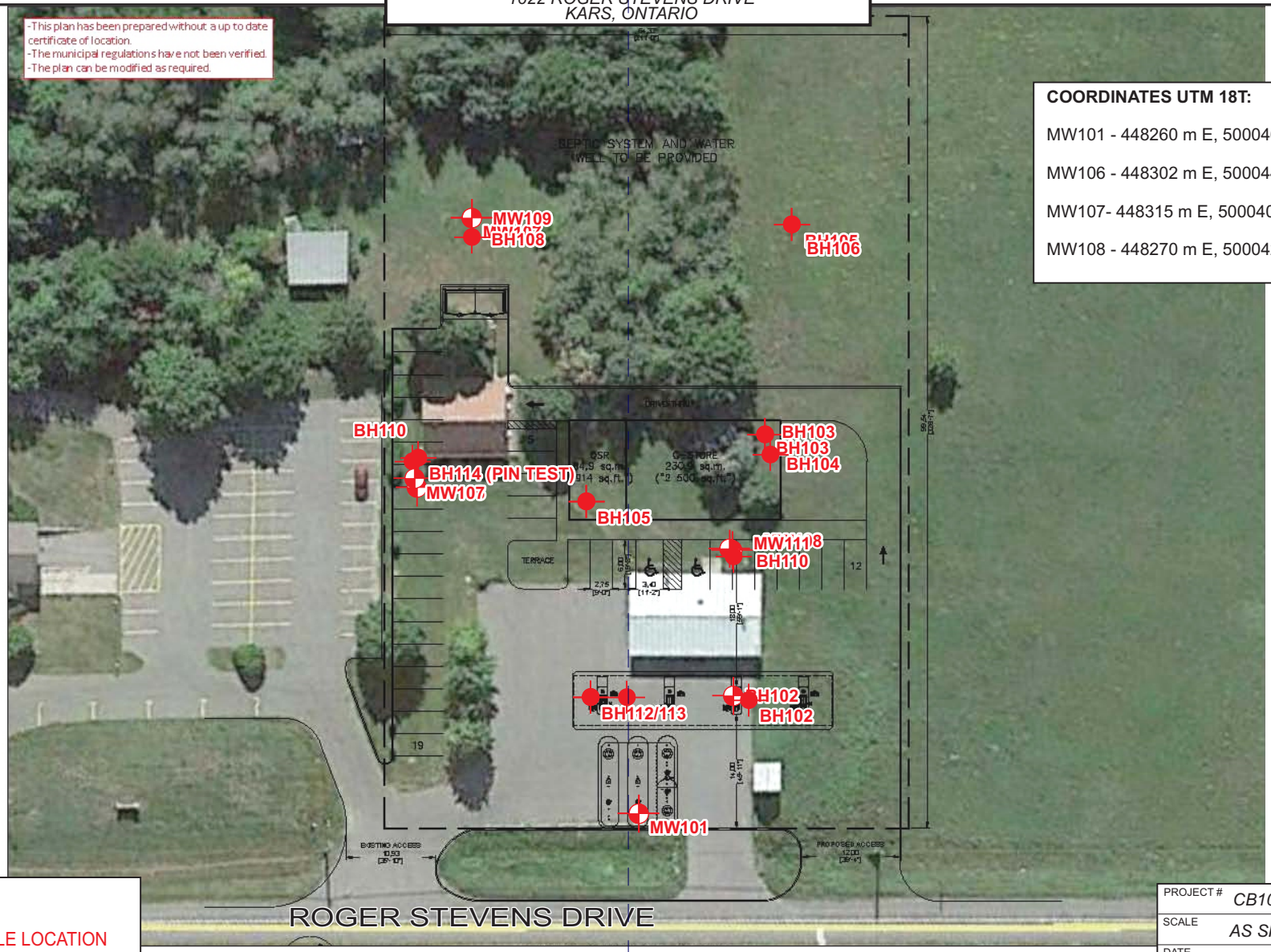
TERRAPEX

BOREHOLE LOCATIONS PLAN

1622 ROGER STEVENS DRIVE
KARS, ONTARIO

CLIENT

Parkland FUEL CORPORATION



COORDINATES UTM 18T:

MW101 - 448260 m E, 5000463 m N

MW106 - 448302 m E, 5000442 m N

MW107- 448315 m E, 5000409 m N

MW108 - 448270 m E, 5000428 m N

LEGEND

- BOREHOLE LOCATION
- MONITORING WELL LOCATION
- PROPOSED MONITORING WELL LOCATION

0 15m 30m

(APPROXIMATE)

SOURCE: PROVIDED BY CLIENT.

PROJECT #	CB1057.00
SCALE	AS SHOWN
DATE	FEBRUARY 2018
DRAWN	GS
CHECKED	GLL
DRAWING #	FIGURE 1

APPENDIX C

BOREHOLE LOGS AND DYNAMIC CONE PENETRATION TEST RESULTS

CLIENT: Parkland Fuel Corporation	METHOD: Split Spoon Sampling		**BH No.: MW101**
PROJECT: 1622 Roger Stevens Drive	PROJECT ENGINEER: Vic	ELEV. (m) 91.23	
LOCATION: Kars, Ontario	NORTHING: 0448260	EASTING: 5000463	PROJECT NO.: CB1057.00

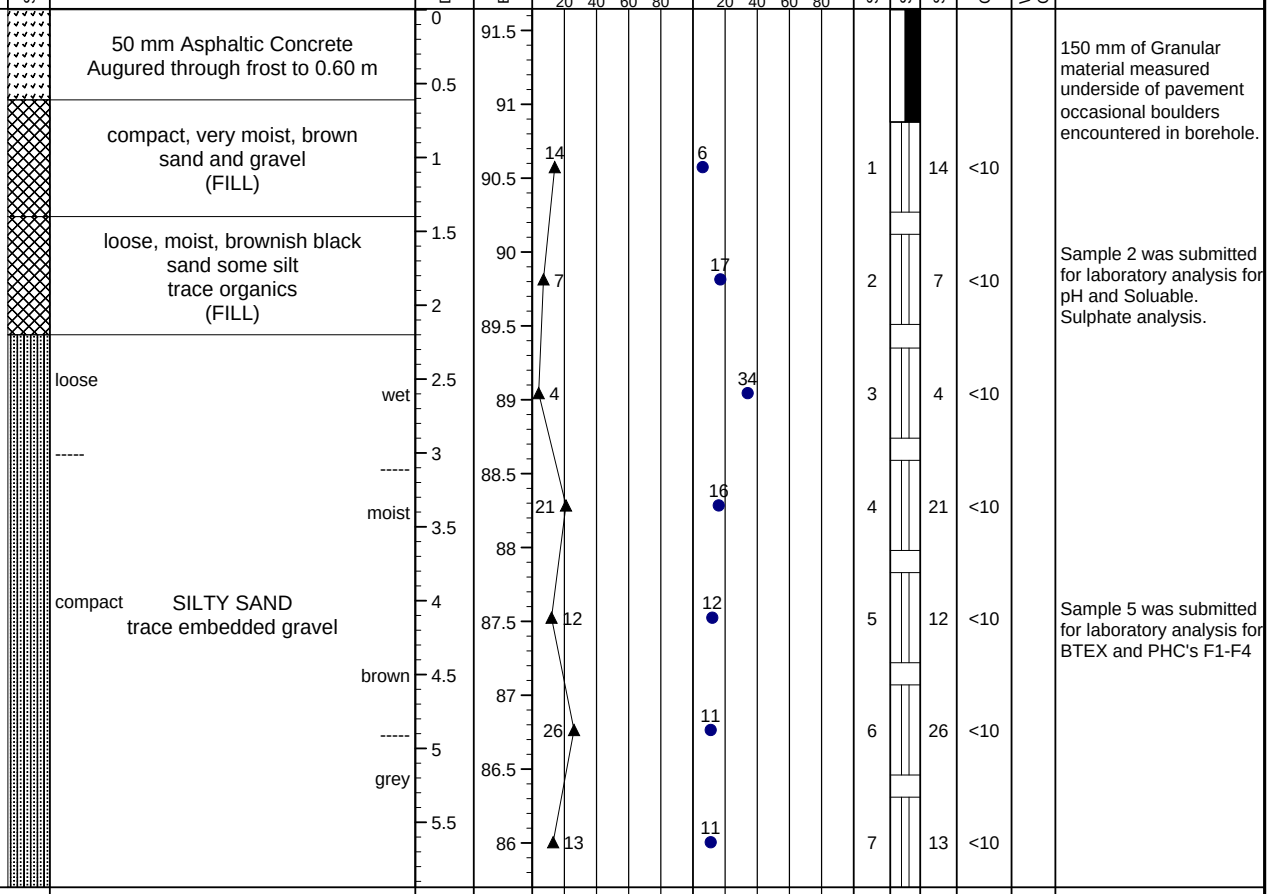
SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON

GWL (m)	SOIL DESCRIPTION	DEPTH (m)	ELEVATION (m)	Shear Strength (kPa) / N-Value (Blows/300mm)	Water Content (%) PL W.C. LL	SAMPLE NO.	SAMPLE TYPE	SPT(N)	CSV (ppm)	Well Construction	REMARKS
	100 mm Asphaltic Concrete Augured through frost to 0.61 m	0	91								occasional boulders encountered in borehole.
▼	compact, moist, brown sandy gravel trace silt (FILL)	0.5 1 1.5 2 2.5	90.5 90 89.5 89	21 11 22	13 6 11	1 2 3		21 11 22	<10 <10 <10		
	compact ----- loose SAND some gravel some silt brown ----- wet grey	3 3.5 4 4.5 5 5.5	88.5 88 87.5 87 86.5 86	34 19 30 15 8	8 10 10 11 11	4 5 6 7 8		34 19 30 15 8	<10 <10 <10 <10 <10		Sample 8 submittted for laboratory analysis for BTEX and PHC (F1-F4)
		6	85.5	6	9	9		6	<10		
	END OF BOREHOLE										

	LOGGED BY: RH	DRILLING DATE: February 26, 2018
	REVIEWED BY: VN	Page 1 of 1

CLIENT: Parkland Fuel Corporation	METHOD: Split Spoon Sampling		**BH No.: BH102**
PROJECT: 1622 Roger Stevens Drive	PROJECT ENGINEER: Vic	ELEV. (m) 91.64	
LOCATION: Kars, Ontario	NORTHING:	EASTING:	PROJECT NO.: CB1057.00

SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON



END OF BOREHOLE

	LOGGED BY: RH	DRILLING DATE: February 26, 2018
	REVIEWED BY: VN	Page 1 of 1

CLIENT: Parkland Fuel Corporation	METHOD: Split Spoon Sampling		**BH No.: BH103**
PROJECT: 1622 Roger Stevens Drive	PROJECT ENGINEER: Vic	ELEV. (m) 89.92	
LOCATION: Kars, Ontario	NORTHING:	EASTING:	PROJECT NO.: CB1057.00

SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON

GWL (m)	SOIL SYMBOL	SOIL DESCRIPTION	DEPTH (m)	ELEVATION (m)	Shear Strength (kPa) 40 80 120 160 / N-Value (Blows/300mm) 20 40 60 80	Water Content (%) PL W.C. LL 20 40 60 80	SAMPLE NO.	SAMPLE TYPE	SPT(N)	CSV (ppm)	Well Construction	REMARKS
		100 mm Topsoil Augured through frost to 0.75 m	0	89.5								102 mm of Topsoil measured in Borehole occasional boulders encountered in borehole.
		loose, wet, dark brown SILTY SAND some organics	0.5 1	89	4	24	1		4	<10		
		-----	1.5	88.5		9						Sample 2 was submitted for laboratory analysis for pH and Soluable. Sulphate analysis.
		dense	2	88	56		2		56	<10		
		moist, brown SILTY SAND some embedded gravel	2.5	87.5	46	9	3		46	<10		
		-----	3	87								Sample 4 was submitted for laboratory analysis of BTEX and PHC's (F1-F2).
		compact	3.5	86.5	14	11	4		14	<10		
			4	86	17	11	5		17	<10		Auger refusal at 2.9 and 4.42 m on possible boulders.
		END OF BOREHOLE										

	LOGGED BY: RH	DRILLING DATE: February 26, 2018
	REVIEWED BY: VN	Page 1 of 1

CLIENT: Parkland Fuel Corporation	METHOD: Split Spoon Sampling		**BH No.: BH104**
PROJECT: 1622 Roger Stevens Drive	PROJECT ENGINEER: Vic	ELEV. (m) 91.75	
LOCATION: Kars, Ontario	NORTHING:	EASTING:	PROJECT NO.: CB1057.00

SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON

GWL (m)	SOIL SYMBOL	SOIL DESCRIPTION	DEPTH (m)	ELEVATION (m)	Shear Strength (kPa) 40 80 120 160 / N-Value (Blows/300mm) 20 40 60 80	Water Content (%) PL W.C. LL 20 40 60 80	SAMPLE NO.	SAMPLE TYPE	SPT(N)	CSV (ppm)	Well Construction	REMARKS
		Topsoil at surface Augured through frost to 0.76 m	0	91.5								occasional boulders encountered in borehole.
		loose ----- compact to dense moist, dark brown sand some silt some organics (FILL)	0.5 1 1.5	91 90.5 90	6 56		1 2		6 56	<10 <10		Sample 1 was submitted for laboratory analysis of BTEX, PHC's F1-F2 and pH. Auger refusal at 1.82 m on possible boulders.
		END OF BOREHOLE										

	LOGGED BY: RH	DRILLING DATE: February 26, 2018
	REVIEWED BY: VN	Page 1 of 1

CLIENT: Parkland Fuel Corporation	METHOD: Split Spoon Sampling		**BH No.: BH105**
PROJECT: 1622 Roger Stevens Drive	PROJECT ENGINEER: Vic	ELEV. (m) 90.29	
LOCATION: Kars, Ontario	NORTHING:	EASTING:	PROJECT NO.: CB1057.00

SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON

GWL (m)	SOIL SYMBOL	SOIL DESCRIPTION	DEPTH (m)	ELEVATION (m)	Shear Strength (kPa) 40 80 120 160 / N-Value (Blows/300mm) 20 40 60 80	Water Content (%) PL W.C. LL 20 40 60 80	SAMPLE NO.	SAMPLE TYPE	SPT(N)	CSV (ppm)	Well Construction	REMARKS
		Topsoil at surface Augured through frost to 0.75 m	0	90								occasional boulders encountered in borehole.
		compact, moist, brown SILTY SAND trace organics	0.5 1	89.5	30		1		30	<10		
			1.5	89								
		compact, moist, brown SILTY SAND some embedded gravel	2	88.5	30		2		30	<10		
			2.5	88	11		3		11	<10		Sample 3 was submitted for laboratory analysis for BTEX and PHC's F1-F4.
			3	87.5								
			3.5	87	26		4		26	<10		
		END OF BOREHOLE										

LOGGED BY: RH | DRILLING DATE: February 26, 2018

REVIEWED BY: VN | Page 1 of 1

CLIENT: Parkland Fuel Corporation	METHOD: Split Spoon Sampling		**BH No.: MW106**
PROJECT: 1622 Roger Stevens Drive	PROJECT ENGINEER: Vic	ELEV. (m) 92.40	
LOCATION: Kars, Ontario	NORTHING: 0448302	EASTING: 5000442	PROJECT NO.: CB1057.00

SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON

GWL (m)	SOIL DESCRIPTION	DEPTH (m)	ELEVATION (m)	Shear Strength (kPa) 40 80 120 160 / N-Value (Blows/300mm) 20 40 60 80	Water Content (%) PL W.C. LL 20 40 60 80	SAMPLE NO.	SAMPLE TYPE	SPT(N)	CSV (ppm)	Well Construction	REMARKS
	Augured through frost to 0.75 m	0	92								occasional boulders encountered in borehole.
	loose, moist, brown SAND trace organics	0.5	91.5	6	12	1		6	<10		
	loose	1	91	8	9	2		8	<10		
	-----	1.5	90.5								
	compact	2	90	22	11	3		22	<10		
	-----	2.5	89.5								
	loose moist, brown SILTY SAND trace embedded gravel	3	89	7	12	4		7	<10		Sample 4 submitted for laboratory analysis of BTEX, PHC's F1-F4 and VOC's.
	-----	3.5	88.5								
	compact brownish grey	4	88	13	11	5		13	<10		
	-----	4.5	87.5	2		6		2	<10		
	-----	5	87								
	loose grey	5.5	86.5	2	12	7		2	<10		
	END OF BOREHOLE	6									

LOGGED BY: RH | DRILLING DATE: February 22, 2018

REVIEWED BY: VN | Page 1 of 1

CLIENT: Parkland Fuel Corporation	METHOD: Split Spoon Sampling		**BH No.: MW107**
PROJECT: 1622 Roger Stevens Drive	PROJECT ENGINEER: Vic	ELEV. (m) 92.46	
LOCATION: Kars, Ontario	NORTHING: 0448315	EASTING: 5000409	PROJECT NO.: CB1057.00

SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON

GWL (m)	SOIL SYMBOL	SOIL DESCRIPTION	DEPTH (m)	ELEVATION (m)	Shear Strength (kPa) 40 80 120 160 / N-Value (Blows/300mm) 20 40 60 80	Water Content (%) PL W.C. LL 20 40 60 80	SAMPLE NO.	SAMPLE TYPE	SPT(N)	CSV (ppm)	Well Construction	REMARKS
		Topsoil at surface Augured through frost to 0.76 m	0	92								occasional boulders encountered in borehole.
		dense, moist, brown SILTY SAND some embedded gravel	0.5 1 1.5 2 2.5 3 3.5	91.5 91 90.5 90 89.5 89	39 50+ 50+ 50+		1 2 3 4		39 50+ 50+ 50+	<10 <10 <10 <10		Sample 3 submitted for laboratory analysis of BTEX and PHC's F1-F4. Auger Refusal at 3.7 m bgs, on possible boulders.
		END OF BOREHOLE										

	LOGGED BY: RH	DRILLING DATE: February 22, 2018
	REVIEWED BY: VN	Page 1 of 1

CLIENT: Parkland Fuel Corporation	METHOD: Split Spoon Sampling		**BH No.: MW108**
PROJECT: 1622 Roger Stevens Drive	PROJECT ENGINEER: Vic	ELEV. (m) 91.38	
LOCATION: Kars, Ontario	NORTHING: 0448270	EASTING: 5000428	PROJECT NO.: CB1057.00

SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON

GWL (m)	SOIL DESCRIPTION	DEPTH (m)	ELEVATION (m)	Shear Strength (kPa) 40 80 120 160 / N-Value (Blows/300mm) 20 40 60 80	Water Content (%) PL W.C. LL 20 40 60 80	SAMPLE NO.	SAMPLE TYPE	SPT(N)	CSV (ppm)	Well Construction	REMARKS
	Topsoil at surface Augured to 0.76 m bgs.	0	91			1					occasional boulders encountered in borehole.
	dense, moist, brown SAND and SILT trace organics trace gravel	0.5	90.5	53		2		53	<10		
	loose, moist, dark brown TOPSOIL	1	90			3A		5	<10		
		1.5	89.5	5		3B			<10		
		2	89								
		2.5	88.5	34		4		34	<10		Auger refusal at 2.89, on possible boulder.
	loose, moist brown SILTY SAND trace embedded gravel	3	88	11		5		11	<10		
		3.5	87.5	5		6		5	<10		
		4	87								Sample 7 was submitted for laboratory analysis of BTEX and PHC's F1-F4 and VOC's. MW108-17 is a duplicate.
		4.5	86.5	8		7		8	<10		
	----- wet grey	5	86			8A		9	<10		
		5.5	85.5	9		8B			<10		
	END OF BOREHOLE										

	LOGGED BY: RH	DRILLING DATE: February 22, 2018
	REVIEWED BY: VN	Page 1 of 1

CLIENT: Parkland Fuel Corporation	METHOD: Split Spoon Sampling		**BH No.: BH109A**
PROJECT: 1622 Roger Stevens Drive	PROJECT ENGINEER: Vic	ELEV. (m) 101.051	
LOCATION: Kars, Ontario	NORTHING:	EASTING:	PROJECT NO.: CB1057.00

SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON

GWL (m)	SOIL SYMBOL	SOIL DESCRIPTION	DEPTH (m)	ELEVATION (m)	Shear Strength (kPa) 40 80 120 160 / N-Value (Blows/300mm) 20 40 60 80	Water Content (%) PL W.C. LL 20 40 60 80	SAMPLE NO.	SAMPLE TYPE	SPT(N)	CSV (ppm)	Well Construction	REMARKS
		50 mm of Asphaltic Concrete Aurgured through frost to 0.76 m.	0	101								occasional boulders encountered in borehole.
		compact, moist, brown sand and gravel (FILL)	0.5	100.5								
			1	100	16		1		16	<10		Auger Refusal at 1.35 m on possible boulder.
		END OF BOREHOLE										

	LOGGED BY: RH	DRILLING DATE: February 26, 2018
	REVIEWED BY: VN	Page 1 of 1

CLIENT: Parkland Fuel Corporation	METHOD: Split Spoon Sampling		**BH No.: BH109B**
PROJECT: 1622 Roger Stevens Drive	PROJECT ENGINEER: Vic	ELEV. (m) 101.051	
LOCATION: Kars, Ontario	NORTHING:	EASTING:	PROJECT NO.: CB1057.00

SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON

GWL (m)	SOIL SYMBOL	SOIL DESCRIPTION	DEPTH (m)	ELEVATION (m)	Shear Strength (kPa) 40 80 120 160 / N-Value (Blows/300mm) 20 40 60 80	Water Content (%) PL W.C. LL 20 40 60 80	SAMPLE NO.	SAMPLE TYPE	SPT(N)	CSV (ppm)	Well Construction	REMARKS
		Asphalt at surface, Augured to 1.5 m	0	101								occasional boulders encountered in borehole.
			0.5	100.5								
			1	100								
			1.5	99.5	11							
		compact, moist brown SILTY SAND trace embedded gravel	2	99			1		11	<10		
			2.5	98.5	20		2		20	<10		Sample 2 was submitted for laboratory analysis for BTEX and PHC F1-F4. Duplicate was taken.
			3	98								
			3.5	97.5	18		3		18	<10		Auger refusal at 3.7 m on possible boulder.
		END OF BOREHOLE										

	LOGGED BY: RH	DRILLING DATE: February 26, 2018
	REVIEWED BY: VN	Page 1 of 1

CLIENT: Parkland Fuel Corporation	METHOD: Dynamic Cone Penetration Test		**BH No.: BH110**
PROJECT: 1622 Roger Stevens Drive	PROJECT ENGINEER: Vic	ELEV. (m)	
LOCATION: Kars, Ontario	NORTHING:	EASTING:	PROJECT NO.: CB1057.00

SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON

GWL (m)	SOIL SYMBOL	SOIL DESCRIPTION	DEPTH (m)	ELEVATION (m)	Shear Strength (kPa) / N-Value (Blows/300mm)	Water Content (%) PL W.C. LL	SAMPLE NO.	SAMPLE TYPE	SPT(N)	CSV (ppm)	Well Construction	REMARKS
		Augured to 3.1	0 – 3									
		Advanced a dynamic cone to a depth of 10.7 m	3 – 9.5		10, 9, 13, 16, 18, 21, 22, 18, 17, 15, 20, 26, 70, 70, 28, 60, 46, 73, 43, 47, 39, 56				10, 9, 13, 16, 18, 21, 22, 18, 17, 15, 20, 26, 70, 70, 28, 60, 46, 73, 43, 47, 39, 56			

LOGGED BY: RH | DRILLING DATE: February 23, 2018

REVIEWED BY: VN |

CLIENT: Parkland Fuel Corporation	METHOD: Dynamic Cone Penetration Test	**BH No.: BH110**
PROJECT: 1622 Roger Stevens Drive	PROJECT ENGINEER: Vic / ELEV. (m)	
LOCATION: Kars, Ontario	NORTHING: / EASTING:	PROJECT NO.: CB1057.00

SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON

GWL (m)	SOIL SYMBOL	SOIL DESCRIPTION	DEPTH (m)	ELEVATION (m)	Shear Strength (kPa) 40 80 120 160 / N-Value (Blows/300mm) 20 40 60 80	Water Content (%) PL W.C. LL 20 40 60 80	SAMPLE NO.	SAMPLE TYPE	SPT(N)	CSV (ppm)	Well Construction	REMARKS
			10		75				75			
					78				78			
			10.5		83				83			
		END OF BOREHOLE										

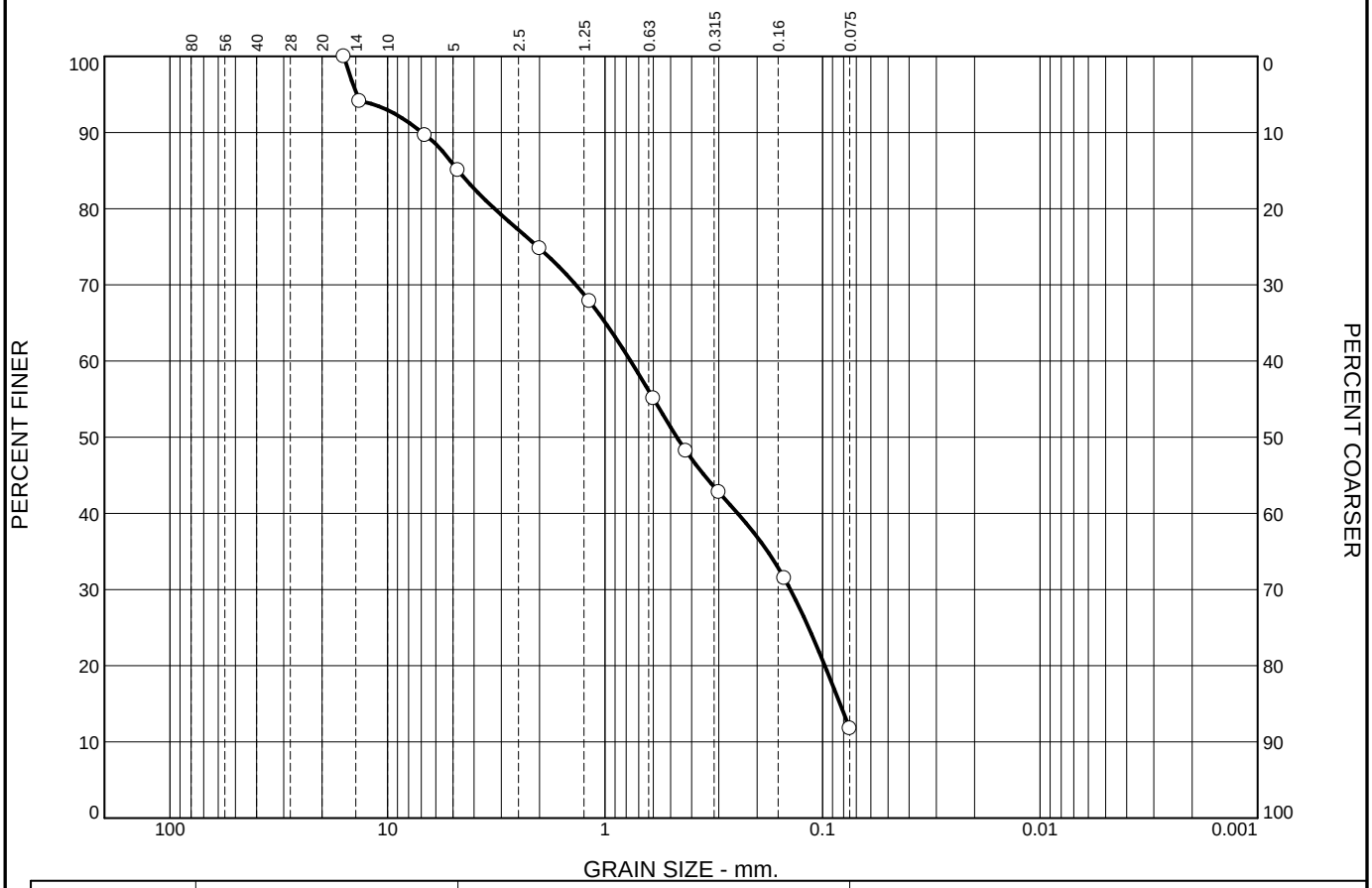
LOGGED BY: RH | DRILLING DATE: February 23, 2018

REVIEWED BY: VN |

APPENDIX D

LABORATORY TEST RESULTS

Grain Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0	0	15	10	27	36	12	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			4.7327	0.7632	0.4676	0.1405	0.0831			

Material Description	USCS	AASHTO
○ SAND, some gravel, some silt		

Project No. CB1057 **Client:** Parkland

Project: 1622 Roger Stevens Road

○ **Sample Number:** MW101 sample 9

Remarks:

○Tested on February 27, 2018

Alston Associates

Geotechnical Division of Terrapex

Figure F1G

Tested By: RH **Checked By:** VN

Grain Size Distribution Report

	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0	0	14	7	12	32	35	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			4.4711	0.2664	0.1670					

Material Description	USCS	AASHTO
○ SILTY SAND, some gravel		

Project No. CB1057 **Client:** Parkland

Project: 1622 Roger Stevens Road

○ **Sample Number:** BH104 sample 2

Remarks:

○Tested on February 27, 2018

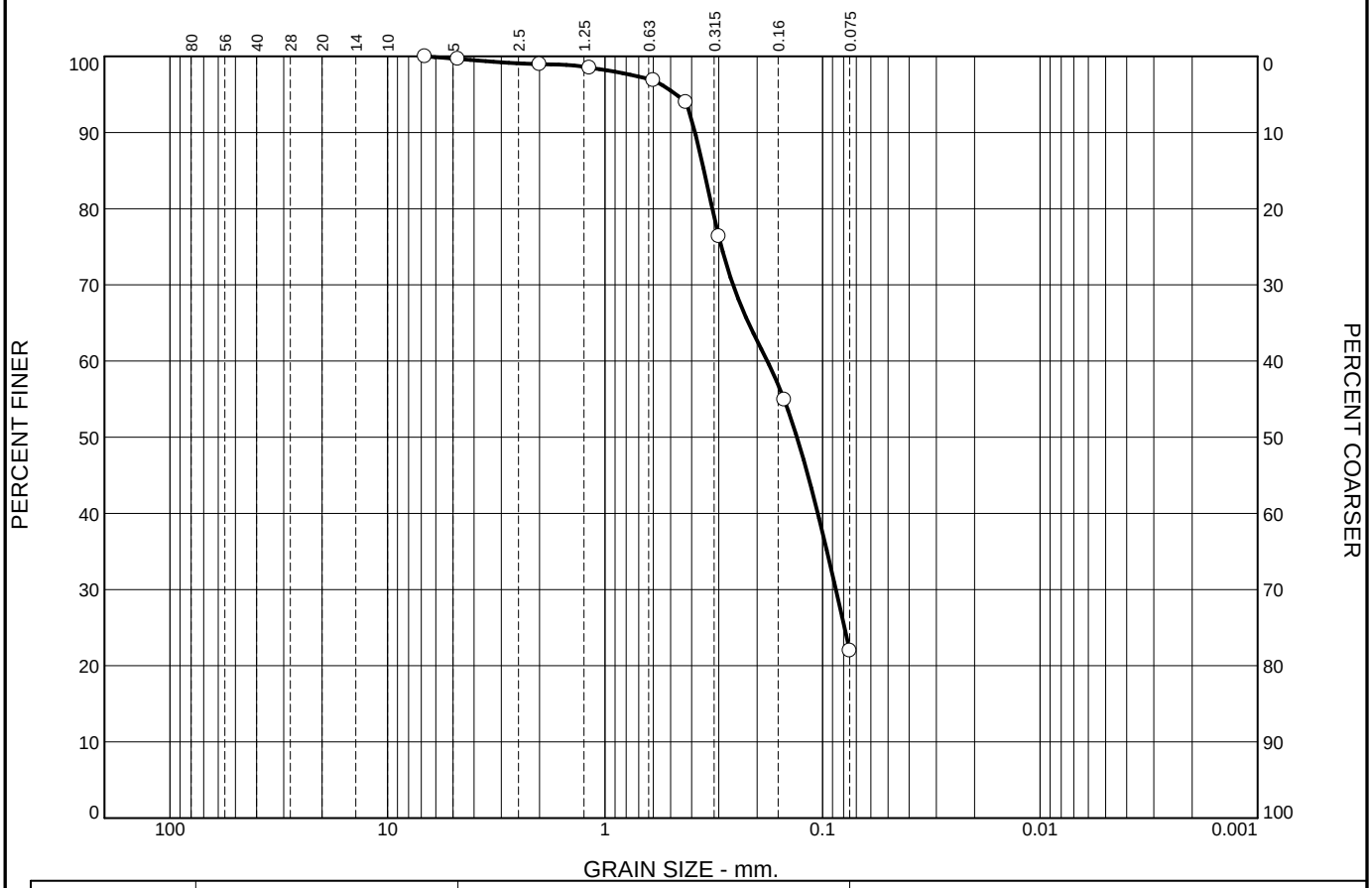
Alston Associates

Geotechnical Division of Terrapex

Figure F2G

Tested By: RH **Checked By:** VN

Grain Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0	0	0	1	5	72	22	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.3510	0.1796	0.1312	0.0869				

Material Description	USCS	AASHTO
○ SILTY SAND		

Project No. CB1057 **Client:** Parkland

Project: 1622 Roger Stevens Road

○ **Sample Number:** BH102 sample 3

Remarks:

○Tested on February 27, 2018

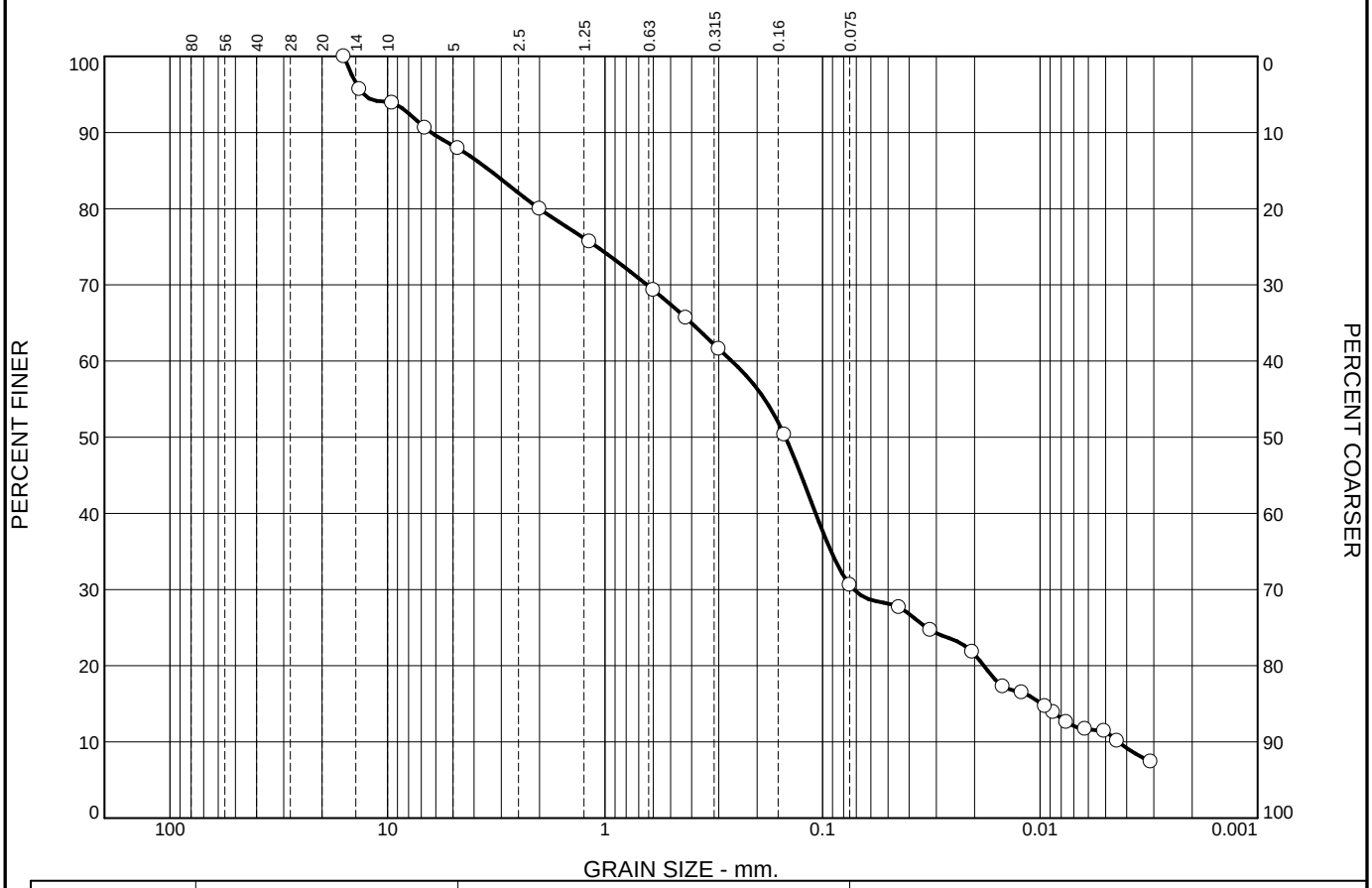
Alston Associates

Geotechnical Division of Terrapex

Figure F3G

Tested By: RH

Grain Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0	0	12	8	14	35	31	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			3.3772	0.2615	0.1481	0.0718	0.0098	0.0044	4.52	59.87

Material Description	USCS	AASHTO
○ SILTY SAND some gravel		

Project No. CB1057.00 **Client:** Parkland Fuel Corporation

Project: 1622 Roger Stevens Drive

○ **Sample Number:** BH105 sample 3

Remarks:

○Tested on March 2, 2018

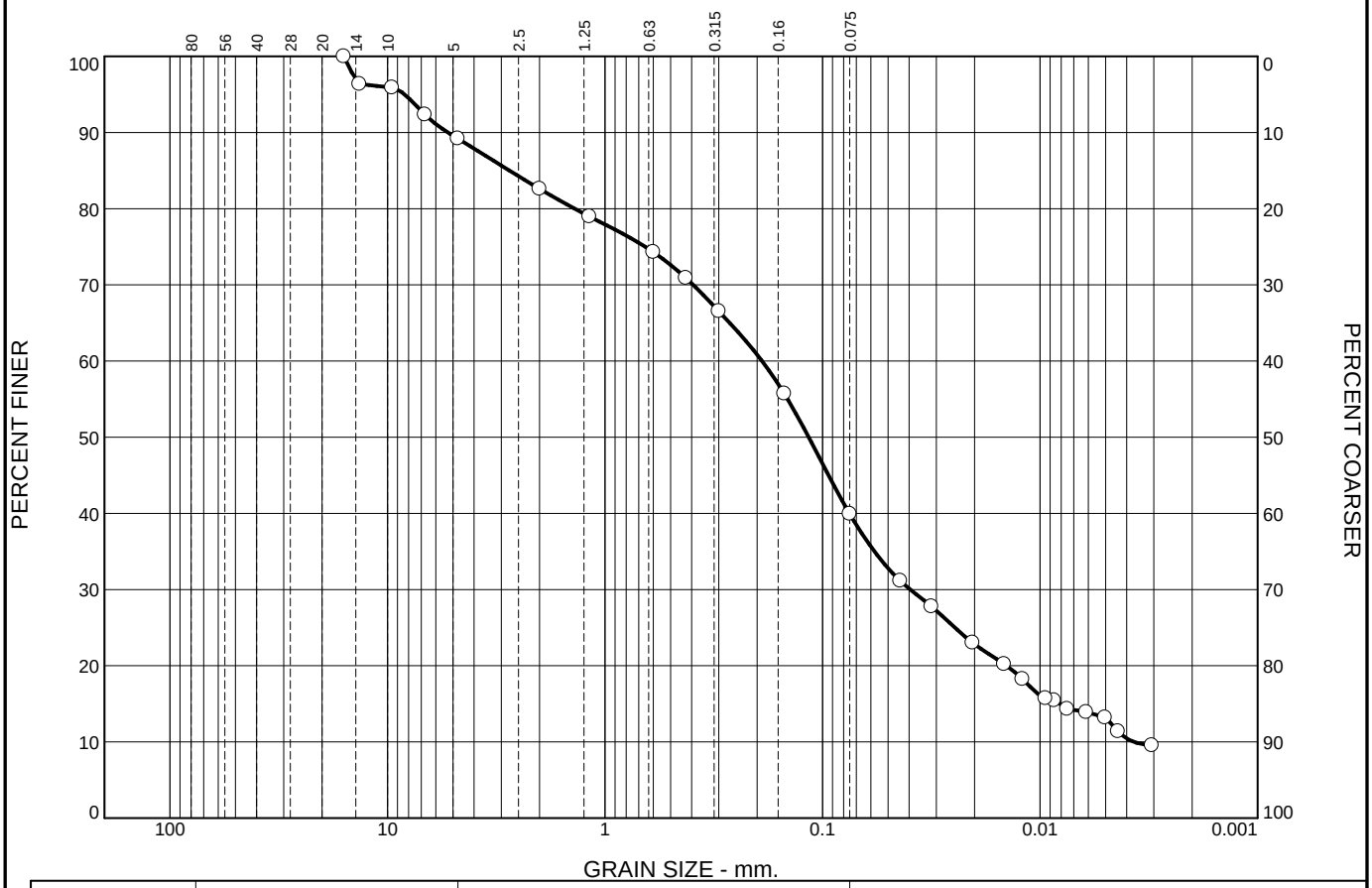
Alston Associates

Geotechnical Division of Terrapex

Figure F4G

Tested By: RH

Grain Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0	0	11	6	12	31	40	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			2.7506	0.1898	0.1159	0.0395	0.0081	0.0037	2.22	51.17

Material Description	USCS	AASHTO
○ SILTY SAND, some gravel		

Project No. CB1057.00 **Client:** Parkland Fuel Corporation

Project: 1622 Roger Stevens Drive

○ **Sample Number:** MW107 sample 2

Remarks:

○Tested on March 2, 2018

Alston Associates

Geotechnical Division of Terrapex

Figure F5G

Tested By: RH

APPENDIX E

CHEMICAL ANALYTICAL SOIL TEST RESULTS

Maxxam
A Bureau Veritas Group Company

Your P.O. #: PIONEER
Your Project #: CB1057.00
Site Location: 1622 Roger Stevens Drive
Your C.O.C. #: 650870-05-01

Attention: Geoff Lussier

Terrapex Environmental Ltd
920 Brant St.
Suite 16
Burlington, ON
Canada L7R 4J1

Report Date: 2018/03/05
Report #: R5029583
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B842304
Received: 2018/02/23, 15:05

Sample Matrix: Soil
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
pH CaCl2 EXTRACT (1)	2	2018/03/02	2018/03/02	CAM SOP-00413	EPA 9045 D m
Sulphate (20:1 Extract) (1)	2	N/A	2018/03/02	CAM SOP-00464	EPA 375.4 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.

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.

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 Maxxam Analytics Mississauga

Maxxam Analytics International Corporation o/a Maxxam Analytics 32 Colonnade Rd, Unit #1000, Nepean, ON K2E 7J6 Phone: 613 274-0573 Fax: 613 274-0574 Website: www.maxxam.ca

Maxxam
A Bureau Veritas Group Company

Your P.O. #: PIONEER
Your Project #: CB1057.00
Site Location: 1622 Roger Stevens Drive
Your C.O.C. #: 650870-05-01

Attention: Geoff Lussier

Terrapex Environmental Ltd
920 Brant St.
Suite 16
Burlington, ON
Canada L7R 4J1

Report Date: 2018/03/05
Report #: R5029583
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B842304
Received: 2018/02/23, 15:05

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Augustyna Dobosz, Project Manager
Email: ADobosz@maxxam.ca
Phone# (905)817-5700 Ext:5798

==========

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Maxxam Job #: B842304
Report Date: 2018/03/05

Terrapex Environmental Ltd
Client Project #: CB1057.00
Site Location: 1622 Roger Stevens Drive
Your P.O. #: PIONEER

RESULTS OF ANALYSES OF SOIL

Maxxam ID		GDL933	GDL934		GDL934		
Sampling Date		2018/02/21 13:00	2018/02/21 14:00		2018/02/21 14:00		
COC Number		650870-05-01	650870-05-01		650870-05-01		
	UNITS	MW102 SAMPLE 4	BH103 SAMPLE 2	QC Batch	BH103 SAMPLE 2 Lab-Dup	RDL	QC Batch
Inorganics							
Available (CaCl2) pH	pH	7.85	7.93	5422743			
Soluble (20:1) Sulphate (SO4)	ug/g	54	54	5420892	42	20	5420892

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B842304
Report Date: 2018/03/05

Terrapex Environmental Ltd
Client Project #: CB1057.00
Site Location: 1622 Roger Stevens Drive
Your P.O. #: PIONEER

TEST SUMMARY

Maxxam ID: GDL933
Sample ID: MW102 SAMPLE 4
Matrix: Soil

Collected: 2018/02/21
Shipped:
Received: 2018/02/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
pH CaCl2 EXTRACT	AT	5422743	2018/03/02	2018/03/02	Tahir Anwar
Sulphate (20:1 Extract)	KONE/EC	5420892	N/A	2018/03/02	Alina Dobreanu

Maxxam ID: GDL934
Sample ID: BH103 SAMPLE 2
Matrix: Soil

Collected: 2018/02/21
Shipped:
Received: 2018/02/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
pH CaCl2 EXTRACT	AT	5422743	2018/03/02	2018/03/02	Tahir Anwar
Sulphate (20:1 Extract)	KONE/EC	5420892	N/A	2018/03/02	Alina Dobreanu

Maxxam ID: GDL934 Dup
Sample ID: BH103 SAMPLE 2
Matrix: Soil

Collected: 2018/02/21
Shipped:
Received: 2018/02/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Sulphate (20:1 Extract)	KONE/EC	5420892	N/A	2018/03/02	Alina Dobreanu

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Maxxam Job #: B842304
Report Date: 2018/03/05

Terrapex Environmental Ltd
Client Project #: CB1057.00
Site Location: 1622 Roger Stevens Drive
Your P.O. #: PIONEER

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 #: B842304
Report Date: 2018/03/05

Terrapex Environmental Ltd
Client Project #: CB1057.00
Site Location: 1622 Roger Stevens Drive
Your P.O. #: PIONEER

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5420892	ADB	Matrix Spike [GDL934-01]	Soluble (20:1) Sulphate (SO4)	2018/03/02		NC	%	70 - 130
5420892	ADB	Spiked Blank	Soluble (20:1) Sulphate (SO4)	2018/03/02		103	%	70 - 130
5420892	ADB	Method Blank	Soluble (20:1) Sulphate (SO4)	2018/03/02	<20		ug/g	
5420892	ADB	RPD [GDL934-01]	Soluble (20:1) Sulphate (SO4)	2018/03/02	25		%	35
5422743	TA1	Spiked Blank	Available (CaCl2) pH	2018/03/02		100	%	97 - 103
5422743	TA1	RPD	Available (CaCl2) pH	2018/03/02	0.22		%	N/A

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.

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.

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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Report Date: 2018/03/05

Terrapex Environmental Ltd
Client Project #: CB1057.00
Site Location: 1622 Roger Stevens Drive
Your P.O. #: PIONEER

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 Service Specialist

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Maxxam Analytics International Corporation o/a Maxxam Analytics
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CHAIN OF CUSTODY RECORD

Page 1 of 1

INVOICE TO:

Company Name: #30396 Parkland Industries Ltd
Attention: Retail Invoices
Address: 4919-59th St Suite 100
Red Deer AB T4N 6C9
Tel: (403) 357-6400 x Fax: (403) 356-3015 x
Email: emilie.price@parkland.ca, victoria.pianarosa@parkland.

REPORT TO:

Company Name: #19684 Terrapex Environmental Ltd
Attention: Geoff Lussier
Address: 920 Brant St. Suite 16
Burlington ON L7R 4J1
Tel: (905) 632-5939 x228 Fax:
Email: g.lussier@terrapex.com

PROJECT INFORMATION:

Quotation #: B75111
P.O. #:
Project: CB1057.00
Project Name: Parkland Kars
Site #: 1622 Roger Stevens Drive
Sampled By: Greg Saboian

Laboratory Use Only:

Maxxam Job #:
Bottle Order #: 650870
COC #: C#650870-05-01
Project Manager: Augustyna Dobosz

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE MAXXAM DRINKING WATER CHAIN OF CUSTODY

Regulation 153 (2011)
- [ ] Table 1 [ ] Res/Park [ ] Medium/Fine
- [x] Table 2 [x] Ind/Comm [ ] Coarse
- [ ] Table 3 [ ] Agri/Other [ ] For RSC
- [ ] Table ___

Other Regulations
- [ ] CCME [ ] Sanitary Sewer Bylaw
- [ ] Reg 558 [ ] Storm Sewer Bylaw
- [ ] MISA Municipality ___
- [ ] PWQO
- [ ] 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: [X]
(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 3DD 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): ~~Petroleum Hydrocarbons CCME Fr1 + BTEX~~ pH + Soluble Sulphate	Petroleum Hydrocarbons F2-F4	O.Reg 153 (CPMS Metals and Sulphate	Soil Texture (%sand, %silt, %clay)	Moisture	pH CaCl2 EXTRACT	Flashpoint	O.Reg 558 TCLP Inorganics Package	O.Reg 558 TCLP PCBs	O.Reg 558 TCLP Volatile Organics HS	# of Bottles	Comments
1		MW102 Sample 4	February 21, 2018	1:00pm	SOIL	NO	X										1	
2		BH103 Sample 2	February 21, 2018	2:00pm	SOIL	NO	X										1	
3					SOIL													
4					SOIL													
5					SOIL													
6					SOIL													
7					SOIL													
8					SOIL													
9					SOIL													
10					SOIL													

23-Feb-18 15:05
Augustyna Dobosz
B842304
URE ENV-907

RECEIVED IN OTTAWA

On ice

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted
RH / RACHEL HARZOG	18/02/23	15:10	Mariana Fasion Rascon	2018/02/23	15:05	
			[illegible]	18/02/24	10:04	

Laboratory Use Only

Time Sensitive	Temperature (°C) on Recei	Custody Seal	Yes	No
0,0,0		Present	✓	
		Intact	✓	

* 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.

* 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 HTTP://MAXXAM.CA/WP-CONTENT/UPLOADS/ONTARIO-COC.PDF.

SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

White: Maxxa Yellow: Client

5/3/3

Maxxam Analytics International Corporation o/a Maxxam Analytics

APPENDIX F
PHASE II ENVIRONMENTAL SITE ASSESSMENT REPORT
(ALSTON, 2018)

PARKLAND FUEL CORPORATION

PHASE II
ENVIRONMENTAL SITE ASSESSMENT

1622 ROGER STEVENS DRIVE,
KARS (OTTAWA), ONTARIO

REVISED FINAL REPORT

SEPTEMBER 27, 2018

Terrapex Environmental Ltd.
920 Brant Street, Unit 16
Burlington, Ontario, L7R 4J1
Telephone: (905) 632-5939
Website: www.terrapex.com

DISTRIBUTION: **PARKLAND FUEL CORPORATION** **1 COPY**
TERRAPEX ENVIRONMENTAL LTD. **1 COPY**
PROJECT # CB1057.00

EXECUTIVE SUMMARY

Terrapex Environmental Ltd. was retained by Parkland Fuel Corporation to conduct a Phase II Environmental Site Assessment (ESA) at the property located at 1622 Roger Stevens Drive and portions of the property at 1618 Roger Stevens Drive in Kars (Ottawa), Ontario (the Site). It is our understanding that the Phase II ESA is being conducted for due diligence purposes prior to the potential redevelopment of the Site into a retail fuel outlet. A geotechnical investigation was completed concurrently with Phase II ESA and the results are reported under a separate cover.

The Site is located on the south side of Roger Stevens Drive and measures approximately 6,400 m^2. The Site is currently occupied by a single storey commercial building and a two storey residence, with the remainder of the Site being covered with asphalt pavement and grass. The Site is accessible from two entrances from Roger Stevens Drive. Neither the commercial building nor the residence were occupied during the Phase II ESA program. Reportedly the residence and commercial building were both serviced by domestic supply wells and septic systems.

The site condition standards (SCS) for Residential/Parkland/Institutional land use in a potable groundwater situation, with coarse textured soil, as specified in Table 2 of the April 15, 2011 Ministry of the Environment (MOECC) *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the "Environmental Protection Act"* document (hereafter referenced as the *Standards*) were used to evaluate the laboratory analytical results. The SCS were determined using the criteria established by O.Reg. 153/04 *Records of Site Condition - Part XV.1 of the Act.*

On February 21 and 22, a total of nine boreholes (MW101, BH102 - BH105, MW106 to MW108, and BH109) were advanced to depths of up to 6.1 m below grade surface. Visual and/or olfactory evidence of petroleum hydrocarbon impact was not observed in soil samples collected from any of the boreholes. Combustible soil vapour (CSV) readings in all of the soil samples were <10 parts per million (ppm).

Monitoring wells were installed into four of the nine boreholes advanced at the site (MW101, MW106, MW107, and MW108). During monitoring of the newly installed monitoring wells on February 23, 2018, Combustible vapour (CV) concentrations in the well headspace of each well was <10 ppm. Depth to water ranged between 0.10 m bgs at MW107 to 2.80 m bgs at MW108. Light, non-aqueous phase liquid (LNAPL) was not detected in any of the wells.

Laboratory analysis indicated that concentrations of benzene, toluene, ethylbenzene, xylenes (collectively, BTEX) and petroleum hydrocarbon (PHC) F1 to F4 fractions in all submitted soil samples did not exceed the applicable Table 2 SCS. Additionally, two soil samples collected from boreholes MW106 and MW108 and submitted for laboratory analysis of volatile organic compounds did contain concentrations of VOCs that exceeded the applicable Table 2 SCS.

Laboratory analysis indicated that concentrations of BTEX and PHC F1 to F4 fractions in groundwater samples collected from each monitoring well did not exceed the applicable Table 2 SCS. Additionally, laboratory analysis indicated that two groundwater samples collected from monitoring wells MW106 and MW108 and submitted for laboratory analysis of VOCs did contain concentrations of VOCs that exceeded the applicable Table 2 SCS.

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APPENDICES

1.0 INTRODUCTION

Terrapex Environmental Ltd. (Terrapex) was retained by Parkland Fuel Corporation (Parkland) to conduct a Phase II Environmental Site Assessment (ESA) at the property located at 1622 Roger Stevens Drive and portions of a property at 1618 Roger Stevens Drive in Kars (Ottawa), Ontario (the Site). It is our understanding that the Phase II ESA is being conducted for due diligence purposes prior to the potential redevelopment of the Site into a retail fuel outlet. A geotechnical investigation was completed concurrently with Phase II ESA and the results are reported under a separate cover.

1.1 SITE DESCRIPTION

The Site is located on the south side of Roger Stevens Drive and measures approximately 6,400 m^2. The Site is currently occupied by a single storey commercial building and a two storey residence, with the remainder of the Site being covered with asphalt pavement and grass. The Site is accessible from two entrances from Roger Stevens Drive.

The commercial building was located along the western portion of the Site and had a footprint of approximately 54 m^2. The commercial building was reportedly serviced by a water supply well located to the west of the building and a septic system was reportedly located to the south of the commercial building. Neither the septic system nor the water supply well were located during the Phase II ESA work program. The commercial building was supplied with natural gas. The residential building was located to the southeast of the commercial building and had a footprint of approximately 40 m^2. Reportedly the residence was serviced by a domestic supply well and septic system, however, neither were located during the Phase II ESA. Neither the commercial building nor the residence were occupied during the Phase II ESA program.

The majority of the Site slopes down towards Roger Stevens Drive however the western portion of the Site features a steep decline of approximately 3.0 meters (m) to the agricultural property located to the west of the property. The Site location and general site layout are shown on Figures 1 and 2, respectively. Selected photographs of the site are provided in Appendix I.

The site is located in an area of mixed residential and commercial land uses. The surrounding land uses are as follows:

North: Roger Stevens Drive and agricultural properties beyond;
East: commercial (Tubman Funeral Homes) and residential properties beyond;
South: vacant undeveloped property and residential beyond, and;
West: agricultural property and Stevens Creek beyond.

The nearest surface water body is Stevens Creek located approximately 158 m southwest of the Site.

1.2 OBJECTIVE

The objective of the Phase II ESA work program was to assess subsurface soil and groundwater quality at the site with respect to petroleum hydrocarbon impacts, if any, in accordance with Ontario Regulation (O.Reg.) 153/04.

1.3 SCOPE OF WORK

The scope of work for the Phase II ESA included the following:

- supervising the drilling of nine boreholes (MW101, BH102 - BH105, MW106 to MW108, and BH109) to depths of up to 6.1 m below ground surface (bgs), by a subcontractor using a CME-55 track-mounted drill rig, equipped with solid-stem augers;
- supervising the installation of four monitoring wells by a licensed well technician;
- collecting representative soil samples during drilling; logging of visual, olfactory, and tactile soil characteristics, as well as any evidence of petroleum hydrocarbon impacts (if present), and measuring combustible soil vapours (CSV) in recovered soil samples;
- submitting selected soil samples from each of the drilled boreholes for laboratory analyses of benzene, toluene, ethylbenzene, xylenes (collectively, BTEX), and the petroleum hydrocarbon (PHC) F1 to F4 fraction parameters;
- submitting selected soil samples for the additional analysis volatile organic compounds (VOCs);
- conducting a well monitoring program of the four newly installed monitoring wells, including measurement of depth to water, presence/thickness of light, non-aqueous phase liquid (LNAPL), and headspace combustible vapours (CVs).
- submitting representative groundwater samples from each of the monitoring wells for laboratory analyses of BTEX and PHC F1 to F4 fractions; in addition, samples from two monitoring wells were also submitted for laboratory analysis of VOCs;
- submitting two representative soil samples for pH analysis and grain size analysis;
- determining the appropriate generic site condition standards (SCS) from the Ontario Ministry of the Environment (MOECC) April 15, 2011 *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act* (the *Standards*) as established by O.Reg. 153/04 *Records of Site Condition*;
- evaluating soil and groundwater analytical results with respect to the appropriate SCS; and,
- preparing a Phase II ESA report detailing the findings and results of the project.

Terrapex subcontracted the services of other firms to complete specialized assignments for the project, as follows:

- private locating services were provided by Multiview Locates Inc. of Mississauga, Ontario;
- soil disposal services were provided by Clean Water Works of Ottawa, Ontario; and,
- drilling and monitoring well installation services were provided by George Downing Drilling (Downing) of Hawkesbury, Ontario; Downing is a MOECC-licensed well drilling contractor; and,
- laboratory analytical services were provided by Maxxam Analytics Inc. (Maxxam), under contract to Parkland, at their laboratory located in Mississauga, Ontario; at the time of the assessment, Maxxam was accredited by the Standards Council of Canada (SCC) for each of the analyses it conducted as part of this work program.

2.0 FIELD PROGRAM

Terrapex conducted the on-site field components of the Phase II ESA between February 21 and 26, 2018. The work program described herein was generally completed in accordance with the protocols described in O.Reg 153/04 and industry-standard practices.

2.1 FIELD PREPARATION

Prior to conducting intrusive field work, Terrapex contacted the appropriate public agencies to identify the locations of buried utilities at and near the subject site. Terrapex also retained Multiview to locate private buried utilities and provide clearances for buried services at the sampling locations.

A site-specific health and safety plan (HASP) and a job safety analysis (JSA) form were prepared by Terrapex prior to commencing the field work. One copy of the HASP and JSA remained with the field crew on the subject site for the duration of the field activities. The project team members and subcontractors that conducted the field activities read and signed the HASP and JSA before commencing work at the subject site.

2.2 BOREHOLE DRILLING AND SOIL SAMPLING

On February 21 and 22, 2018, a total of nine boreholes (MW101, BH102 - BH105, MW106 to MW108, and BH109) were advanced by Downing to depths of up to 6.1 m bgs at the locations shown on Figure 2. It should be noted that auger refusal at shallow depths by suspected boulders necessitated the drilling of a secondary boreholes adjacent to the primary boreholes. These secondary boreholes are considered the same borehole for environmental reporting purposes.

The locations of the nine boreholes were mainly selected to satisfy the requirements of the geotechnical investigation and give also give adequate coverage to assess soil and groundwater conditions across the Site. Borehole MW109 was drilled in close proximity of the commercial building to assess soil and groundwater conditions in the vicinity in the suspected location of a former above ground storage tank (AST). Consideration was also given to the locations of buried and overhead services, the suspected location of the septic tanks as well as surface obstructions at the site, when selecting the placement of boreholes in the field.

During drilling, 51-mm diameter split-spoon samplers were advanced into the subsurface to facilitate the collection of relatively undisturbed soil samples. Terrapex collected soil samples at depth intervals of approximately 0.76 m, and immediately logged the geologic properties of each sample. In addition, each soil sample was examined for visual and/or olfactory evidence of contamination. A vapour sample was collected from each spoon and CSV concentrations were measured in the headspace of each sampling bag with an RKI Eagle 2 Hydrocarbon Surveyor (RKI Eagle) calibrated to n-hexane and operated in the methane elimination mode. Soil samples

which were screened for vapours were not submitted for laboratory analysis; a separate split sample of the soil was collected and stored for possible laboratory analysis.

To mitigate cross-contamination between soil samples, the split-spoon samplers were decontaminated prior to each use by washing with phosphate-free detergent soap and water and then rinsing with distilled water. Terrapex personnel wore fresh nitrile gloves for the handling of each soil sample.

The soil samples were collected in pre-cleaned, laboratory-supplied jars, placed in a cooler with ice, and delivered with signed chain-of-custody forms to Maxxam for laboratory analysis. Graphic borehole logs illustrating the stratigraphy encountered and the measured CSV readings are included in Appendix II.

A total of ten soil samples (including one field duplicate) were submitted for laboratory analysis of BTEX and PHC F1 to F4 fractions. Samples for laboratory analysis were selected to represent observed "worst-case" conditions based on CSV measurements and visual/olfactory evidence of impact, and/or the assumed groundwater table. Two soil samples (MW106-4 and MW108-7) selected on the basis of spatial coverage were also submitted for additional laboratory analysis of VOCs. Soil cuttings generated during the drilling activities were temporarily stored in a waste bin located on-site pending removal for disposal at a licensed facility by Clean Water Works.

2.3 MONITORING WELL INSTALLATION

A total of four monitoring wells (MW101, MW106. MW107, and MW108), constructed of 51-mm diameter polyvinyl chloride (PVC) well pipe and screen, were installed into selected drilled boreholes. The annulus of each well was backfilled with washed silica sand to a minimum depth of approximately 0.3 m above the screened interval, and a bentonite seal was placed above the sand pack in each well to prevent infiltration of surface water. A bolt-down or stick up protective casing was installed on each well, and cemented in place. The locations of the monitoring wells are shown on Figure 2. Monitoring well construction details are provided in the borehole logs included in Appendix II.

On September 19, 2018, Terrapex surveyed the positions and elevations (tops of the well standpipes, as well as the ground surfaces) of the newly installed monitoring wells relative to a temporary site benchmark (TBM). A survey nail located on a utility pole at the northeast corner of the Site was selected as the TBM, which had a geodetic elevation of 92.48 m. As documented on the *Topographic Plan of Survey of Part of Lot 21, Concession 1, Geographic Township of North Gower, City of Ottawa*, by Farley, Smith and Denis Surveying Ltd., 2017, the TBM elevation was derived from the vertical benchmark 0011986U011.

2.4 MONITORING WELL DEVELOPMENT

Following installation, the monitoring wells were instrumented with a dedicated inertial sampler comprising low density polyethylene (LDPE) tubing and a LDPE foot valve. The monitoring wells

were developed on February 22 and 23, 2018. Development of the well was conducted using dedicated LDPE tubing, and a surge block to ensure adequate development across the entire screen length. The well was developed by alternating between purging and surging the well until the purged water was free of visible sediment (e.g., water was "clear"). Approximately 30 L to 60 L of water was purged from each of the monitoring wells.

2.5 GROUNDWATER MONITORING AND SAMPLING

Groundwater monitoring of the newly installed wells was completed on February 23, 2018. Immediately upon removal of the well cap, headspace CVs were measured using the RKI Eagle. The depth to water in each well was measured using Heron H.OIL interface probe. The presence and apparent thickness of any LNAPL in each well was also measured using the interface probe. To mitigate cross-contamination between monitoring wells, the interface probe was washed with a solution of Alconox detergent and water and then rinsed with distilled water prior to use in each well.

Groundwater samples were collected from the four monitoring wells on February 23, 2018. Groundwater samples were collected using a “low-flow” sampling method using a peristaltic pump and a YSI water quality meter. The dedicated tubing was placed in the mid-section of the wetted screened interval and groundwater was pumped from the monitoring well at a rate between 0.1 and 0.5 L/min. Geochemical parameters such as temperature, pH, conductivity, dissolved oxygen, and oxidation-reduction potential were measured during purging. Groundwater samples were collected once the geochemical parameters stabilized.

Groundwater samples were collected from the wells directly into pre-cleaned, laboratory supplied bottles with preservative (where required). The groundwater samples were placed in a cooler with ice, and delivered with signed chain-of-custody forms to Maxxam for laboratory analysis of BTEX and PHC F1 to F4 fractions. Two groundwater samples (MW106 and MW108) were also selected for additional laboratory analysis of VOCs

3.0 SUBSURFACE CONDITIONS

3.1 SOIL

In general, the stratigraphy encountered during the work program comprised of surficial grass or asphalt, underlain by sand and gravel fill to depths between 0.1 and 2.2 m bgs. The fill layer was underlain by a native silty sand with embedded gravel to the maximum depth of the investigation of 6.1 m bgs. Auger refusal was recorded at several locations in close proximity at varying depths, indicative the presence of boulders.

Visual and/or olfactory evidence of petroleum hydrocarbon impact was not observed in soil samples collected from all boreholes. Combustible soil vapour readings in all of the soil samples were <10 parts per million (ppm).

The soil stratigraphy and corresponding soil sample CSV readings for each borehole are shown in the graphic borehole logs provided in Appendix II.

3.2 GROUNDWATER

Apparent wet to saturated conditions in soil were encountered during drilling at approximately 1.5 to 2.2 m bgs in the native soil.

Terrapex monitored the wells on February 23, 2018. During the groundwater monitoring event, CV concentrations in the well headspace of all four monitoring wells was <10 ppm. Depth to water ranged between 0.10 m bgs (MW107) to 2.80 m bgs at MW108. LNALPL was not detected in any of the wells. The survey and monitoring data are summarized in Table 1.

Based on relative groundwater elevations, the inferred direction of groundwater flow is generally to the northwest towards Stevens Creek. Interpreted groundwater contours and the inferred groundwater flow direction for the monitoring event are shown on Figure 3.

4.0 RESULTS

4.1 SOIL AND GROUNDWATER STANDARDS

The site specific details which formed the basis of the selection of the soil and groundwater SCS are summarized below:

- greater than 2 m of overburden was observed during the work program;
- soil pH is between 5 and 9; laboratory analysis of confirmed a pH values of 7.10, 7.85, and 7.93 from soil samples BH104-1, MW102-4, and BH103-2, respectively;
- the site is not within, or adjacent to, an area of "Natural Significance" (as defined by O.Reg. 153/04), or otherwise considered "potentially sensitive";
- the site does not include land which is within 30 m of a water body;
- since the Site was last used for both residential and commercial purposes, the site conditions standards will default to the most sensitive, therefore the property use will be deemed residential;
- The Site and surrounding properties are serviced with drinking water wells;
- stratified site conditions will not be used when evaluating laboratory analytical results; and,
- grain size analysis completed by Terrapex classified the soil at the site as coarse textured, for the purposes of O.Reg. 153/04; a copy of the grain size analysis is included in Appendix III.

Based on the preceding information and assumptions, the SCS applicable for residential/parkland/institutional land use and coarse textured soil in a potable groundwater condition that are described in Table 2 of the *Standards* have been selected for evaluating laboratory analytical results from the site at this time.

4.2 ANALYTICAL RESULTS

4.2.1 SOIL

The results of the laboratory analyses for soil samples submitted for BTEX and PHC F1 to F4 fractions, and VOCs are presented in Tables 2 and 3, respectively. As shown in Table 2, concentrations of BTEX and PHC F1 to F4 fractions in all soil samples submitted for laboratory analysis were less than the applicable Table 2 SCS. As shown in Table 3, concentrations of VOCs in all soil samples submitted for laboratory analysis were less than the applicable Table 2 SCS.

Visual representation of the soil analytical results are provided in Figure 4A and Figure 4B. Copies of the laboratory certificates of analyses are provided in Appendix III.

4.2.2 SOIL WASTE CHARACTERIZATION

One representative sample of the soil cuttings was submitted to Maxxam for waste characterization analysis and included a Toxicity Characteristics Leachate Procedure (TCLP) analysis of metals, as well as bulk VOCs, semi-volatile organic compounds (sVOCs), and PHC F1 to F4 fraction analysis.

The results of the waste characterization analyses indicated that the soil may be managed as non-ignitable, non-hazardous (non-leachate toxic) waste for the purposes of off-site disposal. Copies of the Laboratory Certificates of Analysis for the analyzed soil sample are included in Appendix III.

4.2.3 GROUNDWATER

Laboratory results for groundwater samples analyzed for BTEX and PHC F1 to F4 fractions, and VOCs are presented in Tables 4 and 5, respectively. As shown in Tables 4 and 5, concentrations of BTEX, PHC F1 to F4 fractions, and VOCs in groundwater samples collected from all monitoring wells were less than the applicable Table 2 SCS

Visual representation of the groundwater analytical results is shown on Figure 5A and Figure 5B. Copies of the Laboratory Certificates of Analyses are included in Appendix III.

4.2.4 QUALITY ASSURANCE/QUALITY CONTROL

The Maxxam QA/QC program consisted of the analysis of laboratory replicates, method blanks, percent recoveries, matrix spikes, and surrogate percent recoveries as appropriate for the particular analysis protocol. A review of the quality assurance reports attached to the laboratory certificates of analysis indicate that the laboratory QA/QC program results were within quality control limits.

QA/QC samples submitted by Terrapex for this work program consisted of the following:

- one blind field duplicate soil samples for analysis of BTEX and PHC F1-F4 fractions (MW107-18, duplicate pair of MW108-7);
- one soil methanol vial (labeled field blank) analyzed for BTEX and PHC F1;
- one blind field duplicate groundwater sample for analysis of BTEX and PHC F1-F4 (MW112, duplicate pair of MW101);
- one groundwater trip spike sample for analysis of BTEX and PHC F1;
- one groundwater field blank (labelled blank) sample for analysis of BTEX and PHC F1, and;
- one groundwater trip blank sample for analysis of BTEX and PHC F1 fraction.

No relative percent differences (RPDs) were able to be calculated for either the groundwater or soil duplicate pairs since no concentrations were greater than five times the laboratory method detection limit (MDL). All parameters were not detected at the laboratory MDL in the trip blank sample, and the percent recoveries from the trip spike sample were within quality control limits (±30%).

Based on the above, the QA/QC results for this work program are considered acceptable. The laboratory certificates of analyses are provided in Appendix III.

5.0 SUMMARY

A Phase II Environmental Site Assessment was conducted at the property located at 1622 Roger Stevens Drive and portions of 1618 Roger Stevens Drive property in Kars (Ottawa) Ontario. The Phase II ESA was conducted concurrently with a geotechnical investigation.

On February 21 and 22, 2018, a total of nine boreholes ((MW101, BH102 - BH105, MW106 to MW108, and BH109)) were advanced to depths of up to 6.1 m bgs. Visual and/or olfactory evidence of petroleum hydrocarbon impact was not observed in soil samples collected from any of the boreholes. CSV readings in all of the soil samples were <10 ppm.

Monitoring wells were installed into four of the nine boreholes advanced at the site (MW101, MW106, MW107, and MW108). During monitoring of the newly installed monitoring wells on February 23, 2018, CV concentrations in the headspace of the wells were all <10 ppm. Depth to water ranged between 0.10 m bgs at MW107 to 2.80 m bgs at MW108. LNAPL was not detected in any of the wells.

The SCS for coarse textured soil in a potable groundwater condition that are described in Table 2 of the *Standards* for Residential/Parkland/Institutional land use have been selected to evaluate laboratory analytical results.

Laboratory analysis indicated that concentrations of BTEX, PHC F1 to F4 fractions, and VOCs in all soil and groundwater samples submitted from each borehole/monitoring well did not exceed the applicable Table 2 SCS.

6.0 CLOSURE

The environmental assessment described herein was conducted in accordance with the terms of reference for this project as agreed upon by Parkland Fuel Corporation and Terrapex Environmental Ltd. and to generally accepted engineering or environmental consulting practices in this area.

Terrapex Environmental Ltd. has exercised due care, diligence, and judgement in the performance of this subsurface investigation; however, studies of this nature have inherent limitations. The reported information is believed to provide a reasonable representation of the general environmental conditions at the site at the time of the assessment, however, the data were collected at discrete locations and conditions may vary at other locations or may change with the passage of time. The assessment was also limited to a study of those chemical parameters specifically addressed in this report.

This report was prepared for the sole use of Parkland Fuel Corporation. Terrapex Environmental Ltd. accepts no liability for claims arising from the use of this report, or from decisions made or actions taken as a result of this report, by parties other than Parkland Fuel Corporation.

TERRAPEX ENVIRONMENTAL LTD.

Greg Sabourin, P.Eng.
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Senior Project Manager

Jeff Stevenson, P.Geo
Senior Reviewer

PROFESSIONAL GEOSCIENTIST
P. JEFFREY STEVENSON
PRACTISING MEMBER
1153
ONTARIO

27/18

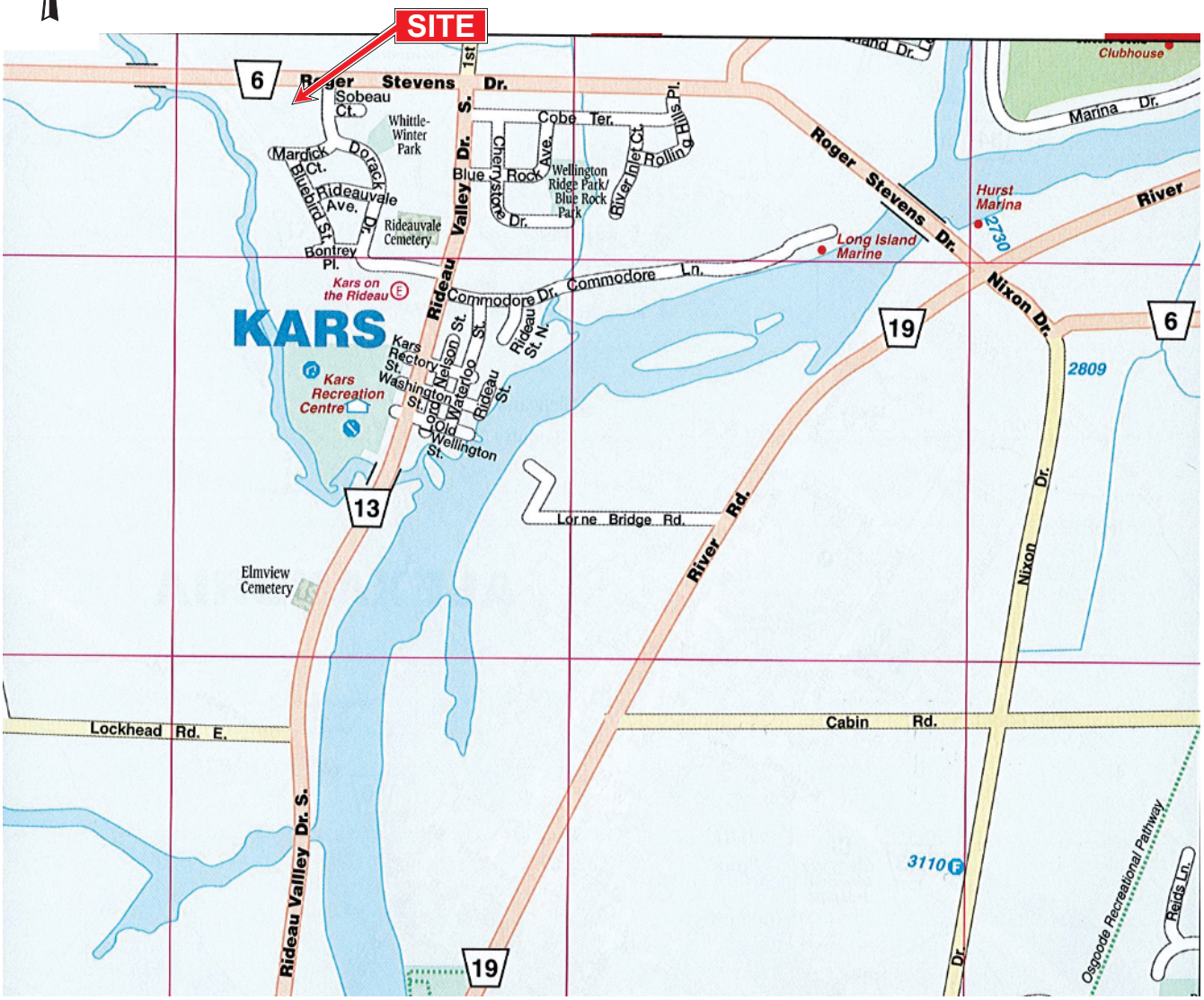
FIGURES

TERRAPEX

SITE LOCATION

1622 ROGER STEVENS DRIVE
KARS, ONTARIO

CLIENT
Parkland FUEL CORPORATION



0 500m 1km
(APPROXIMATE)

NOTE: FIGURE FROM CCCMAPS.COM ATLAS PAGE 99.

PROJECT #	CB1057.00
SCALE	AS SHOWN
DATE	MARCH 2018
DRAWN	ECV
CHECKED	
DRAWING #	FIGURE 1

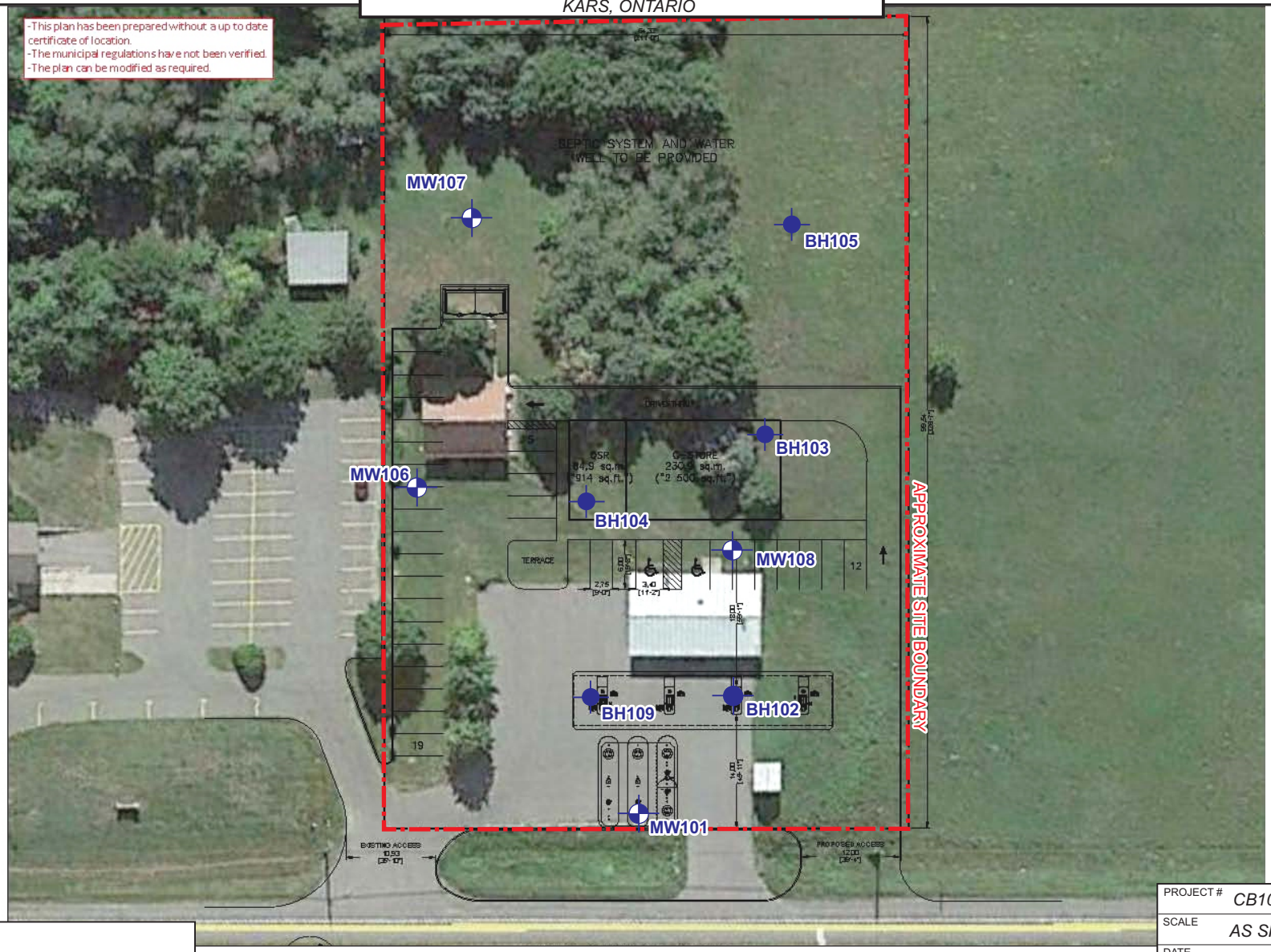
TERRAPEX

GENERAL SITE LAYOUT

1622 ROGER STEVENS DRIVE
KARS, ONTARIO

CLIENT

Parkland
FUEL CORPORATION



LEGEND

- MONITORING WELL (TERRAPEX)
- BOREHOLE (TERRAPEX)

0 15m 30m

(APPROXIMATE)

SOURCE: PROVIDED BY CLIENT.

PROJECT #	CB1057.00
SCALE	AS SHOWN
DATE	MARCH 2018
DRAWN	GS
CHECKED	GLL
DRAWING #	FIGURE 2

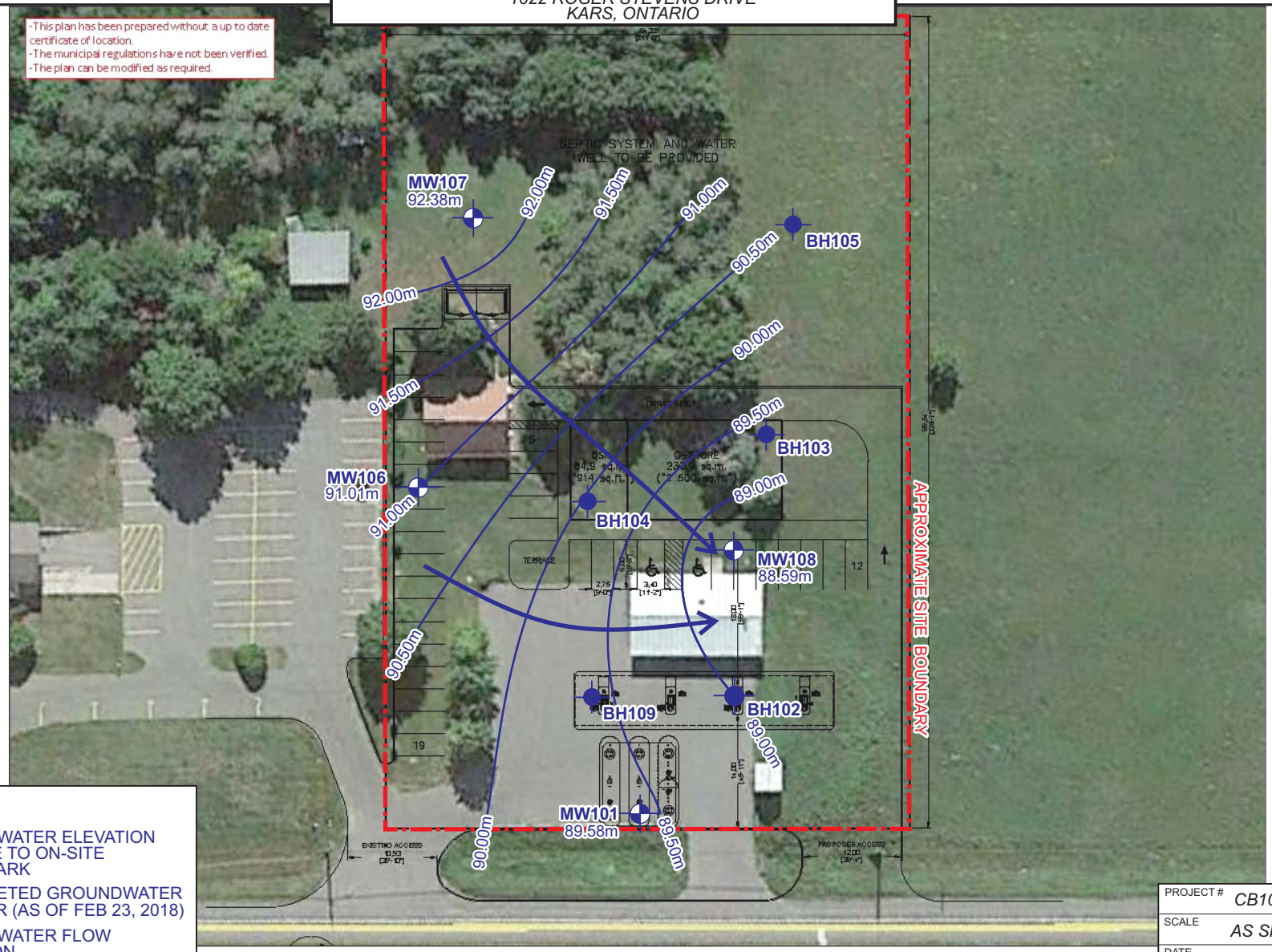
TERRAPEX

INTERPRETED GROUNDWATER FLOW (AS OF FEBRUARY 23, 2018)

1622 ROGER STEVENS DRIVE
KARS, ONTARIO

CLIENT

Parkland FUEL CORPORATION



LEGEND

- 94.66m GROUNDWATER ELEVATION RELATIVE TO ON-SITE BENCHMARK
- INTERPRETED GROUNDWATER CONTOUR (AS OF FEB 23, 2018)
- GROUNDWATER FLOW DIRECTION
- MONITORING WELL (TERRAPEX)
- BOREHOLE (TERRAPEX)

0 15m 30m
(APPROXIMATE)

SOURCE: PROVIDED BY CLIENT.

PROJECT #	CB1057.00
SCALE	AS SHOWN
DATE	MARCH 2018
DRAWN	GS
CHECKED	JM
DRAWING #	FIGURE 3

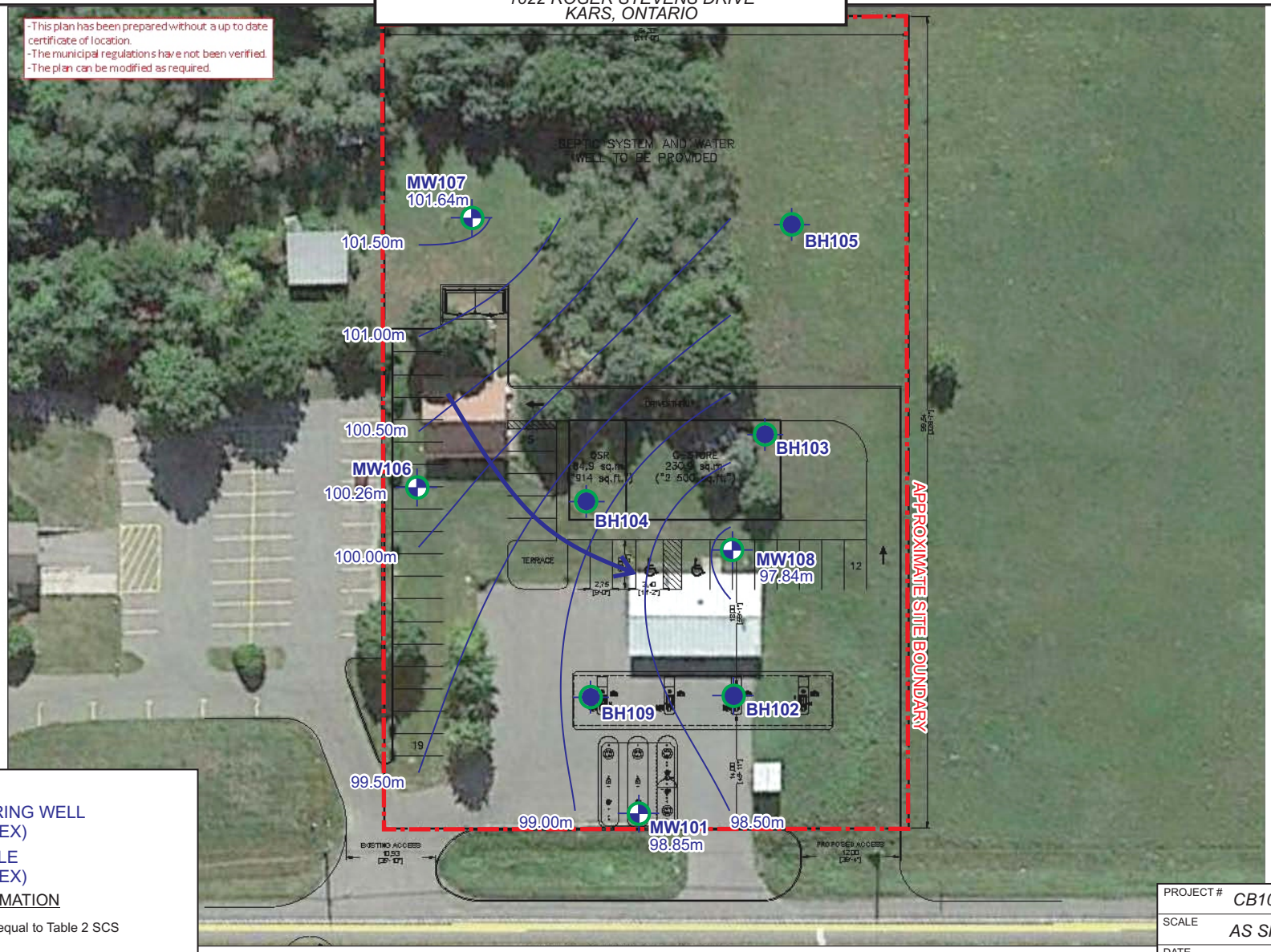
TERRAPEX

SOIL ANALYTICAL RESULTS - PHCs

1622 ROGER STEVENS DRIVE
KARS, ONTARIO

CLIENT

Parkland
FUEL CORPORATION



LEGEND

- MONITORING WELL (TERRAPEX)
- BOREHOLE (TERRAPEX)

ANALYSIS INFORMATION

- Less than or equal to Table 2 SCS
- Greater than Table 2 SCS

SCS (Site Conditions Standards) refer to Standards from *Table 2 of April 15, 2011 Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act*; Residential / Parkland / Institutional land use, coarse textured soil

0 15m 30m
(APPROXIMATE)

SOURCE: PROVIDED BY CLIENT.

PROJECT #	CB1057.00
SCALE	AS SHOWN
DATE	MARCH 2018
DRAWN	GS
CHECKED	JM
DRAWING #	FIGURE 4A

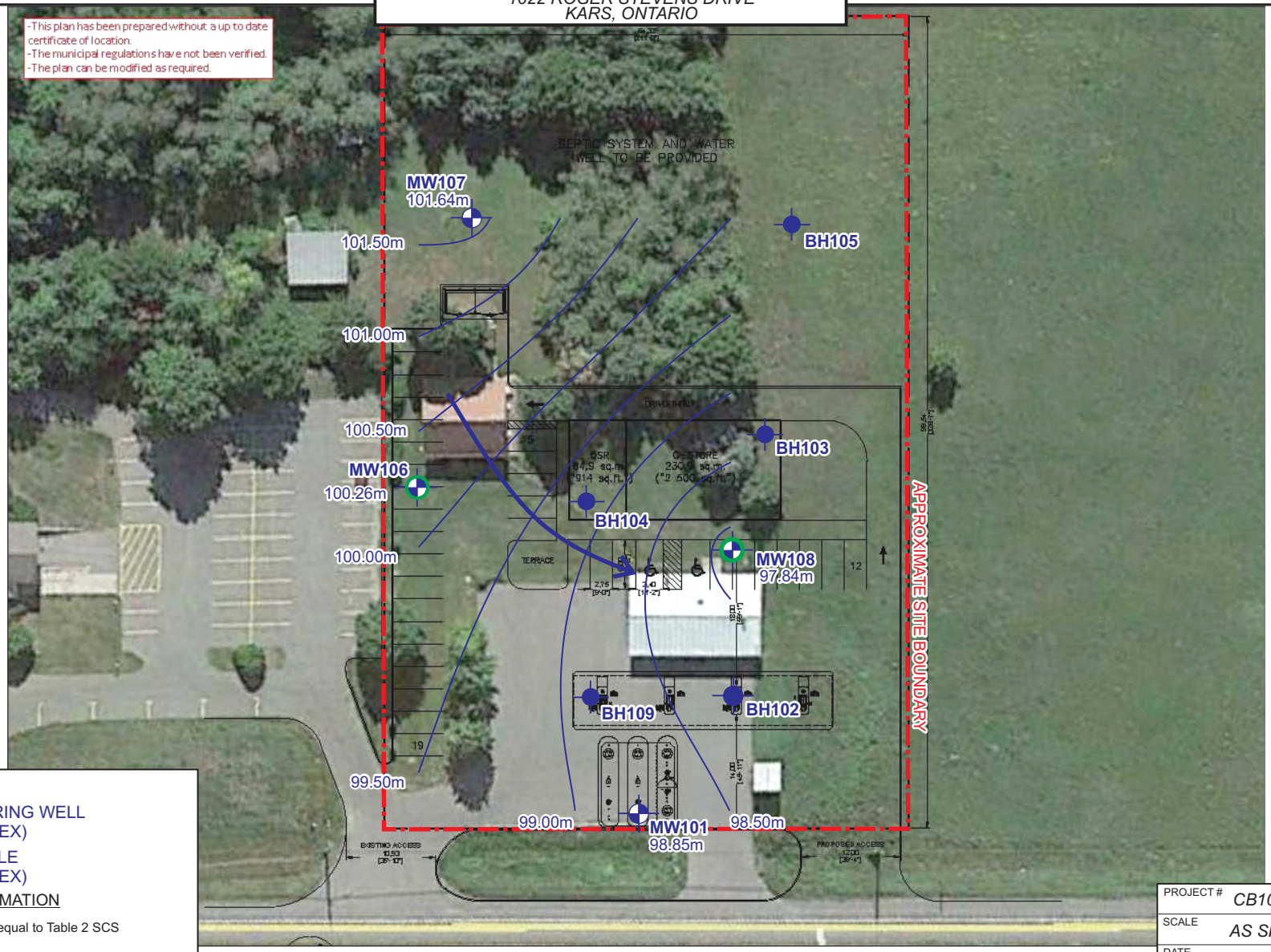
TERRAPEX

SOIL ANALYTICAL RESULTS - VOCs

1622 ROGER STEVENS DRIVE
KARS, ONTARIO

CLIENT

Parkland FUEL CORPORATION



LEGEND

- MONITORING WELL (TERRAPEX)
- BOREHOLE (TERRAPEX)

ANALYSIS INFORMATION

- Less than or equal to Table 2 SCS
- Greater than Table 2 SCS

SCS (Site Conditions Standards) refer to Standards from *Table 2 of April 15, 2011 Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act*; Residential / Parkland / Institutional land use, coarse textured soil

0 15m 30m
(APPROXIMATE)

SOURCE: PROVIDED BY CLIENT.

PROJECT #	CB1057.00
SCALE	AS SHOWN
DATE	MARCH 2018
DRAWN	GS
CHECKED	JM
DRAWING #	FIGURE 4B

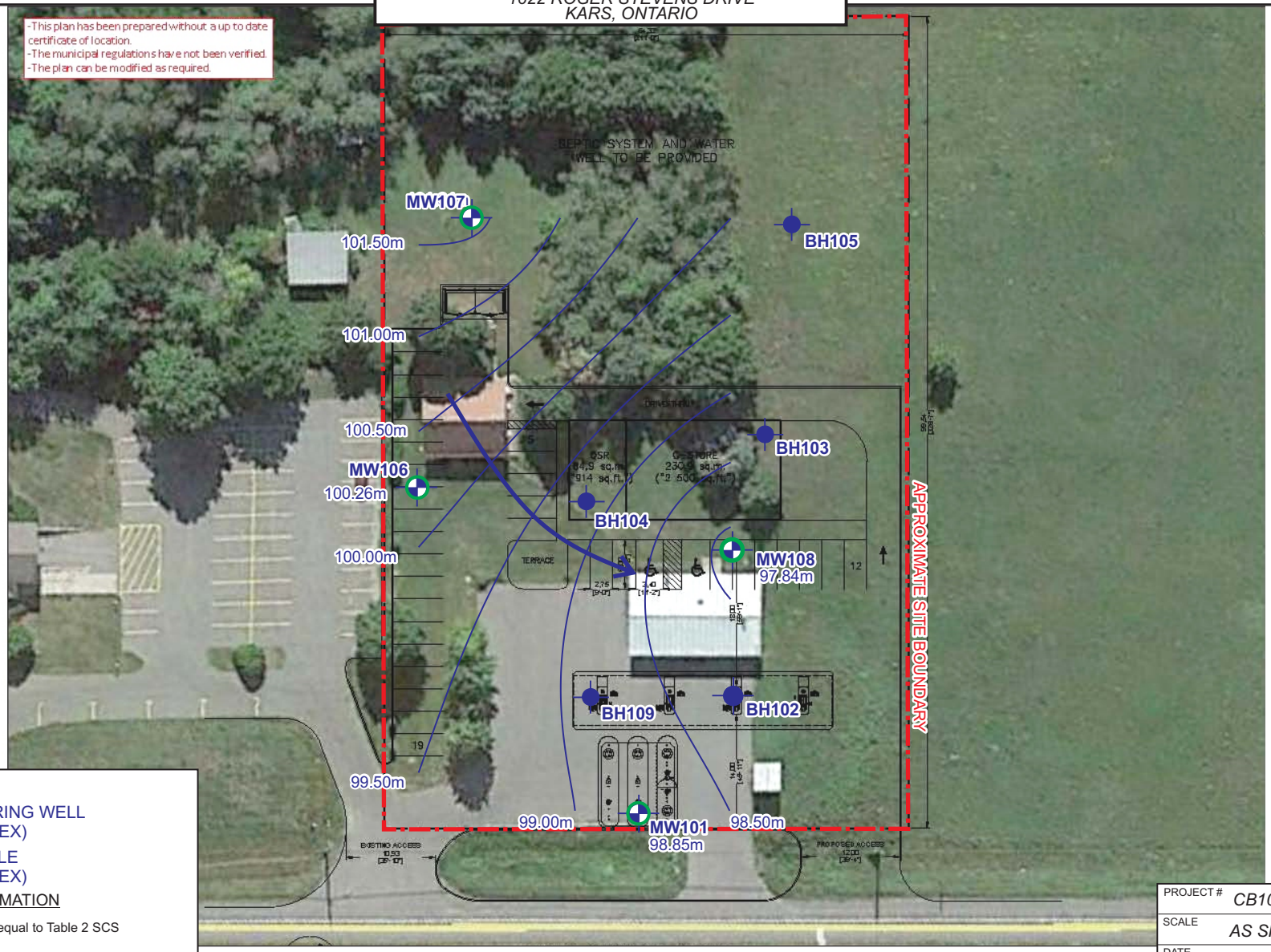
TERRAPEX

GROUNDWATER ANALYTICAL RESULTS - PHCs

1622 ROGER STEVENS DRIVE
KARS, ONTARIO

CLIENT

Parkland
FUEL CORPORATION



LEGEND

- MONITORING WELL (TERRAPEX)
- BOREHOLE (TERRAPEX)

ANALYSIS INFORMATION

- Less than or equal to Table 2 SCS
- Greater than Table 2 SCS

SCS (Site Conditions Standards) refer to Standards from *Table 2 of April 15, 2011 Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act*; coarse textured soil

0 15m 30m
(APPROXIMATE)

SOURCE: PROVIDED BY CLIENT.

PROJECT #	CB1057.00
SCALE	AS SHOWN
DATE	MARCH 2018
DRAWN	GS
CHECKED	JM
DRAWING #	FIGURE 5A

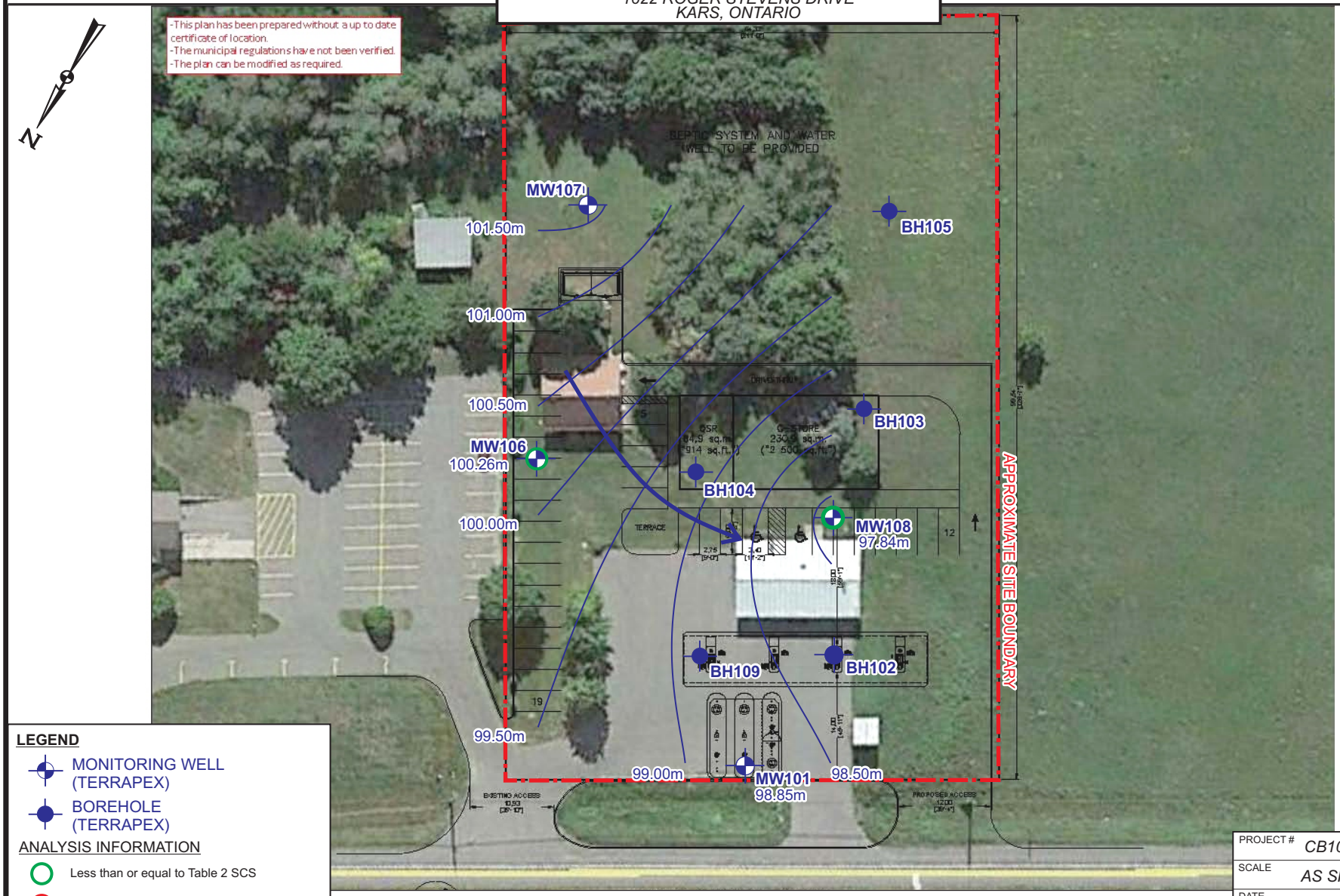
TERRAPEX

GROUNDWATER ANALYTICAL RESULTS - VOCs

1622 ROGER STEVENS DRIVE
KARS, ONTARIO

CLIENT

Parkland FUEL CORPORATION



LEGEND

- MONITORING WELL (TERRAPEX)
- BOREHOLE (TERRAPEX)

ANALYSIS INFORMATION

- Less than or equal to Table 2 SCS
- Greater than Table 2 SCS

SCS (Site Conditions Standards) refer to Standards from *Table 2 of April 15, 2011 Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act*; coarse textured soil

0 15m 30m
(APPROXIMATE)

SOURCE: PROVIDED BY CLIENT.

PROJECT #	CB1057.00
SCALE	AS SHOWN
DATE	MARCH 2018
DRAWN	GS
CHECKED	JM
DRAWING #	FIGURE 5B

TABLES

TABLE 1 GROUNDWATER MONITORING DATA

1622 Roger Stevens Drive, Kars, Ontario

WELL NUMBER	DATE	GROUND ELEVATION[1] (m)	T.O.P. ELEVATION[2] (m)	SCREEN LENGTH (m)	BOTTOM OF SCREEN[3] (m)	CV[4]	DEPTH TO WATER FROM T.O.P. (m)	DEPTH TO WATER FROM GROUND (m)	GROUNDWATER ELEVATION[5] (m)	LNAPL THICKNESS[6] (m)
MW101	15-Mar-18	91.23	91.13	3.00	85.03	<10 ppm	1.55	1.64	89.58	None
MW106	15-Mar-18	92.40	93.28	3.00	86.30	<10 ppm	2.27	1.39	91.01	None
MW107	15-Mar-18	92.46	93.24	2.45	89.26	<10 ppm	0.86	0.08	92.38	None
MW108	15-Mar-18	91.38	92.44	3.00	85.38	<10 ppm	3.85	2.80	88.59	None

[1] Elevation of ground surface at well location, relative to site benchmark

[2] Elevation of highest point of well pipe ("top of pipe"), relative to site benchmark

[3] Elevation of bottom of well screened interval, relative to site benchmark

[4] Combustible vapour concentration in well headspace in parts per million by volume (ppm) or percent of lower explosive limit (%LEL)

[5] Adjusted static water level elevation, relatve to site benchmark, using indicated relative density of LNAPL to groundwater

[6] Measured thickness of light, non-aqueous liquid, if any

Entered by: GS
Checked by: RH

TABLE 2 SOIL ANALYTICAL RESULTS - PHCs
1622 Roger Stevens Drive, Kars, Ontario

Terrapex Sample Name	Units	STANDARDS 2011 Table 2 R / P / I coarse	MW101-8	BH102-5	BH103-4	BH104-1	BH105-3	MW106-4	MW107-3
Sample Depth	m bg	-	4.3 - 4.9	3.8 - 4.4	3.0 - 3.7	0.8 - 1.4	2.3 - 2.9	3.0 - 3.7	2.3 - 2.9
CSV Reading	-	-	<10 ppm	<10 ppm	<10 ppm	<10 ppm	<10 ppm	<10 ppm	<10 ppm
Sampling Date	-	-	22-Feb-18	22-Feb-18	22-Feb-18	22-Feb-18	22-Feb-18	22-Feb-18	22-Feb-18
Analysis Date	-	-	23-Feb-18	23-Feb-18	23-Feb-18	23-Feb-18	23-Feb-18	23-Feb-18	23-Feb-18
Certificate of Analysis No.	-	-	B841113	B841113	B841113	B841113	B841113	B841113	B841113
Benzene	µg/g	0.21	<0.02	<0.02	<0.02	<0.02	<0.02	<0.020	<0.02
Toluene	µg/g	2.3	<0.02	<0.02	<0.02	<0.02	<0.02	<0.020	<0.02
Ethylbenzene	µg/g	1.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.020	<0.02
Xylenes (total)	µg/g	3.1	<0.04	<0.04	<0.04	<0.04	<0.04	<0.020	<0.04
Petroleum Hydrocarbons, F1	µg/g	55	<10	<10	<10	<10	<10	<10	<10
Petroleum Hydrocarbons, F2	µg/g	98	<10	<10	<10	<10	<10	<10	<10
Petroleum Hydrocarbons, F3	µg/g	300	<50	<50	<50	<50	<50	<50	<50
Petroleum Hydrocarbons, F4	µg/g	2,800	<50	<50	<50	<50	<50	<50	<50

[1] Standards from Table 2 of April 15, 2011 *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act* ; Residential / Institutional / Parkland land use, coarse textured soil

m bg Meters below grade
CSV Reading Combustible soil vapour reading (ppm or % LEL)
ppm Parts per million (by volume)
% LEL Percent of the lower explosive limit
BOLD Exceeds standard

Entered by: GS
Checked by: JM

TABLE 2 SOIL ANALYTICAL RESULTS - PHCs
1622 Roger Stevens Drive, Kars, Ontario

Terrapex Sample Name	Units	STANDARDS 2011 Table 2 R / P / I coarse	MW108-7	MW108-17 Duplicate of MW108-78	BH109-4
Sample Depth	m bg	-	4.6 - 5.2	-	2.3 - 2.9
CSV Reading	-	-	<10 ppm	-	<10 ppm
Sampling Date	-	-	22-Feb-18	22-Feb-18	22-Feb-18
Analysis Date	-	-	23-Feb-18	23-Feb-18	23-Feb-18
Certificate of Analysis No.	-	-	B841113	B841113	B841113
Benzene	µg/g	0.21	<0.020	<0.02	<0.02
Toluene	µg/g	2.3	<0.020	<0.02	<0.02
Ethylbenzene	µg/g	1.1	<0.020	<0.02	<0.02
Xylenes (total)	µg/g	3.1	<0.020	<0.04	<0.04
Petroleum Hydrocarbons, F1	µg/g	55	<10	<10	<10
Petroleum Hydrocarbons, F2	µg/g	98	<10	<10	<10
Petroleum Hydrocarbons, F3	µg/g	300	<50	<50	<50
Petroleum Hydrocarbons, F4	µg/g	2,800	<50	<50	<50

[1] Standards from Table 2 of April 15, 2011 *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act* ; Residential / Institutional / Parkland land use, coarse textured soil

m bg Meters below grade

CSV Reading Combustible soil vapour reading (ppm or % LEL)

ppm Parts per million (by volume)

% LEL Percent of the lower explosive limit

BOLD Exceeds standard

Entered by: GS
Checked by: JM

TABLE 3 SOIL ANALYTICAL RESULTS - VOCs
1622 Roger Stevens Drive, Kars, Ontario

Terrapex Sample Name	Units	STANDARDS[1] 2011 Table 2 R / P / I coarse	MW 106-4	MW 108-7
Sample Depth	m bg	-	3.0 - 3.7	4.6 - 5.2
SV Reading	-	-	<10 ppm	<10 ppm
Sampling Date	-	-	22-Feb-18	22-Feb-18
Analysis Date	-	-	23-Feb-18	23-Feb-18
Certificate of Analysis No.	-	-	B841113	B841113
Acetone	µg/g	16	<0.50	<0.50
Benzene	µg/g	0.21	<0.020	<0.020
Bromodichloromethane	µg/g	1.5	<0.050	<0.050
Bromoform	µg/g	0.27	<0.050	<0.050
Bromomethane	µg/g	0.05	<0.050	<0.050
Carbon tetrachloride	µg/g	0.05	<0.050	<0.050
Chlorobenzene	µg/g	2.4	<0.050	<0.050
Chloroform	µg/g	0.05	<0.050	<0.050
Dibromochloromethane	µg/g	2.3	<0.050	<0.050
Dichlorobenzene 1,2-	µg/g	1.2	<0.050	<0.050
Dichlorobenzene, 1,3-	µg/g	4.8	<0.050	<0.050
Dichlorobenzene,1,4-	µg/g	0.083	<0.050	<0.050
Dichlorodifluoromethane	µg/g	16	<0.050	<0.050
Dichloroethane, 1,1-	µg/g	0.47	<0.050	<0.050
Dichloroethane, 1,2-	µg/g	0.05	<0.050	<0.050
Dichloroethylene, 1,1-	µg/g	0.05	<0.050	<0.050
Dichloroethylene, cis-1,2-	µg/g	1.9	<0.050	<0.050
Dichloroethylene, trans-1,2-	µg/g	0.084	<0.050	<0.050
Dichloropropane, 1,2-	µg/g	0.05	<0.050	<0.050
Dichloropropene, cis-1,3-	µg/g	-	<0.030	<0.030
Dichloropropene, trans-1,3-	µg/g	-	<0.040	<0.040
Ethylbenzene	µg/g	1.1	<0.020	<0.020
Ethylene dibromide	µg/g	0.05	<0.050	<0.050
Hexane	µg/g	2.8	<0.050	<0.050
Methyl ethyl ketone	µg/g	16	<0.50	<0.50
Methyl isobutyl ketone	µg/g	1.7	<0.50	<0.50
Methyl tert butyl ether	µg/g	0.75	<0.050	<0.050
Methylene Chloride	µg/g	0.1	<0.050	<0.050
Styrene	µg/g	0.7	<0.050	<0.050
Tetrachloroethane, 1,1,1,2-	µg/g	0.058	<0.050	<0.050
Tetrachloroethane, 1,1,2,2-	µg/g	0.05	<0.050	<0.050
Tetrachloroethylene	µg/g	0.28	<0.050	<0.050
Toluene	µg/g	2.3	<0.020	<0.020
Trichloroethane, 1,1,1-	µg/g	0.38	<0.050	<0.050
Trichloroethane, 1,1,2-	µg/g	0.05	<0.050	<0.050
Trichloroethylene	µg/g	0.061	<0.050	<0.050
Trichlorofluoromethane	µg/g	4	<0.050	<0.050
Vinyl chloride	µg/g	0.02	<0.020	<0.020
m,p-Xylenes	µg/g	-	<0.020	<0.020
o-Xylene	µg/g	-	<0.020	<0.020
Xylenes (total)	µg/g	3.1	<0.020	<0.020

[1] Standards from Table 2 of April 15, 2011 *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act* ; Residential / Institutional / Parkland land use, medium and fine textured soil

m bg Meters below grade

CSV Reading Combustible soil vapour reading (ppm or % LEL)

ppm Parts per million (by volume)

% LEL Percent of the lower explosive limit

BOLD Exceeds standard

TABLE 4 GROUNDWATER ANALYTICAL RESULTS - PHCs
1622 Roger Stevens Drive, Kars, Ontario

Terrapex Sample Name	Units	STANDARDS[1] 2011 Table 2 coarse	MW101	MW112 Field Duplicate of MW101	MW106	MW107	MW108	BLANK FIELD BLANK	Trip Blank
CV Reading	-	-	<10 ppm	-	<10 ppm	<10 ppm	<10 ppm	-	
Sampling Date	-	-	23-Feb-18	23-Feb-18	23-Feb-18	23-Feb-18	23-Feb-18	23-Feb-18	23-Feb-18
Analysis Date	-	-	23/24-Feb-18	23/24-Feb-18	23/24-Feb-18	23/24-Feb-18	23/24-Feb-18	23-Feb-18	23/24-Feb-18
Certificate of Analysis No.	-	-	B841230	B841230	B841230	B841230	B841230	B841230	B841230
Benzene	µg/L	5	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Toluene	µg/L	24	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Ethylbenzene	µg/L	2.4	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Xylenes (total)	µg/L	300	1.4	1.3	<0.20	<0.40	<0.20	<0.40	<0.40
Petroleum Hydrocarbons, F1	µg/L	750	<25	<25	<25	<25	<25	<25	<25
Petroleum Hydrocarbons, F2	µg/L	150	<100	<100	<100	<100	<100	<100	-
Petroleum Hydrocarbons, F3	µg/L	500	<200	<200	<200	<200	<200	<200	-
Petroleum Hydrocarbons, F4	µg/L	500	<200	<200	<200	<200	<200	<200	-

[1] Standards from Table 2 of April 15, 2011 *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act* ; coarse soil

ppm Parts per million (by volume)
CV Reading Combustible vapour reading (ppm or % LEL)
% LEL Percent of the lower explosive limit
- not applicable
BOLD Exceeds standard

Entered by: GS
Checked by: JM

TABLE 5 GROUNDWATER ANALYTICAL RESULTS - VOCs
1622 Roger Stevens Drive, Kars, Ontario

Terrapex Sample Name	Units	STANDARDS 2011 Table 2[1] coarse	MW106	MW108
CV Reading	-	-	<10 ppm	<10 ppm
Sampling Date	-	-	23-Feb-18	23-Feb-18
Analysis Date	-	-	23/24-Feb-18	23/24-Feb-18
Certificate of Analysis No.	-	-	B841230	B841230
Acetone	µg/L	2,700	<10	<10
Benzene	µg/L	5	<0.20	<0.20
Bromodichloromethane	µg/L	16	<0.50	<0.50
Bromoform	µg/L	25	<1.0	<1.0
Bromomethane	µg/L	0.89	<0.50	<0.50
Carbon tetrachloride	µg/L	0.79	<0.20	<0.20
Chlorobenzene	µg/L	30	<0.20	<0.20
Chloroform	µg/L	2.4	<0.20	<0.20
Dibromochloromethane	µg/L	25	<0.50	<0.50
Dichlorobenzene 1,2-	µg/L	3	<0.50	<0.50
Dichlorobenzene, 1,3-	µg/L	59	<0.50	<0.50
Dichlorobenzene,1,4-	µg/L	1	<0.50	<0.50
Dichlorodifluoromethane	µg/L	590	<1.0	<1.0
Dichloroethane, 1,1-	µg/L	5	<0.20	<0.20
Dichloroethane, 1,2-	µg/L	1.6	<0.50	<0.50
Dichloroethylene, 1,1-	µg/L	1.6	<0.20	<0.20
Dichloroethylene, cis-1,2-	µg/L	1.6	<0.50	<0.50
Dichloroethylene, trans-1,2-	µg/L	1.6	<0.50	<0.50
Dichloropropane, 1,2-	µg/L	5	<0.20	<0.20
Dichloropropene, cis-1,3-	µg/L	-	<0.30	<0.30
Dichloropropene, trans-1,3-	µg/L	-	<0.40	<0.40
Dichloropropene, 1,3-	µg/L	0.5	<0.50	<0.50
Ethylbenzene	µg/L	2.4	<0.20	<0.20
Ethylene dibromide	µg/L	0.2	<0.20	<0.20
Hexane	µg/L	51	<1.0	<1.0
Methyl ethyl ketone	µg/L	1,800	<10	<10
Methyl isobutyl ketone	µg/L	640	<5.0	<5.0
Methyl tert butyl ether	µg/L	15	<0.50	<0.50
Methylene Chloride	µg/L	50	<2.0	<2.0
Styrene	µg/L	5.4	<0.50	<0.50
Tetrachloroethane, 1,1,1,2-	µg/L	1.1	<0.50	<0.50
Tetrachloroethane, 1,1,2,2-	µg/L	1	<0.50	<0.50
Tetrachloroethylene	µg/L	1.6	<0.20	<0.20
Toluene	µg/L	24	<0.20	<0.20
Trichloroethane, 1,1,1-	µg/L	200	<0.20	<0.20
Trichloroethane, 1,1,2-	µg/L	4.7	<0.50	<0.50
Trichloroethylene	µg/L	1.6	<0.20	<0.20
Trichlorofluoromethane	µg/L	150	<0.50	<0.50
Vinyl chloride	µg/L	0.5	<0.20	<0.20
m,p-Xylenes	µg/L	-	<0.20	<0.20
o-Xylene	µg/L	-	<0.20	<0.20

[1] Standards from Table 2 of April 15, 2011 *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act* ; coarse soil

ns No standard
CV Reading Combustible vapour reading (ppm or % LEL)
ppm Parts per million (by volume)
% LEL Percent of the lower explosive limit
BOLD Exceeds standard

APPENDIX I

SITE PHOTOGRAPHS

TERRAPEX	**PHOTOGRAPHIC LOG**		
Client: Parkland Fuel Corporation	**Site Location**:	1622 Roger Stevens Drive, Kars, Ontario	**Project No**: CO1057.00

Photo No: 1 **Date:** February 21, 2018 **Viewing Direction:** North **Description:** View of the track-mounted drill rig drilling monitoring well MW101.	

Photo No: 2 **Date:** February 21, 2018 **Viewing Direction:** South **Description:** View of the slope located in the eastern portion of the Site.	

Client: Parkland Fuel Corporation	**Site Location**:	1622 Roger Stevens Drive, Kars, Ontario	**Project No**: CO1057.00

Photo No: 3 **Date:** February 21, 2018 **Viewing Direction:** East **Description:** View of the track-mounted drill rig drilling monitoring well MW101.	

Photo No: 4 **Date:** February 22, 2018 **Viewing Direction:** East **Description:** View of the drillers auguring the borehole at monitoring well MW106.	

Client: Parkland Fuel Corporation	**Site Location**:	1622 Roger Stevens Drive, Kars, Ontario	**Project No**: CO1057.00

Photo No: 5 **Date:** February 21, 2018 **Viewing Direction:** West **Description:** View of the drilling of borehole BH103.	

Photo No: 6 **Date:** February 21, 2018 **Viewing Direction:** Southwest **Description:** A view of the residence located along the eastern portion of the property prior to the drilling and installation of monitoring well MW106.	

Client: Parkland Fuel Corporation	**Site Location**:	1622 Roger Stevens Drive, Kars, Ontario	**Project No**: CO1057.00

Photo No: 7 **Date:** February 22, 2018 **Viewing Direction:** East **Description:** View of the drilling of monitoring well MW107.	

Photo No: 8 **Date:** February 22, 2018 **Viewing Direction:** West **Description:** View of the drilling of the borehole for monitoring well MW108.	

APPENDIX II

BOREHOLE/MONITORING WELL LOGS

CLIENT: Parkland Fuel Corporation	METHOD: Split Spoon Sampling		**BH No.: MW101**
PROJECT: 1622 Roger Stevens Drive	PROJECT ENGINEER: Vic	ELEV. (m) 91.23	
LOCATION: Kars, Ontario	NORTHING: 0448260	EASTING: 5000463	PROJECT NO.: CB1057.00

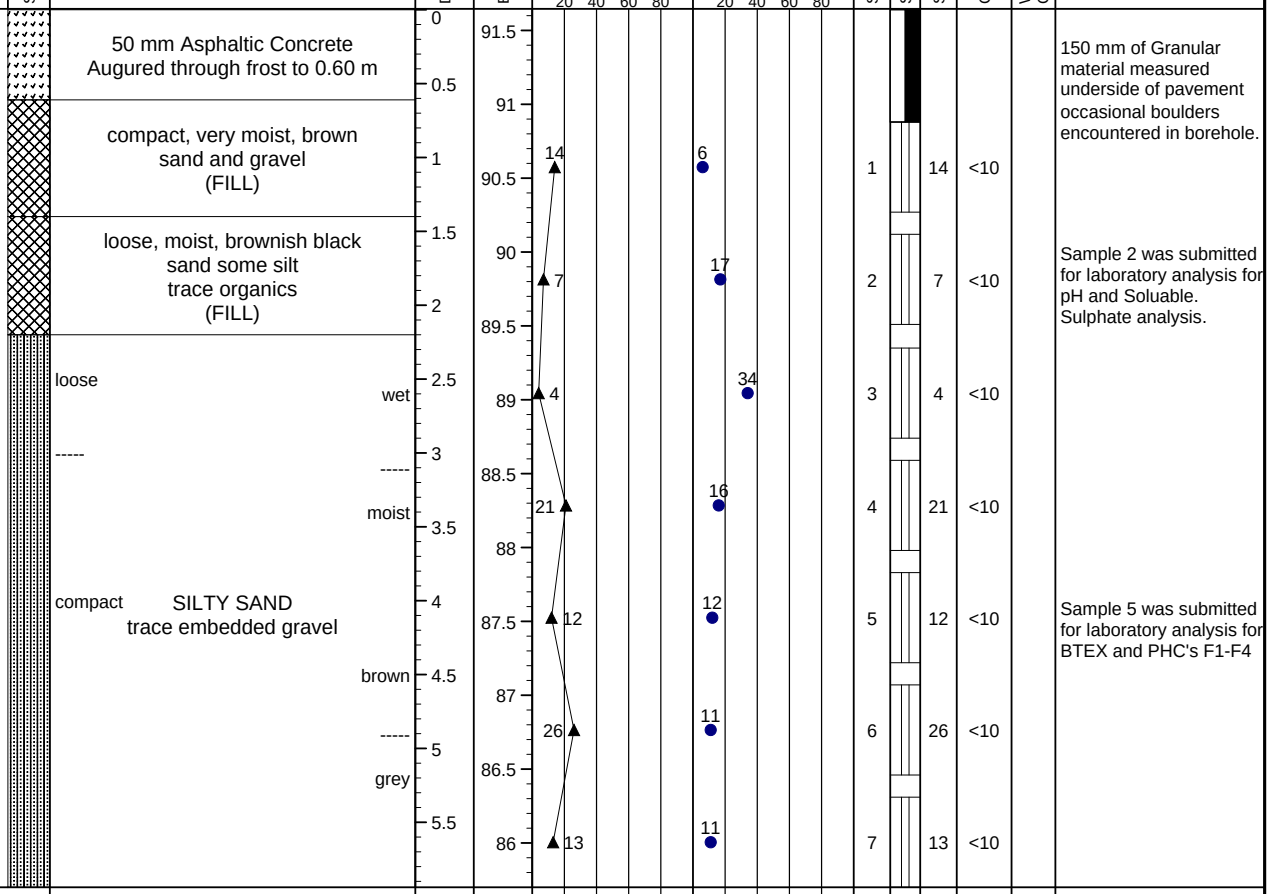
SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON

GWL (m)	SOIL DESCRIPTION	DEPTH (m)	ELEVATION (m)	Shear Strength (kPa) / N-Value (Blows/300mm)	Water Content (%) PL W.C. LL	SAMPLE NO.	SAMPLE TYPE	SPT(N)	CSV (ppm)	Well Construction	REMARKS
	100 mm Asphaltic Concrete Augured through frost to 0.61 m	0	91								occasional boulders encountered in borehole.
▼	compact, moist, brown sandy gravel trace silt (FILL)	0.5 1 1.5 2 2.5	90.5 90 89.5 89	21 11 22	13 6 11	1 2 3		21 11 22	<10 <10 <10		
	compact ----- loose SAND some gravel some silt brown ----- wet grey	3 3.5 4 4.5 5 5.5	88.5 88 87.5 87 86.5 86	34 19 30 15 8	8 10 10 11 11	4 5 6 7 8		34 19 30 15 8	<10 <10 <10 <10 <10		Sample 8 submittted for laboratory analysis for BTEX and PHC (F1-F4)
		6	85.5	6	9	9		6	<10		
	END OF BOREHOLE										

	LOGGED BY: RH	DRILLING DATE: February 26, 2018
	REVIEWED BY: VN	Page 1 of 1

CLIENT: Parkland Fuel Corporation	METHOD: Split Spoon Sampling		**BH No.: BH102**
PROJECT: 1622 Roger Stevens Drive	PROJECT ENGINEER: Vic	ELEV. (m) 91.64	
LOCATION: Kars, Ontario	NORTHING:	EASTING:	PROJECT NO.: CB1057.00

SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON



END OF BOREHOLE

	LOGGED BY: RH	DRILLING DATE: February 26, 2018
	REVIEWED BY: VN	Page 1 of 1

CLIENT: Parkland Fuel Corporation	METHOD: Split Spoon Sampling		**BH No.: BH103**
PROJECT: 1622 Roger Stevens Drive	PROJECT ENGINEER: Vic	ELEV. (m) 89.92	
LOCATION: Kars, Ontario	NORTHING:	EASTING:	PROJECT NO.: CB1057.00

SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON

GWL (m)	SOIL SYMBOL	SOIL DESCRIPTION	DEPTH (m)	ELEVATION (m)	Shear Strength (kPa) 40 80 120 160 / N-Value (Blows/300mm) 20 40 60 80	Water Content (%) PL W.C. LL 20 40 60 80	SAMPLE NO.	SAMPLE TYPE	SPT(N)	CSV (ppm)	Well Construction	REMARKS
		100 mm Topsoil Augured through frost to 0.75 m	0	89.5								102 mm of Topsoil measured in Borehole occasional boulders encountered in borehole.
		loose, wet, dark brown SILTY SAND some organics	0.5 1	89	4	24	1		4	<10		
		-----	1.5	88.5		9						Sample 2 was submitted for laboratory analysis for pH and Soluable. Sulphate analysis.
		dense	2	88	56		2		56	<10		
		moist, brown SILTY SAND some embedded gravel	2.5	87.5	46	9	3		46	<10		
		-----	3	87								Sample 4 was submitted for laboratory analysis of BTEX and PHC's (F1-F2).
		compact	3.5	86.5	14	11	4		14	<10		
			4	86	17	11	5		17	<10		Auger refusal at 2.9 and 4.42 m on possible boulders.
		END OF BOREHOLE										

	LOGGED BY: RH	DRILLING DATE: February 26, 2018
	REVIEWED BY: VN	Page 1 of 1

CLIENT: Parkland Fuel Corporation	METHOD: Split Spoon Sampling		**BH No.: BH104**
PROJECT: 1622 Roger Stevens Drive	PROJECT ENGINEER: Vic	ELEV. (m) 91.75	
LOCATION: Kars, Ontario	NORTHING:	EASTING:	PROJECT NO.: CB1057.00

SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON

GWL (m)	SOIL SYMBOL	SOIL DESCRIPTION	DEPTH (m)	ELEVATION (m)	Shear Strength (kPa) 40 80 120 160 / N-Value (Blows/300mm) 20 40 60 80	Water Content (%) PL W.C. LL 20 40 60 80	SAMPLE NO.	SAMPLE TYPE	SPT(N)	CSV (ppm)	Well Construction	REMARKS
		Topsoil at surface Augured through frost to 0.76 m	0	91.5								occasional boulders encountered in borehole.
		loose ----- compact to dense moist, dark brown sand some silt some organics (FILL)	0.5 1 1.5	91 90.5 90	6 56		1 2		6 56	<10 <10		Sample 1 was submitted for laboratory analysis of BTEX, PHC's F1-F2 and pH. Auger refusal at 1.82 m on possible boulders.
		END OF BOREHOLE										

	LOGGED BY: RH	DRILLING DATE: February 26, 2018
	REVIEWED BY: VN	Page 1 of 1

CLIENT: Parkland Fuel Corporation	METHOD: Split Spoon Sampling		**BH No.: BH105**
PROJECT: 1622 Roger Stevens Drive	PROJECT ENGINEER: Vic	ELEV. (m) 90.29	
LOCATION: Kars, Ontario	NORTHING:	EASTING:	PROJECT NO.: CB1057.00

SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON

GWL (m)	SOIL SYMBOL	SOIL DESCRIPTION	DEPTH (m)	ELEVATION (m)	Shear Strength (kPa) 40 80 120 160 / N-Value (Blows/300mm) 20 40 60 80	Water Content (%) PL W.C. LL 20 40 60 80	SAMPLE NO.	SAMPLE TYPE	SPT(N)	CSV (ppm)	Well Construction	REMARKS
		Topsoil at surface Augured through frost to 0.75 m	0	90								occasional boulders encountered in borehole.
		compact, moist, brown SILTY SAND trace organics	0.5 1	89.5	30		1		30	<10		
			1.5	89								
		compact, moist, brown SILTY SAND some embedded gravel	2	88.5	30		2		30	<10		
			2.5	88	11		3		11	<10		Sample 3 was submitted for laboratory analysis for BTEX and PHC's F1-F4.
			3	87.5								
			3.5	87	26		4		26	<10		
		END OF BOREHOLE										

LOGGED BY: RH | DRILLING DATE: February 26, 2018

REVIEWED BY: VN | Page 1 of 1

CLIENT: Parkland Fuel Corporation	METHOD: Split Spoon Sampling		**BH No.: MW106**
PROJECT: 1622 Roger Stevens Drive	PROJECT ENGINEER: Vic	ELEV. (m) 92.40	
LOCATION: Kars, Ontario	NORTHING: 0448302	EASTING: 5000442	PROJECT NO.: CB1057.00

SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON

GWL (m)	SOIL DESCRIPTION	DEPTH (m)	ELEVATION (m)	Shear Strength (kPa) 40 80 120 160 / N-Value (Blows/300mm) 20 40 60 80	Water Content (%) PL W.C. LL 20 40 60 80	SAMPLE NO.	SAMPLE TYPE	SPT(N)	CSV (ppm)	Well Construction	REMARKS
	Augured through frost to 0.75 m	0	92								occasional boulders encountered in borehole.
	loose, moist, brown SAND trace organics	0.5	91.5	6	12	1		6	<10		
	loose	1	91	8	9	2		8	<10		
	-----	1.5	90.5								
	compact	2	90	22	11	3		22	<10		
	-----	2.5	89.5								
	loose moist, brown SILTY SAND trace embedded gravel	3	89	7	12	4		7	<10		Sample 4 submitted for laboratory analysis of BTEX, PHC's F1-F4 and VOC's.
	-----	3.5	88.5								
	compact brownish grey	4	88	13	11	5		13	<10		
	-----	4.5	87.5	2		6		2	<10		
	-----	5	87								
	loose grey	5.5	86.5	2	12	7		2	<10		
	END OF BOREHOLE	6									

LOGGED BY: RH | DRILLING DATE: February 22, 2018

REVIEWED BY: VN | Page 1 of 1

CLIENT: Parkland Fuel Corporation	METHOD: Split Spoon Sampling		**BH No.: MW107**
PROJECT: 1622 Roger Stevens Drive	PROJECT ENGINEER: Vic	ELEV. (m) 92.46	
LOCATION: Kars, Ontario	NORTHING: 0448315	EASTING: 5000409	PROJECT NO.: CB1057.00

SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON

GWL (m)	SOIL SYMBOL	SOIL DESCRIPTION	DEPTH (m)	ELEVATION (m)	Shear Strength (kPa) 40 80 120 160 / N-Value (Blows/300mm) 20 40 60 80	Water Content (%) PL W.C. LL 20 40 60 80	SAMPLE NO.	SAMPLE TYPE	SPT(N)	CSV (ppm)	Well Construction	REMARKS
		Topsoil at surface Augured through frost to 0.76 m	0	92								occasional boulders encountered in borehole.
		dense, moist, brown SILTY SAND some embedded gravel	0.5 1 1.5 2 2.5 3 3.5	91.5 91 90.5 90 89.5 89	39 50+ 50+ 50+		1 2 3 4		39 50+ 50+ 50+	<10 <10 <10 <10		Sample 3 submitted for laboratory analysis of BTEX and PHC's F1-F4. Auger Refusal at 3.7 m bgs, on possible boulders.
		END OF BOREHOLE										

	LOGGED BY: RH	DRILLING DATE: February 22, 2018
	REVIEWED BY: VN	Page 1 of 1

CLIENT: Parkland Fuel Corporation	METHOD: Split Spoon Sampling		**BH No.: MW108**
PROJECT: 1622 Roger Stevens Drive	PROJECT ENGINEER: Vic	ELEV. (m) 91.38	
LOCATION: Kars, Ontario	NORTHING: 0448270	EASTING: 5000428	PROJECT NO.: CB1057.00

SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON

GWL (m)	SOIL DESCRIPTION	DEPTH (m)	ELEVATION (m)	Shear Strength (kPa) 40 80 120 160 / N-Value (Blows/300mm) 20 40 60 80	Water Content (%) PL W.C. LL 20 40 60 80	SAMPLE NO.	SAMPLE TYPE	SPT(N)	CSV (ppm)	Well Construction	REMARKS
	Topsoil at surface Augured to 0.76 m bgs.	0	91			1					occasional boulders encountered in borehole.
	dense, moist, brown SAND and SILT trace organics trace gravel	0.5	90.5	53		2		53	<10		
	loose, moist, dark brown TOPSOIL	1	90			3A		5	<10		
		1.5	89.5	5		3B			<10		
		2	89								
		2.5	88.5	34		4		34	<10		Auger refusal at 2.89, on possible boulder.
	loose, moist brown SILTY SAND trace embedded gravel	3	88	11		5		11	<10		
		3.5	87.5	5		6		5	<10		
		4	87								Sample 7 was submitted for laboratory analysis of BTEX and PHC's F1-F4 and VOC's. MW108-17 is a duplicate.
		4.5	86.5	8		7		8	<10		
	----- wet grey	5	86			8A		9	<10		
		5.5	85.5	9		8B			<10		
	END OF BOREHOLE										

	LOGGED BY: RH	DRILLING DATE: February 22, 2018
	REVIEWED BY: VN	Page 1 of 1

CLIENT: Parkland Fuel Corporation	METHOD: Split Spoon Sampling		**BH No.: BH109**
PROJECT: 1622 Roger Stevens Drive	PROJECT ENGINEER: Vic	ELEV. (m) 91.70	
LOCATION: Kars, Ontario	NORTHING:	EASTING:	PROJECT NO.: CB1057.00

SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON

GWL (m)	SOIL SYMBOL	SOIL DESCRIPTION	DEPTH (m)	ELEVATION (m)	Shear Strength (kPa) 40 80 120 160 / N-Value (Blows/300mm) 20 40 60 80	Water Content (%) PL W.C. LL 20 40 60 80	SAMPLE NO.	SAMPLE TYPE	SPT(N)	CSV (ppm)	Well Construction	REMARKS
		50 mm of Asphaltic Concrete Aurgured through frost to 0.76 m.	0	91.5			1			<10		occasional boulders encountered in borehole.
		cmpact, moist, brown sand and gravel (FILL)	0.5 / 1	91 / 90.5	16		2		16	<10		
		compact, moist brown SILTY SAND trace embedded gravel	1.5 / 2 / 2.5 / 3	90 / 89.5 / 89 / 88.5	11 / 20 / 18		3 / 4 / 5		11 / 20 / 18	<10 / <10 / <10		Sample 4 was submitted for laboratory analysis for BTEX and PHC F1-F4. Duplicate was taken. Auger refusal at 3.7 m on possible boulder.
		END OF BOREHOLE	3.5									

	LOGGED BY: RH	DRILLING DATE: February 26, 2018
	REVIEWED BY: VN	Page 1 of 1

APPENDIX III

LABORATORY CERTIFICATES OF ANALYSIS

Maxxam
A Bureau Veritas Group Company

Your P.O. #: PIONEER
Your Project #: CB1057.00
Site Location: 1622 Roger Stevens Drive
Your C.O.C. #: 650870-01-01, 650870-02-01

Attention: Geoff Lussier

Terrapex Environmental Ltd
920 Brant St.
Suite 16
Burlington, ON
Canada L7R 4J1

Report Date: 2018/03/06
Report #: R5031879
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B841113
Received: 2018/02/23, 10:10

Sample Matrix: Soil
Samples Received: 11

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
1,3-Dichloropropene Sum	2	N/A	2018/02/23	OTT SOP-00002	EPA 8260C m
Petroleum Hydro. CCME F1 & BTEX in Soil (2)	9	N/A	2018/02/23	OTT SOP-00002	CCME CWS
Petroleum Hydrocarbons F2-F4 in Soil (3)	10	2018/02/23	2018/02/23	OTT SOP-00001	CCME CWS
Moisture	10	N/A	2018/02/23	CAM SOP-00445	McKeague 2nd ed 1978
pH CaCl2 EXTRACT (1)	1	2018/03/06	2018/03/06	CAM SOP-00413	EPA 9045 D m
Volatile Organic Compounds and F1 PHCs	2	N/A	2018/02/23	OTT SOP-00002	EPA 8260C 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.

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.

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 Maxxam Analytics Mississauga
(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 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 32 Colonnade Rd, Unit #1000, Nepean, ON K2E 7J6 Phone: 613 274-0573 Fax: 613 274-0574 Website: www.maxxam.ca

Your P.O. #: PIONEER
Your Project #: CB1057.00
Site Location: 1622 Roger Stevens Drive
Your C.O.C. #: 650870-01-01, 650870-02-01

Attention: Geoff Lussier

Terrapex Environmental Ltd
920 Brant St.
Suite 16
Burlington, ON
Canada L7R 4J1

Report Date: 2018/03/06
Report #: R5031879
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B841113
Received: 2018/02/23, 10:10

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Augustyna Dobosz, Project Manager
Email: ADobosz@maxxam.ca
Phone# (905)817-5700 Ext:5798

==========

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 32 Colonnade Rd, Unit #1000, Nepean, ON K2E 7J6 Phone: 613 274-0573 Fax: 613 274-0574 Website: www.maxxam.ca

Maxxam Job #: B841113
Report Date: 2018/03/06

Terrapex Environmental Ltd
Client Project #: CB1057.00
Site Location: 1622 Roger Stevens Drive
Your P.O. #: PIONEER
Sampler Initials: GS

O.REG 153 PETROLEUM HYDROCARBONS (SOIL)

Maxxam ID		GDG333			GDG333			GDG334	GDG335		
Sampling Date		2018/02/22 08:30			2018/02/22 08:30			2018/02/22 09:30	2018/02/22 12:00		
COC Number		650870-01-01			650870-01-01			650870-01-01	650870-01-01		
	UNITS	MW 101-8	RDL	QC Batch	MW 101-8 Lab-Dup	RDL	QC Batch	MW 102-5	BH 103-4	RDL	QC Batch
Inorganics											
Moisture	%	9.7	0.2	5412285	11	0.2	5412285	11	9.7	0.2	5412285
BTEX & F1 Hydrocarbons											
Benzene	ug/g	<0.02	0.02	5412284				<0.02	<0.02	0.02	5412284
Toluene	ug/g	<0.02	0.02	5412284				<0.02	<0.02	0.02	5412284
Ethylbenzene	ug/g	<0.02	0.02	5412284				<0.02	<0.02	0.02	5412284
o-Xylene	ug/g	<0.02	0.02	5412284				<0.02	<0.02	0.02	5412284
p+m-Xylene	ug/g	<0.04	0.04	5412284				<0.04	<0.04	0.04	5412284
Total Xylenes	ug/g	<0.04	0.04	5412284				<0.04	<0.04	0.04	5412284
F1 (C6-C10)	ug/g	<10	10	5412284				<10	<10	10	5412284
F1 (C6-C10) - BTEX	ug/g	<10	10	5412284				<10	<10	10	5412284
F2-F4 Hydrocarbons											
F2 (C10-C16 Hydrocarbons)	ug/g	<10	10	5412136				<10	<10	10	5412136
F3 (C16-C34 Hydrocarbons)	ug/g	<50	50	5412136				<50	<50	50	5412136
F4 (C34-C50 Hydrocarbons)	ug/g	<50	50	5412136				<50	<50	50	5412136
Reached Baseline at C50	ug/g	Yes		5412136				Yes	Yes		5412136
Surrogate Recovery (%)											
1,4-Difluorobenzene	%	105		5412284				106	106		5412284
4-Bromofluorobenzene	%	114		5412284				114	117		5412284
D10-Ethylbenzene	%	93		5412284				100	97		5412284
D4-1,2-Dichloroethane	%	104		5412284				105	105		5412284
o-Terphenyl	%	83		5412136				77	94		5412136

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B841113
Report Date: 2018/03/06

Terrapex Environmental Ltd
Client Project #: CB1057.00
Site Location: 1622 Roger Stevens Drive
Your P.O. #: PIONEER
Sampler Initials: GS

O.REG 153 PETROLEUM HYDROCARBONS (SOIL)

Maxxam ID		GDG336	GDG337	GDG339	GDG341	GDG342		
Sampling Date		2018/02/22 14:30	2018/02/22 16:30	2018/02/22 10:30	2018/02/22 15:15	2018/02/22 14:15		
COC Number		650870-01-01	650870-01-01	650870-01-01	650870-01-01	650870-01-01		
	UNITS	BH 104-1	BH 105-3	MW 107-3	BH 109-4	MW 108-17	RDL	QC Batch
Inorganics								
Moisture	%	20	9.3	8.0	10	11	0.2	5412285
BTEX & F1 Hydrocarbons								
Benzene	ug/g	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	5412284
Toluene	ug/g	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	5412284
Ethylbenzene	ug/g	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	5412284
o-Xylene	ug/g	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	5412284
p+m-Xylene	ug/g	<0.04	<0.04	<0.04	<0.04	<0.04	0.04	5412284
Total Xylenes	ug/g	<0.04	<0.04	<0.04	<0.04	<0.04	0.04	5412284
F1 (C6-C10)	ug/g	<10	<10	<10	<10	<10	10	5412284
F1 (C6-C10) - BTEX	ug/g	<10	<10	<10	<10	<10	10	5412284
F2-F4 Hydrocarbons								
F2 (C10-C16 Hydrocarbons)	ug/g	<10	<10	<10	<10	<10	10	5412136
F3 (C16-C34 Hydrocarbons)	ug/g	<50	<50	<50	<50	<50	50	5412136
F4 (C34-C50 Hydrocarbons)	ug/g	<50	<50	<50	<50	<50	50	5412136
Reached Baseline at C50	ug/g	Yes	Yes	Yes	Yes	Yes		5412136
Surrogate Recovery (%)								
1,4-Difluorobenzene	%	105	106	106	106	104		5412284
4-Bromofluorobenzene	%	110	113	107	109	107		5412284
D10-Ethylbenzene	%	88	99	104	108	97		5412284
D4-1,2-Dichloroethane	%	103	102	103	103	103		5412284
o-Terphenyl	%	93	95	90	91	92		5412136

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Report Date: 2018/03/06

Terrapex Environmental Ltd
Client Project #: CB1057.00
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Your P.O. #: PIONEER
Sampler Initials: GS

O.REG 153 VOCS BY HS & F1-F4 (SOIL)

Maxxam ID		GDG338	GDG340		
Sampling Date		2018/02/22 08:30	2018/02/22 14:45		
COC Number		650870-01-01	650870-01-01		
	UNITS	MW 106-4	MW 108-7	RDL	QC Batch
Inorganics					
Moisture	%	11	11	0.2	5412285
Calculated Parameters					
1,3-Dichloropropene (cis+trans)	ug/g	<0.050	<0.050	0.050	5412280
Volatile Organics					
Acetone (2-Propanone)	ug/g	<0.50	<0.50	0.50	5412288
Benzene	ug/g	<0.020	<0.020	0.020	5412288
Bromodichloromethane	ug/g	<0.050	<0.050	0.050	5412288
Bromoform	ug/g	<0.050	<0.050	0.050	5412288
Bromomethane	ug/g	<0.050	<0.050	0.050	5412288
Carbon Tetrachloride	ug/g	<0.050	<0.050	0.050	5412288
Chlorobenzene	ug/g	<0.050	<0.050	0.050	5412288
Chloroform	ug/g	<0.050	<0.050	0.050	5412288
Dibromochloromethane	ug/g	<0.050	<0.050	0.050	5412288
1,2-Dichlorobenzene	ug/g	<0.050	<0.050	0.050	5412288
1,3-Dichlorobenzene	ug/g	<0.050	<0.050	0.050	5412288
1,4-Dichlorobenzene	ug/g	<0.050	<0.050	0.050	5412288
Dichlorodifluoromethane (FREON 12)	ug/g	<0.050	<0.050	0.050	5412288
1,1-Dichloroethane	ug/g	<0.050	<0.050	0.050	5412288
1,2-Dichloroethane	ug/g	<0.050	<0.050	0.050	5412288
1,1-Dichloroethylene	ug/g	<0.050	<0.050	0.050	5412288
cis-1,2-Dichloroethylene	ug/g	<0.050	<0.050	0.050	5412288
trans-1,2-Dichloroethylene	ug/g	<0.050	<0.050	0.050	5412288
1,2-Dichloropropane	ug/g	<0.050	<0.050	0.050	5412288
cis-1,3-Dichloropropene	ug/g	<0.030	<0.030	0.030	5412288
trans-1,3-Dichloropropene	ug/g	<0.040	<0.040	0.040	5412288
Ethylbenzene	ug/g	<0.020	<0.020	0.020	5412288
Ethylene Dibromide	ug/g	<0.050	<0.050	0.050	5412288
Hexane	ug/g	<0.050	<0.050	0.050	5412288
Methylene Chloride(Dichloromethane)	ug/g	<0.050	<0.050	0.050	5412288
Methyl Ethyl Ketone (2-Butanone)	ug/g	<0.50	<0.50	0.50	5412288

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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O.REG 153 VOCS BY HS & F1-F4 (SOIL)

Maxxam ID		GDG338	GDG340		
Sampling Date		2018/02/22 08:30	2018/02/22 14:45		
COC Number		650870-01-01	650870-01-01		
	UNITS	MW 106-4	MW 108-7	RDL	QC Batch
Methyl Isobutyl Ketone	ug/g	<0.50	<0.50	0.50	5412288
Methyl t-butyl ether (MTBE)	ug/g	<0.050	<0.050	0.050	5412288
Styrene	ug/g	<0.050	<0.050	0.050	5412288
1,1,1,2-Tetrachloroethane	ug/g	<0.050	<0.050	0.050	5412288
1,1,2,2-Tetrachloroethane	ug/g	<0.050	<0.050	0.050	5412288
Tetrachloroethylene	ug/g	<0.050	<0.050	0.050	5412288
Toluene	ug/g	<0.020	<0.020	0.020	5412288
1,1,1-Trichloroethane	ug/g	<0.050	<0.050	0.050	5412288
1,1,2-Trichloroethane	ug/g	<0.050	<0.050	0.050	5412288
Trichloroethylene	ug/g	<0.050	<0.050	0.050	5412288
Trichlorofluoromethane (FREON 11)	ug/g	<0.050	<0.050	0.050	5412288
Vinyl Chloride	ug/g	<0.020	<0.020	0.020	5412288
p+m-Xylene	ug/g	<0.020	<0.020	0.020	5412288
o-Xylene	ug/g	<0.020	<0.020	0.020	5412288
Total Xylenes	ug/g	<0.020	<0.020	0.020	5412288
F1 (C6-C10)	ug/g	<10	<10	10	5412288
F1 (C6-C10) - BTEX	ug/g	<10	<10	10	5412288
F2-F4 Hydrocarbons					
F2 (C10-C16 Hydrocarbons)	ug/g	<10	<10	10	5412136
F3 (C16-C34 Hydrocarbons)	ug/g	<50	<50	50	5412136
F4 (C34-C50 Hydrocarbons)	ug/g	<50	<50	50	5412136
Reached Baseline at C50	ug/g	Yes	Yes		5412136
Surrogate Recovery (%)					
o-Terphenyl	%	93	90		5412136
4-Bromofluorobenzene	%	89	88		5412288
D10-o-Xylene	%	74	68		5412288
D4-1,2-Dichloroethane	%	94	98		5412288
D8-Toluene	%	95	93		5412288

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B841113
Report Date: 2018/03/06

Terrapex Environmental Ltd
Client Project #: CB1057.00
Site Location: 1622 Roger Stevens Drive
Your P.O. #: PIONEER
Sampler Initials: GS

RESULTS OF ANALYSES OF SOIL

Maxxam ID		GDG336	
Sampling Date		2018/02/22 14:30	
COC Number		650870-01-01	
	UNITS	**BH 104-1**	**QC Batch**
Inorganics			
Available (CaCl2) pH	pH	7.10	5427526
QC Batch = Quality Control Batch			

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Sampler Initials: GS

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		GDG354		
Sampling Date		2018/02/22		
COC Number		650870-02-01		
	UNITS	FIELD BLANK	RDL	QC Batch
BTEX & F1 Hydrocarbons				
Benzene	ug/g	<0.02	0.02	5412284
Toluene	ug/g	<0.02	0.02	5412284
Ethylbenzene	ug/g	<0.02	0.02	5412284
o-Xylene	ug/g	<0.02	0.02	5412284
p+m-Xylene	ug/g	<0.04	0.04	5412284
Total Xylenes	ug/g	<0.04	0.04	5412284
F1 (C6-C10)	ug/g	<10	10	5412284
F1 (C6-C10) - BTEX	ug/g	<10	10	5412284
Surrogate Recovery (%)				
1,4-Difluorobenzene	%	107		5412284
4-Bromofluorobenzene	%	106		5412284
D10-Ethylbenzene	%	116		5412284
D4-1,2-Dichloroethane	%	104		5412284

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B841113
Report Date: 2018/03/06

Terrapex Environmental Ltd
Client Project #: CB1057.00
Site Location: 1622 Roger Stevens Drive
Your P.O. #: PIONEER
Sampler Initials: GS

TEST SUMMARY

Maxxam ID: GDG333 **Collected:** 2018/02/22
Sample ID: MW 101-8 **Shipped:**
Matrix: Soil **Received:** 2018/02/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	5412284	N/A	2018/02/23	Steve Roberts
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5412136	2018/02/23	2018/02/23	Liliana Gaburici
Moisture	BAL	5412285	N/A	2018/02/23	Liliana Gaburici

Maxxam ID: GDG333 Dup **Collected:** 2018/02/22
Sample ID: MW 101-8 **Shipped:**
Matrix: Soil **Received:** 2018/02/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	5412285	N/A	2018/02/23	Liliana Gaburici

Maxxam ID: GDG334 **Collected:** 2018/02/22
Sample ID: MW 102-5 **Shipped:**
Matrix: Soil **Received:** 2018/02/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	5412284	N/A	2018/02/23	Steve Roberts
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5412136	2018/02/23	2018/02/23	Liliana Gaburici
Moisture	BAL	5412285	N/A	2018/02/23	Liliana Gaburici

Maxxam ID: GDG335 **Collected:** 2018/02/22
Sample ID: BH 103-4 **Shipped:**
Matrix: Soil **Received:** 2018/02/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	5412284	N/A	2018/02/23	Steve Roberts
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5412136	2018/02/23	2018/02/23	Liliana Gaburici
Moisture	BAL	5412285	N/A	2018/02/23	Liliana Gaburici

Maxxam ID: GDG336 **Collected:** 2018/02/22
Sample ID: BH 104-1 **Shipped:**
Matrix: Soil **Received:** 2018/02/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	5412284	N/A	2018/02/23	Steve Roberts
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5412136	2018/02/23	2018/02/23	Liliana Gaburici
Moisture	BAL	5412285	N/A	2018/02/23	Liliana Gaburici
pH CaCl2 EXTRACT	AT	5427526	2018/03/06	2018/03/06	Neil Dassanayake

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Report Date: 2018/03/06

Terrapex Environmental Ltd
Client Project #: CB1057.00
Site Location: 1622 Roger Stevens Drive
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Sampler Initials: GS

TEST SUMMARY

Maxxam ID: GDG337 **Collected:** 2018/02/22
Sample ID: BH 105-3 **Shipped:**
Matrix: Soil **Received:** 2018/02/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	5412284	N/A	2018/02/23	Steve Roberts
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5412136	2018/02/23	2018/02/23	Liliana Gaburici
Moisture	BAL	5412285	N/A	2018/02/23	Liliana Gaburici

Maxxam ID: GDG338 **Collected:** 2018/02/22
Sample ID: MW 106-4 **Shipped:**
Matrix: Soil **Received:** 2018/02/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	5412280	N/A	2018/02/23	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5412136	2018/02/23	2018/02/23	Liliana Gaburici
Moisture	BAL	5412285	N/A	2018/02/23	Liliana Gaburici
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5412288	N/A	2018/02/23	Liliana Gaburici

Maxxam ID: GDG339 **Collected:** 2018/02/22
Sample ID: MW 107-3 **Shipped:**
Matrix: Soil **Received:** 2018/02/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	5412284	N/A	2018/02/23	Steve Roberts
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5412136	2018/02/23	2018/02/23	Liliana Gaburici
Moisture	BAL	5412285	N/A	2018/02/23	Liliana Gaburici

Maxxam ID: GDG340 **Collected:** 2018/02/22
Sample ID: MW 108-7 **Shipped:**
Matrix: Soil **Received:** 2018/02/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	5412280	N/A	2018/02/23	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5412136	2018/02/23	2018/02/23	Liliana Gaburici
Moisture	BAL	5412285	N/A	2018/02/23	Liliana Gaburici
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5412288	N/A	2018/02/23	Liliana Gaburici

Maxxam ID: GDG341 **Collected:** 2018/02/22
Sample ID: BH 109-4 **Shipped:**
Matrix: Soil **Received:** 2018/02/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	5412284	N/A	2018/02/23	Steve Roberts
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5412136	2018/02/23	2018/02/23	Liliana Gaburici
Moisture	BAL	5412285	N/A	2018/02/23	Liliana Gaburici

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Report Date: 2018/03/06

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TEST SUMMARY

Maxxam ID: GDG342
Sample ID: MW 108-17
Matrix: Soil

Collected: 2018/02/22
Shipped:
Received: 2018/02/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	5412284	N/A	2018/02/23	Steve Roberts
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5412136	2018/02/23	2018/02/23	Liliana Gaburici
Moisture	BAL	5412285	N/A	2018/02/23	Liliana Gaburici

Maxxam ID: GDG354
Sample ID: FIELD BLANK
Matrix: Soil

Collected: 2018/02/22
Shipped:
Received: 2018/02/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	5412284	N/A	2018/02/23	Steve Roberts

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Sampler Initials: GS

GENERAL COMMENTS

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

Package 1	8.3°C

Revised report (2018/03/06): pH analysis added to sample BH104-1 per client request

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
5412136	LGA	Spiked Blank	o-Terphenyl	2018/02/23		106	%	30 - 130
			F2 (C10-C16 Hydrocarbons)	2018/02/23		97	%	80 - 120
			F3 (C16-C34 Hydrocarbons)	2018/02/23		97	%	80 - 120
			F4 (C34-C50 Hydrocarbons)	2018/02/23		97	%	80 - 120
5412136	LGA	RPD	F2 (C10-C16 Hydrocarbons)	2018/02/23	1.0		%	50
			F3 (C16-C34 Hydrocarbons)	2018/02/23	1.0		%	50
			F4 (C34-C50 Hydrocarbons)	2018/02/23	1.0		%	50
5412136	LGA	Method Blank	o-Terphenyl	2018/02/23		94	%	30 - 130
			F2 (C10-C16 Hydrocarbons)	2018/02/23	<10		ug/g	
			F3 (C16-C34 Hydrocarbons)	2018/02/23	<50		ug/g	
			F4 (C34-C50 Hydrocarbons)	2018/02/23	<50		ug/g	
5412284	STE	Spiked Blank	1,4-Difluorobenzene	2018/02/23		104	%	60 - 140
			4-Bromofluorobenzene	2018/02/23		116	%	60 - 140
			D10-Ethylbenzene	2018/02/23		103	%	30 - 130
			D4-1,2-Dichloroethane	2018/02/23		112	%	60 - 140
			Benzene	2018/02/23		92	%	60 - 140
			Toluene	2018/02/23		83	%	60 - 140
			Ethylbenzene	2018/02/23		86	%	60 - 140
			o-Xylene	2018/02/23		86	%	60 - 140
			p+m-Xylene	2018/02/23		87	%	60 - 140
			F1 (C6-C10)	2018/02/23		95	%	80 - 120
			F1 (C6-C10) - BTEX	2018/02/23		95	%	N/A
5412284	STE	RPD	Benzene	2018/02/23	7.2		%	50
			Toluene	2018/02/23	2.5		%	50
			Ethylbenzene	2018/02/23	0.98		%	50
			o-Xylene	2018/02/23	2.2		%	50
			p+m-Xylene	2018/02/23	0.46		%	50
			F1 (C6-C10)	2018/02/23	0.33		%	50
			F1 (C6-C10) - BTEX	2018/02/23	0		%	50
5412284	STE	Method Blank	1,4-Difluorobenzene	2018/02/23		103	%	60 - 140
			4-Bromofluorobenzene	2018/02/23		116	%	60 - 140
			D10-Ethylbenzene	2018/02/23		101	%	30 - 130
			D4-1,2-Dichloroethane	2018/02/23		110	%	60 - 140
			Benzene	2018/02/23	<0.02		ug/g	
			Toluene	2018/02/23	<0.02		ug/g	
			Ethylbenzene	2018/02/23	<0.02		ug/g	
			o-Xylene	2018/02/23	<0.02		ug/g	
			p+m-Xylene	2018/02/23	<0.04		ug/g	
			Total Xylenes	2018/02/23	<0.04		ug/g	
			F1 (C6-C10)	2018/02/23	<10		ug/g	
			F1 (C6-C10) - BTEX	2018/02/23	<10		ug/g	
5412285	LGA	RPD [GDG333-01]	Moisture	2018/02/23	7.9		%	50
5412288	LGA	Spiked Blank	4-Bromofluorobenzene	2018/02/23		102	%	60 - 140
			D10-o-Xylene	2018/02/23		79	%	60 - 130
			D4-1,2-Dichloroethane	2018/02/23		102	%	60 - 140
			D8-Toluene	2018/02/23		102	%	60 - 140
			Acetone (2-Propanone)	2018/02/23		103	%	60 - 140
			Benzene	2018/02/23		103	%	60 - 130
			Bromodichloromethane	2018/02/23		95	%	60 - 130
			Bromoform	2018/02/23		112	%	60 - 130
			Bromomethane	2018/02/23		82	%	60 - 140

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Carbon Tetrachloride	2018/02/23		89	%	60 - 130
			Chlorobenzene	2018/02/23		91	%	60 - 130
			Chloroform	2018/02/23		88	%	60 - 130
			Dibromochloromethane	2018/02/23		108	%	60 - 130
			1,2-Dichlorobenzene	2018/02/23		95	%	60 - 130
			1,3-Dichlorobenzene	2018/02/23		92	%	60 - 130
			1,4-Dichlorobenzene	2018/02/23		96	%	60 - 130
			Dichlorodifluoromethane (FREON 12)	2018/02/23		71	%	60 - 140
			1,1-Dichloroethane	2018/02/23		94	%	60 - 130
			1,2-Dichloroethane	2018/02/23		100	%	60 - 130
			1,1-Dichloroethylene	2018/02/23		83	%	60 - 130
			cis-1,2-Dichloroethylene	2018/02/23		94	%	60 - 130
			trans-1,2-Dichloroethylene	2018/02/23		84	%	60 - 130
			1,2-Dichloropropane	2018/02/23		84	%	60 - 130
			cis-1,3-Dichloropropene	2018/02/23		96	%	60 - 130
			trans-1,3-Dichloropropene	2018/02/23		97	%	60 - 130
			Ethylbenzene	2018/02/23		95	%	60 - 130
			Ethylene Dibromide	2018/02/23		109	%	60 - 130
			Hexane	2018/02/23		86	%	60 - 130
			Methylene Chloride(Dichloromethane)	2018/02/23		83	%	60 - 130
			Methyl Ethyl Ketone (2-Butanone)	2018/02/23		107	%	60 - 140
			Methyl Isobutyl Ketone	2018/02/23		116	%	60 - 130
			Methyl t-butyl ether (MTBE)	2018/02/23		87	%	60 - 130
			Styrene	2018/02/23		110	%	60 - 130
			1,1,1,2-Tetrachloroethane	2018/02/23		103	%	60 - 130
			1,1,2,2-Tetrachloroethane	2018/02/23		107	%	60 - 130
			Tetrachloroethylene	2018/02/23		92	%	60 - 130
			Toluene	2018/02/23		95	%	60 - 130
			1,1,1-Trichloroethane	2018/02/23		87	%	60 - 130
			1,1,2-Trichloroethane	2018/02/23		90	%	60 - 130
			Trichloroethylene	2018/02/23		91	%	60 - 130
			Trichlorofluoromethane (FREON 11)	2018/02/23		87	%	60 - 130
			Vinyl Chloride	2018/02/23		86	%	60 - 130
			p+m-Xylene	2018/02/23		90	%	60 - 130
			o-Xylene	2018/02/23		103	%	60 - 130
			F1 (C6-C10)	2018/02/23		104	%	80 - 120
5412288	LGA	RPD	Acetone (2-Propanone)	2018/02/23	22		%	50
			Benzene	2018/02/23	5.7		%	50
			Bromodichloromethane	2018/02/23	19		%	50
			Bromoform	2018/02/23	24		%	50
			Bromomethane	2018/02/23	12		%	50
			Carbon Tetrachloride	2018/02/23	3.9		%	50
			Chlorobenzene	2018/02/23	3.8		%	50
			Chloroform	2018/02/23	7.4		%	50
			Dibromochloromethane	2018/02/23	15		%	50
			1,2-Dichlorobenzene	2018/02/23	1.7		%	50
			1,3-Dichlorobenzene	2018/02/23	4.3		%	50
			1,4-Dichlorobenzene	2018/02/23	1.4		%	50
			Dichlorodifluoromethane (FREON 12)	2018/02/23	5.1		%	50
			1,1-Dichloroethane	2018/02/23	9.6		%	50
			1,2-Dichloroethane	2018/02/23	25		%	50

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Maxxam Job #: B841113
Report Date: 2018/03/06

Terrapex Environmental Ltd
Client Project #: CB1057.00
Site Location: 1622 Roger Stevens Drive
Your P.O. #: PIONEER
Sampler Initials: GS

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,1-Dichloroethylene	2018/02/23	2.4		%	50
			cis-1,2-Dichloroethylene	2018/02/23	13		%	50
			trans-1,2-Dichloroethylene	2018/02/23	2.4		%	50
			1,2-Dichloropropane	2018/02/23	11		%	50
			cis-1,3-Dichloropropene	2018/02/23	26		%	50
			trans-1,3-Dichloropropene	2018/02/23	33		%	50
			Ethylbenzene	2018/02/23	6.8		%	50
			Ethylene Dibromide	2018/02/23	26		%	50
			Hexane	2018/02/23	15		%	50
			Methylene Chloride(Dichloromethane)	2018/02/23	14		%	50
			Methyl Ethyl Ketone (2-Butanone)	2018/02/23	41		%	50
			Methyl Isobutyl Ketone	2018/02/23	40		%	50
			Methyl t-butyl ether (MTBE)	2018/02/23	5.1		%	50
			Styrene	2018/02/23	5.1		%	50
			1,1,1,2-Tetrachloroethane	2018/02/23	3.0		%	50
			1,1,2,2-Tetrachloroethane	2018/02/23	27		%	50
			Tetrachloroethylene	2018/02/23	2.6		%	50
			Toluene	2018/02/23	0.53		%	50
			1,1,1-Trichloroethane	2018/02/23	0.80		%	50
			1,1,2-Trichloroethane	2018/02/23	17		%	50
			Trichloroethylene	2018/02/23	2.8		%	50
			Trichlorofluoromethane (FREON 11)	2018/02/23	4.7		%	50
			Vinyl Chloride	2018/02/23	0.88		%	50
			p+m-Xylene	2018/02/23	4.6		%	50
			o-Xylene	2018/02/23	0.94		%	50
			F1 (C6-C10)	2018/02/23	1.9		%	30
5412288	LGA	Method Blank	4-Bromofluorobenzene	2018/02/23		89	%	60 - 140
			D10-o-Xylene	2018/02/23		81	%	60 - 130
			D4-1,2-Dichloroethane	2018/02/23		114	%	60 - 140
			D8-Toluene	2018/02/23		88	%	60 - 140
			Acetone (2-Propanone)	2018/02/23	<0.50		ug/g	
			Benzene	2018/02/23	<0.020		ug/g	
			Bromodichloromethane	2018/02/23	<0.050		ug/g	
			Bromoform	2018/02/23	<0.050		ug/g	
			Bromomethane	2018/02/23	<0.050		ug/g	
			Carbon Tetrachloride	2018/02/23	<0.050		ug/g	
			Chlorobenzene	2018/02/23	<0.050		ug/g	
			Chloroform	2018/02/23	<0.050		ug/g	
			Dibromochloromethane	2018/02/23	0.0		ug/g	
			1,2-Dichlorobenzene	2018/02/23	<0.050		ug/g	
			1,3-Dichlorobenzene	2018/02/23	<0.050		ug/g	
			1,4-Dichlorobenzene	2018/02/23	<0.050		ug/g	
			Dichlorodifluoromethane (FREON 12)	2018/02/23	<0.050		ug/g	
			1,1-Dichloroethane	2018/02/23	<0.050		ug/g	
			1,2-Dichloroethane	2018/02/23	<0.050		ug/g	
			1,1-Dichloroethylene	2018/02/23	<0.050		ug/g	
			cis-1,2-Dichloroethylene	2018/02/23	<0.050		ug/g	
			trans-1,2-Dichloroethylene	2018/02/23	<0.050		ug/g	
			1,2-Dichloropropane	2018/02/23	<0.050		ug/g	
			cis-1,3-Dichloropropene	2018/02/23	<0.030		ug/g	
			trans-1,3-Dichloropropene	2018/02/23	<0.040		ug/g	

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Maxxam Job #: B841113
Report Date: 2018/03/06

Terrapex Environmental Ltd
Client Project #: CB1057.00
Site Location: 1622 Roger Stevens Drive
Your P.O. #: PIONEER
Sampler Initials: GS

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Ethylbenzene	2018/02/23	<0.020		ug/g	
			Ethylene Dibromide	2018/02/23	<0.050		ug/g	
			Hexane	2018/02/23	<0.050		ug/g	
			Methylene Chloride(Dichloromethane)	2018/02/23	<0.050		ug/g	
			Methyl Ethyl Ketone (2-Butanone)	2018/02/23	<0.50		ug/g	
			Methyl Isobutyl Ketone	2018/02/23	<0.50		ug/g	
			Methyl t-butyl ether (MTBE)	2018/02/23	<0.050		ug/g	
			Styrene	2018/02/23	<0.050		ug/g	
			1,1,1,2-Tetrachloroethane	2018/02/23	<0.050		ug/g	
			1,1,2,2-Tetrachloroethane	2018/02/23	<0.050		ug/g	
			Tetrachloroethylene	2018/02/23	<0.050		ug/g	
			Toluene	2018/02/23	<0.020		ug/g	
			1,1,1-Trichloroethane	2018/02/23	<0.050		ug/g	
			1,1,2-Trichloroethane	2018/02/23	<0.050		ug/g	
			Trichloroethylene	2018/02/23	<0.050		ug/g	
			Trichlorofluoromethane (FREON 11)	2018/02/23	<0.050		ug/g	
			Vinyl Chloride	2018/02/23	<0.020		ug/g	
			p+m-Xylene	2018/02/23	<0.020		ug/g	
			o-Xylene	2018/02/23	<0.020		ug/g	
			Total Xylenes	2018/02/23	<0.020		ug/g	
			F1 (C6-C10)	2018/02/23	<10		ug/g	
			F1 (C6-C10) - BTEX	2018/02/23	<10		ug/g	
5427526	NYS	Spiked Blank	Available (CaCl2) pH	2018/03/06		99	%	97 - 103
5427526	NYS	RPD	Available (CaCl2) pH	2018/03/06	0.52		%	N/A

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

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.

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Maxxam Job #: B841113
Report Date: 2018/03/06

Terrapex Environmental Ltd
Client Project #: CB1057.00
Site Location: 1622 Roger Stevens Drive
Your P.O. #: PIONEER
Sampler Initials: GS

VALIDATION SIGNATURE PAGE

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

Cristina Carriere, Scientific Service Specialist

Steve Roberts, Ottawa Lab Manager

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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CHAIN OF CUSTODY RECORD

Page 1 of 2

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name:	#30396 Parkland Industries Ltd	Company Name:	#19684 Terrapex Environmental Ltd	Quotation #:	B75111	Maxxam Job #:	Bottle Order #: 650870
Attention:	Retail Invoices	Attention:	Geoff Lussier	P.O. #:			
Address:	4919-59th St Suite 100 Red Deer AB T4N 6C9	Address:	920 Brant St. Suite 16 Burlington ON L7R 4J1	Project:	CB1057.00		
Tel:	(403) 357-6400 x Fax: (403) 356-3015 x	Tel:	(905) 632-5939 x228 Fax:	Project Name:	Parkland Kars	COC #: C#650870-01-01	Project Manager: Augustyna Dobosz
Email:	emilie.price@parkland.ca, victoria.pianarosa@parkland.	Email:	g.lussier@terrapex.com	Site #:	1622 Roger Stevens Drive		
				Sampled By:	Greg Sabourin		

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE MAXXAM 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
- ☐ 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: Feb. 23 '18 Time Required: ___ ☒
Rush Confirmation Number: AD20180223-01 (call lab for #)

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle): Metals / Hg / Cr VI	Petroleum Hydrocarbons CCME F1 & BTEX	Petroleum Hydrocarbons F2-F4	O.Reg 153 ICPMS Metals and Sulphate	Soil Texture (%sand, %silt, %clay)	Moisture VOCs	pH CaCl2 EXTRACT	Flashpoint	O.Reg 558 TCLP Inorganics Package	O.Reg 558 TCLP PCBs	O.Reg 558 TCLP Volatile Organics HS	# of Bottles	Comments
1		~~MW101-8~~ MW101-8	Feb22'18	8:30	SOIL		X	X									3	
2		MW102-5	Feb21'18	9:30	SOIL		X	X									3	
3		BH103-4	Feb21'18	12:00	SOIL		X	X									3	
4		BH104-1	Feb.21'18	2:30	SOIL		X	X									3	
5		BH105-3	Feb.21'18	4:30	SOIL		X	X									3	
6		MW106-4	Feb.22'18	8:30	SOIL		X	X			X						3	
7		MW107-3	Feb.22'18	10:30	SOIL		X	X									3	
8		MW108-7	Feb.22'18	2:45	SOIL		X	X			X						3	
9		BH109-4	Feb.22'18	3:15	SOIL		X	X									3	On ice
10		MW108-17	Feb.22'18	2:45	SOIL		X	X									3	

23-Feb-18 10:10
Augustyna Dobosz
B841113

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
Greg Sabourin	18/02/23	10:10	Mariana Fascia Fascia	2018/02/23	10:10	

Laboratory Use Only

Time Sensitive	Temperature (°C) on Recei	Custody Seal	Yes	No
	4.8.9	Present	✓	
		Intact	✓	

* 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.

* 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 HTTP://MAXXAM.CA/WP-CONTENT/UPLOADS/ONTARIO-COC.PDF.

SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

White: Maxxa Yellow: Client

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CHAIN OF CUSTODY RECORD

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name:	#30396 Parkland Industries Ltd	Company Name:	#19684 Terrapex Environmental Ltd	Quotation #:	B75111	Maxxam Job #:	Bottle Order #: 650870
Attention:	Retail Invoices	Attention:	Geoff Lussier	P.O. #:			
Address:	4919-59th St Suite 100 Red Deer AB T4N 6C9	Address:	920 Brant St. Suite 16 Burlington ON L7R 4J1	Project:	CB1057.00	COC #: C#650870-02-01	Project Manager: Augustyna Dobosz
Tel:	(403) 357-6400 x Fax: (403) 356-3015 x	Tel:	(905) 632-5939 x228 Fax:	Project Name:	Parkland Kars		
Email:	emilie.price@parkland.ca, victoria.pianarosa@parkland.	Email:	g.lussier@terrapex.com	Site #:	1622 Roger Stevens Drive		
				Sampled By:	Greg Sabourin		

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE MAXXAM 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 ☐ 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: Feb. 23 '18 Time Required: ___ ☒
Rush Confirmation Number: AD20180223-01 (call lab for #)

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle): Metals / Hg / Cr VI	Petroleum Hydrocarbons CCME F1 & BTEX	Petroleum Hydrocarbons F2-F4	O.Reg 153 ICPMS Metals and Sulphate	Soil Texture (%sand, %silt, %clay)	~~Volatiles~~ BTEX / PHC F1	pH CaCl2 EXTRACT	Flashpoint	O.Reg 558 TCLP Inorganics Package	O.Reg 558 TCLP PCBs	O.Reg 558 TCLP Volatile Organics HS	# of Bottles	Comments
1		Field Blank	Feb. 22 '18	—	SOIL						X						2	
2					SOIL													
3					SOIL													
4					SOIL													
5					SOIL													RECEIVED IN OTTAWA
6					SOIL													
7					SOIL													
8					SOIL													
9					SOIL													Onica
10					SOIL													

23-Feb-18 10:10
Augustyna Dobosz
B841113
KIV OTT 001

* 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				
Greg Sabourin	18/02/23	10:15	Mariana Vascon Fonseca	2018/02/23	10:10		Time Sensitive	Temperature (°C) on Recei 4.1, 4.9	Custody Seal Present / Intact	Yes ☑ ☑	No

* 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.

* 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 HTTP://MAXXAM.CA/WP-CONTENT/UPLOADS/ONTARIO-COC.PDF.

SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

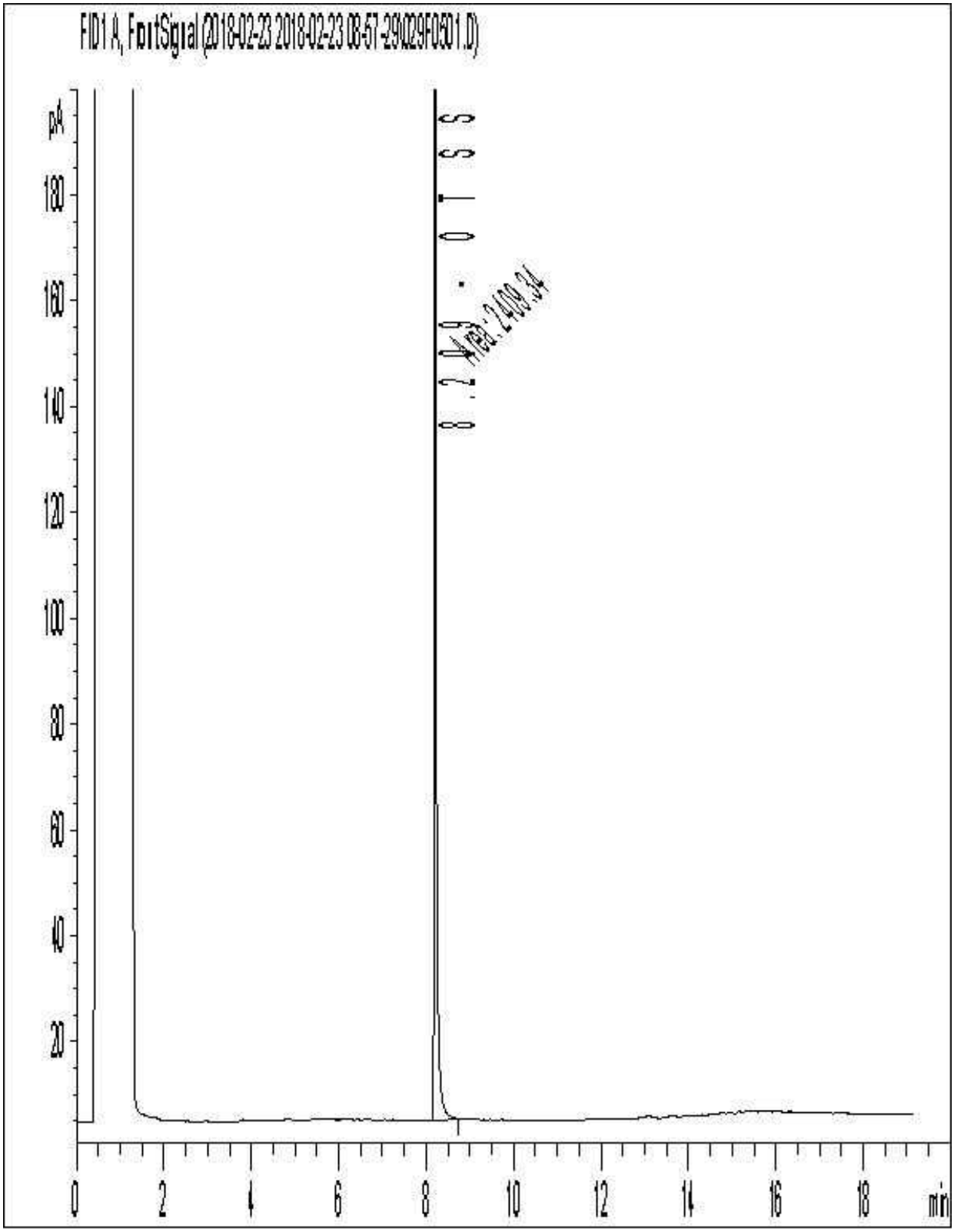
White: Maxxa Yellow: Client

Maxxam Analytics International Corporation o/a Maxxam Analytics

Maxxam Job #: B841113
Report Date: 2018/03/06
Maxxam Sample: GDG333

Terrapex Environmental Ltd
Client Project #: CB1057.00
Project name: 1622 Roger Stevens Drive
Client ID: MW 101-8

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram

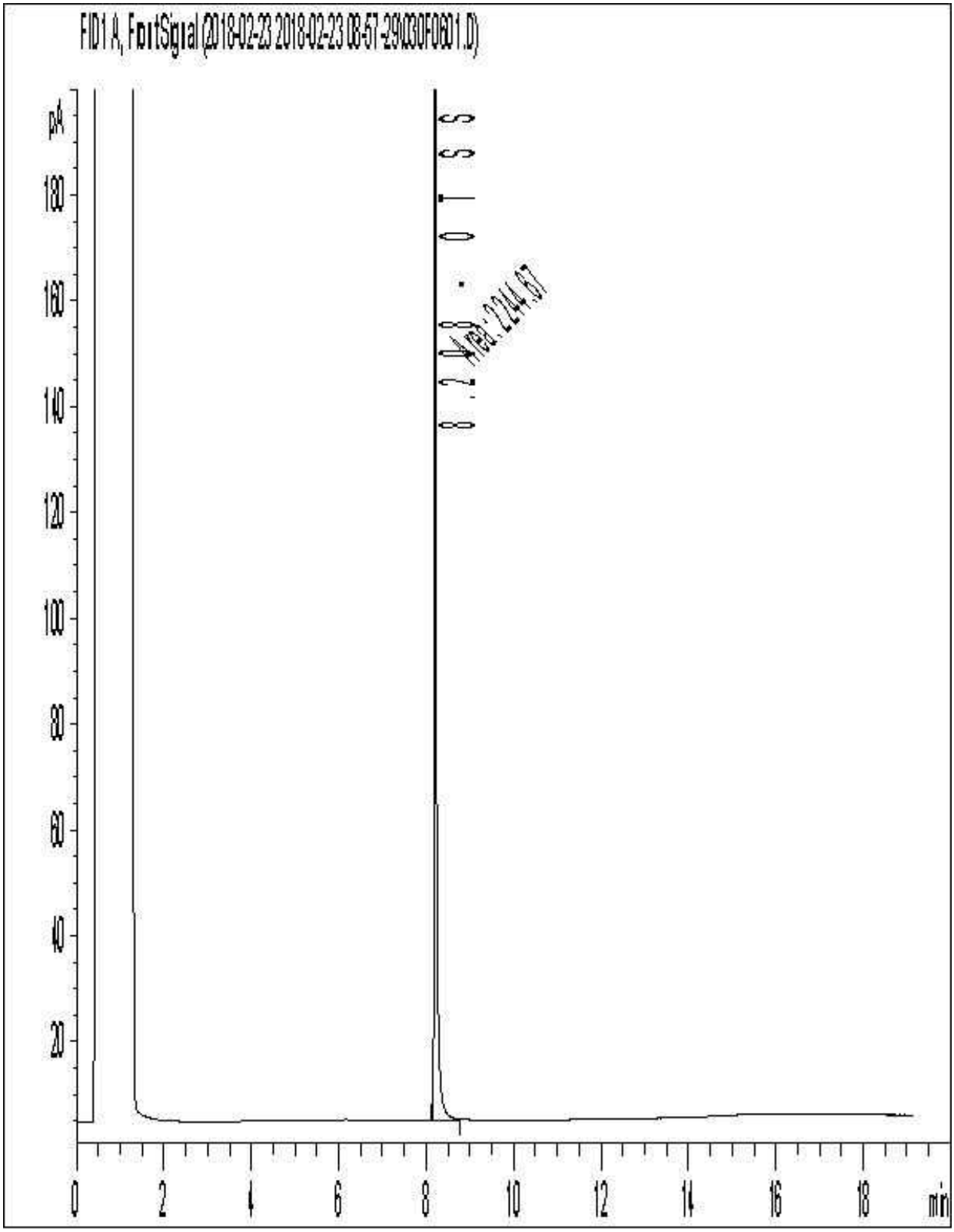


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B841113
Report Date: 2018/03/06
Maxxam Sample: GDG334

Terrapex Environmental Ltd
Client Project #: CB1057.00
Project name: 1622 Roger Stevens Drive
Client ID: MW 102-5

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram

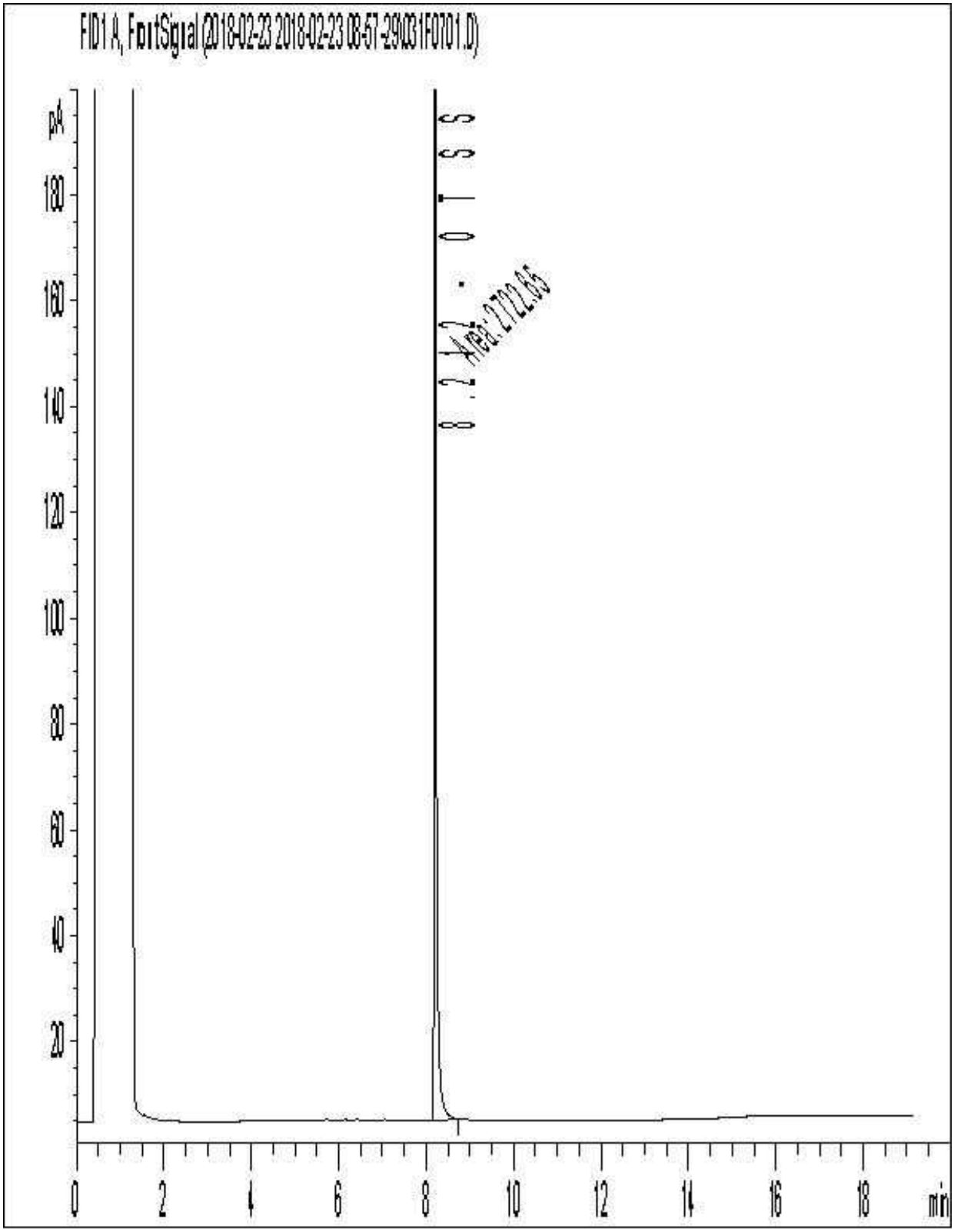


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B841113
Report Date: 2018/03/06
Maxxam Sample: GDG335

Terrapex Environmental Ltd
Client Project #: CB1057.00
Project name: 1622 Roger Stevens Drive
Client ID: BH 103-4

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram

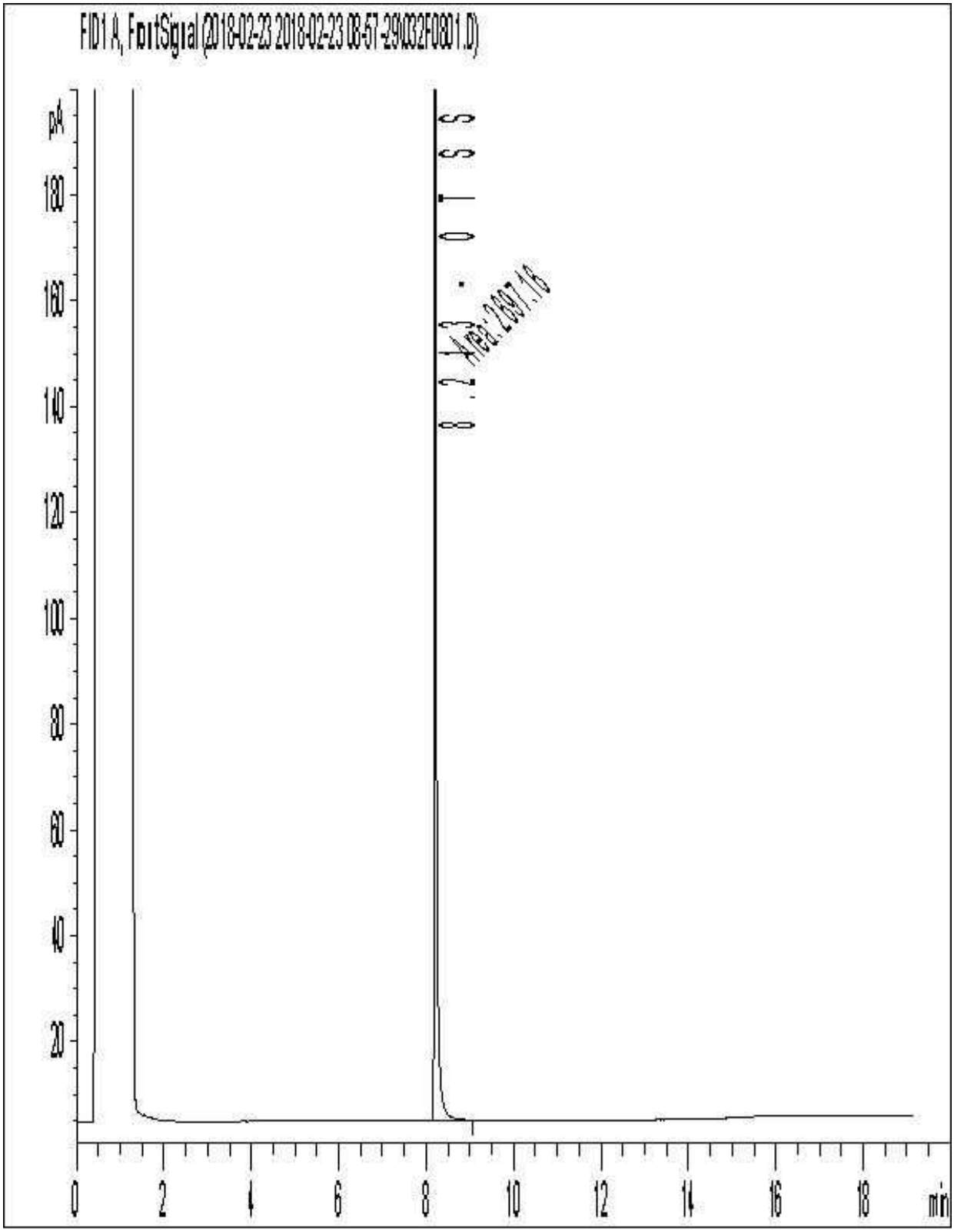


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B841113
Report Date: 2018/03/06
Maxxam Sample: GDG336

Terrapex Environmental Ltd
Client Project #: CB1057.00
Project name: 1622 Roger Stevens Drive
Client ID: BH 104-1

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram

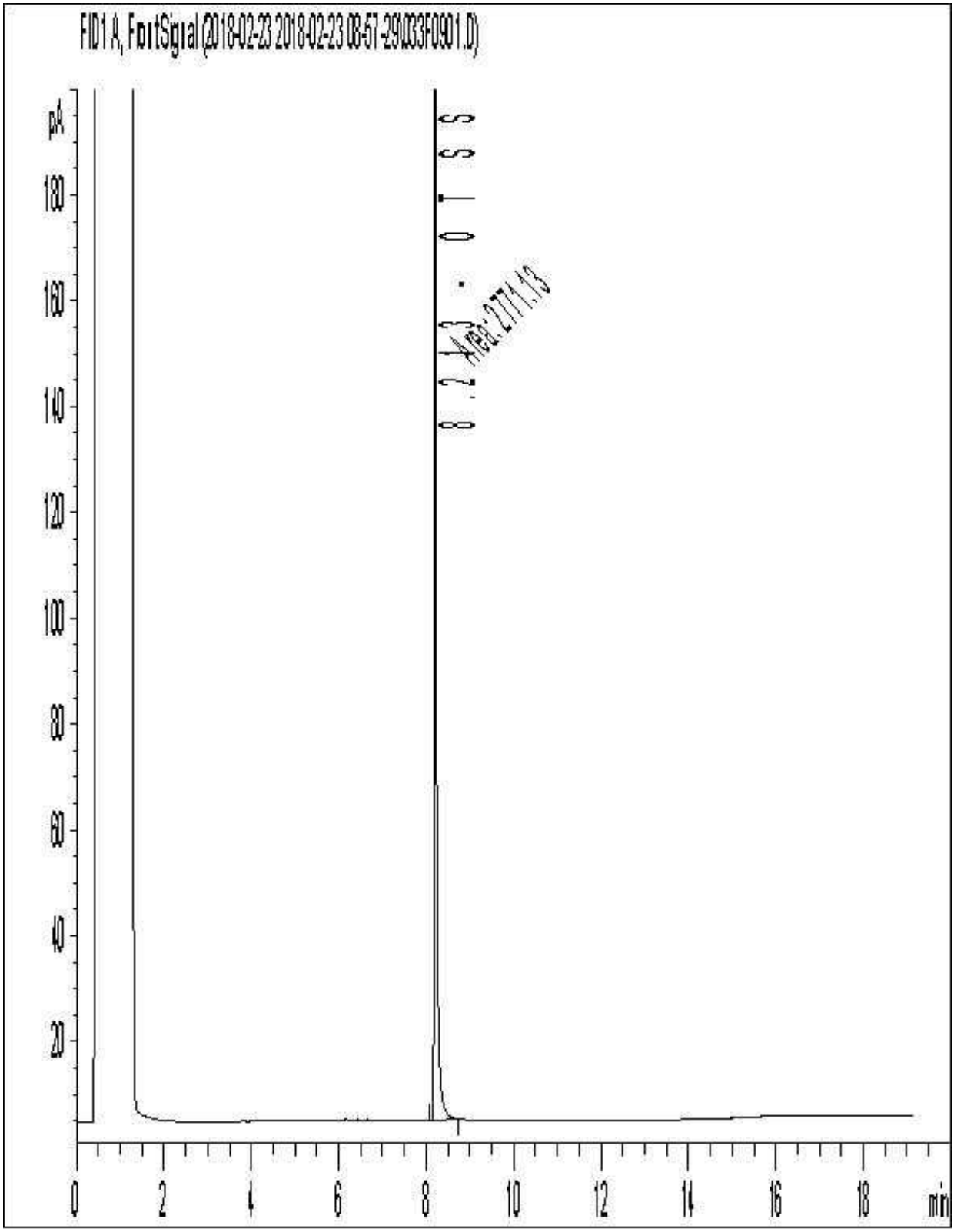


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B841113
Report Date: 2018/03/06
Maxxam Sample: GDG337

Terrapex Environmental Ltd
Client Project #: CB1057.00
Project name: 1622 Roger Stevens Drive
Client ID: BH 105-3

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram

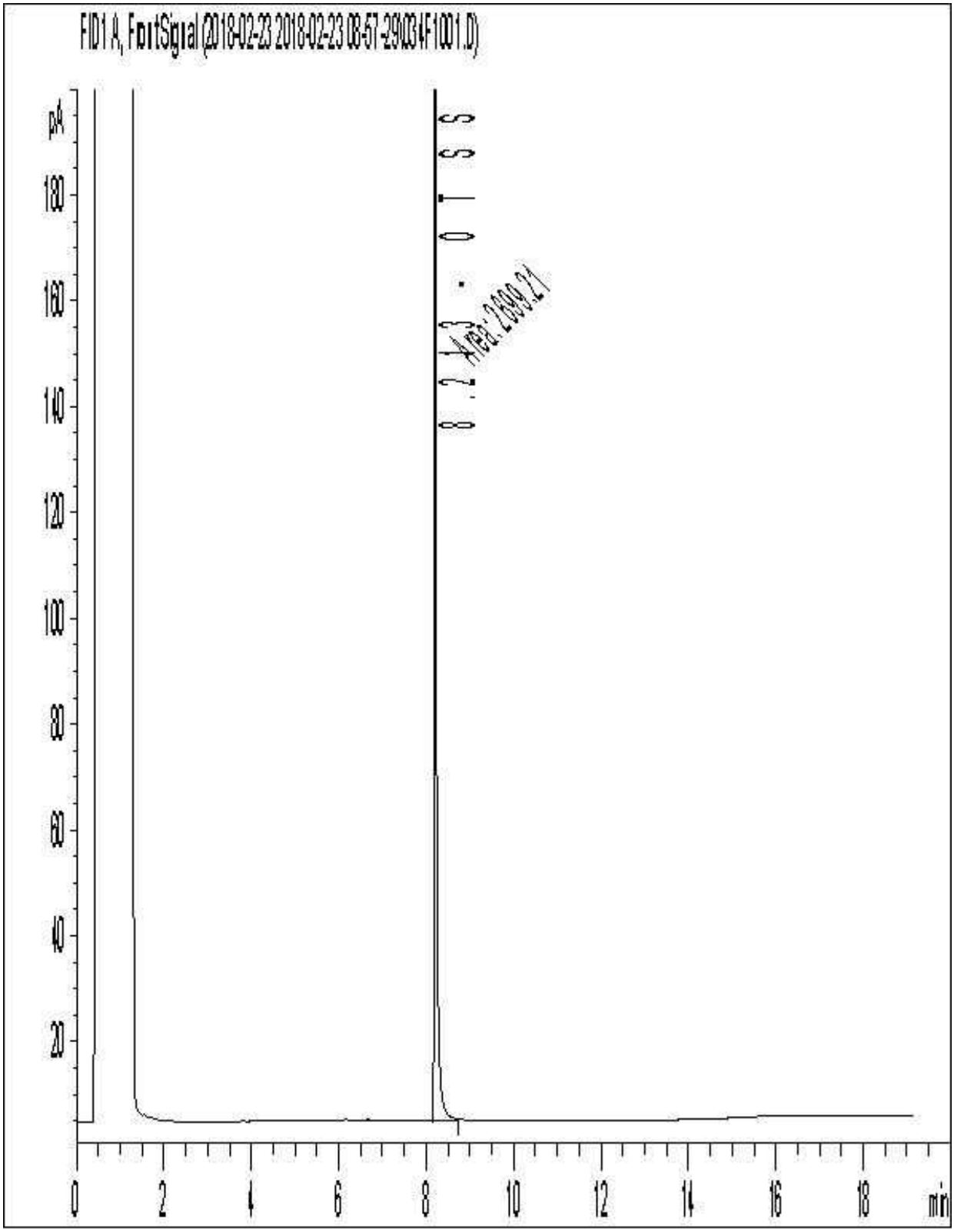


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B841113
Report Date: 2018/03/06
Maxxam Sample: GDG338

Terrapex Environmental Ltd
Client Project #: CB1057.00
Project name: 1622 Roger Stevens Drive
Client ID: MW 106-4

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram

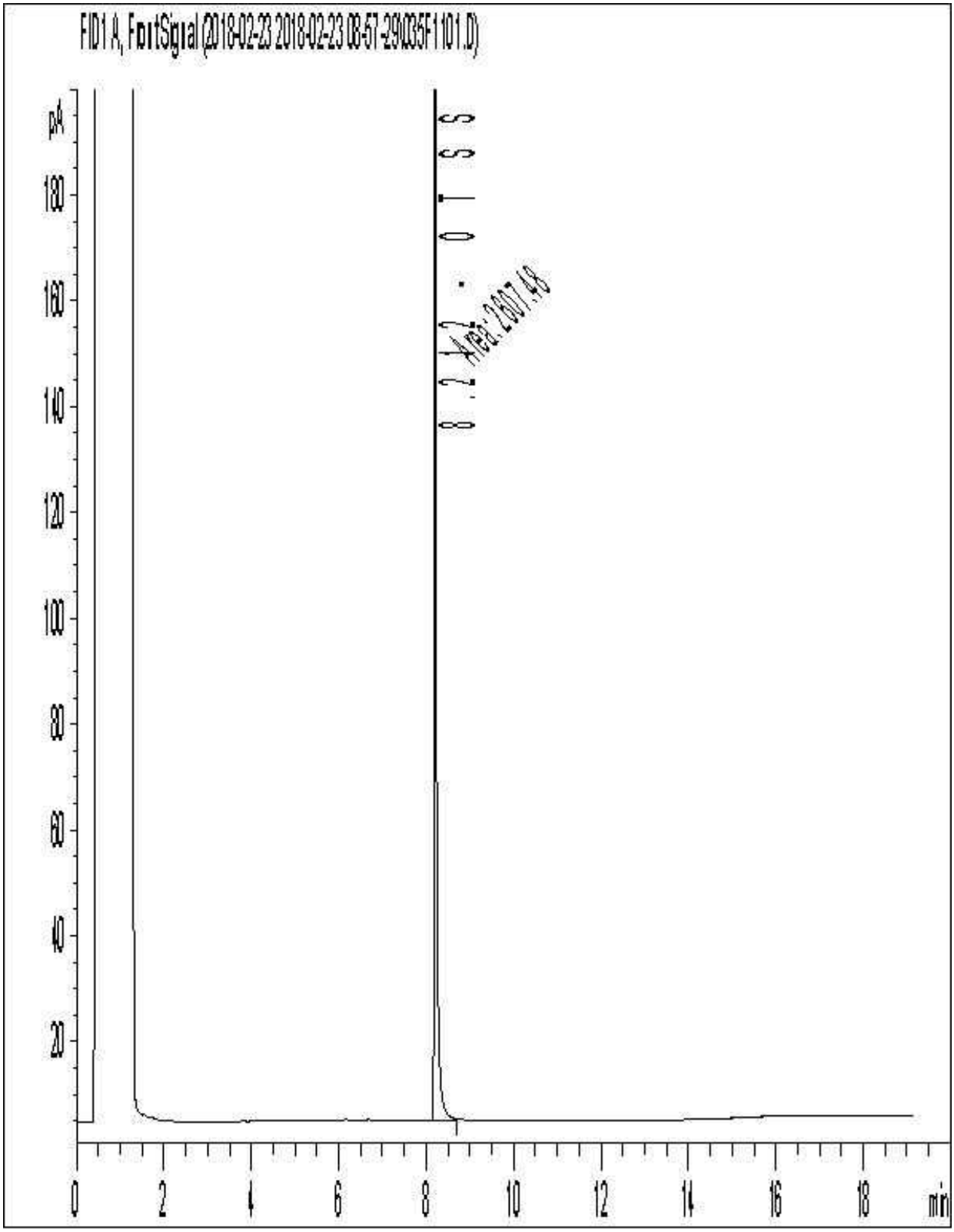


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B841113
Report Date: 2018/03/06
Maxxam Sample: GDG339

Terrapex Environmental Ltd
Client Project #: CB1057.00
Project name: 1622 Roger Stevens Drive
Client ID: MW 107-3

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram

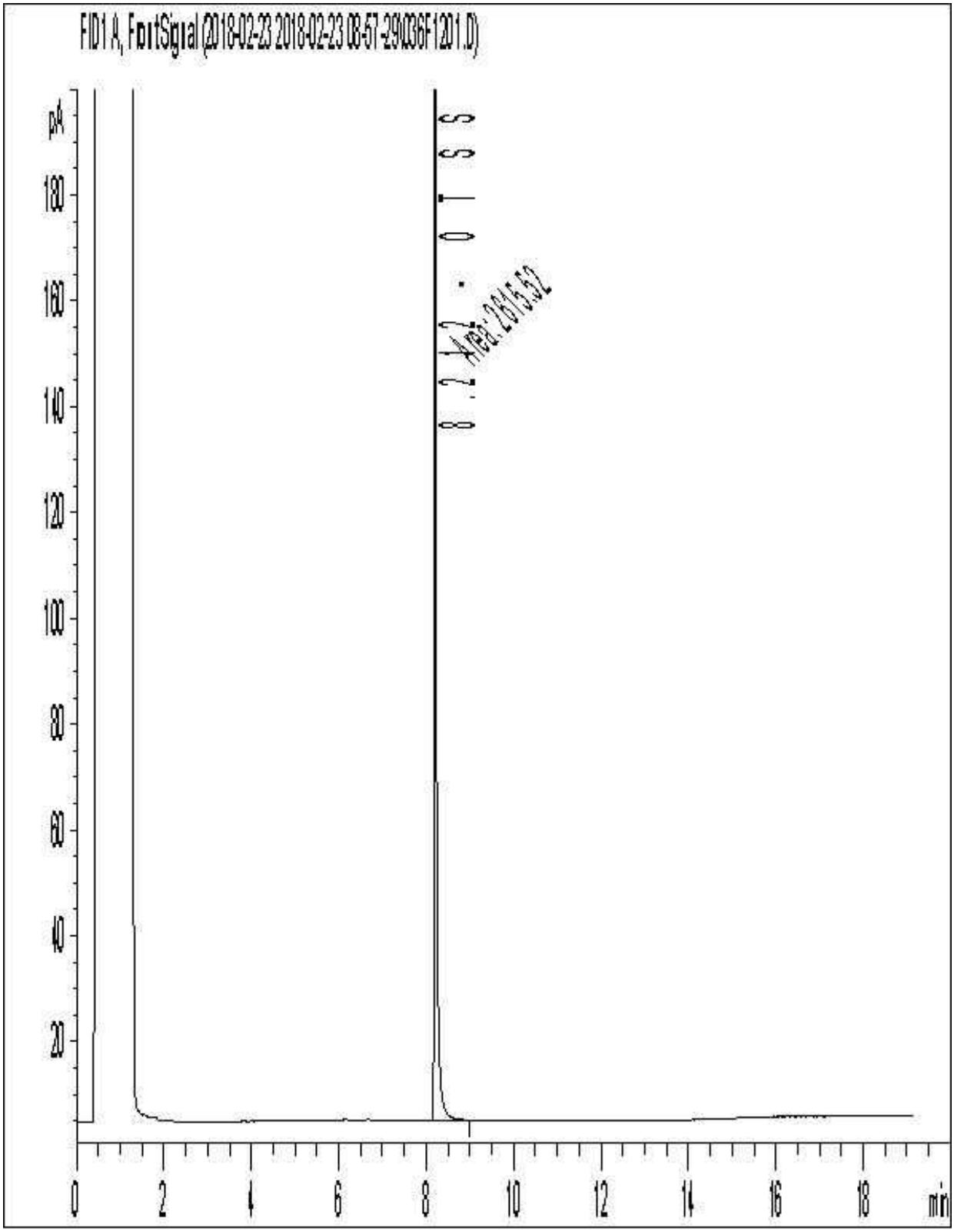


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B841113
Report Date: 2018/03/06
Maxxam Sample: GDG340

Terrapex Environmental Ltd
Client Project #: CB1057.00
Project name: 1622 Roger Stevens Drive
Client ID: MW 108-7

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram

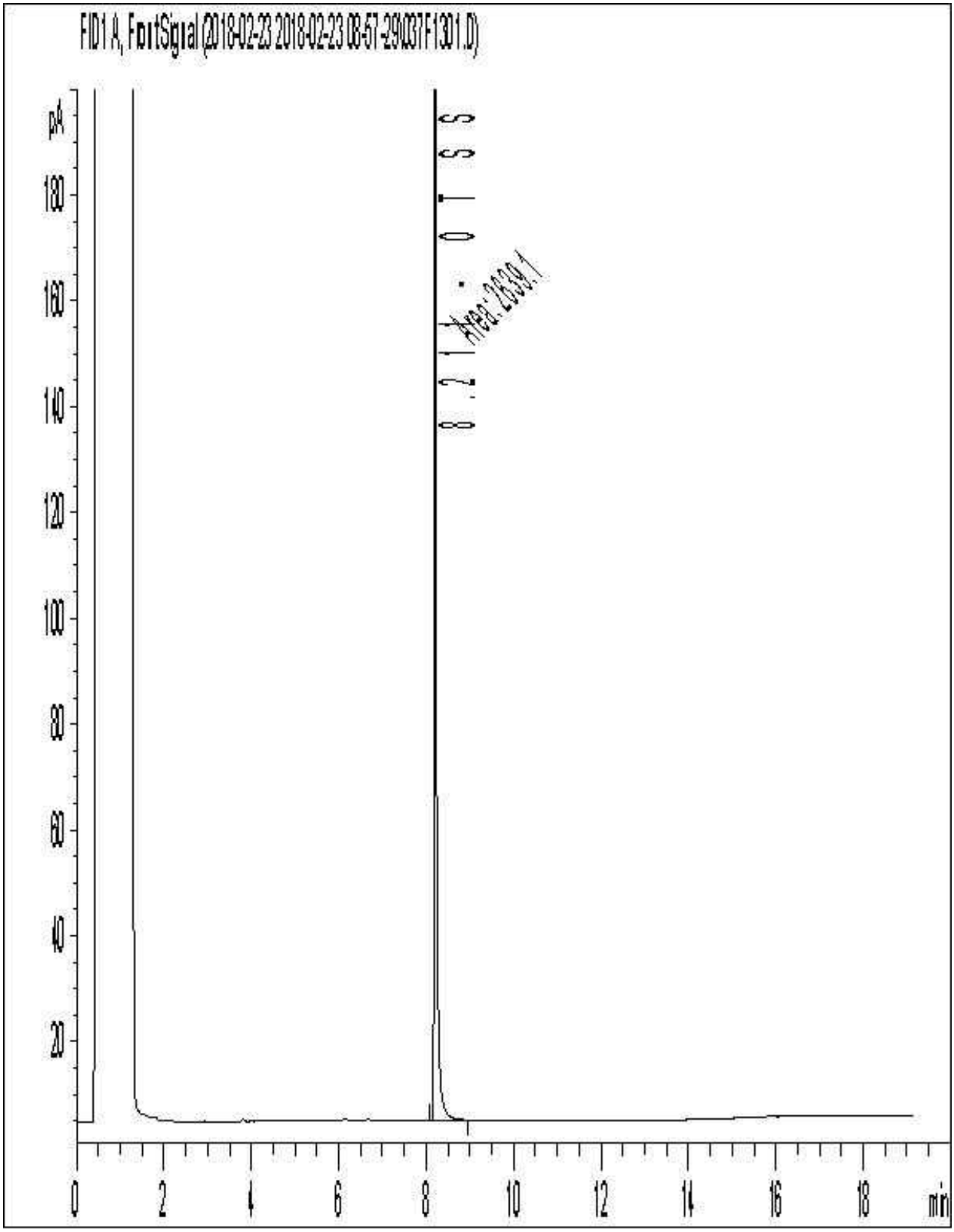


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B841113
Report Date: 2018/03/06
Maxxam Sample: GDG341

Terrapex Environmental Ltd
Client Project #: CB1057.00
Project name: 1622 Roger Stevens Drive
Client ID: BH 109-4

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram

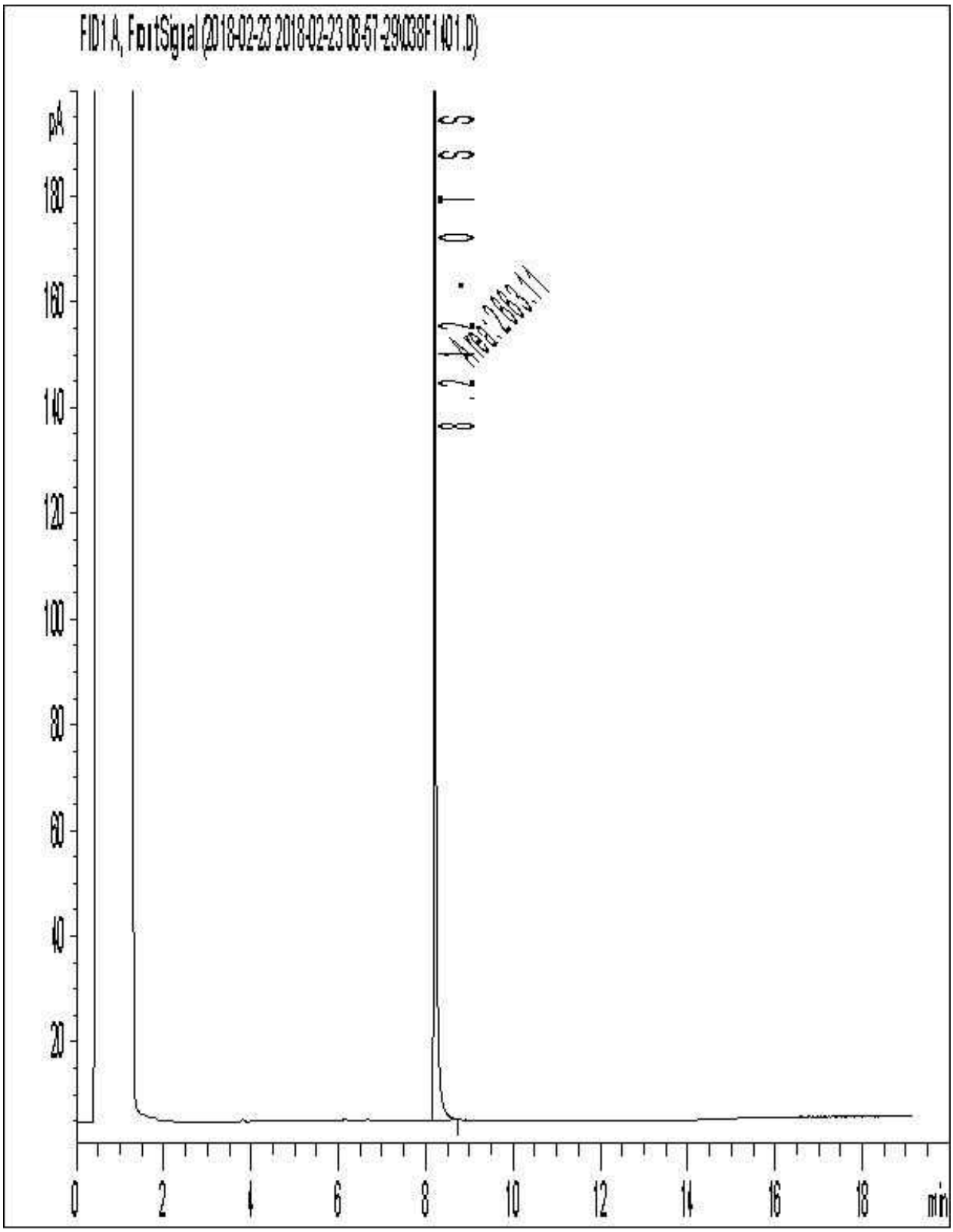


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B841113
Report Date: 2018/03/06
Maxxam Sample: GDG342

Terrapex Environmental Ltd
Client Project #: CB1057.00
Project name: 1622 Roger Stevens Drive
Client ID: MW 108-17

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.

Maxxam
A Bureau Veritas Group Company

Your Project #: CB1057.00
Site Location: 1622 Roger Stevens Drive
Your C.O.C. #: 650870-04-01

Attention: Geoff Lussier

Terrapex Environmental Ltd
920 Brant St.
Suite 16
Burlington, ON
Canada L7R 4J1

Report Date: 2018/02/26
Report #: R5017915
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B841230
Received: 2018/02/23, 10:10

Sample Matrix: Water
Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
1,3-Dichloropropene Sum	2	N/A	2018/02/26	OTT SOP-00002	EPA 8260C m
Petroleum Hydro. CCME F1 & BTEX in Water	6	N/A	2018/02/23	OTT SOP-00002	CCME CWS
Petroleum Hydrocarbons F2-F4 in Water (1)	6	2018/02/23	2018/02/24	OTT SOP-00001	CCME Hydrocarbons
Volatile Organic Compounds and F1 PHCs	2	N/A	2018/02/23	OTT SOP-00002	EPA 8260C 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.

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.

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 32 Colonnade Rd, Unit #1000, Nepean, ON K2E 7J6 Phone: 613 274-0573 Fax: 613 274-0574 Website: www.maxxam.ca

Your Project #: CB1057.00
Site Location: 1622 Roger Stevens Drive
Your C.O.C. #: 650870-04-01

Attention: Geoff Lussier

Terrapex Environmental Ltd
920 Brant St.
Suite 16
Burlington, ON
Canada L7R 4J1

Report Date: 2018/02/26
Report #: R5017915
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B841230
Received: 2018/02/23, 10:10

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Augustyna Dobosz, Project Manager
Email: ADobosz@maxxam.ca
Phone# (905)817-5700 Ext:5798

==========

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 32 Colonnade Rd, Unit #1000, Nepean, ON K2E 7J6 Phone: 613 274-0573 Fax: 613 274-0574 Website: www.maxxam.ca

Maxxam Job #: B841230
Report Date: 2018/02/26

Terrapex Environmental Ltd
Client Project #: CB1057.00
Site Location: 1622 Roger Stevens Drive
Sampler Initials: RH

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		GDG968	GDG969		
Sampling Date		2018/02/23 09:00	2018/02/23 14:00		
COC Number		650870-04-01	650870-04-01		
	UNITS	TRIP BLANK	TRIP SPIKE	RDL	QC Batch
BTEX & F1 Hydrocarbons					
Benzene	ug/L	<0.20	92.77%	0.20	5412712
Toluene	ug/L	<0.20	95.68%	0.20	5412712
Ethylbenzene	ug/L	<0.20	90.32%	0.20	5412712
o-Xylene	ug/L	<0.20	90.72%	0.20	5412712
p+m-Xylene	ug/L	<0.40	92.77%	0.40	5412712
Total Xylenes	ug/L	<0.40	NA	0.40	5412712
F1 (C6-C10)	ug/L	<25	97.64%	25	5412712
F1 (C6-C10) - BTEX	ug/L	<25	NA	25	5412712
Surrogate Recovery (%)					
1,4-Difluorobenzene	%	107	112		5412712
4-Bromofluorobenzene	%	105	114		5412712
D10-Ethylbenzene	%	116	117		5412712
D4-1,2-Dichloroethane	%	106	111		5412712

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 32 Colonnade Rd, Unit #1000, Nepean, ON K2E 7J6 Phone: 613 274-0573 Fax: 613 274-0574 Website: www.maxxam.ca

Maxxam Job #: B841230
Report Date: 2018/02/26

Terrapex Environmental Ltd
Client Project #: CB1057.00
Site Location: 1622 Roger Stevens Drive
Sampler Initials: RH

O.REG 153 PETROLEUM HYDROCARBONS (WATER)

Maxxam ID		GDG963			GDG963			GDG965	GDG967		
Sampling Date		2018/02/23 09:18			2018/02/23 09:18			2018/02/23 10:00	2018/02/23 09:30		
COC Number		650870-04-01			650870-04-01			650870-04-01	650870-04-01		
	UNITS	MW 101	RDL	QC Batch	MW 101 Lab-Dup	RDL	QC Batch	MW 107	BLANK	RDL	QC Batch
BTEX & F1 Hydrocarbons											
Benzene	ug/L	<0.20	0.20	5412712	<0.20	0.20	5412712	<0.20	<0.20	0.20	5412712
Toluene	ug/L	<0.20	0.20	5412712	<0.20	0.20	5412712	<0.20	<0.20	0.20	5412712
Ethylbenzene	ug/L	<0.20	0.20	5412712	<0.20	0.20	5412712	<0.20	<0.20	0.20	5412712
o-Xylene	ug/L	0.66	0.20	5412712	0.61	0.20	5412712	<0.20	<0.20	0.20	5412712
p+m-Xylene	ug/L	0.72	0.40	5412712	0.71	0.40	5412712	<0.40	<0.40	0.40	5412712
Total Xylenes	ug/L	1.4	0.40	5412712	1.3	0.40	5412712	<0.40	<0.40	0.40	5412712
F1 (C6-C10)	ug/L	<25	25	5412712	<25	25	5412712	<25	<25	25	5412712
F1 (C6-C10) - BTEX	ug/L	<25	25	5412712	<25	25	5412712	<25	<25	25	5412712
F2-F4 Hydrocarbons											
F2 (C10-C16 Hydrocarbons)	ug/L	<100	100	5412185				<100	<100	100	5412185
F3 (C16-C34 Hydrocarbons)	ug/L	<200	200	5412185				<200	<200	200	5412185
F4 (C34-C50 Hydrocarbons)	ug/L	<200	200	5412185				<200	<200	200	5412185
Reached Baseline at C50	ug/L	Yes		5412185				Yes	Yes		5412185
Surrogate Recovery (%)											
1,4-Difluorobenzene	%	105		5412712	105		5412712	106	105		5412712
4-Bromofluorobenzene	%	112		5412712	112		5412712	113	108		5412712
D10-Ethylbenzene	%	120		5412712	103		5412712	108	113		5412712
D4-1,2-Dichloroethane	%	105		5412712	104		5412712	106	103		5412712
o-Terphenyl	%	99		5412185				103	98		5412185

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

Maxxam Analytics International Corporation o/a Maxxam Analytics 32 Colonnade Rd, Unit #1000, Nepean, ON K2E 7J6 Phone: 613 274-0573 Fax: 613 274-0574 Website: www.maxxam.ca

Maxxam Job #: B841230
Report Date: 2018/02/26

Terrapex Environmental Ltd
Client Project #: CB1057.00
Site Location: 1622 Roger Stevens Drive
Sampler Initials: RH

O.REG 153 PETROLEUM HYDROCARBONS (WATER)

Maxxam ID		GDG970		
Sampling Date		2018/02/23 09:15		
COC Number		650870-04-01		
	UNITS	MW 112	RDL	QC Batch
BTEX & F1 Hydrocarbons				
Benzene	ug/L	<0.20	0.20	5412712
Toluene	ug/L	<0.20	0.20	5412712
Ethylbenzene	ug/L	<0.20	0.20	5412712
o-Xylene	ug/L	0.62	0.20	5412712
p+m-Xylene	ug/L	0.63	0.40	5412712
Total Xylenes	ug/L	1.3	0.40	5412712
F1 (C6-C10)	ug/L	<25	25	5412712
F1 (C6-C10) - BTEX	ug/L	<25	25	5412712
F2-F4 Hydrocarbons				
F2 (C10-C16 Hydrocarbons)	ug/L	<100	100	5412185
F3 (C16-C34 Hydrocarbons)	ug/L	<200	200	5412185
F4 (C34-C50 Hydrocarbons)	ug/L	<200	200	5412185
Reached Baseline at C50	ug/L	Yes		5412185
Surrogate Recovery (%)				
1,4-Difluorobenzene	%	105		5412712
4-Bromofluorobenzene	%	111		5412712
D10-Ethylbenzene	%	103		5412712
D4-1,2-Dichloroethane	%	94		5412712
o-Terphenyl	%	100		5412185

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 32 Colonnade Rd, Unit #1000, Nepean, ON K2E 7J6 Phone: 613 274-0573 Fax: 613 274-0574 Website: www.maxxam.ca

Maxxam Job #: B841230
Report Date: 2018/02/26

Terrapex Environmental Ltd
Client Project #: CB1057.00
Site Location: 1622 Roger Stevens Drive
Sampler Initials: RH

O.REG 153 VOCS BY HS & F1-F4 (WATER)

Maxxam ID		GDG964			GDG964			GDG966		
Sampling Date		2018/02/23 09:25			2018/02/23 09:25			2018/02/23 08:15		
COC Number		650870-04-01			650870-04-01			650870-04-01		
	UNITS	MW 106	RDL	QC Batch	MW 106 Lab-Dup	RDL	QC Batch	MW 108	RDL	QC Batch
Calculated Parameters										
1,3-Dichloropropene (cis+trans)	ug/L	<0.50	0.50	5412500				<0.50	0.50	5412500
Volatile Organics										
Acetone (2-Propanone)	ug/L	<10	10	5413136	<10	10	5413136	<10	10	5413136
Benzene	ug/L	<0.20	0.20	5413136	<0.20	0.20	5413136	<0.20	0.20	5413136
Bromodichloromethane	ug/L	<0.50	0.50	5413136	<0.50	0.50	5413136	<0.50	0.50	5413136
Bromoform	ug/L	<1.0	1.0	5413136	<1.0	1.0	5413136	<1.0	1.0	5413136
Bromomethane	ug/L	<0.50	0.50	5413136	<0.50	0.50	5413136	<0.50	0.50	5413136
Carbon Tetrachloride	ug/L	<0.20	0.20	5413136	<0.20	0.20	5413136	<0.20	0.20	5413136
Chlorobenzene	ug/L	<0.20	0.20	5413136	<0.20	0.20	5413136	<0.20	0.20	5413136
Chloroform	ug/L	<0.20	0.20	5413136	<0.20	0.20	5413136	<0.20	0.20	5413136
Dibromochloromethane	ug/L	<0.50	0.50	5413136	<0.50	0.50	5413136	<0.50	0.50	5413136
1,2-Dichlorobenzene	ug/L	<0.50	0.50	5413136	<0.50	0.50	5413136	<0.50	0.50	5413136
1,3-Dichlorobenzene	ug/L	<0.50	0.50	5413136	<0.50	0.50	5413136	<0.50	0.50	5413136
1,4-Dichlorobenzene	ug/L	<0.50	0.50	5413136	<0.50	0.50	5413136	<0.50	0.50	5413136
Dichlorodifluoromethane (FREON 12)	ug/L	<1.0	1.0	5413136	<1.0	1.0	5413136	<1.0	1.0	5413136
1,1-Dichloroethane	ug/L	<0.20	0.20	5413136	<0.20	0.20	5413136	<0.20	0.20	5413136
1,2-Dichloroethane	ug/L	<0.50	0.50	5413136	<0.50	0.50	5413136	<0.50	0.50	5413136
1,1-Dichloroethylene	ug/L	<0.20	0.20	5413136	<0.20	0.20	5413136	<0.20	0.20	5413136
cis-1,2-Dichloroethylene	ug/L	<0.50	0.50	5413136	<0.50	0.50	5413136	<0.50	0.50	5413136
trans-1,2-Dichloroethylene	ug/L	<0.50	0.50	5413136	<0.50	0.50	5413136	<0.50	0.50	5413136
1,2-Dichloropropane	ug/L	<0.20	0.20	5413136	<0.20	0.20	5413136	<0.20	0.20	5413136
cis-1,3-Dichloropropene	ug/L	<0.30	0.30	5413136	<0.30	0.30	5413136	<0.30	0.30	5413136
trans-1,3-Dichloropropene	ug/L	<0.40	0.40	5413136	<0.40	0.40	5413136	<0.40	0.40	5413136
Ethylbenzene	ug/L	<0.20	0.20	5413136	<0.20	0.20	5413136	<0.20	0.20	5413136
Ethylene Dibromide	ug/L	<0.20	0.20	5413136	<0.20	0.20	5413136	<0.20	0.20	5413136
Hexane	ug/L	<1.0	1.0	5413136	<1.0	1.0	5413136	<1.0	1.0	5413136
Methylene Chloride(Dichloromethane)	ug/L	<2.0	2.0	5413136	<2.0	2.0	5413136	<2.0	2.0	5413136
Methyl Ethyl Ketone (2-Butanone)	ug/L	<10	10	5413136	<10	10	5413136	<10	10	5413136
Methyl Isobutyl Ketone	ug/L	<5.0	5.0	5413136	<5.0	5.0	5413136	<5.0	5.0	5413136

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

Maxxam Analytics International Corporation o/a Maxxam Analytics 32 Colonnade Rd, Unit #1000, Nepean, ON K2E 7J6 Phone: 613 274-0573 Fax: 613 274-0574 Website: www.maxxam.ca

Maxxam Job #: B841230
Report Date: 2018/02/26

Terrapex Environmental Ltd
Client Project #: CB1057.00
Site Location: 1622 Roger Stevens Drive
Sampler Initials: RH

O.REG 153 VOCS BY HS & F1-F4 (WATER)

Maxxam ID		GDG964			GDG964			GDG966		
Sampling Date		2018/02/23 09:25			2018/02/23 09:25			2018/02/23 08:15		
COC Number		650870-04-01			650870-04-01			650870-04-01		
	UNITS	MW 106	RDL	QC Batch	MW 106 Lab-Dup	RDL	QC Batch	MW 108	RDL	QC Batch
Methyl t-butyl ether (MTBE)	ug/L	<0.50	0.50	5413136	<0.50	0.50	5413136	<0.50	0.50	5413136
Styrene	ug/L	<0.50	0.50	5413136	<0.50	0.50	5413136	<0.50	0.50	5413136
1,1,1,2-Tetrachloroethane	ug/L	<0.50	0.50	5413136	<0.50	0.50	5413136	<0.50	0.50	5413136
1,1,2,2-Tetrachloroethane	ug/L	<0.50	0.50	5413136	<0.50	0.50	5413136	<0.50	0.50	5413136
Tetrachloroethylene	ug/L	<0.20	0.20	5413136	<0.20	0.20	5413136	<0.20	0.20	5413136
Toluene	ug/L	<0.20	0.20	5413136	<0.20	0.20	5413136	<0.20	0.20	5413136
1,1,1-Trichloroethane	ug/L	<0.20	0.20	5413136	<0.20	0.20	5413136	<0.20	0.20	5413136
1,1,2-Trichloroethane	ug/L	<0.50	0.50	5413136	<0.50	0.50	5413136	<0.50	0.50	5413136
Trichloroethylene	ug/L	<0.20	0.20	5413136	<0.20	0.20	5413136	<0.20	0.20	5413136
Trichlorofluoromethane (FREON 11)	ug/L	<0.50	0.50	5413136	<0.50	0.50	5413136	<0.50	0.50	5413136
Vinyl Chloride	ug/L	<0.20	0.20	5413136	<0.20	0.20	5413136	<0.20	0.20	5413136
p+m-Xylene	ug/L	<0.20	0.20	5413136	<0.20	0.20	5413136	<0.20	0.20	5413136
o-Xylene	ug/L	<0.20	0.20	5413136	<0.20	0.20	5413136	<0.20	0.20	5413136
Total Xylenes	ug/L	<0.20	0.20	5413136	<0.20	0.20	5413136	<0.20	0.20	5413136
F1 (C6-C10)	ug/L	<25	25	5413136	<25	25	5413136	<25	25	5413136
F1 (C6-C10) - BTEX	ug/L	<25	25	5413136	<25	25	5413136	<25	25	5413136
F2-F4 Hydrocarbons										
F2 (C10-C16 Hydrocarbons)	ug/L	<100	100	5412185				<100	100	5412185
F3 (C16-C34 Hydrocarbons)	ug/L	<200	200	5412185				<200	200	5412185
F4 (C34-C50 Hydrocarbons)	ug/L	<200	200	5412185				<200	200	5412185
Reached Baseline at C50	ug/L	Yes		5412185				Yes		5412185
Surrogate Recovery (%)										
o-Terphenyl	%	99		5412185				103		5412185
4-Bromofluorobenzene	%	83		5413136	86		5413136	85		5413136
D4-1,2-Dichloroethane	%	110		5413136	106		5413136	109		5413136
D8-Toluene	%	88		5413136	86		5413136	88		5413136

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B841230
Report Date: 2018/02/26

Terrapex Environmental Ltd
Client Project #: CB1057.00
Site Location: 1622 Roger Stevens Drive
Sampler Initials: RH

TEST SUMMARY

Maxxam ID: GDG963
Sample ID: MW 101
Matrix: Water

Collected: 2018/02/23
Shipped:
Received: 2018/02/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5412712	N/A	2018/02/23	Lyndsey Hart
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5412185	2018/02/23	2018/02/24	Liliana Gaburici

Maxxam ID: GDG963 Dup
Sample ID: MW 101
Matrix: Water

Collected: 2018/02/23
Shipped:
Received: 2018/02/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5412712	N/A	2018/02/23	Lyndsey Hart

Maxxam ID: GDG964
Sample ID: MW 106
Matrix: Water

Collected: 2018/02/23
Shipped:
Received: 2018/02/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	5412500	N/A	2018/02/26	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5412185	2018/02/23	2018/02/24	Liliana Gaburici
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5413136	N/A	2018/02/23	Liliana Gaburici

Maxxam ID: GDG964 Dup
Sample ID: MW 106
Matrix: Water

Collected: 2018/02/23
Shipped:
Received: 2018/02/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5413136	N/A	2018/02/23	Liliana Gaburici

Maxxam ID: GDG965
Sample ID: MW 107
Matrix: Water

Collected: 2018/02/23
Shipped:
Received: 2018/02/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5412712	N/A	2018/02/23	Lyndsey Hart
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5412185	2018/02/23	2018/02/24	Liliana Gaburici

Maxxam ID: GDG966
Sample ID: MW 108
Matrix: Water

Collected: 2018/02/23
Shipped:
Received: 2018/02/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	5412500	N/A	2018/02/26	Liliana Gaburici
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5412185	2018/02/23	2018/02/24	Liliana Gaburici
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5413136	N/A	2018/02/23	Liliana Gaburici

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Maxxam Job #: B841230
Report Date: 2018/02/26

Terrapex Environmental Ltd
Client Project #: CB1057.00
Site Location: 1622 Roger Stevens Drive
Sampler Initials: RH

TEST SUMMARY

Maxxam ID: GDG967 **Collected:** 2018/02/23
Sample ID: BLANK **Shipped:**
Matrix: Water **Received:** 2018/02/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5412712	N/A	2018/02/23	Lyndsey Hart
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5412185	2018/02/23	2018/02/24	Liliana Gaburici

Maxxam ID: GDG968 **Collected:** 2018/02/23
Sample ID: TRIP BLANK **Shipped:**
Matrix: Water **Received:** 2018/02/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5412712	N/A	2018/02/23	Lyndsey Hart

Maxxam ID: GDG969 **Collected:** 2018/02/23
Sample ID: TRIP SPIKE **Shipped:**
Matrix: Water **Received:** 2018/02/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5412712	N/A	2018/02/23	Lyndsey Hart

Maxxam ID: GDG970 **Collected:** 2018/02/23
Sample ID: MW 112 **Shipped:**
Matrix: Water **Received:** 2018/02/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5412712	N/A	2018/02/23	Lyndsey Hart
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5412185	2018/02/23	2018/02/24	Liliana Gaburici

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Maxxam Job #: B841230
Report Date: 2018/02/26

Terrapex Environmental Ltd
Client Project #: CB1057.00
Site Location: 1622 Roger Stevens Drive
Sampler Initials: RH

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.

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Maxxam Job #: B841230
Report Date: 2018/02/26

Terrapex Environmental Ltd
Client Project #: CB1057.00
Site Location: 1622 Roger Stevens Drive
Sampler Initials: RH

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5412185	LGA	Matrix Spike	o-Terphenyl	2018/02/23		115	%	30 - 130
			F2 (C10-C16 Hydrocarbons)	2018/02/23		100	%	50 - 130
			F3 (C16-C34 Hydrocarbons)	2018/02/23		100	%	50 - 130
			F4 (C34-C50 Hydrocarbons)	2018/02/23		100	%	50 - 130
5412185	LGA	Spiked Blank	o-Terphenyl	2018/02/23		104	%	30 - 130
			F2 (C10-C16 Hydrocarbons)	2018/02/23		93	%	80 - 120
			F3 (C16-C34 Hydrocarbons)	2018/02/23		93	%	80 - 120
			F4 (C34-C50 Hydrocarbons)	2018/02/23		93	%	80 - 120
5412185	LGA	Method Blank	o-Terphenyl	2018/02/23		101	%	30 - 130
			F2 (C10-C16 Hydrocarbons)	2018/02/23	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2018/02/23	<200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2018/02/23	<200		ug/L	
5412185	LGA	RPD	F2 (C10-C16 Hydrocarbons)	2018/02/23	NC		%	50
			F3 (C16-C34 Hydrocarbons)	2018/02/23	NC		%	50
			F4 (C34-C50 Hydrocarbons)	2018/02/23	NC		%	50
5412712	LHR	Matrix Spike [GDG965-02]	1,4-Difluorobenzene	2018/02/23		103	%	70 - 130
			4-Bromofluorobenzene	2018/02/23		115	%	70 - 130
			D10-Ethylbenzene	2018/02/23		112	%	70 - 130
			D4-1,2-Dichloroethane	2018/02/23		104	%	70 - 130
			Benzene	2018/02/23		97	%	70 - 130
			Toluene	2018/02/23		89	%	70 - 130
			Ethylbenzene	2018/02/23		90	%	70 - 130
			o-Xylene	2018/02/23		90	%	70 - 130
			p+m-Xylene	2018/02/23		91	%	70 - 130
			F1 (C6-C10)	2018/02/23		123	%	70 - 130
5412712	LHR	Spiked Blank	1,4-Difluorobenzene	2018/02/23		103	%	70 - 130
			4-Bromofluorobenzene	2018/02/23		114	%	70 - 130
			D10-Ethylbenzene	2018/02/23		121	%	70 - 130
			D4-1,2-Dichloroethane	2018/02/23		105	%	70 - 130
			Benzene	2018/02/23		101	%	70 - 130
			Toluene	2018/02/23		98	%	70 - 130
			Ethylbenzene	2018/02/23		101	%	70 - 130
			o-Xylene	2018/02/23		98	%	70 - 130
			p+m-Xylene	2018/02/23		101	%	70 - 130
			F1 (C6-C10)	2018/02/23		115	%	70 - 130
5412712	LHR	Method Blank	1,4-Difluorobenzene	2018/02/23		102	%	70 - 130
			4-Bromofluorobenzene	2018/02/23		115	%	70 - 130
			D10-Ethylbenzene	2018/02/23		115	%	70 - 130
			D4-1,2-Dichloroethane	2018/02/23		104	%	70 - 130
			Benzene	2018/02/23	<0.20		ug/L	
			Toluene	2018/02/23	<0.20		ug/L	
			Ethylbenzene	2018/02/23	<0.20		ug/L	
			o-Xylene	2018/02/23	<0.20		ug/L	
			p+m-Xylene	2018/02/23	<0.40		ug/L	
			Total Xylenes	2018/02/23	<0.40		ug/L	
			F1 (C6-C10)	2018/02/23	<25		ug/L	
			F1 (C6-C10) - BTEX	2018/02/23	<25		ug/L	
5412712	LHR	RPD [GDG963-02]	Benzene	2018/02/23	NC		%	40
			Toluene	2018/02/23	NC		%	40
			Ethylbenzene	2018/02/23	NC		%	40
			o-Xylene	2018/02/23	7.5		%	40

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			p+m-Xylene	2018/02/23	1.1		%	40
			Total Xylenes	2018/02/23	4.1		%	40
			F1 (C6-C10)	2018/02/23	NC		%	40
			F1 (C6-C10) - BTEX	2018/02/23	NC		%	40
5413136	LGA	Matrix Spike [GDG966-02]	4-Bromofluorobenzene	2018/02/23		99	%	70 - 130
			D4-1,2-Dichloroethane	2018/02/23		99	%	70 - 130
			D8-Toluene	2018/02/23		94	%	70 - 130
			Acetone (2-Propanone)	2018/02/23		93	%	60 - 140
			Benzene	2018/02/23		94	%	70 - 130
			Bromodichloromethane	2018/02/23		86	%	70 - 130
			Bromoform	2018/02/23		95	%	70 - 130
			Bromomethane	2018/02/23		79	%	60 - 140
			Carbon Tetrachloride	2018/02/23		84	%	70 - 130
			Chlorobenzene	2018/02/23		85	%	70 - 130
			Chloroform	2018/02/23		85	%	70 - 130
			Dibromochloromethane	2018/02/23		96	%	70 - 130
			1,2-Dichlorobenzene	2018/02/23		89	%	70 - 130
			1,3-Dichlorobenzene	2018/02/23		89	%	70 - 130
			1,4-Dichlorobenzene	2018/02/23		90	%	70 - 130
			Dichlorodifluoromethane (FREON 12)	2018/02/23		69	%	60 - 140
			1,1-Dichloroethane	2018/02/23		84	%	70 - 130
			1,2-Dichloroethane	2018/02/23		87	%	70 - 130
			1,1-Dichloroethylene	2018/02/23		81	%	70 - 130
			cis-1,2-Dichloroethylene	2018/02/23		83	%	70 - 130
			trans-1,2-Dichloroethylene	2018/02/23		77	%	70 - 130
			1,2-Dichloropropane	2018/02/23		71	%	70 - 130
			cis-1,3-Dichloropropene	2018/02/23		89	%	70 - 130
			trans-1,3-Dichloropropene	2018/02/23		96	%	70 - 130
			Ethylbenzene	2018/02/23		88	%	70 - 130
			Ethylene Dibromide	2018/02/23		93	%	70 - 130
			Hexane	2018/02/23		82	%	70 - 130
			Methylene Chloride(Dichloromethane)	2018/02/23		72	%	70 - 130
			Methyl Ethyl Ketone (2-Butanone)	2018/02/23		84	%	60 - 140
			Methyl Isobutyl Ketone	2018/02/23		87	%	70 - 130
			Methyl t-butyl ether (MTBE)	2018/02/23		76	%	70 - 130
			Styrene	2018/02/23		91	%	70 - 130
			1,1,1,2-Tetrachloroethane	2018/02/23		95	%	70 - 130
			1,1,2,2-Tetrachloroethane	2018/02/23		89	%	70 - 130
			Tetrachloroethylene	2018/02/23		80	%	70 - 130
			Toluene	2018/02/23		81	%	70 - 130
			1,1,1-Trichloroethane	2018/02/23		82	%	70 - 130
			1,1,2-Trichloroethane	2018/02/23		76	%	70 - 130
			Trichloroethylene	2018/02/23		84	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2018/02/23		84	%	70 - 130
			Vinyl Chloride	2018/02/23		81	%	70 - 130
			p+m-Xylene	2018/02/23		81	%	70 - 130
			o-Xylene	2018/02/23		84	%	70 - 130
			F1 (C6-C10)	2018/02/23		93	%	60 - 140
5413136	LGA	Spiked Blank	4-Bromofluorobenzene	2018/02/23		102	%	70 - 130
			D4-1,2-Dichloroethane	2018/02/23		100	%	70 - 130
			D8-Toluene	2018/02/23		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
			Acetone (2-Propanone)	2018/02/23		80	%	60 - 140
			Benzene	2018/02/23		108	%	70 - 130
			Bromodichloromethane	2018/02/23		92	%	70 - 130
			Bromoform	2018/02/23		96	%	70 - 130
			Bromomethane	2018/02/23		84	%	60 - 140
			Carbon Tetrachloride	2018/02/23		101	%	70 - 130
			Chlorobenzene	2018/02/23		96	%	70 - 130
			Chloroform	2018/02/23		90	%	70 - 130
			Dibromochloromethane	2018/02/23		101	%	70 - 130
			1,2-Dichlorobenzene	2018/02/23		96	%	70 - 130
			1,3-Dichlorobenzene	2018/02/23		98	%	70 - 130
			1,4-Dichlorobenzene	2018/02/23		99	%	70 - 130
			Dichlorodifluoromethane (FREON 12)	2018/02/23		83	%	60 - 140
			1,1-Dichloroethane	2018/02/23		96	%	70 - 130
			1,2-Dichloroethane	2018/02/23		88	%	70 - 130
			1,1-Dichloroethylene	2018/02/23		95	%	70 - 130
			cis-1,2-Dichloroethylene	2018/02/23		94	%	70 - 130
			trans-1,2-Dichloroethylene	2018/02/23		92	%	70 - 130
			1,2-Dichloropropane	2018/02/23		81	%	70 - 130
			cis-1,3-Dichloropropene	2018/02/23		89	%	70 - 130
			trans-1,3-Dichloropropene	2018/02/23		82	%	70 - 130
			Ethylbenzene	2018/02/23		103	%	70 - 130
			Ethylene Dibromide	2018/02/23		95	%	70 - 130
			Hexane	2018/02/23		101	%	70 - 130
			Methylene Chloride(Dichloromethane)	2018/02/23		79	%	70 - 130
			Methyl Ethyl Ketone (2-Butanone)	2018/02/23		83	%	60 - 140
			Methyl Isobutyl Ketone	2018/02/23		88	%	70 - 130
			Methyl t-butyl ether (MTBE)	2018/02/23		85	%	70 - 130
			Styrene	2018/02/23		109	%	70 - 130
			1,1,1,2-Tetrachloroethane	2018/02/23		107	%	70 - 130
			1,1,2,2-Tetrachloroethane	2018/02/23		91	%	70 - 130
			Tetrachloroethylene	2018/02/23		106	%	70 - 130
			Toluene	2018/02/23		98	%	70 - 130
			1,1,1-Trichloroethane	2018/02/23		97	%	70 - 130
			1,1,2-Trichloroethane	2018/02/23		81	%	70 - 130
			Trichloroethylene	2018/02/23		100	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2018/02/23		100	%	70 - 130
			Vinyl Chloride	2018/02/23		95	%	70 - 130
			p+m-Xylene	2018/02/23		97	%	70 - 130
			o-Xylene	2018/02/23		106	%	70 - 130
			F1 (C6-C10)	2018/02/23		104	%	60 - 140
5413136	LGA	Method Blank	4-Bromofluorobenzene	2018/02/23		89	%	70 - 130
			D4-1,2-Dichloroethane	2018/02/23		107	%	70 - 130
			D8-Toluene	2018/02/23		88	%	70 - 130
			Acetone (2-Propanone)	2018/02/23	<10		ug/L	
			Benzene	2018/02/23	<0.20		ug/L	
			Bromodichloromethane	2018/02/23	<0.50		ug/L	
			Bromoform	2018/02/23	<1.0		ug/L	
			Bromomethane	2018/02/23	<0.50		ug/L	
			Carbon Tetrachloride	2018/02/23	<0.20		ug/L	
			Chlorobenzene	2018/02/23	<0.20		ug/L	
			Chloroform	2018/02/23	<0.20		ug/L	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dibromochloromethane	2018/02/23	<0.50		ug/L	
			1,2-Dichlorobenzene	2018/02/23	<0.50		ug/L	
			1,3-Dichlorobenzene	2018/02/23	<0.50		ug/L	
			1,4-Dichlorobenzene	2018/02/23	<0.50		ug/L	
			Dichlorodifluoromethane (FREON 12)	2018/02/23	<1.0		ug/L	
			1,1-Dichloroethane	2018/02/23	<0.20		ug/L	
			1,2-Dichloroethane	2018/02/23	<0.50		ug/L	
			1,1-Dichloroethylene	2018/02/23	<0.20		ug/L	
			cis-1,2-Dichloroethylene	2018/02/23	<0.50		ug/L	
			trans-1,2-Dichloroethylene	2018/02/23	<0.50		ug/L	
			1,2-Dichloropropane	2018/02/23	<0.20		ug/L	
			cis-1,3-Dichloropropene	2018/02/23	<0.30		ug/L	
			trans-1,3-Dichloropropene	2018/02/23	<0.40		ug/L	
			Ethylbenzene	2018/02/23	<0.20		ug/L	
			Ethylene Dibromide	2018/02/23	<0.20		ug/L	
			Hexane	2018/02/23	<1.0		ug/L	
			Methylene Chloride(Dichloromethane)	2018/02/23	<2.0		ug/L	
			Methyl Ethyl Ketone (2-Butanone)	2018/02/23	<10		ug/L	
			Methyl Isobutyl Ketone	2018/02/23	<5.0		ug/L	
			Methyl t-butyl ether (MTBE)	2018/02/23	<0.50		ug/L	
			Styrene	2018/02/23	<0.50		ug/L	
			1,1,1,2-Tetrachloroethane	2018/02/23	<0.50		ug/L	
			1,1,2,2-Tetrachloroethane	2018/02/23	<0.50		ug/L	
			Tetrachloroethylene	2018/02/23	<0.20		ug/L	
			Toluene	2018/02/23	<0.20		ug/L	
			1,1,1-Trichloroethane	2018/02/23	<0.20		ug/L	
			1,1,2-Trichloroethane	2018/02/23	<0.50		ug/L	
			Trichloroethylene	2018/02/23	<0.20		ug/L	
			Trichlorofluoromethane (FREON 11)	2018/02/23	<0.50		ug/L	
			Vinyl Chloride	2018/02/23	<0.20		ug/L	
			p+m-Xylene	2018/02/23	<0.20		ug/L	
			o-Xylene	2018/02/23	<0.20		ug/L	
			Total Xylenes	2018/02/23	<0.20		ug/L	
			F1 (C6-C10)	2018/02/23	<25		ug/L	
			F1 (C6-C10) - BTEX	2018/02/23	<25		ug/L	
5413136	LGA	RPD [GDG964-02]	Acetone (2-Propanone)	2018/02/23	NC		%	30
			Benzene	2018/02/23	NC		%	30
			Bromodichloromethane	2018/02/23	NC		%	30
			Bromoform	2018/02/23	NC		%	30
			Bromomethane	2018/02/23	NC		%	30
			Carbon Tetrachloride	2018/02/23	NC		%	30
			Chlorobenzene	2018/02/23	NC		%	30
			Chloroform	2018/02/23	NC		%	30
			Dibromochloromethane	2018/02/23	NC		%	30
			1,2-Dichlorobenzene	2018/02/23	NC		%	30
			1,3-Dichlorobenzene	2018/02/23	NC		%	30
			1,4-Dichlorobenzene	2018/02/23	NC		%	30
			Dichlorodifluoromethane (FREON 12)	2018/02/23	NC		%	30
			1,1-Dichloroethane	2018/02/23	NC		%	30
			1,2-Dichloroethane	2018/02/23	NC		%	30
			1,1-Dichloroethylene	2018/02/23	NC		%	30
			cis-1,2-Dichloroethylene	2018/02/23	NC		%	30

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			trans-1,2-Dichloroethylene	2018/02/23	NC		%	30
			1,2-Dichloropropane	2018/02/23	NC		%	30
			cis-1,3-Dichloropropene	2018/02/23	NC		%	30
			trans-1,3-Dichloropropene	2018/02/23	NC		%	30
			Ethylbenzene	2018/02/23	NC		%	30
			Ethylene Dibromide	2018/02/23	NC		%	30
			Hexane	2018/02/23	NC		%	30
			Methylene Chloride(Dichloromethane)	2018/02/23	NC		%	30
			Methyl Ethyl Ketone (2-Butanone)	2018/02/23	NC		%	30
			Methyl Isobutyl Ketone	2018/02/23	NC		%	30
			Methyl t-butyl ether (MTBE)	2018/02/23	NC		%	30
			Styrene	2018/02/23	NC		%	30
			1,1,1,2-Tetrachloroethane	2018/02/23	NC		%	30
			1,1,2,2-Tetrachloroethane	2018/02/23	NC		%	30
			Tetrachloroethylene	2018/02/23	NC		%	30
			Toluene	2018/02/23	NC		%	30
			1,1,1-Trichloroethane	2018/02/23	NC		%	30
			1,1,2-Trichloroethane	2018/02/23	NC		%	30
			Trichloroethylene	2018/02/23	NC		%	30
			Trichlorofluoromethane (FREON 11)	2018/02/23	NC		%	30
			Vinyl Chloride	2018/02/23	NC		%	30
			p+m-Xylene	2018/02/23	NC		%	30
			o-Xylene	2018/02/23	NC		%	30
			Total Xylenes	2018/02/23	NC		%	30
			F1 (C6-C10)	2018/02/23	NC		%	30
			F1 (C6-C10) - BTEX	2018/02/23	NC		%	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).

Maxxam Analytics International Corporation o/a Maxxam Analytics 32 Colonnade Rd, Unit #1000, Nepean, ON K2E 7J6 Phone: 613 274-0573 Fax: 613 274-0574 Website: www.maxxam.ca

Maxxam Job #: B841230
Report Date: 2018/02/26

Terrapex Environmental Ltd
Client Project #: CB1057.00
Site Location: 1622 Roger Stevens Drive
Sampler Initials: RH

VALIDATION SIGNATURE PAGE

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

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 32 Colonnade Rd, Unit #1000, Nepean, ON K2E 7J6 Phone: 613 274-0573 Fax: 613 274-0574 Website: www.maxxam.ca

Maxxam
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Maxxam Analytics International Corporation o/a Maxxam Analytics
6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel:(905) 817-5700 Toll-free:800-563-6266 Fax:(905) 817-5777 www.maxxam.ca

CHAIN OF CUSTODY RECORD

Page 1 of 1

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name:	#30396 Parkland Industries Ltd	Company Name:	#19684 Terrapex Environmental Ltd	Quotation #:	B75111	Maxxam Job #:	Bottle Order #: 650870
Attention:	Retail Invoices	Attention:	Geoff Lussier	P.O. #:			
Address:	4919-59th St Suite 100 Red Deer AB T4N 6C9	Address:	920 Brant St. Suite 16 Burlington ON L7R 4J1	Project:	CB1057.00	COC #: C#650870-04-01	Project Manager: Augustyna Dobosz
Tel:	(403) 357-6400 x Fax: (403) 356-3015 x	Tel:	(905) 632-5939 x228 Fax:	Project Name:	1622 Roger Stevens Drive		
Email:	emilie.price@parkland.ca, victoria.pianarosa@parkland.	Email:	g.lussier@terrapex.com	Site #: / Sampled By:	RH		

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE MAXXAM 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 ☐ 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: Feb 23 18 Time Required: ___ ☒
Rush Confirmation Number: AD20180223-01 *(call lab for #)*

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle): Metals / Hg / Cr VI	Petroleum Hydrocarbons CCME F1 & BTEX	Petroleum Hydrocarbons F2-F4	O.Reg 153 ICPMS Metals and Sulphate	Soil Texture (%sand, %silt, %clay)	Moisture O.Reg 153 2003	pH CaCl2 EXTRACT	Flashpoint	O.Reg 558 TCLP Inorganics Package	O.Reg 558 TCLP PCBs	O.Reg 558 TCLP Volatile Organics HS	# of Bottles	Comments
1		MW101	Feb 23	9:18	~~SOIL~~ GW	–	X	X									4	
2		MW106	Feb 23	9:25	~~SOIL~~ GW	–	X	X			X						4	
3		MW107	Feb 23	10:00	~~SOIL~~ GW	–	X	X									4	
4		MW108	Feb 23	8:15	~~SOIL~~ GW		X	X			X						4	
5		Blank	Feb 23	9:30	~~SOIL~~ GW		X	X									4	
6		~~Trip~~ Blank	Feb 23	9:00	~~SOIL~~ GW		X	~~X~~									2	RECEIVED IN OTTAWA
7		trip spike	Feb 23	14:00	~~SOIL~~ GW		X										2	
8		MW112	Feb 23	9:15	~~SOIL~~ GW		X	X									4	
9					SOIL													On ice
10					SOIL													

23-Feb-18 10:10
Augustyna Dobosz
B841230

* 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			
RH Rachel Herzog	18/02/23	10:10	Mariana Fasson Fasson	2018/02/23	10:10		Time Sensitive	Temperature (°C) on Recei 3,3,3	Custody Seal Present / Intact	Yes: Y / Y; No

* 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.

* 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 HTTP://MAXXAM.CA/WP-CONTENT/UPLOADS/ONTARIO-COC.PDF.

SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

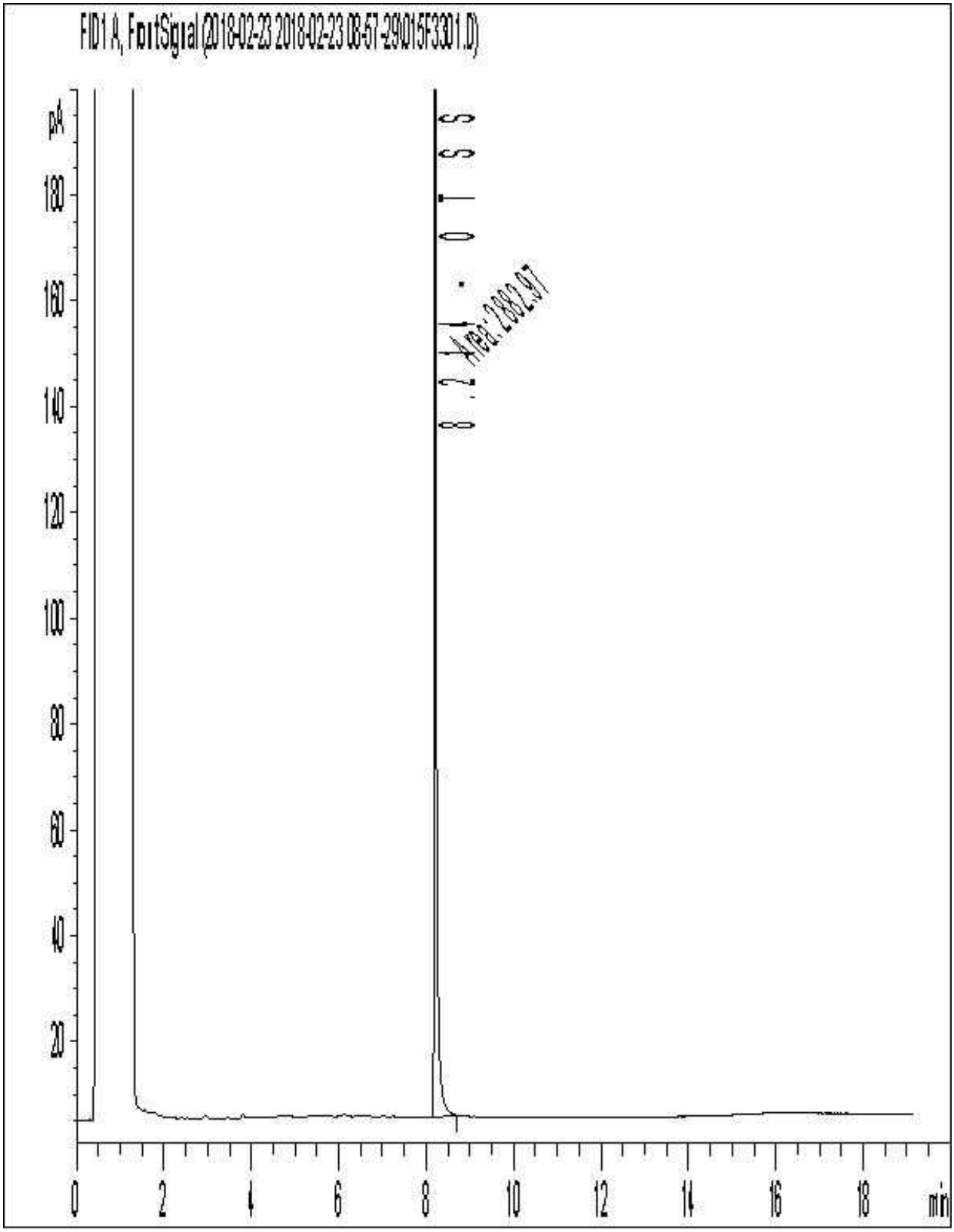
White: Maxxa Yellow: Client

Maxxam Analytics International Corporation o/a Maxxam Analytics

Maxxam Job #: B841230
Report Date: 2018/02/26
Maxxam Sample: GDG963

Terrapex Environmental Ltd
Client Project #: CB1057.00
Project name: 1622 Roger Stevens Drive
Client ID: MW 101

Petroleum Hydrocarbons F2-F4 in Water Chromatogram

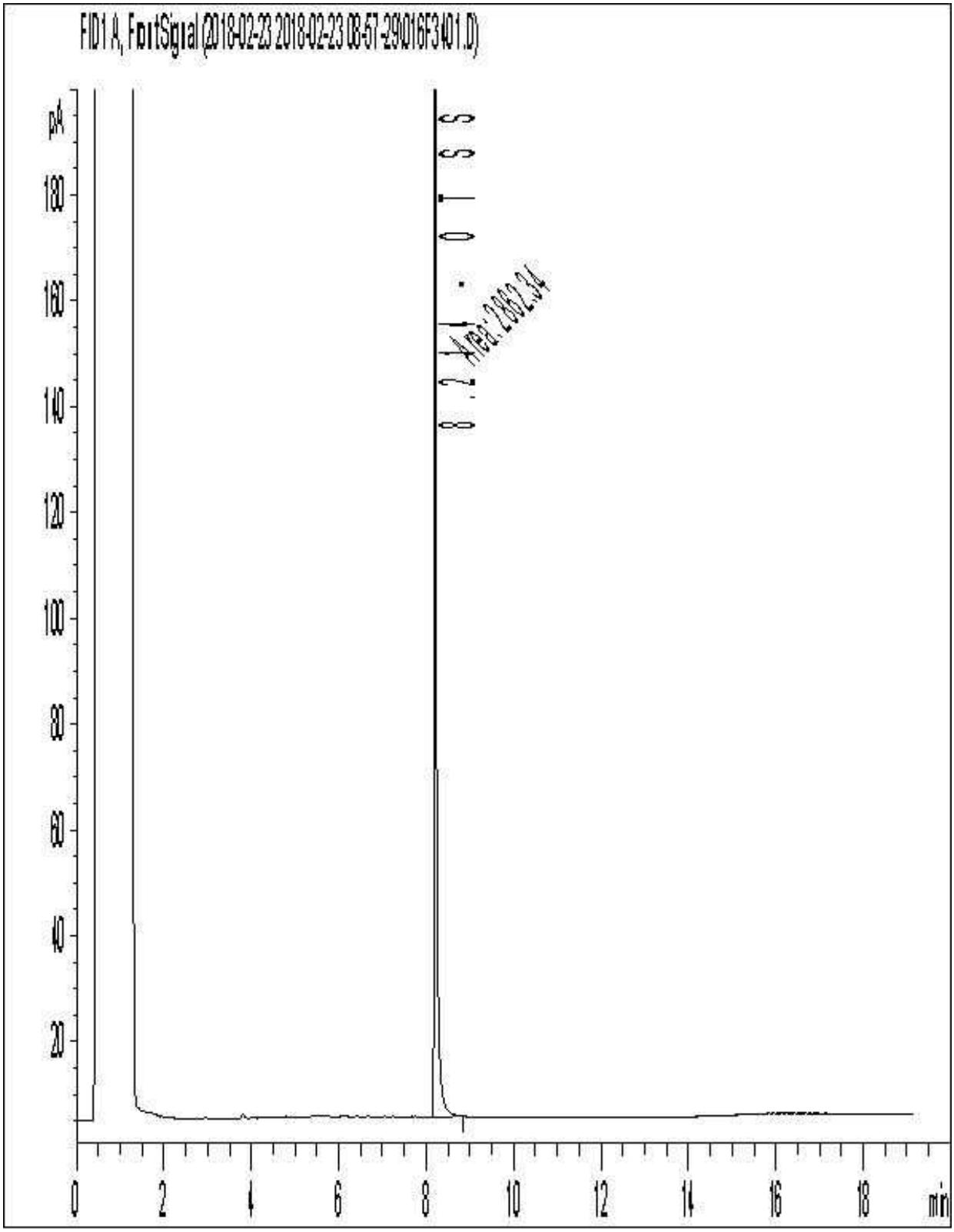


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B841230
Report Date: 2018/02/26
Maxxam Sample: GDG964

Terrapex Environmental Ltd
Client Project #: CB1057.00
Project name: 1622 Roger Stevens Drive
Client ID: MW 106

Petroleum Hydrocarbons F2-F4 in Water Chromatogram

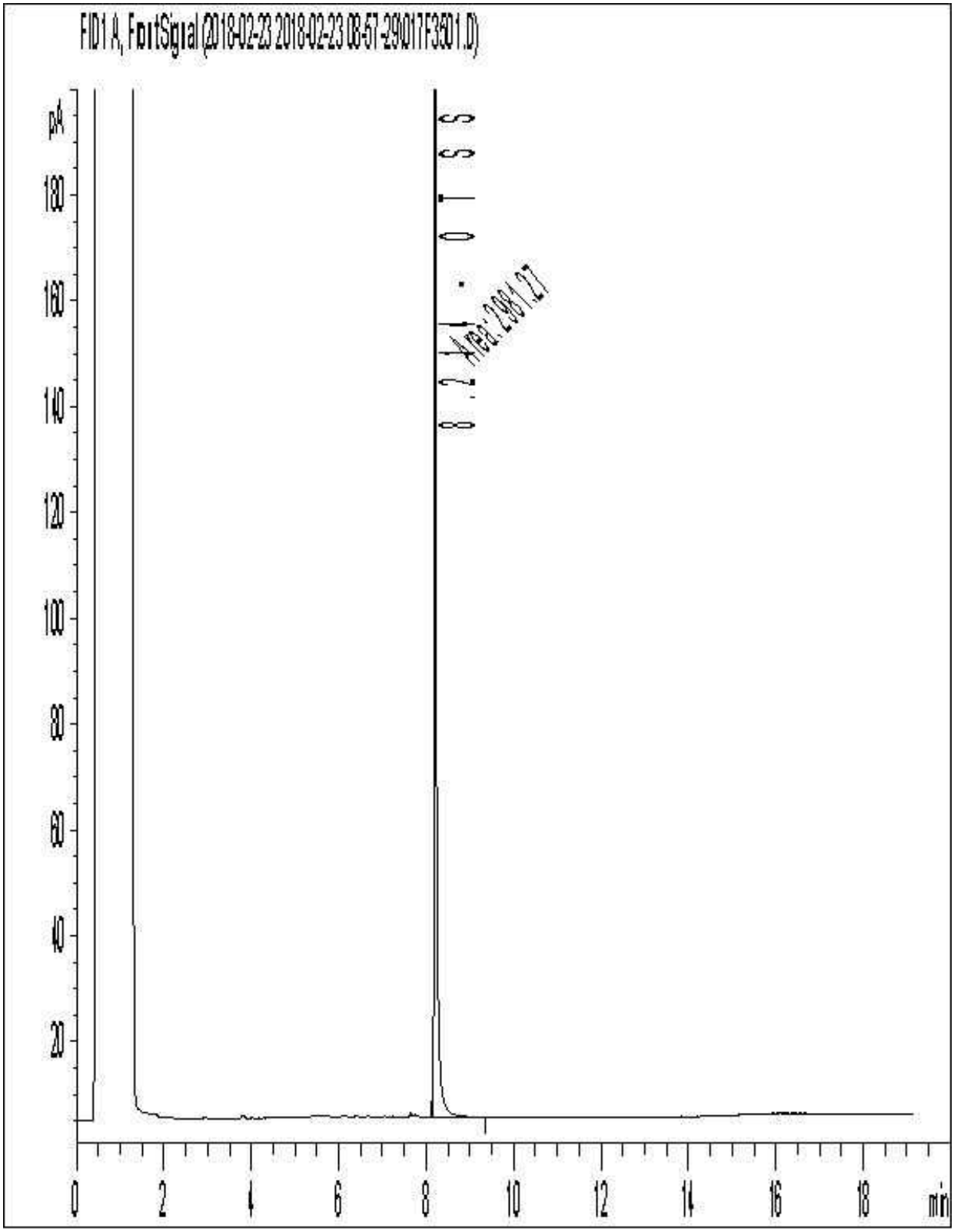


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B841230
Report Date: 2018/02/26
Maxxam Sample: GDG965

Terrapex Environmental Ltd
Client Project #: CB1057.00
Project name: 1622 Roger Stevens Drive
Client ID: MW 107

Petroleum Hydrocarbons F2-F4 in Water Chromatogram

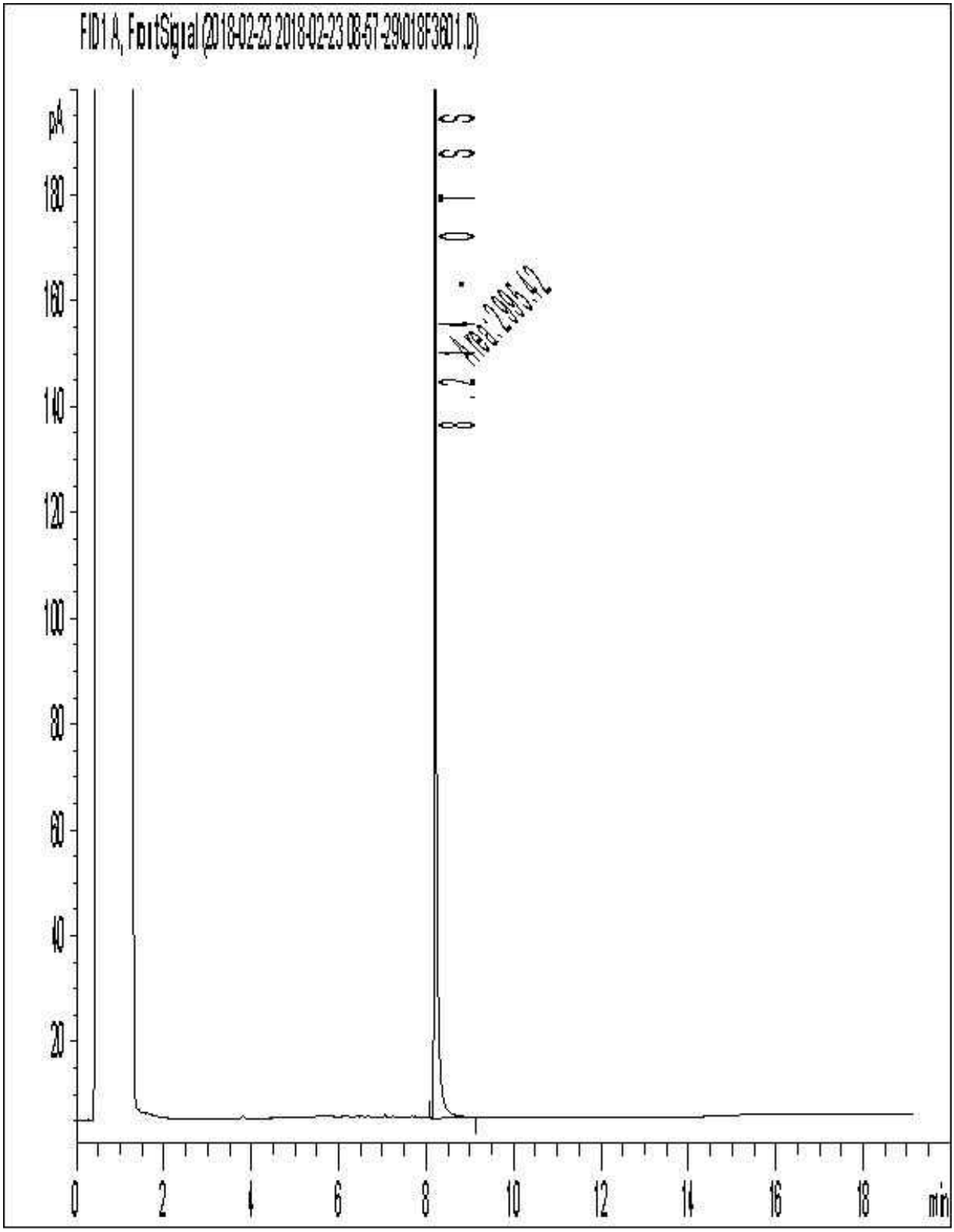


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B841230
Report Date: 2018/02/26
Maxxam Sample: GDG966

Terrapex Environmental Ltd
Client Project #: CB1057.00
Project name: 1622 Roger Stevens Drive
Client ID: MW 108

Petroleum Hydrocarbons F2-F4 in Water Chromatogram

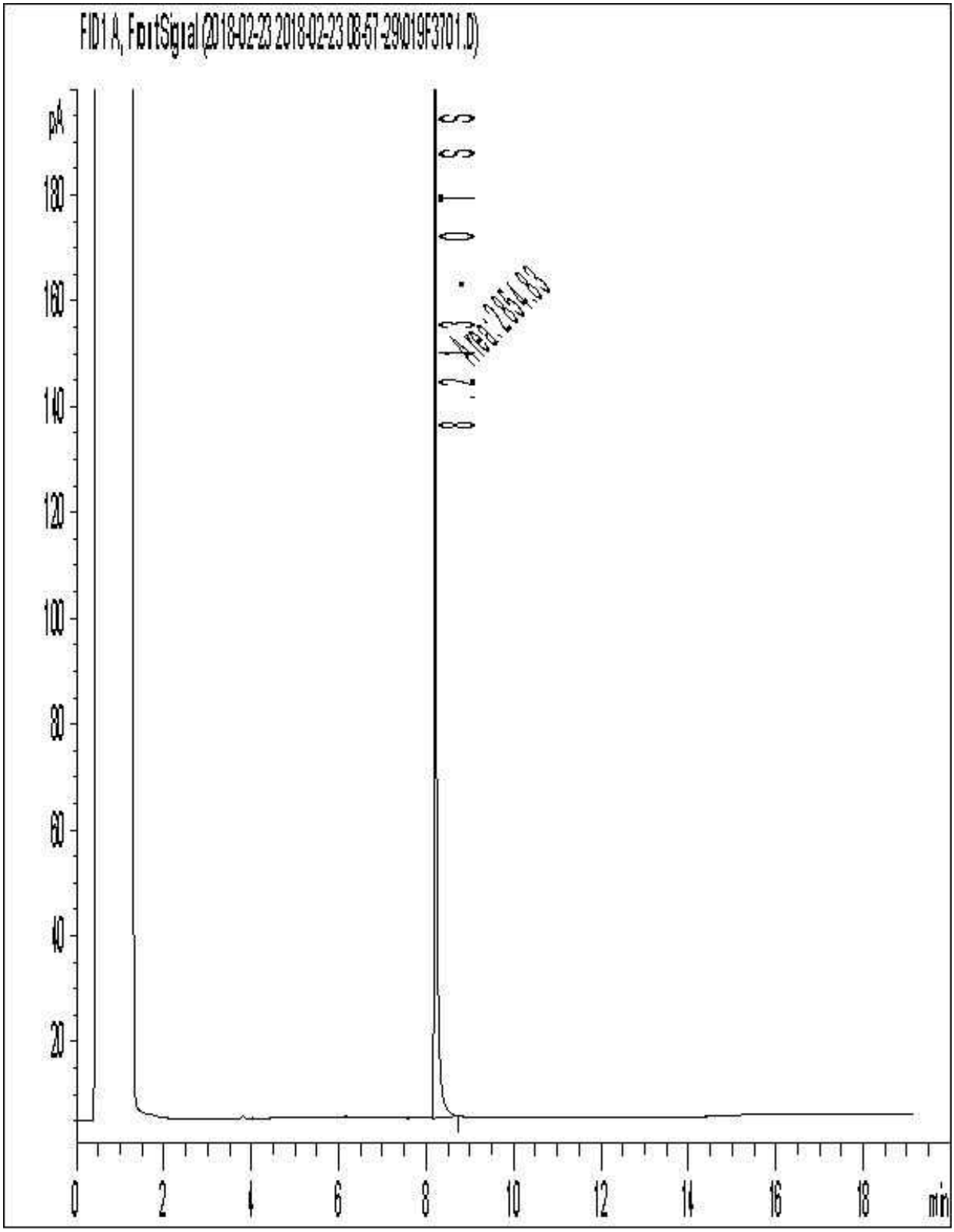


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B841230
Report Date: 2018/02/26
Maxxam Sample: GDG967

Terrapex Environmental Ltd
Client Project #: CB1057.00
Project name: 1622 Roger Stevens Drive
Client ID: BLANK

Petroleum Hydrocarbons F2-F4 in Water Chromatogram

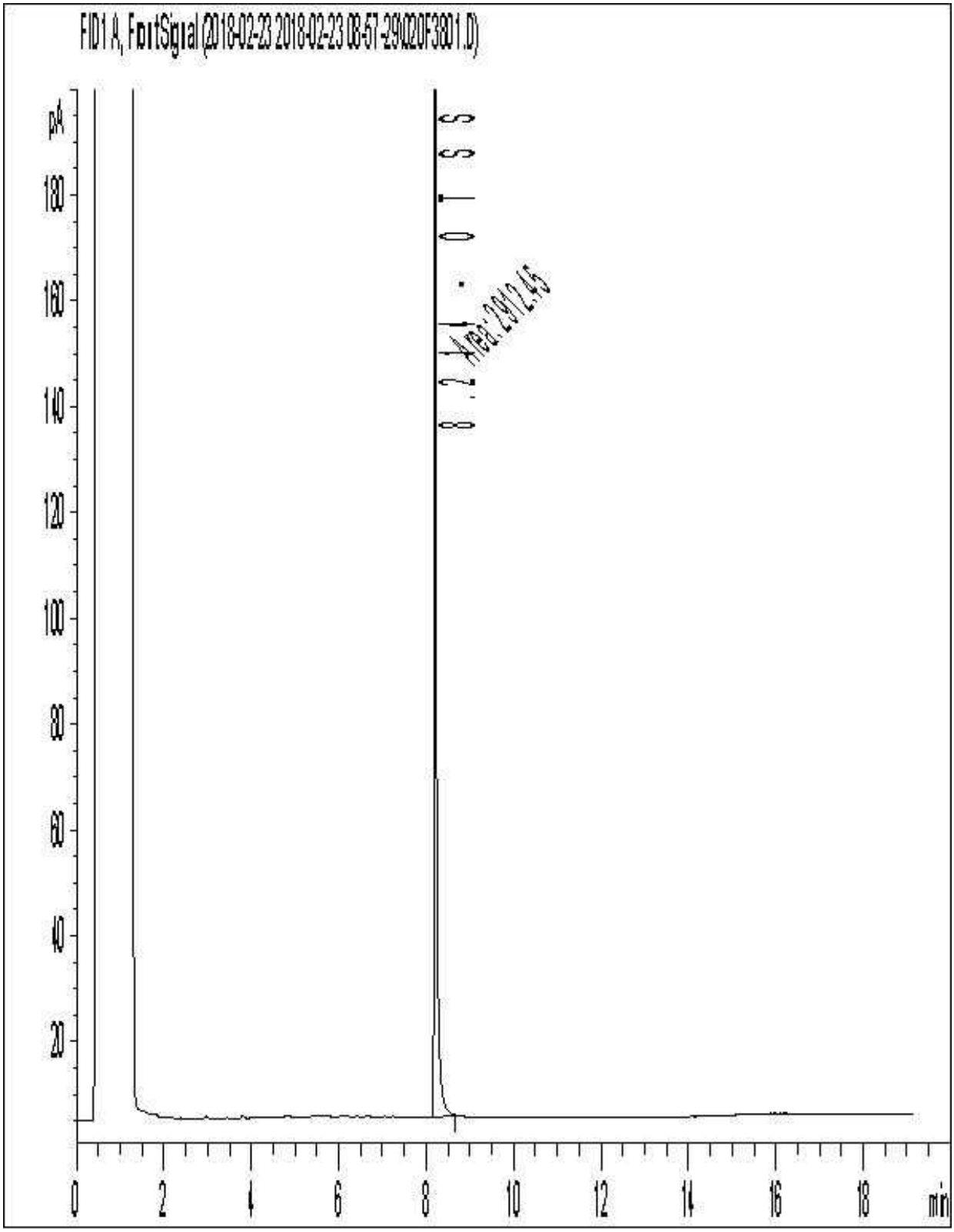


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B841230
Report Date: 2018/02/26
Maxxam Sample: GDG970

Terrapex Environmental Ltd
Client Project #: CB1057.00
Project name: 1622 Roger Stevens Drive
Client ID: MW 112

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.

Maxxam
A Bureau Veritas Group Company

Your P.O. #: PIONEER
Your Project #: CB1057.00
Site Location: 1622 Roger Stevens Drive
Your C.O.C. #: 650870-05-01

Attention: Geoff Lussier

Terrapex Environmental Ltd
920 Brant St.
Suite 16
Burlington, ON
Canada L7R 4J1

Report Date: 2018/03/05
Report #: R5029583
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B842304
Received: 2018/02/23, 15:05

Sample Matrix: Soil
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
pH CaCl2 EXTRACT (1)	2	2018/03/02	2018/03/02	CAM SOP-00413	EPA 9045 D m
Sulphate (20:1 Extract) (1)	2	N/A	2018/03/02	CAM SOP-00464	EPA 375.4 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.

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.

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 Maxxam Analytics Mississauga

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Maxxam
A Bureau Veritas Group Company

Your P.O. #: PIONEER
Your Project #: CB1057.00
Site Location: 1622 Roger Stevens Drive
Your C.O.C. #: 650870-05-01

Attention: Geoff Lussier

Terrapex Environmental Ltd
920 Brant St.
Suite 16
Burlington, ON
Canada L7R 4J1

Report Date: 2018/03/05
Report #: R5029583
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B842304
Received: 2018/02/23, 15:05

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Augustyna Dobosz, Project Manager
Email: ADobosz@maxxam.ca
Phone# (905)817-5700 Ext:5798

==========

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 #: B842304
Report Date: 2018/03/05

Terrapex Environmental Ltd
Client Project #: CB1057.00
Site Location: 1622 Roger Stevens Drive
Your P.O. #: PIONEER

RESULTS OF ANALYSES OF SOIL

Maxxam ID		GDL933	GDL934		GDL934		
Sampling Date		2018/02/21 13:00	2018/02/21 14:00		2018/02/21 14:00		
COC Number		650870-05-01	650870-05-01		650870-05-01		
	UNITS	MW102 SAMPLE 4	BH103 SAMPLE 2	QC Batch	BH103 SAMPLE 2 Lab-Dup	RDL	QC Batch
Inorganics							
Available (CaCl2) pH	pH	7.85	7.93	5422743			
Soluble (20:1) Sulphate (SO4)	ug/g	54	54	5420892	42	20	5420892

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B842304
Report Date: 2018/03/05

Terrapex Environmental Ltd
Client Project #: CB1057.00
Site Location: 1622 Roger Stevens Drive
Your P.O. #: PIONEER

TEST SUMMARY

Maxxam ID: GDL933
Sample ID: MW102 SAMPLE 4
Matrix: Soil

Collected: 2018/02/21
Shipped:
Received: 2018/02/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
pH CaCl2 EXTRACT	AT	5422743	2018/03/02	2018/03/02	Tahir Anwar
Sulphate (20:1 Extract)	KONE/EC	5420892	N/A	2018/03/02	Alina Dobreanu

Maxxam ID: GDL934
Sample ID: BH103 SAMPLE 2
Matrix: Soil

Collected: 2018/02/21
Shipped:
Received: 2018/02/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
pH CaCl2 EXTRACT	AT	5422743	2018/03/02	2018/03/02	Tahir Anwar
Sulphate (20:1 Extract)	KONE/EC	5420892	N/A	2018/03/02	Alina Dobreanu

Maxxam ID: GDL934 Dup
Sample ID: BH103 SAMPLE 2
Matrix: Soil

Collected: 2018/02/21
Shipped:
Received: 2018/02/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Sulphate (20:1 Extract)	KONE/EC	5420892	N/A	2018/03/02	Alina Dobreanu

Maxxam Analytics International Corporation o/a Maxxam Analytics 32 Colonnade Rd, Unit #1000, Nepean, ON K2E 7J6 Phone: 613 274-0573 Fax: 613 274-0574 Website: www.maxxam.ca

Maxxam Job #: B842304
Report Date: 2018/03/05

Terrapex Environmental Ltd
Client Project #: CB1057.00
Site Location: 1622 Roger Stevens Drive
Your P.O. #: PIONEER

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
A Bureau Veritas Group Company

Your P.O. #: PIONEER
Your Project #: CB1057.00
Site Location: 1622 Roger Stevens Drive
Your C.O.C. #: 650870-06-01

Attention: Geoff Lussier

Terrapex Environmental Ltd
920 Brant St.
Suite 16
Burlington, ON
Canada L7R 4J1

Report Date: 2018/03/12
Report #: R5038214
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B847405
Received: 2018/03/01, 17:00

Sample Matrix: Soil
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Methylnaphthalene Sum (1)	1	N/A	2018/03/09	CAM SOP-00301	EPA 8270D m
ABN Compounds in soil by GC/MS (1)	1	2018/03/08	2018/03/09	CAM SOP-00301	EPA 8270 m
1,3-Dichloropropene Sum (1)	1	N/A	2018/03/07		EPA 8260C m
Dinitrotoluene Sum (1)	1	2018/03/02	2018/03/09	CAM SOP - 00301	EPA 8270
Petroleum Hydrocarbons F2-F4 in Soil (1, 2)	1	2018/03/06	2018/03/07	CAM SOP-00316	CCME CWS m
F4G (CCME Hydrocarbons Gravimetric) (1)	1	2018/03/09	2018/03/09	CAM SOP-00316	CCME PHC-CWS m
Mercury (TCLP Leachable) (mg/L) (1)	1	N/A	2018/03/07	CAM SOP-00453	EPA 7470A m
Total Metals in TCLP Leachate by ICPMS (1)	1	2018/03/07	2018/03/07	CAM SOP-00447	EPA 6020B m
Moisture (1)	1	N/A	2018/03/05	CAM SOP-00445	Carter 2nd ed 51.2 m
TCLP - % Solids (1)	1	2018/03/06	2018/03/07	CAM SOP-00401	EPA 1311 Update I m
TCLP - Extraction Fluid (1)	1	N/A	2018/03/07	CAM SOP-00401	EPA 1311 Update I m
TCLP - Initial and final pH (1)	1	N/A	2018/03/07	CAM SOP-00401	EPA 1311 Update I m
Volatile Organic Compounds and F1 PHCs (1)	1	N/A	2018/03/06	CAM SOP-00230	EPA 8260C 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.

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.

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Your P.O. #: PIONEER
Your Project #: CB1057.00
Site Location: 1622 Roger Stevens Drive
Your C.O.C. #: 650870-06-01

Attention: Geoff Lussier

Terrapex Environmental Ltd
920 Brant St.
Suite 16
Burlington, ON
Canada L7R 4J1

Report Date: 2018/03/12
Report #: R5038214
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B847405
Received: 2018/03/01, 17:00

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 Maxxam Analytics Mississauga
(2) 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

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Augustyna Dobosz, Project Manager
Email: ADobosz@maxxam.ca
Phone# (905)817-5700 Ext:5798

==========

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.

Terrapex Environmental Ltd
Client Project #: CB1057.00
Site Location: 1622 Roger Stevens Drive
Your P.O. #: PIONEER

O.REG 153 VOCS BY HS & F1-F4 (SOIL)

Maxxam ID		GEL410		
Sampling Date		2018/02/26 12:00		
COC Number		650870-06-01		
	UNITS	TCLP	RDL	QC Batch
Inorganics				
Moisture	%	8.3	1.0	5425860
Calculated Parameters				
1,3-Dichloropropene (cis+trans)	ug/g	<0.050	0.050	5423161
Volatile Organics				
Acetone (2-Propanone)	ug/g	<0.50	0.50	5425684
Benzene	ug/g	<0.020	0.020	5425684
Bromodichloromethane	ug/g	<0.050	0.050	5425684
Bromoform	ug/g	<0.050	0.050	5425684
Bromomethane	ug/g	<0.050	0.050	5425684
Carbon Tetrachloride	ug/g	<0.050	0.050	5425684
Chlorobenzene	ug/g	<0.050	0.050	5425684
Chloroform	ug/g	<0.050	0.050	5425684
Dibromochloromethane	ug/g	<0.050	0.050	5425684
1,2-Dichlorobenzene	ug/g	<0.050	0.050	5425684
1,3-Dichlorobenzene	ug/g	<0.050	0.050	5425684
1,4-Dichlorobenzene	ug/g	<0.050	0.050	5425684
Dichlorodifluoromethane (FREON 12)	ug/g	<0.050	0.050	5425684
1,1-Dichloroethane	ug/g	<0.050	0.050	5425684
1,2-Dichloroethane	ug/g	<0.050	0.050	5425684
1,1-Dichloroethylene	ug/g	<0.050	0.050	5425684
cis-1,2-Dichloroethylene	ug/g	<0.050	0.050	5425684
trans-1,2-Dichloroethylene	ug/g	<0.050	0.050	5425684
1,2-Dichloropropane	ug/g	<0.050	0.050	5425684
cis-1,3-Dichloropropene	ug/g	<0.030	0.030	5425684
trans-1,3-Dichloropropene	ug/g	<0.040	0.040	5425684
Ethylbenzene	ug/g	<0.020	0.020	5425684
Ethylene Dibromide	ug/g	<0.050	0.050	5425684
Hexane	ug/g	<0.050	0.050	5425684
Methylene Chloride(Dichloromethane)	ug/g	<0.050	0.050	5425684
Methyl Ethyl Ketone (2-Butanone)	ug/g	<0.50	0.50	5425684

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B847405
Report Date: 2018/03/12

Terrapex Environmental Ltd
Client Project #: CB1057.00
Site Location: 1622 Roger Stevens Drive
Your P.O. #: PIONEER

O.REG 153 VOCS BY HS & F1-F4 (SOIL)

Maxxam ID		GEL410		
Sampling Date		2018/02/26 12:00		
COC Number		650870-06-01		
	UNITS	TCLP	RDL	QC Batch
Methyl Isobutyl Ketone	ug/g	<0.50	0.50	5425684
Methyl t-butyl ether (MTBE)	ug/g	<0.050	0.050	5425684
Styrene	ug/g	<0.050	0.050	5425684
1,1,1,2-Tetrachloroethane	ug/g	<0.050	0.050	5425684
1,1,2,2-Tetrachloroethane	ug/g	<0.050	0.050	5425684
Tetrachloroethylene	ug/g	<0.050	0.050	5425684
Toluene	ug/g	<0.020	0.020	5425684
1,1,1-Trichloroethane	ug/g	<0.050	0.050	5425684
1,1,2-Trichloroethane	ug/g	<0.050	0.050	5425684
Trichloroethylene	ug/g	<0.050	0.050	5425684
Trichlorofluoromethane (FREON 11)	ug/g	<0.050	0.050	5425684
Vinyl Chloride	ug/g	<0.020	0.020	5425684
p+m-Xylene	ug/g	<0.020	0.020	5425684
o-Xylene	ug/g	<0.020	0.020	5425684
Total Xylenes	ug/g	<0.020	0.020	5425684
F1 (C6-C10)	ug/g	<10	10	5425684
F1 (C6-C10) - BTEX	ug/g	<10	10	5425684
F2-F4 Hydrocarbons				
F2 (C10-C16 Hydrocarbons)	ug/g	<10	10	5428073
F3 (C16-C34 Hydrocarbons)	ug/g	290	50	5428073
F4 (C34-C50 Hydrocarbons)	ug/g	720	50	5428073
Reached Baseline at C50	ug/g	No		5428073
Surrogate Recovery (%)				
o-Terphenyl	%	92		5428073
4-Bromofluorobenzene	%	90		5425684
D10-o-Xylene	%	88		5425684
D4-1,2-Dichloroethane	%	116		5425684
D8-Toluene	%	99		5425684

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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O.REG 153 SEMIVOLATILES PACKAGE (SOIL)

Maxxam ID		GEL410			GEL410		
Sampling Date		2018/02/26 12:00			2018/02/26 12:00		
COC Number		650870-06-01			650870-06-01		
	UNITS	TCLP	RDL	QC Batch	TCLP Lab-Dup	RDL	QC Batch
Semivolatile Organics							
1,2,4-Trichlorobenzene	ug/g	<0.1	0.1	5431382	<0.1	0.1	5431382
1-Methylnaphthalene	ug/g	<0.06	0.06	5431382	<0.06	0.06	5431382
2,4,5-Trichlorophenol	ug/g	<0.2	0.2	5431382	<0.2	0.2	5431382
2,4,6-Trichlorophenol	ug/g	<0.2	0.2	5431382	<0.2	0.2	5431382
2,4-Dichlorophenol	ug/g	<0.2	0.2	5431382	<0.2	0.2	5431382
2,4-Dimethylphenol	ug/g	<0.4	0.4	5431382	<0.4	0.4	5431382
2,4-Dinitrophenol	ug/g	<1	1	5431382	<1	1	5431382
2,4-Dinitrotoluene	ug/g	<0.2	0.2	5431382	<0.2	0.2	5431382
2,6-Dinitrotoluene	ug/g	<0.2	0.2	5431382	<0.2	0.2	5431382
2-Chlorophenol	ug/g	<0.2	0.2	5431382	<0.2	0.2	5431382
2-Methylnaphthalene	ug/g	<0.06	0.06	5431382	<0.06	0.06	5431382
3,3'-Dichlorobenzidine	ug/g	<1	1	5431382	<1	1	5431382
Acenaphthene	ug/g	<0.06	0.06	5431382	<0.06	0.06	5431382
Acenaphthylene	ug/g	<0.1	0.1	5431382	<0.1	0.1	5431382
Anthracene	ug/g	<0.06	0.06	5431382	<0.06	0.06	5431382
Benzo(a)anthracene	ug/g	<0.1	0.1	5431382	<0.1	0.1	5431382
Benzo(a)pyrene	ug/g	<0.1	0.1	5431382	<0.1	0.1	5431382
Benzo(b/j)fluoranthene	ug/g	<0.2	0.2	5431382	<0.2	0.2	5431382
Benzo(g,h,i)perylene	ug/g	<0.2	0.2	5431382	<0.2	0.2	5431382
Benzo(k)fluoranthene	ug/g	<0.06	0.06	5431382	<0.06	0.06	5431382
Biphenyl	ug/g	<0.1	0.1	5431382	<0.1	0.1	5431382
Bis(2-chloroethyl)ether	ug/g	<0.4	0.4	5431382	<0.4	0.4	5431382
Bis(2-chloroisopropyl)ether	ug/g	<0.2	0.2	5431382	<0.2	0.2	5431382
Bis(2-ethylhexyl)phthalate	ug/g	<2	2	5431382	<2	2	5431382
Chrysene	ug/g	<0.1	0.1	5431382	<0.1	0.1	5431382
Dibenz(a,h)anthracene	ug/g	<0.1	0.1	5431382	<0.1	0.1	5431382
Diethyl phthalate	ug/g	<0.4	0.4	5431382	<0.4	0.4	5431382
Dimethyl phthalate	ug/g	<0.4	0.4	5431382	<0.4	0.4	5431382
Fluoranthene	ug/g	<0.1	0.1	5431382	<0.1	0.1	5431382
Fluorene	ug/g	<0.06	0.06	5431382	<0.06	0.06	5431382

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B847405
Report Date: 2018/03/12

Terrapex Environmental Ltd
Client Project #: CB1057.00
Site Location: 1622 Roger Stevens Drive
Your P.O. #: PIONEER

O.REG 153 SEMIVOLATILES PACKAGE (SOIL)

Maxxam ID		GEL410			GEL410		
Sampling Date		2018/02/26 12:00			2018/02/26 12:00		
COC Number		650870-06-01			650870-06-01		
	UNITS	**TCLP**	**RDL**	**QC Batch**	**TCLP Lab-Dup**	**RDL**	**QC Batch**
Indeno(1,2,3-cd)pyrene	ug/g	<0.2	0.2	5431382	<0.2	0.2	5431382
Naphthalene	ug/g	<0.06	0.06	5431382	<0.06	0.06	5431382
p-Chloroaniline	ug/g	<0.4	0.4	5431382	<0.4	0.4	5431382
Pentachlorophenol	ug/g	<0.2	0.2	5431382	<0.2	0.2	5431382
Phenanthrene	ug/g	<0.1	0.1	5431382	<0.1	0.1	5431382
Phenol	ug/g	<0.2	0.2	5431382	<0.2	0.2	5431382
Pyrene	ug/g	<0.1	0.1	5431382	<0.1	0.1	5431382
Calculated Parameters							
2,4- & 2,6-Dinitrotoluene	ug/g	<0.28	0.28	5423858			
Methylnaphthalene, 2-(1-)	ug/g	<0.085	0.085	5423856			
Surrogate Recovery (%)							
2,4,6-Tribromophenol	%	73		5431382	69		5431382
2-Fluorobiphenyl	%	92		5431382	88		5431382
D14-Terphenyl (FS)	%	96		5431382	94		5431382
D5-Nitrobenzene	%	74		5431382	72		5431382

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

Maxxam Job #: B847405
Report Date: 2018/03/12

Terrapex Environmental Ltd
Client Project #: CB1057.00
Site Location: 1622 Roger Stevens Drive
Your P.O. #: PIONEER

O.REG 558 TCLP LEACHATE PREPARATION (SOIL)

Maxxam ID		GEL410		
Sampling Date		2018/02/26 12:00		
COC Number		650870-06-01		
	UNITS	TCLP	RDL	QC Batch
Inorganics				
Final pH	pH	6.26		5428355
Initial pH	pH	9.41		5428355
TCLP - % Solids	%	100	0.2	5428353
TCLP Extraction Fluid	N/A	FLUID 1		5428354

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Report Date: 2018/03/12

Terrapex Environmental Ltd
Client Project #: CB1057.00
Site Location: 1622 Roger Stevens Drive
Your P.O. #: PIONEER

O.REG 558 TCLP METALS (SOIL)

Maxxam ID		GEL410		
Sampling Date		2018/02/26 12:00		
COC Number		650870-06-01		
	UNITS	TCLP	RDL	QC Batch
Metals				
Leachable Mercury (Hg)	mg/L	<0.0010	0.0010	5429337
Leachable Arsenic (As)	mg/L	<0.2	0.2	5429454
Leachable Barium (Ba)	mg/L	0.6	0.2	5429454
Leachable Boron (B)	mg/L	0.1	0.1	5429454
Leachable Cadmium (Cd)	mg/L	<0.05	0.05	5429454
Leachable Chromium (Cr)	mg/L	<0.1	0.1	5429454
Leachable Lead (Pb)	mg/L	<0.1	0.1	5429454
Leachable Selenium (Se)	mg/L	<0.1	0.1	5429454
Leachable Silver (Ag)	mg/L	<0.01	0.01	5429454
Leachable Uranium (U)	mg/L	<0.01	0.01	5429454

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Terrapex Environmental Ltd
Client Project #: CB1057.00
Site Location: 1622 Roger Stevens Drive
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PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		GEL410		
Sampling Date		2018/02/26 12:00		
COC Number		650870-06-01		
	UNITS	**TCLP**	**RDL**	**QC Batch**
F2-F4 Hydrocarbons				
F4G-sg (Grav. Heavy Hydrocarbons)	ug/g	2400	100	5433583

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B847405
Report Date: 2018/03/12

Terrapex Environmental Ltd
Client Project #: CB1057.00
Site Location: 1622 Roger Stevens Drive
Your P.O. #: PIONEER

TEST SUMMARY

Maxxam ID: GEL410
Sample ID: TCLP
Matrix: Soil

Collected: 2018/02/26
Shipped:
Received: 2018/03/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5423856	N/A	2018/03/09	Automated Statchk
ABN Compounds in soil by GC/MS	GC/MS	5431382	2018/03/08	2018/03/09	Milijana Avramovic
1,3-Dichloropropene Sum	CALC	5423161	N/A	2018/03/07	Automated Statchk
Dinitrotoluene Sum	CALC	5423858	2018/03/09	2018/03/09	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5428073	2018/03/06	2018/03/07	Zhiyue (Frank) Zhu
F4G (CCME Hydrocarbons Gravimetric)	BAL	5433583	2018/03/09	2018/03/09	Debra Deslandes
Mercury (TCLP Leachable) (mg/L)	CV/AA	5429337	N/A	2018/03/07	Ron Morrison
Total Metals in TCLP Leachate by ICPMS	ICP1/MS	5429454	2018/03/07	2018/03/07	Matthew Ritenburg
Moisture	BAL	5425860	N/A	2018/03/05	Min Yang
TCLP - % Solids	BAL	5428353	2018/03/06	2018/03/07	Jian (Ken) Wang
TCLP - Extraction Fluid		5428354	N/A	2018/03/07	Jian (Ken) Wang
TCLP - Initial and final pH	PH	5428355	N/A	2018/03/07	Jian (Ken) Wang
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5425684	N/A	2018/03/06	Karen Hughes

Maxxam ID: GEL410 Dup
Sample ID: TCLP
Matrix: Soil

Collected: 2018/02/26
Shipped:
Received: 2018/03/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
ABN Compounds in soil by GC/MS	GC/MS	5431382	2018/03/08	2018/03/09	Milijana Avramovic

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GENERAL COMMENTS

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

Package 1	0.0°C

Sample GEL410 [TCLP] : VOCF1 Analysis: Greater than 10g of soil was submitted in the field preserved vial. This significantly exceeds the protocol specification of approximately 5g. Additional methanol was added to the vial to ensure extraction efficiency.

ABN 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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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5425684	KH2	Matrix Spike	4-Bromofluorobenzene	2018/03/06		96	%	60 - 140
			D10-o-Xylene	2018/03/06		96	%	60 - 130
			D4-1,2-Dichloroethane	2018/03/06		110	%	60 - 140
			D8-Toluene	2018/03/06		100	%	60 - 140
			Acetone (2-Propanone)	2018/03/06		104	%	60 - 140
			Benzene	2018/03/06		99	%	60 - 140
			Bromodichloromethane	2018/03/06		95	%	60 - 140
			Bromoform	2018/03/06		85	%	60 - 140
			Bromomethane	2018/03/06		108	%	60 - 140
			Carbon Tetrachloride	2018/03/06		101	%	60 - 140
			Chlorobenzene	2018/03/06		94	%	60 - 140
			Chloroform	2018/03/06		101	%	60 - 140
			Dibromochloromethane	2018/03/06		91	%	60 - 140
			1,2-Dichlorobenzene	2018/03/06		95	%	60 - 140
			1,3-Dichlorobenzene	2018/03/06		96	%	60 - 140
			1,4-Dichlorobenzene	2018/03/06		102	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2018/03/06		122	%	60 - 140
			1,1-Dichloroethane	2018/03/06		103	%	60 - 140
			1,2-Dichloroethane	2018/03/06		102	%	60 - 140
			1,1-Dichloroethylene	2018/03/06		108	%	60 - 140
			cis-1,2-Dichloroethylene	2018/03/06		101	%	60 - 140
			trans-1,2-Dichloroethylene	2018/03/06		98	%	60 - 140
			1,2-Dichloropropane	2018/03/06		96	%	60 - 140
			cis-1,3-Dichloropropene	2018/03/06		95	%	60 - 140
			trans-1,3-Dichloropropene	2018/03/06		97	%	60 - 140
			Ethylbenzene	2018/03/06		94	%	60 - 140
			Ethylene Dibromide	2018/03/06		94	%	60 - 140
			Hexane	2018/03/06		102	%	60 - 140
			Methylene Chloride(Dichloromethane)	2018/03/06		106	%	60 - 140
			Methyl Ethyl Ketone (2-Butanone)	2018/03/06		102	%	60 - 140
			Methyl Isobutyl Ketone	2018/03/06		96	%	60 - 140
			Methyl t-butyl ether (MTBE)	2018/03/06		98	%	60 - 140
			Styrene	2018/03/06		87	%	60 - 140
			1,1,1,2-Tetrachloroethane	2018/03/06		92	%	60 - 140
			1,1,2,2-Tetrachloroethane	2018/03/06		94	%	60 - 140
			Tetrachloroethylene	2018/03/06		97	%	60 - 140
			Toluene	2018/03/06		93	%	60 - 140
			1,1,1-Trichloroethane	2018/03/06		104	%	60 - 140
			1,1,2-Trichloroethane	2018/03/06		103	%	60 - 140
			Trichloroethylene	2018/03/06		97	%	60 - 140
			Trichlorofluoromethane (FREON 11)	2018/03/06		112	%	60 - 140
			Vinyl Chloride	2018/03/06		107	%	60 - 140
			p+m-Xylene	2018/03/06		92	%	60 - 140
			o-Xylene	2018/03/06		93	%	60 - 140
			F1 (C6-C10)	2018/03/06		112	%	60 - 140
5425684	KH2	Spiked Blank	4-Bromofluorobenzene	2018/03/06		96	%	60 - 140
			D10-o-Xylene	2018/03/06		90	%	60 - 130
			D4-1,2-Dichloroethane	2018/03/06		109	%	60 - 140
			D8-Toluene	2018/03/06		100	%	60 - 140
			Acetone (2-Propanone)	2018/03/06		102	%	60 - 140
			Benzene	2018/03/06		98	%	60 - 130
			Bromodichloromethane	2018/03/06		94	%	60 - 130

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Bromoform	2018/03/06		83	%	60 - 130
			Bromomethane	2018/03/06		104	%	60 - 140
			Carbon Tetrachloride	2018/03/06		101	%	60 - 130
			Chlorobenzene	2018/03/06		94	%	60 - 130
			Chloroform	2018/03/06		101	%	60 - 130
			Dibromochloromethane	2018/03/06		89	%	60 - 130
			1,2-Dichlorobenzene	2018/03/06		96	%	60 - 130
			1,3-Dichlorobenzene	2018/03/06		99	%	60 - 130
			1,4-Dichlorobenzene	2018/03/06		105	%	60 - 130
			Dichlorodifluoromethane (FREON 12)	2018/03/06		121	%	60 - 140
			1,1-Dichloroethane	2018/03/06		103	%	60 - 130
			1,2-Dichloroethane	2018/03/06		101	%	60 - 130
			1,1-Dichloroethylene	2018/03/06		108	%	60 - 130
			cis-1,2-Dichloroethylene	2018/03/06		101	%	60 - 130
			trans-1,2-Dichloroethylene	2018/03/06		100	%	60 - 130
			1,2-Dichloropropane	2018/03/06		96	%	60 - 130
			cis-1,3-Dichloropropene	2018/03/06		91	%	60 - 130
			trans-1,3-Dichloropropene	2018/03/06		90	%	60 - 130
			Ethylbenzene	2018/03/06		95	%	60 - 130
			Ethylene Dibromide	2018/03/06		92	%	60 - 130
			Hexane	2018/03/06		101	%	60 - 130
			Methylene Chloride(Dichloromethane)	2018/03/06		105	%	60 - 130
			Methyl Ethyl Ketone (2-Butanone)	2018/03/06		100	%	60 - 140
			Methyl Isobutyl Ketone	2018/03/06		94	%	60 - 130
			Methyl t-butyl ether (MTBE)	2018/03/06		98	%	60 - 130
			Styrene	2018/03/06		88	%	60 - 130
			1,1,1,2-Tetrachloroethane	2018/03/06		92	%	60 - 130
			1,1,2,2-Tetrachloroethane	2018/03/06		93	%	60 - 130
			Tetrachloroethylene	2018/03/06		98	%	60 - 130
			Toluene	2018/03/06		92	%	60 - 130
			1,1,1-Trichloroethane	2018/03/06		104	%	60 - 130
			1,1,2-Trichloroethane	2018/03/06		102	%	60 - 130
			Trichloroethylene	2018/03/06		98	%	60 - 130
			Trichlorofluoromethane (FREON 11)	2018/03/06		112	%	60 - 130
			Vinyl Chloride	2018/03/06		107	%	60 - 130
			p+m-Xylene	2018/03/06		93	%	60 - 130
			o-Xylene	2018/03/06		94	%	60 - 130
			F1 (C6-C10)	2018/03/06		98	%	80 - 120
5425684	KH2	Method Blank	4-Bromofluorobenzene	2018/03/06		92	%	60 - 140
			D10-o-Xylene	2018/03/06		94	%	60 - 130
			D4-1,2-Dichloroethane	2018/03/06		110	%	60 - 140
			D8-Toluene	2018/03/06		100	%	60 - 140
			Acetone (2-Propanone)	2018/03/06	<0.50		ug/g	
			Benzene	2018/03/06	<0.020		ug/g	
			Bromodichloromethane	2018/03/06	<0.050		ug/g	
			Bromoform	2018/03/06	<0.050		ug/g	
			Bromomethane	2018/03/06	<0.050		ug/g	
			Carbon Tetrachloride	2018/03/06	<0.050		ug/g	
			Chlorobenzene	2018/03/06	<0.050		ug/g	
			Chloroform	2018/03/06	<0.050		ug/g	
			Dibromochloromethane	2018/03/06	<0.050		ug/g	
			1,2-Dichlorobenzene	2018/03/06	<0.050		ug/g	

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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	2018/03/06	<0.050		ug/g	
			1,4-Dichlorobenzene	2018/03/06	<0.050		ug/g	
			Dichlorodifluoromethane (FREON 12)	2018/03/06	<0.050		ug/g	
			1,1-Dichloroethane	2018/03/06	<0.050		ug/g	
			1,2-Dichloroethane	2018/03/06	<0.050		ug/g	
			1,1-Dichloroethylene	2018/03/06	<0.050		ug/g	
			cis-1,2-Dichloroethylene	2018/03/06	<0.050		ug/g	
			trans-1,2-Dichloroethylene	2018/03/06	<0.050		ug/g	
			1,2-Dichloropropane	2018/03/06	<0.050		ug/g	
			cis-1,3-Dichloropropene	2018/03/06	<0.030		ug/g	
			trans-1,3-Dichloropropene	2018/03/06	<0.040		ug/g	
			Ethylbenzene	2018/03/06	<0.020		ug/g	
			Ethylene Dibromide	2018/03/06	<0.050		ug/g	
			Hexane	2018/03/06	<0.050		ug/g	
			Methylene Chloride(Dichloromethane)	2018/03/06	<0.050		ug/g	
			Methyl Ethyl Ketone (2-Butanone)	2018/03/06	<0.50		ug/g	
			Methyl Isobutyl Ketone	2018/03/06	<0.50		ug/g	
			Methyl t-butyl ether (MTBE)	2018/03/06	<0.050		ug/g	
			Styrene	2018/03/06	<0.050		ug/g	
			1,1,1,2-Tetrachloroethane	2018/03/06	<0.050		ug/g	
			1,1,2,2-Tetrachloroethane	2018/03/06	<0.050		ug/g	
			Tetrachloroethylene	2018/03/06	<0.050		ug/g	
			Toluene	2018/03/06	<0.020		ug/g	
			1,1,1-Trichloroethane	2018/03/06	<0.050		ug/g	
			1,1,2-Trichloroethane	2018/03/06	<0.050		ug/g	
			Trichloroethylene	2018/03/06	<0.050		ug/g	
			Trichlorofluoromethane (FREON 11)	2018/03/06	<0.050		ug/g	
			Vinyl Chloride	2018/03/06	<0.020		ug/g	
			p+m-Xylene	2018/03/06	<0.020		ug/g	
			o-Xylene	2018/03/06	<0.020		ug/g	
			Total Xylenes	2018/03/06	<0.020		ug/g	
			F1 (C6-C10)	2018/03/06	<10		ug/g	
			F1 (C6-C10) - BTEX	2018/03/06	<10		ug/g	
5425684	KH2	RPD	Acetone (2-Propanone)	2018/03/06	NC		%	50
			Benzene	2018/03/06	NC		%	50
			Bromodichloromethane	2018/03/06	NC		%	50
			Bromoform	2018/03/06	NC		%	50
			Bromomethane	2018/03/06	NC		%	50
			Carbon Tetrachloride	2018/03/06	NC		%	50
			Chlorobenzene	2018/03/06	NC		%	50
			Chloroform	2018/03/06	NC		%	50
			Dibromochloromethane	2018/03/06	NC		%	50
			1,2-Dichlorobenzene	2018/03/06	NC		%	50
			1,3-Dichlorobenzene	2018/03/06	NC		%	50
			1,4-Dichlorobenzene	2018/03/06	NC		%	50
			Dichlorodifluoromethane (FREON 12)	2018/03/06	NC		%	50
			1,1-Dichloroethane	2018/03/06	NC		%	50
			1,2-Dichloroethane	2018/03/06	NC		%	50
			1,1-Dichloroethylene	2018/03/06	NC		%	50
			cis-1,2-Dichloroethylene	2018/03/06	NC		%	50
			trans-1,2-Dichloroethylene	2018/03/06	NC		%	50
			1,2-Dichloropropane	2018/03/06	NC		%	50

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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	2018/03/06	NC		%	50
			trans-1,3-Dichloropropene	2018/03/06	NC		%	50
			Ethylbenzene	2018/03/06	NC		%	50
			Ethylene Dibromide	2018/03/06	NC		%	50
			Hexane	2018/03/06	NC		%	50
			Methylene Chloride(Dichloromethane)	2018/03/06	NC		%	50
			Methyl Ethyl Ketone (2-Butanone)	2018/03/06	NC		%	50
			Methyl Isobutyl Ketone	2018/03/06	NC		%	50
			Methyl t-butyl ether (MTBE)	2018/03/06	NC		%	50
			Styrene	2018/03/06	NC		%	50
			1,1,1,2-Tetrachloroethane	2018/03/06	NC		%	50
			1,1,2,2-Tetrachloroethane	2018/03/06	NC		%	50
			Tetrachloroethylene	2018/03/06	NC		%	50
			Toluene	2018/03/06	NC		%	50
			1,1,1-Trichloroethane	2018/03/06	NC		%	50
			1,1,2-Trichloroethane	2018/03/06	NC		%	50
			Trichloroethylene	2018/03/06	NC		%	50
			Trichlorofluoromethane (FREON 11)	2018/03/06	NC		%	50
			Vinyl Chloride	2018/03/06	NC		%	50
			p+m-Xylene	2018/03/06	NC		%	50
			o-Xylene	2018/03/06	NC		%	50
			Total Xylenes	2018/03/06	NC		%	50
			F1 (C6-C10)	2018/03/06	NC		%	30
			F1 (C6-C10) - BTEX	2018/03/06	NC		%	30
5425860	JGH	RPD	Moisture	2018/03/05	2.7		%	20
5428073	ZZ	Matrix Spike	o-Terphenyl	2018/03/07		94	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2018/03/07		93	%	50 - 130
			F3 (C16-C34 Hydrocarbons)	2018/03/07		95	%	50 - 130
			F4 (C34-C50 Hydrocarbons)	2018/03/07		97	%	50 - 130
5428073	ZZ	Spiked Blank	o-Terphenyl	2018/03/07		90	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2018/03/07		89	%	80 - 120
			F3 (C16-C34 Hydrocarbons)	2018/03/07		92	%	80 - 120
			F4 (C34-C50 Hydrocarbons)	2018/03/07		92	%	80 - 120
5428073	ZZ	Method Blank	o-Terphenyl	2018/03/07		93	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2018/03/07	<10		ug/g	
			F3 (C16-C34 Hydrocarbons)	2018/03/07	<50		ug/g	
			F4 (C34-C50 Hydrocarbons)	2018/03/07	<50		ug/g	
5428073	ZZ	RPD	F2 (C10-C16 Hydrocarbons)	2018/03/07	NC		%	30
			F3 (C16-C34 Hydrocarbons)	2018/03/07	NC		%	30
			F4 (C34-C50 Hydrocarbons)	2018/03/07	NC		%	30
5429337	RON	Matrix Spike	Leachable Mercury (Hg)	2018/03/07		98	%	75 - 125
5429337	RON	Leachate Blank	Leachable Mercury (Hg)	2018/03/07	<0.0010		mg/L	
5429337	RON	Spiked Blank	Leachable Mercury (Hg)	2018/03/07		96	%	80 - 120
5429337	RON	Method Blank	Leachable Mercury (Hg)	2018/03/07	<0.0010		mg/L	
5429337	RON	RPD	Leachable Mercury (Hg)	2018/03/07	NC		%	25
5429454	MRG	Matrix Spike	Leachable Arsenic (As)	2018/03/07		100	%	80 - 120
			Leachable Barium (Ba)	2018/03/07		94	%	80 - 120
			Leachable Boron (B)	2018/03/07		100	%	80 - 120
			Leachable Cadmium (Cd)	2018/03/07		97	%	80 - 120
			Leachable Chromium (Cr)	2018/03/07		98	%	80 - 120
			Leachable Lead (Pb)	2018/03/07		92	%	80 - 120
			Leachable Selenium (Se)	2018/03/07		98	%	80 - 120

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QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Leachable Silver (Ag)	2018/03/07		95	%	80 - 120
			Leachable Uranium (U)	2018/03/07		97	%	80 - 120
5429454	MRG	Leachate Blank	Leachable Arsenic (As)	2018/03/07	<0.2		mg/L	
			Leachable Barium (Ba)	2018/03/07	<0.2		mg/L	
			Leachable Boron (B)	2018/03/07	<0.1		mg/L	
			Leachable Cadmium (Cd)	2018/03/07	<0.05		mg/L	
			Leachable Chromium (Cr)	2018/03/07	<0.1		mg/L	
			Leachable Lead (Pb)	2018/03/07	<0.1		mg/L	
			Leachable Selenium (Se)	2018/03/07	<0.1		mg/L	
			Leachable Silver (Ag)	2018/03/07	<0.01		mg/L	
			Leachable Uranium (U)	2018/03/07	<0.01		mg/L	
5429454	MRG	Spiked Blank	Leachable Arsenic (As)	2018/03/07		93	%	80 - 120
			Leachable Barium (Ba)	2018/03/07		93	%	80 - 120
			Leachable Boron (B)	2018/03/07		93	%	80 - 120
			Leachable Cadmium (Cd)	2018/03/07		93	%	80 - 120
			Leachable Chromium (Cr)	2018/03/07		91	%	80 - 120
			Leachable Lead (Pb)	2018/03/07		92	%	80 - 120
			Leachable Selenium (Se)	2018/03/07		93	%	80 - 120
			Leachable Silver (Ag)	2018/03/07		95	%	80 - 120
			Leachable Uranium (U)	2018/03/07		96	%	80 - 120
5429454	MRG	RPD	Leachable Arsenic (As)	2018/03/07	NC		%	35
			Leachable Barium (Ba)	2018/03/07	15		%	35
			Leachable Boron (B)	2018/03/07	27		%	35
			Leachable Cadmium (Cd)	2018/03/07	NC		%	35
			Leachable Chromium (Cr)	2018/03/07	NC		%	35
			Leachable Lead (Pb)	2018/03/07	NC		%	35
			Leachable Selenium (Se)	2018/03/07	NC		%	35
			Leachable Silver (Ag)	2018/03/07	NC		%	35
			Leachable Uranium (U)	2018/03/07	NC		%	35
5431382	MA	Matrix Spike [GEL410-01]	2,4,6-Tribromophenol	2018/03/09		104	%	50 - 130
			2-Fluorobiphenyl	2018/03/09		95	%	50 - 130
			D14-Terphenyl (FS)	2018/03/09		101	%	50 - 130
			D5-Nitrobenzene	2018/03/09		76	%	50 - 130
			1,2,4-Trichlorobenzene	2018/03/09		85	%	50 - 130
			1-Methylnaphthalene	2018/03/09		90	%	50 - 130
			2,4,5-Trichlorophenol	2018/03/09		107	%	50 - 130
			2,4,6-Trichlorophenol	2018/03/09		100	%	50 - 130
			2,4-Dichlorophenol	2018/03/09		99	%	50 - 130
			2,4-Dimethylphenol	2018/03/09		80	%	30 - 130
			2,4-Dinitrophenol	2018/03/09		44	%	30 - 130
			2,4-Dinitrotoluene	2018/03/09		91	%	50 - 130
			2,6-Dinitrotoluene	2018/03/09		82	%	50 - 130
			2-Chlorophenol	2018/03/09		88	%	50 - 130
			2-Methylnaphthalene	2018/03/09		89	%	50 - 130
			3,3'-Dichlorobenzidine	2018/03/09		101	%	30 - 130
			Acenaphthene	2018/03/09		105	%	50 - 130
			Acenaphthylene	2018/03/09		98	%	50 - 130
			Anthracene	2018/03/09		99	%	50 - 130
			Benzo(a)anthracene	2018/03/09		107	%	50 - 130
			Benzo(a)pyrene	2018/03/09		108	%	50 - 130
			Benzo(b/j)fluoranthene	2018/03/09		116	%	50 - 130
			Benzo(g,h,i)perylene	2018/03/09		68	%	50 - 130

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QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Benzo(k)fluoranthene	2018/03/09		121	%	50 - 130
			Biphenyl	2018/03/09		94	%	50 - 130
			Bis(2-chloroethyl)ether	2018/03/09		75	%	50 - 130
			Bis(2-chloroisopropyl)ether	2018/03/09		82	%	50 - 130
			Bis(2-ethylhexyl)phthalate	2018/03/09		101	%	50 - 130
			Chrysene	2018/03/09		110	%	50 - 130
			Dibenz(a,h)anthracene	2018/03/09		78	%	50 - 130
			Diethyl phthalate	2018/03/09		97	%	50 - 130
			Dimethyl phthalate	2018/03/09		100	%	50 - 130
			Fluoranthene	2018/03/09		114	%	50 - 130
			Fluorene	2018/03/09		108	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2018/03/09		76	%	50 - 130
			Naphthalene	2018/03/09		109	%	50 - 130
			p-Chloroaniline	2018/03/09		83	%	30 - 130
			Pentachlorophenol	2018/03/09		19 (1)	%	50 - 130
			Phenanthrene	2018/03/09		104	%	50 - 130
			Phenol	2018/03/09		88	%	30 - 130
			Pyrene	2018/03/09		106	%	50 - 130
5431382	MA	Spiked Blank	2,4,6-Tribromophenol	2018/03/08		86	%	50 - 130
			2-Fluorobiphenyl	2018/03/08		96	%	50 - 130
			D14-Terphenyl (FS)	2018/03/08		111	%	50 - 130
			D5-Nitrobenzene	2018/03/08		93	%	50 - 130
			1,2,4-Trichlorobenzene	2018/03/08		88	%	50 - 130
			1-Methylnaphthalene	2018/03/08		88	%	50 - 130
			2,4,5-Trichlorophenol	2018/03/08		102	%	50 - 130
			2,4,6-Trichlorophenol	2018/03/08		96	%	50 - 130
			2,4-Dichlorophenol	2018/03/08		81	%	50 - 130
			2,4-Dimethylphenol	2018/03/08		80	%	30 - 130
			2,4-Dinitrophenol	2018/03/08		10 (1)	%	30 - 130
			2,4-Dinitrotoluene	2018/03/08		97	%	50 - 130
			2,6-Dinitrotoluene	2018/03/08		93	%	50 - 130
			2-Chlorophenol	2018/03/08		92	%	50 - 130
			2-Methylnaphthalene	2018/03/08		86	%	50 - 130
			3,3'-Dichlorobenzidine	2018/03/08		62	%	30 - 130
			Acenaphthene	2018/03/08		100	%	50 - 130
			Acenaphthylene	2018/03/08		97	%	50 - 130
			Anthracene	2018/03/08		92	%	50 - 130
			Benzo(a)anthracene	2018/03/08		105	%	50 - 130
			Benzo(a)pyrene	2018/03/08		99	%	50 - 130
			Benzo(b/j)fluoranthene	2018/03/08		102	%	50 - 130
			Benzo(g,h,i)perylene	2018/03/08		108	%	50 - 130
			Benzo(k)fluoranthene	2018/03/08		111	%	50 - 130
			Biphenyl	2018/03/08		89	%	50 - 130
			Bis(2-chloroethyl)ether	2018/03/08		92	%	50 - 130
			Bis(2-chloroisopropyl)ether	2018/03/08		93	%	50 - 130
			Bis(2-ethylhexyl)phthalate	2018/03/08		89	%	50 - 130
			Chrysene	2018/03/08		103	%	50 - 130
			Dibenz(a,h)anthracene	2018/03/08		108	%	50 - 130
			Diethyl phthalate	2018/03/08		103	%	50 - 130
			Dimethyl phthalate	2018/03/08		95	%	50 - 130
			Fluoranthene	2018/03/08		107	%	50 - 130
			Fluorene	2018/03/08		107	%	50 - 130

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QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Indeno(1,2,3-cd)pyrene	2018/03/08		103	%	50 - 130
			Naphthalene	2018/03/08		103	%	50 - 130
			p-Chloroaniline	2018/03/08		60	%	30 - 130
			Pentachlorophenol	2018/03/08		63	%	50 - 130
			Phenanthrene	2018/03/08		97	%	50 - 130
			Phenol	2018/03/08		98	%	30 - 130
			Pyrene	2018/03/08		118	%	50 - 130
5431382	MA	Method Blank	2,4,6-Tribromophenol	2018/03/08		73	%	50 - 130
			2-Fluorobiphenyl	2018/03/08		102	%	50 - 130
			D14-Terphenyl (FS)	2018/03/08		110	%	50 - 130
			D5-Nitrobenzene	2018/03/08		94	%	50 - 130
			1,2,4-Trichlorobenzene	2018/03/08	<0.05		ug/g	
			1-Methylnaphthalene	2018/03/08	<0.03		ug/g	
			2,4,5-Trichlorophenol	2018/03/08	<0.08		ug/g	
			2,4,6-Trichlorophenol	2018/03/08	<0.1		ug/g	
			2,4-Dichlorophenol	2018/03/08	<0.1		ug/g	
			2,4-Dimethylphenol	2018/03/08	<0.2		ug/g	
			2,4-Dinitrophenol	2018/03/08	<0.5		ug/g	
			2,4-Dinitrotoluene	2018/03/08	<0.1		ug/g	
			2,6-Dinitrotoluene	2018/03/08	<0.1		ug/g	
			2-Chlorophenol	2018/03/08	<0.08		ug/g	
			2-Methylnaphthalene	2018/03/08	<0.03		ug/g	
			3,3'-Dichlorobenzidine	2018/03/08	<0.5		ug/g	
			Acenaphthene	2018/03/08	<0.03		ug/g	
			Acenaphthylene	2018/03/08	<0.05		ug/g	
			Anthracene	2018/03/08	<0.03		ug/g	
			Benzo(a)anthracene	2018/03/08	<0.05		ug/g	
			Benzo(a)pyrene	2018/03/08	<0.05		ug/g	
			Benzo(b/j)fluoranthene	2018/03/08	<0.1		ug/g	
			Benzo(g,h,i)perylene	2018/03/08	<0.1		ug/g	
			Benzo(k)fluoranthene	2018/03/08	<0.03		ug/g	
			Biphenyl	2018/03/08	<0.05		ug/g	
			Bis(2-chloroethyl)ether	2018/03/08	<0.2		ug/g	
			Bis(2-chloroisopropyl)ether	2018/03/08	<0.1		ug/g	
			Bis(2-ethylhexyl)phthalate	2018/03/08	<1		ug/g	
			Chrysene	2018/03/08	<0.05		ug/g	
			Dibenz(a,h)anthracene	2018/03/08	<0.05		ug/g	
			Diethyl phthalate	2018/03/08	<0.2		ug/g	
			Dimethyl phthalate	2018/03/08	<0.2		ug/g	
			Fluoranthene	2018/03/08	<0.05		ug/g	
			Fluorene	2018/03/08	<0.03		ug/g	
			Indeno(1,2,3-cd)pyrene	2018/03/08	<0.08		ug/g	
			Naphthalene	2018/03/08	<0.03		ug/g	
			p-Chloroaniline	2018/03/08	<0.2		ug/g	
			Pentachlorophenol	2018/03/08	<0.1		ug/g	
			Phenanthrene	2018/03/08	<0.05		ug/g	
			Phenol	2018/03/08	<0.09		ug/g	
			Pyrene	2018/03/08	<0.05		ug/g	
5431382	MA	RPD [GEL410-01]	1,2,4-Trichlorobenzene	2018/03/09	NC		%	40
			1-Methylnaphthalene	2018/03/09	NC		%	40
			2,4,5-Trichlorophenol	2018/03/09	NC		%	40
			2,4,6-Trichlorophenol	2018/03/09	NC		%	40

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			2,4-Dichlorophenol	2018/03/09	NC		%	40
			2,4-Dimethylphenol	2018/03/09	NC		%	40
			2,4-Dinitrophenol	2018/03/09	NC		%	40
			2,4-Dinitrotoluene	2018/03/09	NC		%	40
			2,6-Dinitrotoluene	2018/03/09	NC		%	40
			2-Chlorophenol	2018/03/09	NC		%	40
			2-Methylnaphthalene	2018/03/09	NC		%	40
			3,3'-Dichlorobenzidine	2018/03/09	NC		%	40
			Acenaphthene	2018/03/09	NC		%	40
			Acenaphthylene	2018/03/09	NC		%	40
			Anthracene	2018/03/09	NC		%	40
			Benzo(a)anthracene	2018/03/09	NC		%	40
			Benzo(a)pyrene	2018/03/09	NC		%	40
			Benzo(b/j)fluoranthene	2018/03/09	NC		%	40
			Benzo(g,h,i)perylene	2018/03/09	NC		%	40
			Benzo(k)fluoranthene	2018/03/09	NC		%	40
			Biphenyl	2018/03/09	NC		%	40
			Bis(2-chloroethyl)ether	2018/03/09	NC		%	40
			Bis(2-chloroisopropyl)ether	2018/03/09	NC		%	40
			Bis(2-ethylhexyl)phthalate	2018/03/09	NC		%	40
			Chrysene	2018/03/09	NC		%	40
			Dibenz(a,h)anthracene	2018/03/09	NC		%	40
			Diethyl phthalate	2018/03/09	NC		%	40
			Dimethyl phthalate	2018/03/09	NC		%	40
			Fluoranthene	2018/03/09	NC		%	40
			Fluorene	2018/03/09	NC		%	40
			Indeno(1,2,3-cd)pyrene	2018/03/09	NC		%	40
			Naphthalene	2018/03/09	NC		%	40
			p-Chloroaniline	2018/03/09	NC		%	40
			Pentachlorophenol	2018/03/09	NC		%	40
			Phenanthrene	2018/03/09	NC		%	40
			Phenol	2018/03/09	NC		%	40
			Pyrene	2018/03/09	NC		%	40
5433583	DDS	Matrix Spike [GEL410-03]	F4G-sg (Grav. Heavy Hydrocarbons)	2018/03/09		NC	%	65 - 135
5433583	DDS	Spiked Blank	F4G-sg (Grav. Heavy Hydrocarbons)	2018/03/09		100	%	65 - 135
5433583	DDS	Method Blank	F4G-sg (Grav. Heavy Hydrocarbons)	2018/03/09	<100		ug/g	
5433583	DDS	RPD	F4G-sg (Grav. Heavy Hydrocarbons)	2018/03/09	0		%	50

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 (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) The recovery was below the lower control limit. This may represent a low bias in some results for this specific analyte.

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Maxxam Job #: B847405
Report Date: 2018/03/12

Terrapex Environmental Ltd
Client Project #: CB1057.00
Site Location: 1622 Roger Stevens Drive
Your P.O. #: PIONEER

VALIDATION SIGNATURE PAGE

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

Cristina Carriere, Scientific Service Specialist

Ewa Pranjic, M.Sc., C.Chem, 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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A Bureau Veritas Group Company

Maxxam Analytics International Corporation o/a Maxxam Analytics
6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel:(905) 817-5700 Toll-free:800-563-6266 Fax:(905) 817-5777 www.maxxam.ca

01-Mar-18 17:00
Augustyna Dobosz
B847405
MAF ENV-678

Page 1 of 1

Bottle Order #: 650870
Project Manager: Augustyna Dobosz
C#650870-06-01

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:	
Company Name:	#30396 Parkland Industries Ltd	Company Name:	#19684 Terrapex Environmental Ltd	Quotation #:	B75111
Attention:	Retail Invoices	Attention:	Geoff Lussier	P.O. #:	
Address:	4919-59th St Suite 100, Red Deer AB T4N 6C9	Address:	920 Brant St. Suite 16, Burlington ON L7R 4J1	Project:	CB1057.00
				Project Name:	
Tel:	(403) 357-6400 x Fax: (403) 356-3015 x	Tel:	(905) 632-5939 x228 Fax:	Site #:	1622 Roger Stevens Drive
Email:	emilie.price@parkland.ca, victoria.pianarosa@parkland.	Email:	g.lussier@terrapex.com	Sampled By:	GS

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE MAXXAM DRINKING WATER CHAIN OF CUSTODY

Regulation 153 (2011)
- [ ] Table 1 [ ] Res/Park [ ] Medium/Fine
- [x] Table 2 [x] Ind/Comm [ ] Coarse
- [ ] Table 3 [ ] Agri/Other [ ] For RSC
- [ ] Table ___

Other Regulations
- [ ] CCME [ ] Sanitary Sewer Bylaw
- [ ] Reg 558 [ ] Storm Sewer Bylaw
- [ ] MISA Municipality ___
- [ ] PWQO
- [ ] 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: [x]
(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 #)

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle): Metals / Hg / Cr VI	Petroleum Hydrocarbons CCME F1 & BTEX	Petroleum Hydrocarbons F2-F4	OReg 153 VOC's (~~O.Reg 153 ICPMS Metals and Sulphate~~)	OReg 153 SVOC's (~~Soil Texture (%sand, %silt, %clay)~~)	Moisture	pH CaCl2 EXTRACT	~~Flashpoint~~	O.Reg 558 TCLP ~~Inorganics Package~~ (Heavy metals)	~~O.Reg 558 TCLP PCBs~~	O.Reg 558 TCLP Volatile Organics HS	# of Bottles	Comments
1		TCLP	Feb 26 ~~12:00~~	12:00	SOIL	–	X	X	X	X			~~X~~	X			5	
2					SOIL													
3					SOIL													
4					SOIL													
5					SOIL													
6					SOIL													RECEIVED IN OTTAWA
7					SOIL													
8					SOIL													
9					SOIL													On ice
10					SOIL													

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted
[signature] Greg Sabourin	18/03/01	1:30	Mariana Vasconcelos	2018/03/01	17:00	
			[signature] BYUSHGN Idriz	2018/03/02	09:00	

Laboratory Use Only

Time Sensitive	Temperature (°C) on Recei	Custody Seal	Yes	No
	0, 0, 0	Present	Y	
		Intact	Y	

* 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.

* 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. 2/3/3

** SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT HTTP://MAXXAM.CA/WP-CONTENT/UPLOADS/ONTARIO-COC.PDF.

SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

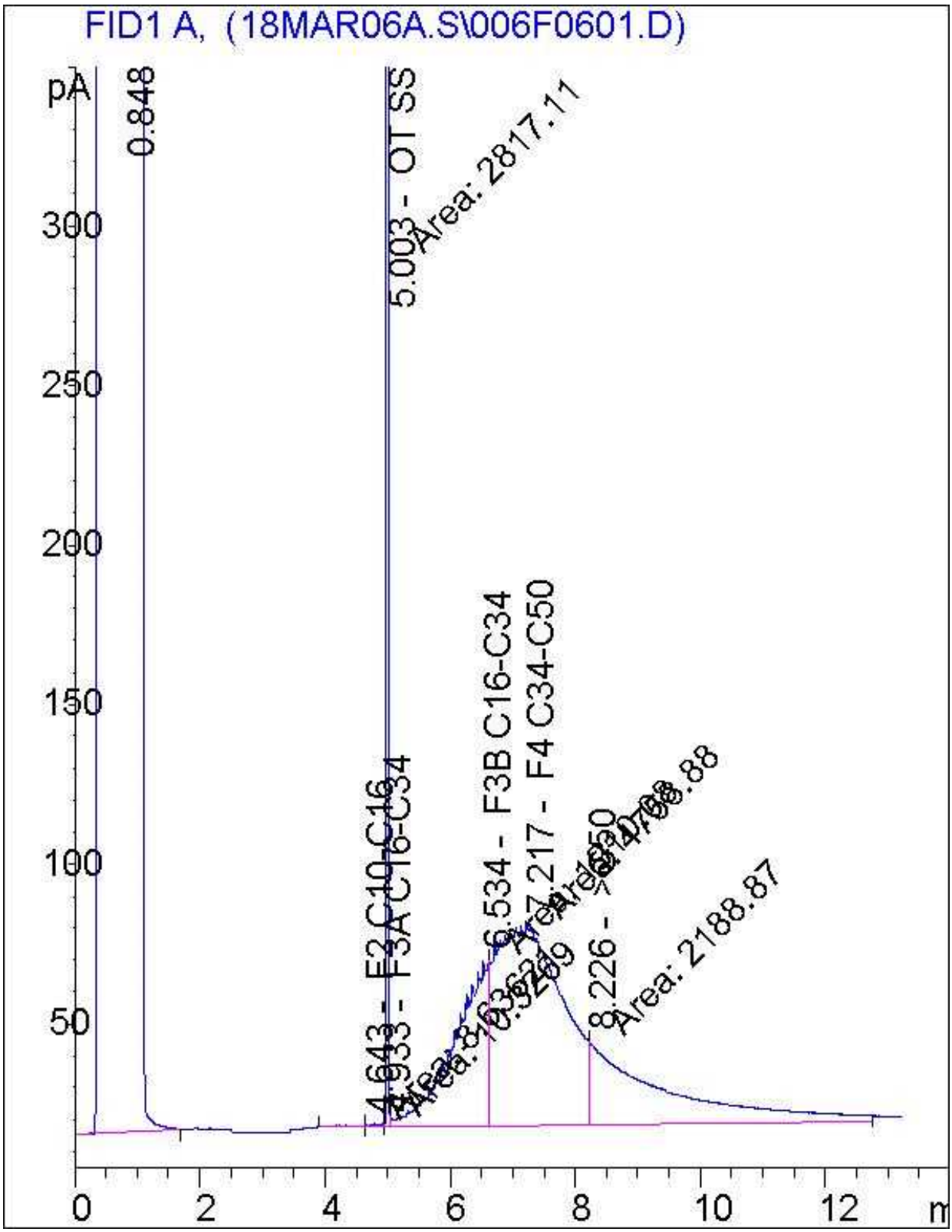
White: Maxxa Yellow: Client

Maxxam Analytics International Corporation o/a Maxxam Analytics

Maxxam Job #: B847405
Report Date: 2018/03/12
Maxxam Sample: GEL410

Terrapex Environmental Ltd
Client Project #: CB1057.00
Project name: 1622 Roger Stevens Drive
Client ID: TCLP

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.

Maxxam Job #: B842304
Report Date: 2018/03/05

Terrapex Environmental Ltd
Client Project #: CB1057.00
Site Location: 1622 Roger Stevens Drive
Your P.O. #: PIONEER

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5420892	ADB	Matrix Spike [GDL934-01]	Soluble (20:1) Sulphate (SO4)	2018/03/02		NC	%	70 - 130
5420892	ADB	Spiked Blank	Soluble (20:1) Sulphate (SO4)	2018/03/02		103	%	70 - 130
5420892	ADB	Method Blank	Soluble (20:1) Sulphate (SO4)	2018/03/02	<20		ug/g	
5420892	ADB	RPD [GDL934-01]	Soluble (20:1) Sulphate (SO4)	2018/03/02	25		%	35
5422743	TA1	Spiked Blank	Available (CaCl2) pH	2018/03/02		100	%	97 - 103
5422743	TA1	RPD	Available (CaCl2) pH	2018/03/02	0.22		%	N/A

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.

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.

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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Maxxam Job #: B842304
Report Date: 2018/03/05

Terrapex Environmental Ltd
Client Project #: CB1057.00
Site Location: 1622 Roger Stevens Drive
Your P.O. #: PIONEER

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 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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CHAIN OF CUSTODY RECORD

Page 1 of 1

INVOICE TO:

Company Name: #30396 Parkland Industries Ltd
Attention: Retail Invoices
Address: 4919-59th St Suite 100
Red Deer AB T4N 6C9
Tel: (403) 357-6400 x Fax: (403) 356-3015 x
Email: emilie.price@parkland.ca, victoria.pianarosa@parkland.

REPORT TO:

Company Name: #19684 Terrapex Environmental Ltd
Attention: Geoff Lussier
Address: 920 Brant St. Suite 16
Burlington ON L7R 4J1
Tel: (905) 632-5939 x228 Fax:
Email: g.lussier@terrapex.com

PROJECT INFORMATION:

Quotation #: B75111
P.O. #:
Project: CB1057.00
Project Name: Parkland Kars
Site #: 1622 Roger Stevens Drive
Sampled By: Greg Saboian

Laboratory Use Only:

Maxxam Job #:
Bottle Order #: 650870
COC #: C#650870-05-01
Project Manager: Augustyna Dobosz

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE MAXXAM DRINKING WATER CHAIN OF CUSTODY

Regulation 153 (2011)
- [ ] Table 1 [ ] Res/Park [ ] Medium/Fine
- [x] Table 2 [x] Ind/Comm [ ] Coarse
- [ ] Table 3 [ ] Agri/Other [ ] For RSC
- [ ] Table ___

Other Regulations
- [ ] CCME [ ] Sanitary Sewer Bylaw
- [ ] Reg 558 [ ] Storm Sewer Bylaw
- [ ] MISA Municipality ___
- [ ] PWQO
- [ ] 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: [X]
(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 3DD 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): ~~Petroleum Hydrocarbons CCME Fr1 + BTEX~~ pH + Soluble Sulphate	Petroleum Hydrocarbons F2-F4	O.Reg 153 (CPMS Metals and Sulphate	Soil Texture (%sand, %silt, %clay)	Moisture	pH CaCl2 EXTRACT	Flashpoint	O.Reg 558 TCLP Inorganics Package	O.Reg 558 TCLP PCBs	O.Reg 558 TCLP Volatile Organics HS	# of Bottles	Comments
1		MW102 Sample 4	February 21, 2018	1:00pm	SOIL	NO	X										1	
2		BH103 Sample 2	February 21, 2018	2:00pm	SOIL	NO	X										1	
3					SOIL													
4					SOIL													
5					SOIL													
6					SOIL													
7					SOIL													
8					SOIL													
9					SOIL													
10					SOIL													

23-Feb-18 15:05
Augustyna Dobosz
B842304
URE ENV-907

RECEIVED IN OTTAWA

On ice

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted
RH / RACHEL HARZOG	18/02/23	15:10	Mariana Fasion Rascon	2018/02/23	15:05	
			[illegible]	18/02/24	10:04	

Laboratory Use Only

Time Sensitive	Temperature (°C) on Recei	Custody Seal	Yes	No
0,0,0		Present	✓	
		Intact	✓	

* 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.

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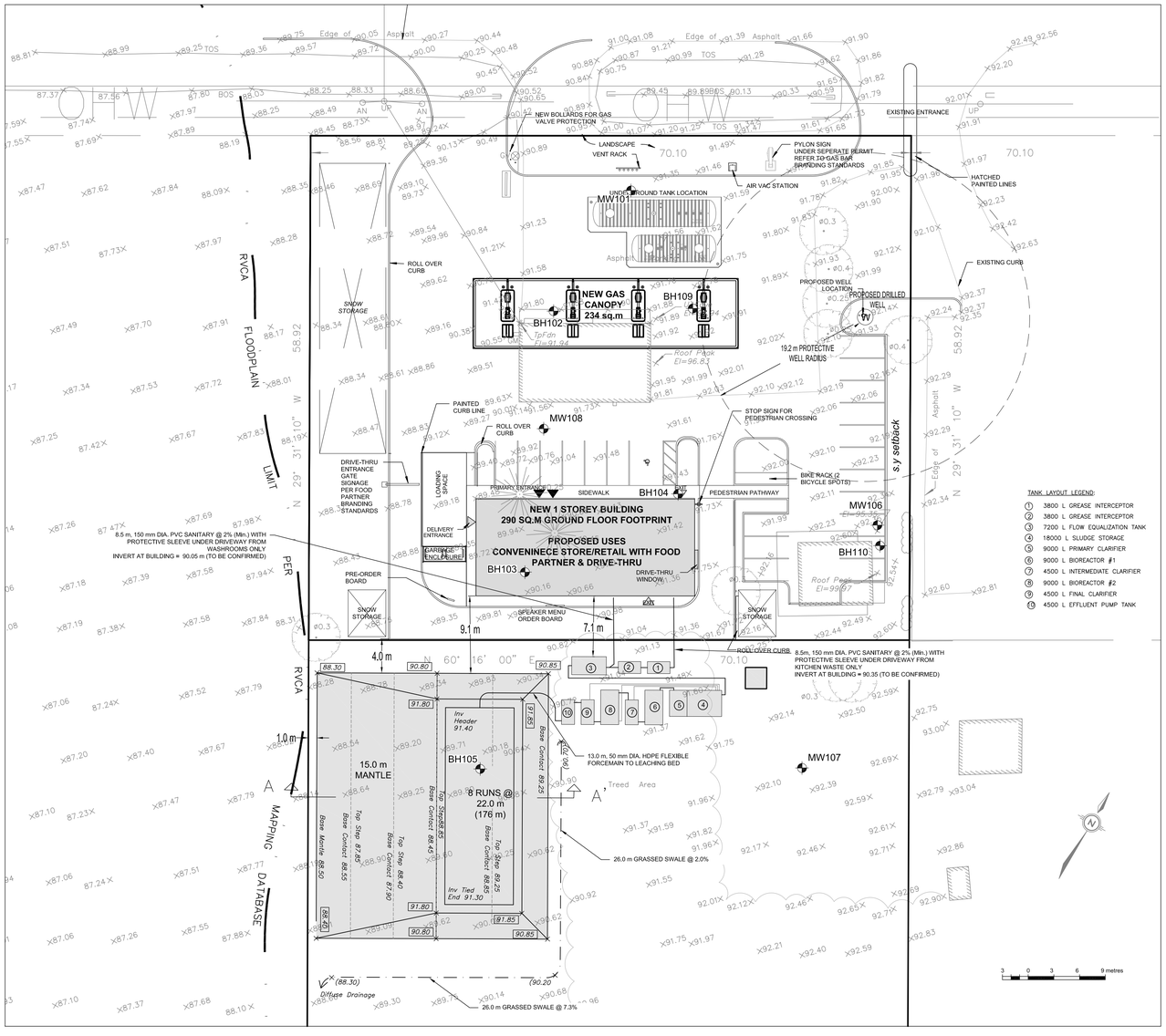
SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

White: Maxxa Yellow: Client

5/3/3

Maxxam Analytics International Corporation o/a Maxxam Analytics

APPENDIX G
SEPTIC SYSTEM DESIGN DRAWINGS (WSP, 2018)



LEGEND

- (97.07) — DRAINAGE SWALE WITH SWALE INVERT
- × 87.26 — EXISTING GRADE
- × 88.00 — PROPOSED FINISHED SEPTIC GRADE AT SPECIFIC LOCATION
- CROSS SECTION LINE
- BH105 — BOREHOLE / MONITOR LOCATION AND DESIGNATION

BOREHOLES/MONITORS FROM ALSTON ASSOCIATES GEOTECHNICAL, DATED MARCH 15, 2018

BOREHOLE BH105

0.00 – 0.75 m TOPSOIL
0.75 – 1.25 m SILTY SAND, BROWN, TRACE ORGANICS, COMPACT, MOIST
1.25 – 3.70 m SILTY SAND, BROWN, SOME GRAVEL, COMPACT, MOIST

BOREHOLE MW107

0.00 – 0.76 m TOPSOIL
0.76 – 3.70 m SILTY SAND, BROWN, SOME GRAVEL, DENSE, MOIST

TANK LAYOUT LEGEND:

1. 3800 L GREASE INTERCEPTOR
2. 3800 L GREASE INTERCEPTOR
3. 7200 L FLOW EQUALIZATION TANK
4. 18000 L SLUDGE STORAGE
5. 9000 L PRIMARY CLARIFIER
6. 9000 L BIOREACTOR #1
7. 4500 L INTERMEDIATE CLARIFIER
8. 9000 L BIOREACTOR #2
9. 4500 L FINAL CLARIFIER
10. 4500 L EFFLUENT PUMP TANK

SEWAGE SYSTEM CONSTRUCTION / MAINTENANCE NOTES

1. SEWAGE DISPOSAL SYSTEM HAS BEEN DESIGNED TO ACCEPT CBOD <10 mg/L, AND TSS <10 mg/L.
2. SEWAGE SYSTEM DESIGNED FOR A DAILY FLOW OF 8890 L/DAY.
3. ALL PVC FITTINGS AND PIPES ARE SCHEDULE 40.
4. PRESSURE PIPES SHALL BE HIGH DENSITY POLYETHYLENE.
5. ALL WORK SHALL BE IN ACCORDANCE WITH RELEVANT CODES AND GUIDELINES.
6. PRIOR TO COMMENCEMENT OF EXCAVATIONS, UNDERGROUND SERVICES SHALL BE LOCATED.
7. CONTRACTOR MUST REPORT ANY DISCREPANCIES TO THE PROJECT ENGINEER TO DETERMINE THE IMPACT.
8. ANY CHANGES MUST BE APPROVED BY THE PROJECT ENGINEER.
9. ALL RISERS SHALL EXTEND TO SURFACE, COMPLETE WITH CHILD PROOF, TAMPER PROOF, LIDS.
10. ALL GRAVITY CONNECTIONS SHALL HAVE A MINIMUM 2 % GRADE, UNLESS OTHERWISE SPECIFIED.
11. ALL SANITARY PIPES / FORCEMAINS SHALL BE INSULATED UNDER ROADWAYS AND WALKWAYS AT A DEPTH GREAT ENOUGH TO ENSURE PROTECTION FROM FROST AND CRUSHING.
12. WSP MUST BE PRESENT DURING CONSTRUCTION ACTIVITIES TO VERIFY DESIGN ASSUMPTIONS AND TO DOCUMENT THE CONSTRUCTION OF THE SYSTEM. THIS DESIGN CANNOT BE RELIED UPON WITHOUT THIS SUPERVISION.
13. CONSTRUCTION OF THE SYSTEM SHALL BE COMPLETED BY A LICENSED CONTRACTOR (BY THE MINISTRY OF MUNICIPAL AFFAIRS AND HOUSING).
14. BASE EXCAVATION IS TO BE SCARIFIED PRIOR TO PLACING FILL MATERIAL. NO EQUIPMENT (RUBBER TIRE OR TRACK) IS TO COME INTO CONTACT WITH THE SOIL AFTER SCARIFICATION. SCARIFIED SOILS CANNOT BE LEFT EXPOSED TO RAIN. IMPORTED MATERIAL IS TO BE BLADED ONTO THE SCARIFIED AREA IN 0.20 TO 0.25 m LIFTS AND TRACK COMPACTED.
15. SAND FILL MUST MEET THE SPECIFICATIONS OF: T = 6 TO 8 min/cm OR LESS WITH ≤ 5 % PASSING THE 200 SIEVE.
16. LEACHING BED SHALL BE IMMEDIATELY SODDED OR SEEDED UPON COMPLETION, SLOPED AREAS (4:1 OF STEEPER) MUST BE SODDED.
17. NO LANDSCAPING OR BUILDINGS ARE PERMITTED ON THE LEACHING BED AREA UNLESS SPECIFICALLY APPROVED BY WSP.
18. NO IRRIGATION SYSTEMS ARE PERMITTED ON THE LEACHING BED AREA.
19. PUMP CHAMBERS AND PUMPS SHALL HAVE ALL ELECTRICAL COMPONENTS AND CONNECTIONS INSTALLED IN ACCORDANCE WITH THE CURRENT SPECIFICATIONS OF HYDRO.
20. TANKS SHALL BE INSTALLED ON 50 mm OF LOOSE SAND SPREAD EVENLY OVER MINIMUM 200 mm OF COMPACTED GRAVEL OR CRUSHED STONE.
21. ALARMS SHALL BE A 120 VOLT AUDIBLE ALARM LOCATED IN A CONVENIENT, ACCESSIBLE AREA, AND CLEARLY AND PERMANENTLY LABELED AS "SEWAGE PUMP TANK–HIGH LEVEL ALARM".
22. THE BUILDING SUMP, WATER SOFTENER, WATER TREATMENT SYSTEM, FURNACE CONDENSATE DISCHARGE AND EAVES TROUGH DOWN SPOUTS SHALL NOT BE CONNECTED TO THE SEWAGE SYSTEM. DIRECT ALL SUCH FLOWS TO APPROVED OUTLETS LOCATED AWAY FROM LEACHING BED AND TANK AREAS.
23. TANKS SHALL BE INSTALLED AT AN APPROPRIATE DEPTH TO ACCOMMODATE GRAVITY FLOW BETWEEN TANKS (WHERE APPLICABLE) BASED ON FINISHED GRADE.
24. ALL JOINT SEALS TO BE DONE WITH PRIMER AND MASTIC BAND, OR AS PER THE MANUFACTURER'S REQUIREMENTS.
25. ALL HOLES AROUND PIPES GOING THROUGH CONCRETE STRUCTURE SHALL BE SEALED WITH NON–SHRINKING GROUT FROM INSIDE AND OUTSIDE.
26. IF HIGH GROUNDWATER CONDITIONS ARE ENCOUNTERED, TANKS WITH DYNAMIC WATER LEVELS MUST BE ANCHORED.
27. ALL CONCRETE TANKS ARE TO HAVE A MAXIMUM BURIAL DEPTH OF 1.0 m IN NON TRAFFIC AREAS. EXTRA REINFORCEMENT IS REQUIRED FOR TRAFFIC AREAS AND/OR DEEP BURIAL.
28. TANK SEAMS AFFECTED BY HIGH GROUNDWATER ELEVATIONS MUST BE WATERPROOFED WITH AN EXTERIOR MEMBRANE.
29. ANY FILL ENCOUNTERED DURING THE LEACHING BED CONSTRUCTION MUST NOT BE USED IN THE LEACHING BED AREA UNLESS IT MEETS OBC SPECIFICATIONS OR SPECIFICATIONS OF THIS DESIGN.
30. THE STONE, PIPE AND SAND FILL OF EXISTING LEACHING MUST BE REMOVED FROM THE PROPOSED LEACHING BED AREA PRIOR TO CONSTRUCTION.
31. A 14 GAUGE TW–SOLID COPPER LIGHT COLOURED PLASTIC COATED TRACER WIRE, OR OTHER MEANS AS DEEMED ACCEPTABLE BY THE TOWN, SHALL BE INSTALLED FOR DETECTION PURPOSES ON THE HEADER LINE AND DISTRIBUTION PIPES.
32. THE SLUDGE STORAGE / PRIMARY CLARIFIERS, FLOW EQUALIZATION, INTERMEDIATE CLARIFIER AND BIOREACTORS TANKS SHALL BE INSULATED ON THE SIDES (TO BELOW THE FROST LINE) AND TOP.

FLOW CALCULATIONS

PROPOSED GAS BAR:

PROPOSED NUMBER OF NOZZLES = 8
FLOW PER NOZZLE = 560 L/DAY
NUMBER OF WASHROOMS FOR GAS BAR = 2
FLOW PER GAS BAR WASHROOM = 950 L/DAY
DAILY DESIGN FLOW FOR GAS BAR = (8)(560) + (1)(950) = 6380 L/DAY = Q1

PROPOSED TAKE–OUT RESTAURANT (24 HOURS) :

FLOOR AREA = 93.0 m²
FLOW PER 9.25 m² OF FLOOR AREA = 190 L/DAY
NUMBER OF EMPLOYEES = 8
FLOW PER EMPLOYEE = 75 L/DAY
DAILY DESIGN FLOW FOR TAKE–OUT RESTAURANT = (93.0/9.25)(190) + (8)(75) = 2510 L/DAY = Q2

DAILY DESIGN SEWAGE FLOW = Q1 + Q2 = 8890 L/DAY = Q

PERCOLATION RATE OF NATIVE SOILS = 20 min/cm (SANDY SILT, TRACE GRAVEL) BASED ON ALSTON ASSOCIATES GEOTECHNICAL, DATED MARCH 15, 2018 = T
LEACHING BED TYPE = RAISED TYPE A DISPOSAL SYSTEM

MINIMUM BASAL LOADING AREA = QT/400 = 445 m²
PROPOSED BASAL LOADING AREA = 837 m² (27.0 x 31.0 m)
MINIMUM STONE AND PIPE AREA = Q/50 = 178 m²
PROPOSED STONE AND PIPE AREA = 184 m² (8.0 m x 23.0 m)
PROPOSED LENGTH OF DISTRIBUTION PIPE = 176 m (8 RUNS @ 22.0 m LENGTH)
PROPOSED FLOW EQUALIZATION PUMPS = DUPLEX VORTEX SEWAGE PUMPS (BJM MODEL SV400) OR EQUAL
PROPOSED EQUALIZATION PUMP SETTINGS = 185 L/DOSE, TIMED, ONCE EVERY 30 MIN, ALTERNATING BETWEEN PUMPS
PROPOSED FINAL PUMP TANK PUMPS = DUPLEX EFFLUENT PUMPS (LIBERTY MODEL 280) OR EQUAL
PROPOSED FINAL PUMP TANK SETTINGS = 700 L/CYCLE, ON DEMAND, ALTERNATING BETWEEN PUMPS

KEY PLAN:

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ISSUED FOR - REVISION:

IS	RE	DATE	DESCRIPTION

SEAL:

LICENSED PROFESSIONAL ENGINEER
C.A.A. LARWA
100173519
PROVINCE OF ONTARIO

CLIENT:
INVECTA DEVELOPMENT (OTTAWA) CORPORATION

CLIENT REF. #:

PROJECT:
PROPOSED QUICK SERVICE RESTAURANT AND SERVICE STATION
1618/1622 ROGER STEVENS DRIVE
KARS, ONTARIO

PROJECT NO.: 181-05280-00
DATE: JUNE 2018

wsp
126 DON HILLOCK DRIVE, UNIT 2
AURORA, ONTARIO CANADA L4G 0G9
TEL.: 905-750-3080 | FAX: 905-727-0463 | WWW.WSP.COM

ORIGINAL SCALE: 1:300
IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE.
25mm

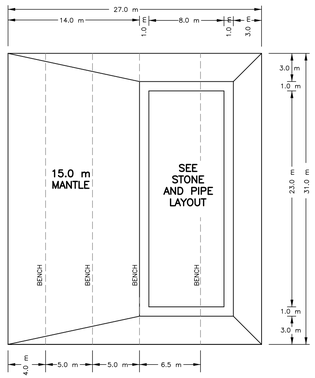
TITLE:
PLAN VIEW
ON-SITE SEWAGE TREATMENT AND DISPOSAL SYSTEM DESIGN

DRAWING NUMBER: 1
SHEET #: 1 OF 2

DESIGNED BY: CAL
DRAWN BY: PLB
CHECKED BY: CAL
DISCIPLINE: ENVIRONMENT
ISSUE: SUBMISSION
DATE OF:
REV #: 0

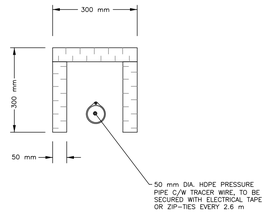
BED LAYOUT

SCALE 1:300



RIGIDBOARD INSULATION DETAIL

NOT TO SCALE

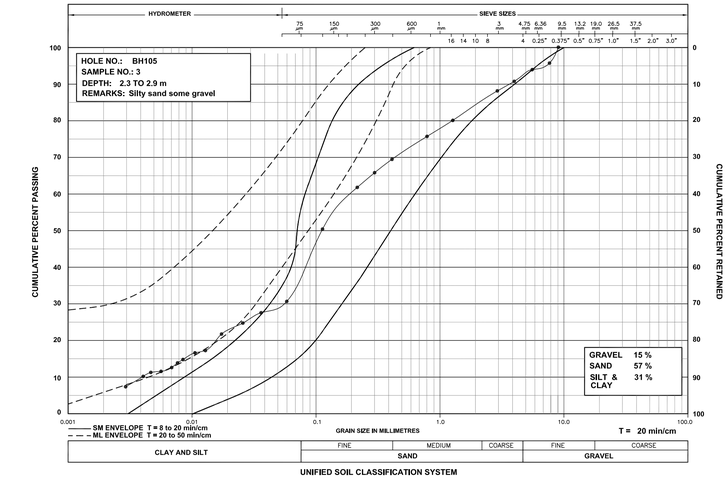


INVERTED 'U'

NOTES:

1. TO BE USED OVER FORCEMAINS WHERE LESS THAN 1.5 m COVER. TO BE USED OVER GRAVITY SEWERS WHERE LESS THAN 1.0 m COVER.
2. RIGIDBOARD TO BE DOW HI, CELFORT, PR FOAMULAR EXTRUDED POLYSTYRENE RATED FOR 30 psi.
3. TRENCH EXCAVATION, BEDDING AND BACKFILL AS PER OPSS.

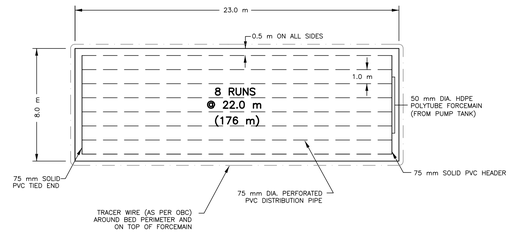
PARTICLE SIZE DISTRIBUTION



UNIFIED SOIL CLASSIFICATION SYSTEM

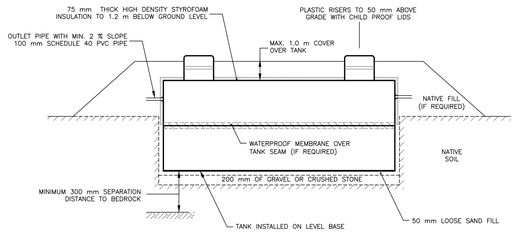
STONE AND PIPE LAYOUT

SCALE 1:200



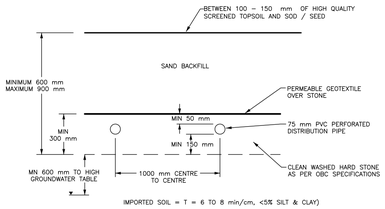
TYPICAL TANK SECTION

NOT TO SCALE



STONE LAYER DETAIL

NOT TO SCALE



IMPORTED SOIL = T = 6 TO 8 min/cm, <5% SILT & CLAY)

TANK LAYOUT

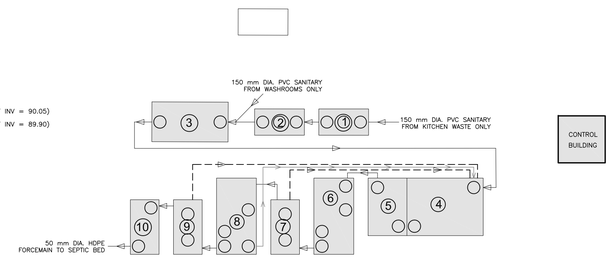
NOT TO SCALE

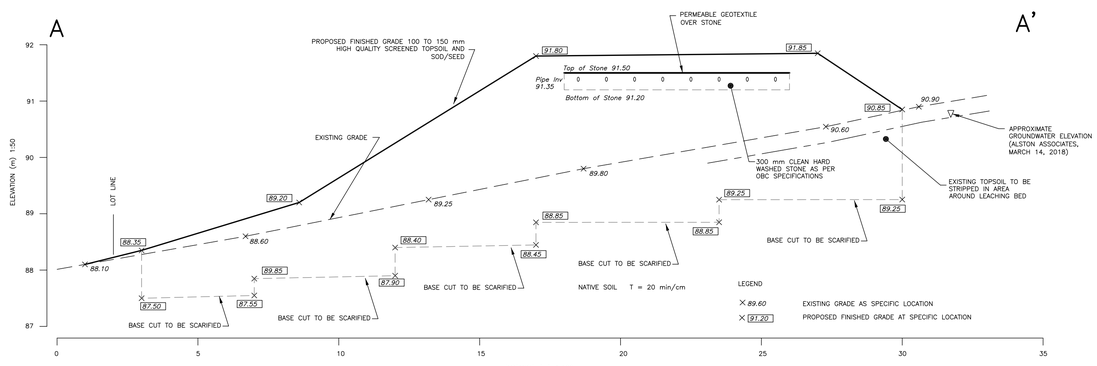
TANK LAYOUT LEGEND:

1. 3800 L GREASE INTERCEPTOR (FG = 90.85, INLET INV = 90.15, OUTLET INV = 90.05)
2. 3800 L GREASE INTERCEPTOR (FG = 90.75, INLET INV = 90.00, OUTLET INV = 89.90)
3. 7200 L FLOW EQUALIZATION TANK (FG = 90.75, INLET INV = 89.85)
4. 18000 L SLUDGE STORAGE (FG = 91.60, INLET INV = 91.00)
5. 9000 L PRIMARY CLARIFIER (FG = 91.60, OUTLET INV = 90.90)
6. 9000 L BIOREACTOR #1 (FG = 91.50, INLET INV = 90.85)
7. 4500 L INTERMEDIATE CLARIFIER (FG = 91.40, OUTLET INV = 90.75)
8. 9000 L BIOREACTOR #2 (FG = 91.40, INLET INV = 90.70)
9. 4500 L FINAL CLARIFIER (FG = 91.20, OUTLET INV = 90.60)
10. 4500 L EFFLUENT PUMP TANK (FG = 91.20, INLET INV = 90.55)

SANITARY EFFLUENT PUMP
SANITARY FLOW DIRECTION
SLUDGE RETURN
RECIRCULATION LINE

FG = FINISHED GRADE





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ORIGINAL SCALE: 1:300

IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE.

25mm

TITLE:

DETAILS & SPECIFICATIONS ON-SITE SEWAGE TREATMENT AND DISPOSAL SYSTEM DESIGN

DRAWING NUMBER: 2

SHEET #: 2 OF 2

DESIGNED BY: IA
DRAWN BY: PLB
CHECKED BY: CAL
DISCIPLINE: ENVIRONMENT
ISSUE: SUBMISSION
REV #
DATE OF: