



MORRISON HERSHFIELD

FINAL REPORT

**Phase One and Phase Two  
Environmental Site Assessments –  
1101 Baxter Road, Ottawa, Ontario**

Presented to:

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## EXECUTIVE SUMMARY

Morrison Hershfield Ltd. (MH) was retained by Regional Group (the Client), to conduct a combined phase one and two Environmental Site Assessment (ESA) of the property located at 1101 Baxter Road, in Ottawa, Ontario (referred to as the phase one/two property).

The phase one/two property has been a newspaper and printing shop since about 1972 and is currently in use by the Ottawa Citizen and the Ottawa Sun daily newspapers.

Based on the results of the phase one ESA, seven (7) areas of potential environmental concern (APEC) were identified on the phase one/two property. These include a former maintenance garage, a former private fuel outlet, a former new and used varsol underground storage tank (UST) nest and areas supporting the active printing operations including a plate room, a printing press room and locations for ink storage. Two (2) off-site APECs were also identified.

The subsurface investigation for the phase two ESA consisted of sampling four (4) existing monitoring wells (EW-2 to EW-5) and drilling five (5) new boreholes (BS-1 to BS-5), two (2) of which were advanced inside the building. Two (2) of the outdoor borehole were completed as monitoring wells. Soil and groundwater samples were collected and submit for analysis of the contaminants of concern which included metals, petroleum hydrocarbons (PHC) and volatile organic compounds (VOC). Polycyclic aromatic hydrocarbons (PAH) were also analyzed in select soil samples.

Soil and groundwater contamination was confirmed in the vicinity of the former waste varsol UST nest. The former location of the tanks (which was apparently subject to a remedial excavation) does not appear to be impacted but the area immediately downgradient, which is currently beneath the paper storage room, has contamination which manifests itself in the form of PAH and PHC impacts in the soil and PHC Fraction 2 impacts in the groundwater. This contamination appears to be most prominent at the depth of the water table and extends to roughly 5.5 m below ground surface. The extent of the contamination is not known, but is presumed to be limited (no more than one or two tens of metres from the highest measured concentrations). The key concern with the contamination is its potential to volatilize and contaminate the indoor air.

Recommendations for addressing the identified contamination vary depending on whether the phase two property will remain as is, will be used for a different industrial or commercial use, or will be redeveloped. For continued operation of the facility as is, no further investigation or remediation is warranted. If the existing building is to remain but be repurposed, the issue of indoor-air quality should be reexamined. If the building is to be demolished as part of a redevelopment, excavation and disposal of the contamination is recommended. The cost of such a remediation is very roughly estimated at two hundred thousand dollars.

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# 1. INTRODUCTION

Morrison Hershfield Ltd. (MH) was retained by Regional Group (the Client), to conduct a combined phase one and two environmental site assessment (ESA) of the property located at 1101 Baxter Road, in Ottawa, Ontario (hereafter referred to as the phase one property, the phase two property, the phase one/two property or, simply, the property, depending on the context). The phase one/two property has been a newspaper and printing shop since about 1972 and MH understands that the current investigations are required as part of a potential real estate transaction involving the sale of the property.

The phase one/two property is located in the Iris neighborhood of Nepean in Ottawa west. The property has an irregular shape and a total site area of 3.2 hectares, with public road frontage along Baxter Road. The current use of the property is light industrial and the surrounding land use includes commercial (primarily retail and office spaces) and residential. At the time of the phase one and two ESA, the property was in use by the Ottawa Citizen and the Ottawa Sun daily newspapers.

## 1.1 Objective

The objectives of the phase one and two ESA were:

- to determine potential sources of environmental liability associated with the phase one/two property, arising from current and/or historical activities on the site and surrounding properties within the study area, based on the review of current and historical records and a site inspection; and,
- to confirm through intrusive testing whether soil and/or groundwater at the phase one/two property has been adversely impacted by those potential sources of environmental liability;

The phase one and two ESA included a limited phase one ESA, which is discussed in Section 2.0 and a phase two ESA, discussed in Section 3.0.

## 2. PHASE ONE ESA INVESTIGATION

### 2.1 Phase One ESA Scope of Work

The purpose of this phase one ESA was to determine the likelihood that contaminants have affected land or water on, in or under the phase one property, and to determine the need for a phase two ESA.

The phase one ESA was conducted following the principles of the Canadian Standards Association Z768 Guideline and *Ontario Regulation 153/04 Records of Site Condition, Part XV.1 of the Environmental Protection Act (EPA)*, as amended (*O. Reg. 153/04*), and in accordance with generally accepted professional practises. The assessment included the following major activities:

- Reviewing the historical occupancy of the phase one property through the use of available aerial photographs, environmental databases, topographical maps and existing environmental reports (if any);
- Contacting municipal and provincial agencies to determine the existence of records of environmental regulatory non-compliance, if any, and reviewing such records where available;
- Obtaining an EcoLog Environmental Risk Information Services Ltd. (ERIS) report for the phase one property and study area properties within a 250 metre (m) radius of the phase one property;
- Reviewing available geological maps, well records and utility maps for the vicinity of the phase one property;
- Conducting interviews with designated phase one property representative(s) as a resource for current and historical phase one property information, as well as to provide MH staff with unrestricted access to all areas of the phase one property;
- Conducting a reconnaissance of the phase one property and study area properties, within a 250 metre (m) radius of the phase one property, in order to identify the presence of actual and/or potential environmental contaminants or environmental concerns of significance. Properties other than the phase one property were observed during a walk-by inspection from publically accessible locations;
- Reviewing the current use of the phase one property and any land use practices that may have impacted its environmental condition;
- Reviewing the current use of the study area properties and any land use practices that may have impacted the environmental condition of the phase one property;
- Preparing a report to document the findings.

The phase one ESA generally complies with O. Reg.153/04, with the following exceptions:

- Input from regulatory agencies was not directly sought;
- A search of land title and assessment rolls for the phase one property was not conducted; and,
- A new survey of the phase one property was not completed.

Therefore, this phase one ESA is not intended to support the filing of a Record of Site Condition (RSC) under Part XV.1 of the *Environmental Protection Act*.

The nomenclature for potentially contaminating activities (PCAs) and areas of potential environmental concern (APECs) is adopted from Ontario Regulation 153/04, as amended. A PCA is an activity within the study area with the potential to affect the phase one property, whereas an APEC is an area within the phase one property that is potentially contaminated due to the identified PCA. This phase one ESA identifies both PCAs and APECs.

MH has confirmed neither the completeness nor the accuracy of any of the records that were obtained or any of the statements made by others. It is a basic assumption that any correspondence, material, data, evaluations, and reports furnished by others are free of latent deficiencies or inaccuracies.

## 2.2 Records Review

### 2.2.1 Phase One Study Area Determination

The phase one study area includes the phase one property and all surrounding properties wholly or partially within 250 meters of the phase one property boundaries, as shown on **Figure 1** in **Appendix A**. The 250 meter radius was used to gain an understanding of the current and past uses of the surrounding properties, which is referred to as the study area to identify potential or existing subsurface environmental impacts at the phase one property.

The phase one property is zoned as Light Industrial (LI), as shown on **Figure 2** in **Appendix A**. Light Industrial zoning allows for a wide range of low impact light industrial uses, as well as office and office-type uses in a campus-like industrial setting, as outlined in Sections 199 to 206 of the City of Ottawa Zoning By-Law (No. 2008-250).

### 2.2.2 First Developed Use Determination

Various data sources were searched to determine the first use of the phase one property, including information from aerial photos, environmental databases, and existing environmental reports. The phase one property was originally used for agricultural purposes, and then was developed in 1972 into a light industrial property used primarily for newspaper printing and remained as such until the present day.

### 2.2.3 Environmental Reports

A number of former environmental investigations have been completed for the phase one property, including:

- Phase I-II – Environmental Site Assessment, 1101 Baxter Road, Ottawa, Ontario. Prepared by Paterson Group Inc., dated February 27, 2017.
- Phase II Environmental Site Assessment, The Ottawa Citizen, 1101 Baxter Road, Ottawa, Ontario. Prepared by EMP, dated November 2001.
- Phase I Environmental Site Assessment, The Ottawa Citizen, 1101 Baxter Road, Ottawa, Ontario prepared by Golder Associates Ltd., dated July 10, 2000.
- Subsurface Investigation, The Ottawa Citizen Building, 1101 Baxter Road, Ottawa, Ontario. Prepared by Oliver Mangione McCalla and Associates Limited, dated September, 1992.

A copy of the Phase I-II Environmental Site Assessment Report by Paterson Group in 2017 (the Paterson report), was provided by a representative of Postmedia. The Paterson report was completed to research the past and current use of the property and adjacent properties and to identify environmental concerns with the potential to have impacted the phase one property. The phase two portion of the investigation was completed to assess potential soil and groundwater impacts from former fuel and varsol underground storage tank nests, the former private garage, use of the property as a printing facility and the former dry cleaning facility to the south.

As part of the Paterson phase two ESA, seven (7) boreholes were drilled on the property and four (4) were instrumented with groundwater monitoring wells. Seven (7) soil samples were collected and submitted for analysis of petroleum hydrocarbon fraction 1 to fraction 4 (PHC F1-F4), benzene, toluene, ethylbenzene and xylene (BTEX), and volatile organic compounds (VOC). The contaminant concentrations in soil and groundwater were compared to two (2) sets of standards obtained from the document *Soil, Ground water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act*. These included Table 3 Standards for residential property use and Table 3 standards for commercial property use. One (1) soil sample collected from an indoor borehole (BH6, between 3.0 and 3.7 m, in the paper storage room, north of the former varsol UST nest) contained PHC F1 at concentrations above both the Table 3 residential and Table 3 commercial standards and PHC F2 at concentrations above the Table 3 residential standards. The groundwater samples met the Table 3 standards for all parameters analysed, with the exception of chloroform, which was suspected to have been attributable to the use of municipal water during the drilling program.

The report noted that the volume of remnant contaminated soil in the vicinity of the former varsol underground storage tanks is not accurately known, but is not expected to be extensive based on the concentrations identified in soil at BH6.

No other existing reports were available for review.

## 2.2.4 Environmental Databases

A standard search of provincial, federal and private databases for records pertaining to the phase one property and the study area, which includes adjacent properties within a 250 meter radius was completed by Ecolog ERIS. A copy of the Ecology ERIS report is available in **Appendix B**.

The following databases searched by EcoLog ERIS contained information pertaining to properties within a 250 meter radius from the center of the phase one property.

- Certificate of Approval – 3 records
- Environmental Registry – 2 records
- Environmental Compliance Approval – 4 records
- ERIS Historical Searches – 7 records
- List of TSSA Expired Facilities – 7 records
- Ontario Regulation 347 Waste Generators Summary – 63 records
- National PCB Inventory – 1 record
- National Pollutant Release Inventory – 9 records
- Inventory of PCB Storage Sites – 5 records
- Private and Retail Fuel Storage Tanks – 1 record
- Scott's Manufacturing Directory – 12 records
- Ontario Spills – 3 records
- Water Well Information System – 6 records

### **Certificate of Approval**

Three (3) Certificates of Approval were listed. The first was an application for an Air Certificate of Approval in 2003, which was revoked or replaced for the Ottawa Citizen Group Inc. at 1101 Baxter Road (phase one property). The second was also an application for an Air Certificate of Approval which was applied for and approved in 2009 for the Ottawa Citizen Group Inc. at the same location. The third application was for an Air Certificate of Approval for Nuvo Network Management Inc. at 2650 Queensview Drive, which was applied for and approved in 2006.

Considering the nature of the approval types they do not pose a potential environmental concern for the phase one property.

### **Environmental Compliance Approval**

Four (4) Environmental Compliance Approvals (ECA) were listed. Three (3) of the ECAs were identical records to those listed above as Certificates of Approval. The fourth record was listed for exp Services Inc., located at 1051 Baxter Road for air approval in 2016.

Considering the nature of the approvals, they do not pose a potential environmental concern.

### **ERIS Historical Searches**

A search of the ERIS Historical Database (dated 1999 – February 28, 2018) found that there are seven (7) ERIS historical search sites within the study area. Three (3) of the records were for 1101 Baxter Road (phase one property), requested by Paterson Group in 2017, Pinchin Environmental in 2009, and ERM in 2000. The remaining records were listed for Highway 417, as requested by MMM Group in 2017, for 1051 Baxter Road, as requested by JDS Uniphase Corp in 2001, for 1050 Baxter Road, as requested by VTX Consulting Services Inc. in 2001, and for 2650 Queensview Drive, as requested by Golder Associated in 2017.

### **List of TSSA Expired Facilities**

Seven (7) TSSA expired facilities were listed within the phase one study area. All seven (7) of the listings were for the Ottawa Citizen, 1101 Baxter Road, which either were expired as of April 20, 1990 or do not list a specific expiration date. The expired “instances” included a fuel service facility, fuel service liquid fuel tanks and fuel service piping.

### **Ontario Regulation 347 Waste Generators Summary**

A search of the Ontario Regulation 347 Waste Generators database, dated 1986 to December 31, 2017 found that there were 63 records listed. A number of the records are listed under the Ottawa Citizen at 1101 Baxter Road (phase one property), for multiple types of waste generation between 1986 and 2017. The waste generation was described as paint/pigment/coating residues, petroleum distillates, waste oils and lubricants, light fuels, halogenated solvents, PCB's, photoprocessing wastes, alkaline wastes, heavy metals, other specified inorganics, acid waste – heavy metals, oil skimming & sludges, graphic art wastes, emulsified oils, aliphatic solvents and/or waste crankcase oils and lubricants.

A number of waste generation records were listed for a dry cleaning business located at 1129 Baxter Road between 1986 - 1990 and 1992 - 2001. The records are listed under John Ebbs Enterprises Ltd., O/A Palmer Cleaners, Palmer Cleaners or Baxter Cleaners. The waste generated during this time was described as halogenated solvents.

Waste generation records were listed for multiple businesses located at 1050 - 1051 Baxter Road, including Holmes Heating, UTC Canada, Carrier Enterprise/Carrier Canada Ltd, Reliance Comfort, APH (Micot) Canada Inc, Climec Residential, Reset Electronics Inc, Deboer's, Optelian Access Networks, exp Services, and Micromasurements Canada. The records described the generated waste at this location as waste oils and lubricants, inorganic laboratory chemicals, petroleum distillates, alkaline wastes-heavy metals, other specified inorganics, paint/pigment/coating/residues, aliphatic solvents, waste compressed gases, alkaline wastes-other metals, acid waste-heavy metals, waste oils and lubricants, acid waste-other metals, waste compressed gases, petroleum distillates, waste crankcase oils and lubricants, transfer station oils wastes, non-hazardous waste, halogenated solvents and photoprocessing waste.

It is important to note that APH (Micot) Canada Inc., is specifically listed as a waste generator for photoprocessing wastes related to platemaking between 1986 and 1998. Plates for the printing operation at the phase one property may have been supplied by APH during this period but this has not been confirmed.

One waste generation record was listed under International Datacasting Corp., located at 2650 Queensview Drive, for emulsified oils and other polymeric wastes in 1994 and 1995.

### **National PCB Inventory**

A search of the National PCB Inventory database, dated 1988 to 2008 has found that there is one PCB site within the phase one study area. The record is listed for the Ottawa Citizen at 1101 Baxter Road (phase one property) and no details are listed.

## **National Pollutant Release Inventory**

A search of the National Pollutant Release Inventory (NPRI) database, dated 1993 to 2017, has found that there are nine (9) NPRI sites within the phase one study area. All nine (9) records are listed for the Ottawa Citizen located at 1101 Baxter Road (phase one property). The records list a number of different pollutants that were released, including a number of volatile organic compounds.

## **Inventory of PCB Storage Sites**

A search of the PCB storage sites database found that there are five (5) PCB storage records for the phase one property. It was listed as a PCB storage site from 1998 to 2000 for having drums containing ballasts with high levels of PCBs. The phase one property was also listed as a PCB storage site in 2003 and 2004, but no further details were listed.

## **Private and Retail Fuel Storage Tanks**

A search of the private and retail fuel storage tanks (PRT) database, dated 1989-1996 found one record for the phase one property for a private tank with a capacity of 27,276 L (7,200 gal). No expiration date was listed.

## **Scott's Manufacturing Directory**

A search of the Scott's Manufacturing Directory database (dated 1992 to March 2011) found 12 records for a location in the phase one study area. Five (5) of the records are listed for the phase one property, for newspaper publishing and printing.

Five (5) records are listed for businesses located at 1050-1051 Baxter Road, for computer systems design and related services, computer and peripheral equipment manufacturing, coating, engraving, heat treating and allied activities, metal working machinery manufacturing, commercial and service industry machinery manufacturing, material handling equipment manufacturing, and showcase, partition and shelving and locker manufacturing.

The two (2) remaining records are listed for businesses located at 2650 Queensview Drive, for all other plastic product manufacturing, electrical wiring and construction supplies wholesale and distribution, industrial machinery, equipment and supplies wholesale and distribution, and electronic components, navigational and communications equipment and supplies wholesale and distribution.

## **Ontario Spills**

The Ontario Spills database indicated three (3) records of spills within the phase one study area:

- A spill was documented at the phase one property for an unknown amount of varsol and ink to land and sewer due to a container overflow, as reported on March 3<sup>rd</sup>, 1993. Environmental impacts were considered as possible to land or water.

- A spill was documented at the phase one property for an unknown amount of transport truck diesel to ground due to a container leak on November 21, 1995. Environmental impact to land was listed as possible. The incident summary noted that the spill may have been cleaned up.
- A spill was documented at the phase one property for an underground varsol tank leak to land on April 27<sup>th</sup>, 1993. Soil contamination was confirmed.

## Water Well Information System

A search of the Water Well Information System (WWIS) database, dated December 31, 2017, found that there are six (6) WWIS listings within the study area. The WWIS records are listed as monitoring wells, test holes or abandoned wells for 1050 Baxter Road (installed in 2014 and 2016), 1099 Baxter Road (2014), and/or 1129 Baxter Road (2009).

### 2.2.5 Newspaper Articles

One relevant news article from the Ottawa Citizen was discovered regarding a property located within the study area. The article is titled "Ikea launches \$8-million lawsuit Alleges dry-cleaning chemicals contaminated soil under land set for chain's biggest Canadian outlet", by Glen McGregor, dated December 22, 2009.

This article notes that Ikea Canada says, in court documents, that an environmental study found tetrachloroethylene (PCE) in the soil under the parking lot at the east end of Pinecrest Mall, located on Iris Street, adjacent to Baxter Road. The article noted that Ikea Canada launched a suit against the owner of the small strip mall, located on the east side of Baxter Road, along with the past owner of the mall, and the owners of two dry-cleaning outlets that operated there until 2004. Ikea alleged that PCE and other hazardous chemicals seeped into the soil and water table from the dry-cleaners.

The article also noted that City planner Prescott McDonald said Ikea will likely treat the groundwater to neutralize the contaminants and create a barrier to keep out any more, rather than try to remove the soil.

### 2.2.6 Aerial Photographs

Historical satellite imagery from GeoOttawa, the City of Ottawa's interactive web mapping application, were reviewed for the years 1958, 1965, 1976, 1991, 2007 and 2017. The aerial photos were reviewed as part of this investigation to determine the land uses at the phase one property and the study area. Table 1 provides a comprehensive summary of the findings from the satellite imagery review. Annotated versions of the aerial photographs are included in **Appendix C**.

**Table 1: Aerial Satellite Imagery Review**

Date	Observations for the Phase One Property and Study Area
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Date	Observations for the Phase One Property and Study Area
1958	In this photo, the phase one property and surrounding study area is in use for agricultural purposes. A small residential subdivision is visible to the east of the study area. A rail line is visible passing west-to-northeast through the northern portion of the study area. Greenbank Road is visible to the west of the study area.
1965	In this photo, the phase one property appears to be vacant, but the vegetation appears to be stressed or disturbed. The rail line in the northern portion of the study area has been redeveloped as a highway. Greenbank Road is still visible, and appears to have been updated with a connection to the new highway. The southernmost portion of the study area has been developed into residential properties. Residential properties have also been developed to the north of the study area.
1976	In this photo, a large building has been developed on the phase one property. In the northeastern portion of the study area, a large building has been constructed which may be for industrial or commercial use. This building is likely the present day OC Transpo garage located at 2550 Queensview Drive.
1991	In this photo, the properties to the west, east and southeast of the phase one property have been developed as industrial or commercial properties with large parking areas. A small addition to the southwestern side of the building on the phase one property was added and a fuel pump and garage is also visible on-site. There is a dark coloured area on the pavement near the garage building which is likely wash water.
2007	In this photo, we can see that additional commercial or industrial properties were developed in the northern portion and western portion of the study area. These properties are likely the present day Leon's furniture retail store located at 2600 Queensview Drive and the present day Milestones restaurant located at 1080 Baxter Road. A large addition was added on the north side of the on-site building.
2017	No change.

### 2.2.7 Topography, Hydrology, Geology

The phase one property and study area is relatively flat, with a ground surface elevation of around 75 meters above sea level (masl). The study area is municipally serviced and drainage on the streets and surrounding properties is collected by storm sewers. The depth to groundwater is estimated at 3 m, and the direction of shallow groundwater flow is estimated as north, towards Pinecrest Creek.

The phase one property is located in the physiographic region known as the Ottawa Valley Clay Plain, which lies within the Ottawa-St. Lawrence Lowland (Chapman and Putnam, 1984). The overburden at the phase one property consists of older alluvial deposits of clay, silt, sand and gravel (Ontario Geological Survey, 2010).

Available geological mapping indicates that the depth to bedrock is estimated at 9 m. The bedrock consists of sandstone, limestone and shale of the Rockcliffe Formation (Armstrong and Dodge, 2007).

## 2.2.8 Fill Materials

The phase one property is at approximately the same grade as the surrounding properties within the study area. Therefore, significant amounts of fill materials are not expected to be present.

## 2.2.9 Areas of Natural Significance

No areas of natural significance were identified within the phase one study area, using the Ministry of Natural Resources web mapping tool (Land Information Ontario), or GeoOttawa.

## 2.2.10 Borehole and Well Records

A review of the MECP (MECP, 2017) Water Well Information System (WWIS) database was conducted for all water supply wells within a 500 m radius. According to the WWIS, no domestic wells are located within 500 m of the phase one property. There are approximately 25 decommissioned or abandoned monitoring/observation wells or test holes within 500 meters of the phase one property. The monitoring/observation wells or test holes were installed between 2009 and 2011, and are either listed for 1129 Baxter Road or 2685 Iris Street. 1129 Baxter Road appears to be the address of a small strip mall adjacent to the phase one property, and 2685 Iris Street appears to be the address of a number of department stores within the Pinecrest Shopping Centre (based on Google Earth™).

The water well locations as shown in the WWIS appear to be erroneous based on the actual addresses listed on the well records and it should be noted that the margin of error of the locations of MECP well records ranges from 100 to 300 meters.

## 2.3 Interviews

On October 3<sup>rd</sup>, 2018, MH personnel conducted an interview regarding the phase one property with Mr. David DesRochers, the building service and security manager with Postmedia. Mr. DesRochers has worked at the phase one property for 33 years.

Mr DesRocher noted or confirmed the following:

- The building was constructed in 1972. A small addition was added in 1978 towards the south and included the warehouse. A small second addition was added in 1996, which included a new mail room and the addition of a printing press.
- The printing presses have been in their current location since 1972. Each printing press unit has nine presses and each unit has a dampening system which mists water onto the press.
- The presses are cleaned daily using a blanket wash and varsol. The varsol waste is stored in totes and is shipped off-site for disposal as hazardous waste.
- There was a former varsol UST nest on the property, which was removed in approximately 1993/1994.

- There are no existing USTs on the property and there are two above ground storage tanks (AST) for diesel.
- There was a former private fuel outlet on the property with fuel dispensing equipment and multiple UST, which were removed in approximately 1993/1994.
- There was a former garage on the property, which was used for automobile cleaning and repairs. The garage was serviced by a septic tank and was demolished in approximately 1993/1994.
- The outdoor asphalt pavement was resurfaced in approximately 1994.
- The property generates both domestic and hazardous waste which is appropriately managed.
- There is a sump pit in the basement which collects water from the building operations and discharges it to the sanitary sewer.

## 2.4 Site Visit

### 2.4.1 General Requirements

The purpose of the phase one property reconnaissance is to document any PCAs which may be contributing to or causing a APECs, and to identify any relevant structures and areas of disturbed soils such as fill areas.

The phase one property site visit was completed on October 3<sup>rd</sup>, 2018 between 9:00 and 15:30. The visit consisted of an escorted walkthrough and inspection of the basement, ground floor and part of the second floor of the building located on the phase one property, and a self-directed walkthrough of the outdoor areas.

Annotated photographs taken during the phase one property reconnaissance are provided in Appendix D.

### 2.4.2 General Description

The phase one property is occupied by one building which is surrounded by asphalt with parking and access lanes to Baxter Road to the northwest, east and southeast and some landscaped areas. The parking areas are graded for drainage and multiple catch basins are present on-site.

The building consists of a vacant basement level below part of the office/newsroom area (northwestern portion), a warehouse/distribution space (northeast portion), a paper storage space (southeastern portion), black ink storage room (southeastern portion), a printing press room, a plate room (central portion), mechanical shops, maintenance rooms, office space (southwestern portion).

The building is supplied by municipal services and utilities, including water, sewage, waste/recycling, hydro and natural gas.

### 2.4.3 Fuel and Chemical Storage and Staining

There are two above ground storage tanks (ASTs) for diesel on the phase one property. One tank is located on the ground floor within a mechanical/maintenance room and is linked to a smaller diesel storage tank located on the second floor. The ground floor tank is a double-walled steel tank with a 1,110 L capacity that was installed in 2008. Part of the AST is surrounded by a secondary containment wall, indicating that there was likely a former smaller and possibly single walled AST at the same location.

A number of chemicals are stored on-site, including but not limited to, varsol, finishers, flushing oil, industrial oil, lubricating oils, hydraulic oils, dampening solution, degreaser, processor cleaner, scaletrol, coloured inks, black ink, and domestic cleaners.

The coloured ink, oils, varsol and dampening solutions are stored in dedicated containers throughout the press room, while black ink is stored in permanent vats in the black ink room that are periodically refilled from an outdoor access point.

The concrete floors throughout the pressroom, ink storage area and waste storage area were covered with oil, dampening solution and some ink. Adsorbent sheets were being applied to multiple areas within the pressroom, including under and around the printing presses.

Staining was observed on the concrete floors in multiple locations, including throughout the press room, waste storage area and ink storage area. Stained concrete was also observed in multiple areas within the plate room, and in some mechanical rooms and/or machine/maintenance shops. Black staining was observed on and around most ceiling and wall vents within the printing press room, plate room, mechanical shops and maintenance shops.

Some patches and joints were observed on the concrete floors in the printing press room and in some of the machine/maintenance shops. Overall, the concrete flooring appeared to be maintained and in fairly good condition.

### 2.4.4 Process Waste and Wastewater Discharge

Domestic and hazardous waste is generated at the phase one property. Waste varsol is stored in dedicated totes near the loading bay.

Some chemical wastes, such as those in the plate room appear to be stored in large plastic drums for future removal and disposal off-site.

Aluminum waste is generated with the creation of printing plates and is stored on-site at the phase one property in pails within the plate room. Once the aluminum plates are used for printing, they are stored in large bins in the printing press room for future recycling.

Domestic and recyclable waste is stored in dumpsters on the exterior of the building, near the loading dock.

Wastewater from the phase one property generally consists of wash water and sewage. Floor drains were observed in the printing press room and the machine/maintenance

shops. One sump pit was observed in the vacant basement of the office area which contained stagnant wastewater with a visible sheen on the surface.

#### **2.4.5 Monitoring Wells**

Existing monitoring wells were observed at the phase one property within the printing press room, paper storage room, and ink storage area at the time of inspection. Multiple wells were also observed on the property surrounding the building, nearby the former garage, former varsol UST nest, and towards the southwestern property boundary.

#### **2.4.6 Pits and Lagoons**

No pits or lagoons were observed on the phase one property at the time of inspection.

#### **2.4.7 Fill**

No fill piles or topographic anomalies was observed on the phase one property.

#### **2.4.8 Land (Signs of Contamination)**

The phase one property was inspected for areas of stained soil, vegetation or pavement, areas and of stressed vegetation, areas of placed fill or debris, potentially contaminating activities, and unidentified substances.

No signs of dumping, stressed vegetation, placed fill or debris or unidentified substances were noted.

Stained brick and pavement was observed at the black ink fill pipes at the southeast corner of the building.

#### **2.4.9 Watercourses, Ditches, and Standing Water**

No watercourses, ditches or open standing water were present on or in the vicinity of the phase one property at the time of inspection.

#### **2.4.10 Observations within the Phase One Study Area**

The phase one property is located on Baxter Road, within an area that consists largely of residential properties, with some commercial and industrial properties nearby. The surrounding properties include the shopping complex at 2685 Iris Street, the Baxter Plaza at 1119/1129 Baxter Road and the business complex at 1050-1051 Baxter Road with mixed commercial, recreational and industrial use. A number of commercial and light industrial properties are also present to the north, on the other side of Highway 417, including the OC Transpo bus garage located at 2550 Queensview Drive.

The phase one property study area, not including the phase one property at 1101 Baxter Road, was inspected via a limited desktop review using Google Maps™ and Streetview™.

## 2.5 Review and Evaluation of Information

### 2.5.1 Current and Past Uses

The phase one property was used for agricultural purposes from prior to 1958 to approximately 1965. From 1965 to 1972, the property was vacant and undeveloped. In 1972, the property was developed for the use of printing and publishing and remained largely unchanged until the present day, with the exception of an addition in 1978 and 1996.

Table 2 summarizes the current and past uses of the phase one property, as identified from this assessment.

**Table 2: Summary of Current and Past Uses**

Year or Period	Description of Property Use	Other Observations from Aerial Photographs Etc.
Prior to 1958 - circa 1965	Used for agricultural purposes	The phase one property was vacant and used primarily for agriculture purposes. Some residential properties were developed to the east and south of the phase one property and a rail line was present to the north until it was redeveloped into a highway in around 1965.
Circa 1965 – 1972	Vacant, undeveloped	The phase one property remains vacant and undeveloped.
1972 - Present	Vacant, undeveloped	The phase one property was developed for the use of printing and publishing and a large building was constructed. Additions to the building on the phase one property were made in 1978 and 1996. Residential, commercial and industrial properties were developed to the west, east, south and north of the phase one property.

### 2.5.2 Potentially Contaminating Activities

PCAs were identified both at the phase one property and within the study area. The PCAs are summarized below, and are shown on **Figure 2**, in **Appendix A**.

#### Phase One Property

- **Storage, maintenance, fueling and repair of equipment, vehicles, and material used to maintain transportation systems.** The phase one property had a former garage on-site which was used for automobile repairs and cleaning.
- **Gasoline and Associated Products Storage in Fixed Tanks.** The phase one property currently has two indoor diesel ASTs. A number of underground storage tanks (UST) were formerly present on-site, including at least one fuel UST for a former private fuel outlet to the southwest of the building, and a varsol/slop UST southeast of the building.

- **Metal Treatment, Coating, Plating and Finishing** based on the production of aluminum printing plates.
- **Ink Manufacturing, Processing and Bulk Storage.** The phase one property has been and is currently used for newspaper printing and publishing. Large quantities of black ink and colour ink have been observed on-site.

### **Phase One Study Area**

- **Rail Yards, Tracks and Spurs** based on the former west to east rail line to the north of the phase one property, which was redeveloped into a Highway 417 in the nineteen sixties.
- **Metal Treatment, Coating, Plating and Finishing** based on the records obtained from Scott's Manufacturing Directory describing former property use at 1050-1051 Baxter Road.
- **Electronic and Computer Equipment Manufacturing** based on the records obtained from Scott's Manufacturing Directory describing former property use at 1050-1051 Baxter Road.
- **Operation of Dry Cleaning Equipment** at the former dry cleaning facility at the Baxter Plaza at 1129 Baxter Road.

De-icing activities within the study area may have caused elevated concentrations of salt related parameters in the soil and/or groundwater at the phase one property. However, it should be noted that under Ontario Regulation 153/04, if a site condition standard is exceeded solely because a substance has been used on a highway for de-icing applications, the site condition standard is deemed not to be exceeded. Therefore, the likely de-icing activities at the phase one property and within the study area is not considered a PCA.

### **2.5.3 Areas of Actual or Potential Environmental Concern**

Based on the findings from the records review, interview and site visit, seven (7) areas of potential environmental concern (APEC) were identified on the phase one property, as summarized below in Table 3

**Table 3: Summary of Areas of Potential Environmental Concern**

APEC	Location of APEC on Phase One Property	PCA	Location of PCA (On-Site or Off-Site)	Contaminants of Potential Concern	Media Potentially Impacted
APEC 1	Southern portion of the property at former location of garage.	Storage, maintenance, fueling and repair of equipment, vehicles, and material used to maintain transportation systems	On-Site	PHC, VOC, Metals	Soil and groundwater
APEC 2	Southern portion of the property at former location of private fuel outlet and UST nest, adjacent to the mechanical/maintenance shops/rooms.	Gasoline and Associated Products Storage in Fixed Tanks	On-Site	PHC, VOC, Metals	Soil and groundwater
APEC 3	Southeastern portion of the property at former location of varsol UST nest.	Gasoline and Associated Products Storage in Fixed Tanks	On-Site	PHC, VOC, Metals	Soil and groundwater
APEC 4	Central portion of the property, where plate room is located.	Metal Treatment, Coating, Plating and Finishing	On-Site	Metals, VOC	Soil and Groundwater
APEC 5	Central portion of the property, where printing press room and ink storage area is located.	Ink Manufacturing, Processing and Bulk Storage	On-Site	Metals, VOC, PAH	Soil and groundwater
APEC 6	Southwestern portion of the property.	Operation of Dry Cleaning Equipment	Off-site at neighboring property (former Baxter Plaza dry cleaners at 1129 Baxter Road)	VOC	Groundwater
APEC 7	Eastern portion of the property.	Metal Treatment, Coating, Plating and Finishing, and Electronic and Computer Equipment Manufacturing	Off-site at neighboring property, 1050-1051 Baxter Road	Metals, VOC, PAH	Soil and groundwater

PHC – Petroleum Hydrocarbons

VOC – Volatile Organic Compounds

PAH – Polycyclic Aromatic Hydrocarbons



The findings that are considered to be of *de minimis* concern are listed below:

**Table 4: Summary of Findings Considered as De Minimis Concern**

Finding	Rationale
Indoor Diesel UST	Based on the condition and age (installed in 2008) of the indoor double walled steel ASTs and the immediate area surrounding the tanks.
Former west-east rail line to the north of the phase one property	Given that the rail line was replaced with the Trans-Canada Highway and considering that groundwater flow is to the north, up-gradient of the phase one property.

## **3. PHASE TWO ESA INVESTIGATION**

### **3.1 Scope of Work**

The purpose of this phase two ESA is to identify any subsurface contamination that may result in environmental liability to the property owner. The agreed upon scope of work to achieve this purpose was as follows:

- Perform an outdoor subsurface investigation consisting of drilling three (3) boreholes, each equipped with a monitoring well;
- Perform an indoor subsurface investigation consisting of drilling two (2) boreholes each equipped with a monitoring well;
- Conduct chemical analysis of soil and groundwater for the identified chemicals of concern;
- Summarize and interpret the collected data and prepare a report to document the findings.

Given the short timeline for completing this assignment, the phase two ESA was not designed to be exhaustive and represents the best efforts to provide quick information on the level of contamination at the phase two property. The phase two ESA was performed in general conformance with Canadian Standards Association (CSA) standard Z768-01 and is not intended to support a Record of Site Condition under Ontario Regulation 153/04 and Part XV.1 of the Environmental Protection Act. Moreover, delineation of the full extent and severity of any identified contamination and an estimation of remediation costs are not included in the scope of work for this limited phase two ESA.

### **3.2 Methods**

#### **3.2.1 Development of Site Conceptual Model and Sampling Plan**

The phase two property conceptual model was developed based on a review of the available topography, geology, and hydrogeology information, and information provided by the Client.

A sampling and analysis plan was developed that specified the locations and depths of boreholes, the planned construction details of monitoring wells, the target horizons for contamination and the number of soil and groundwater samples to be collected and analyzed.

#### **3.2.2 Health and Safety**

Prior to performing any of the field investigation, MH prepared a site specific health and safety plan (HASP) titled: "Health and Safety Plan, 1101 Baxter Road Environmental Site Assessment". This HASP included information on the corporate

Health, Safety and the Environment program; general site rules; accident/incident reporting and investigation; check-in procedures; emergency contact numbers; potential hazards inherent to this assignment; hazard assessment and mitigation; hospital route and safety tailgate meeting form.

A health and safety tailgate meeting was performed each morning to inform on-site personnel of the potential risks and safety measures associated with the planned work for the day.

### 3.2.3 Underground Utility Locates

Underground utility locates were conducted for both private and public utilities, using a commercial utility locating service. All points of investigation were marked out prior to being cleared by the locator, and/or moved to a cleared location.

### 3.2.4 Borehole Drilling

Drilling was carried out by Strata Drilling Group (Strata) of Ottawa, Ontario under the supervision of MH staff. Strata is a licensed well contractor, with staff who are licensed well technicians in accordance with *O.Reg. 903*. Drilling was performed at both indoor and outdoor locations. Outdoor boreholes were advanced using a Geoprobe 7822DT direct push drill rig while indoor boreholes were advanced using a Geoprobe 420M direct push drill rig.

### 3.2.5 Soil Sampling

For the outdoor boreholes, continuous soil samples were collected in 1.5 m long plastic liners using either an 8.2 cm outside diameter (OD) dual tube sampling system or a 5.7 cm OD macro-core sampling system. For the indoor boreholes, continuous soil samples were collected in 1.2 m long plastic liners using the 5.7 cm OD macro-core sampling system.

All retrieved soil samples were immediately inspected in the plastic liners for field evidence of contamination and then transferred to polyethylene bags for sampling and headspace organic vapour screening. Nitrile gloves were worn by MH field staff at all times during collection and handling of soil samples, and were changed for each sample in order to minimize the potential for cross contamination.

The polyethylene bags used for vapour screening were filled halfway with soil and allowed to equilibrate for several minutes before conducting headspace vapour readings. The vapour readings were measured using an RKI Eagle II gas monitor, equipped with Photoionization Detector (PID) and Combustible Gas Indicator (CGI) sensors and methane elimination mode turned on. Prior to use in the field, the PID was calibrated using an isobutylene standard of 100 ppm, while the CGI was calibrated using a hexane standard of 400 ppm. During reading events, the probe-tip of the gas monitor was used to puncture the sealed polyethylene bag and the peak PID and CGI readings after 15 seconds of measurement were recorded.

Based on field evidence of contamination and/or vapour readings, the most contaminated samples were placed in laboratory supplied jars and vials. The filled

jars and vials for each soil sample included two (2) glass jars (150 mL and 250 mL) with Teflon-lined lids, and two (2) 40 mL glass vials with methanol preservative. The soil that was placed in the 40 mL glass vials was collected in 5 g samples using dedicated Terra Core™ samplers. The samples were then placed in ice-filled coolers for storage, prior to delivery to the lab.

Following sample collection, a minimum of one (1) soil sample from each borehole was selected for laboratory analysis of one (1) or more of the identified COCs. The COCs included metals, PAH, PHC and VOC.

### 3.2.6 Monitoring Well Installation

Monitoring wells were installed in two (2) of the three (3) outdoor boreholes advanced as part of this investigation. The monitoring wells were constructed using 50 mm diameter schedule 40 polyvinyl chloride (PVC) riser pipes and slotted screens. The monitoring wells were installed with 3.05m long slotted screens (0.25 mm slot spacing) and solid riser pipes which extended to the ground surface. The monitoring wells were installed by Strata in accordance with the requirements of *O.Reg. 903* under the supervision of MH field staff. The top of each riser pipe was sealed with a slip cap and covered with a flush-mount protective casing. Silica Sand was used to fill the borehole annulus around the screened portion of the monitoring well and extended at least 30 cm above the top of the screen. Sodium bentonite HOLEPLUG® (3/8" grade) was placed to seal the remaining annular space surrounding the PVC riser pipes, up to ground surface.

### 3.2.7 Groundwater Monitoring and Sampling

Groundwater monitoring involved collecting static water levels and determining the presence (and if applicable, thickness) of non-aqueous phase liquid (NAPL) from all installed monitoring wells at the phase two property. Groundwater monitoring was performed using a Solinst Model 122 interface probe, which was used to measure the depth to water in meters below the top of the riser pipe (mBTOP) and to confirm the presence/absence of non-aqueous phase liquid (NAPL) in each monitoring well.

Monitoring well purging and sampling was performed using dedicated low density polyethylene (LDPE) tubing equipped with an inertial foot valve. Groundwater samples were collected after three (3) well volumes were purged from the well. Groundwater samples collected for metals analysis were field filtered at the time of sample collection using in-line 0.45 µm filters. The groundwater samples were collected in laboratory supplied bottles and vials, filled to the laboratory recommended volumes and subsequently placed in an ice filled cooler for transportation to the lab.

### 3.2.8 Laboratory Analysis of Soil, Groundwater, and Sediment

All soil and groundwater samples were submitted under chain of custody documentation to ALS Environmental (ALS) within the sample holding times outlined in the *Protocol for Analytical Methods Used in the Assessment of Properties under*

Part XV.1 of the Environmental Protection Act. ALS is a Canadian Association for Laboratory Accreditation (CALA) accredited laboratory for the analyses performed.

### 3.2.9 Quality Assurance/Quality Control

Quality assurance and quality control (QA/QC) measures were employed during the field program and included the following:

- Non-dedicated sampling equipment was decontaminated between sampling events by cleaning the equipment in an aqueous solution of Alconox™ detergent and rinsing it with methanol and deionized water before reuse.
- A fresh pair of nitrile gloves were worn by field staff at all times during sample collection and handling to minimize the potential for cross contamination.
- Soil and groundwater samples were collected in pre-cleaned, laboratory supplied bottles, jars and vials, with preservation (as necessary).
- Prior to delivery to the lab, samples were handled and stored in accordance with the requirements outlined in the MECP document “*Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act*”, March 9, 2004 (amended as of July 1, 2011).

In addition to these measures, field QC samples were collected in order to determine the precision of the analytical methods and assess the error associated with sample heterogeneity. The field QC samples included blind duplicate samples to evaluate analytical precision, field precision and sample homogeneity.

Precision between duplicate samples is measured using the Relative Percent Difference (RPD) method. The RPD is calculated as follows:

$$RPD = \frac{|C_s - C_d|}{(C_s + C_d)/2} \times 100$$

where  $C_s$  is the concentration of the original sample and  $C_d$  is the concentration of the duplicate sample.

Acceptable RPD limits for field quality control measures such as duplicates, are generally two times the published acceptable RPD limits for laboratory quality control measures (CCME, 2016). As such the upper bounds for acceptable RPD values for soil and groundwater are presented in the table below:

**Table 5: Acceptable RPD Values for Field Duplicates**

Parameter Group	Acceptable Soil RPD Values	Acceptable GW RPD Values
Metals	80%	40%
PAH	100%	60%
PHC	60%	60%
VOC	100%	60%

## 3.3 Results

### 3.3.1 Environmental Field Investigation

Borehole locations were cleared for public and private utilities by USL-1 of Ottawa, Ontario on October 12, 2018. The environmental field investigation was performed from October 9<sup>th</sup> to October 19<sup>th</sup>, 2018 and consisted of the following:

- Groundwater monitoring, purging and sampling of four (4) existing monitoring wells (EW-2 to EW-5) previously installed by others across the phase two property. This monitoring and sampling event was performed on October 9<sup>th</sup>, 2018.
- Drilling a total of five (5) boreholes across the phase two property (BS-1 to BS-5), two (2) of which were advanced indoors. Outdoor drilling was done on October 15<sup>th</sup>, 2018 and indoor drilling was done on October 19<sup>th</sup>, 2018.
- Installing overburden monitoring wells in two (2) of the three (3) outdoor boreholes (BS-1 and BS-3) and performing groundwater monitoring, purging and sampling of these two (2) wells. This monitoring and sampling event was performed on October 17<sup>th</sup>, 2018.

This investigation was consistent with the proposed scope of work, with one exception. Three (3) planned monitoring well installations were removed from the field program and four (4) existing monitoring wells were sampled instead. This scope modifications was made after discussions with the client.

A summary of the environmental investigation can be seen on **Figure 3** in **Appendix A**.

### 3.3.2 Soil Conditions

Details of the subsurface conditions encountered during drilling are presented on the borehole logs in **Appendix E**.

Generally speaking, the soil stratigraphy at the phase two property consisted of asphalt or reinforced concrete underlain by granular fill, underlain by a deposit of silty sand to sandy silt underlain by a predominantly silty sand glacial till, overlying bedrock.

Borehole BS-5 was the only borehole with soil that displayed field evidence of contamination (both visual and olfactory). Soil from this borehole was dark stained around the water table and had a noticeable hydrocarbon odour that decreased in strength with increasing depth below the water table. This borehole was drilled in the vicinity of the former waste varsol UST nest and this tank nest is a likely source of the observed impacts.

None of the remaining boreholes had any noticeable field evidence of contamination. That said, a 1 m long piece of black decaying wood was observed in borehole BS-2. The source of this wood is unknown but could be some remaining infrastructure from

the former private fuel outlet in the vicinity of BS-2 or backfill used in the decommissioning this fuel outlet.

Headspace organic vapour readings were relatively low for all boreholes except borehole BS-5. The maximum headspace vapour readings for the phase two property were measured in this borehole from sample BS-5 SA6 and consisted of a peak PID reading of 1,144 ppm and a peak CGI reading of 3,600 ppm. This sample was submitted for laboratory analysis of metals, PAH, PHC and VOC.

### 3.3.3 Groundwater Conditions and Hydrogeology

The measured static water levels and the results from groundwater monitoring are summarized in **Table 6** below.

**Table 6: Static Water Levels and Groundwater Elevations**

Monitoring Well ID	Static Water Level (mBTOP)	Date of Static Water Level Measurement	Presence of LNAPL	Groundwater Elevation* (mASL)
EW-1	2.22	October 9, 2018	None	N/A
EW-2	2.78	October 9, 2018	None	N/A
EW-3	3.76	October 9, 2018	None	N/A
EW-4	3.31	October 9, 2018	None	N/A
EW-5	3.27	October 9, 2018	None	N/A
EW-6	2.58	October 9, 2018	None	N/A
EW-8	2.93	October 9, 2018	None	N/A
EW-11	3.26	October 9, 2018	None	N/A
BS-1	2.08	October 17, 2018	None	N/A
BS-3	2.29	October 17, 2018	None	N/A

The conclusions about LNAPL presence are based on the results of groundwater monitoring with a Solinst Model 122 interface probe. Values for groundwater elevations were not available at this time as surveying of the installed and existing monitoring wells could not be completed in the given timeframe. Therefore, no conclusions about the horizontal groundwater flow direction can be made at this time.

In terms of groundwater quality, monitoring well EW-5 was the only well that showed signs of contamination during purging and sampling. A noticeable organic odour (or possible hydrocarbon odour) was noted in the purge water. As with the observed evidence of contamination in soil, this monitoring well was installed in the vicinity of the former waste varsol UST nest and this tank nest is a likely source of the observed impacts.

### 3.3.4 Applicable Standards

Provincial standards described in the MECP document entitled "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the *Environmental Protection*

*Act* dated April 15, 2011, are currently used for the assessment of potentially contaminated sites in the context of Ontario Regulation (“O. Reg.”) 153/04 as amended.

The following characteristics were noted for the phase two property and were used in selecting the applicable site condition standards (SCS):

- The phase two property and the surrounding lands within the study area are serviced by a municipal drinking water supply which is not supplied by the local groundwater;
- The phase two property is not considered a shallow soil property (a property in which more than 1/3 of its area is covered with soil whose thickness is equal to or less than 2 meters);
- The closest water body to the phase two property is Pinecrest Creek, located roughly 900 m northeast of the phase two property;
- Coarse soil texture was considered for the phase two property (conservative approach) as no grain size analysis was performed as part of this investigation.
- The most sensitive present day land use of the phase two property is industrial;

Based on the above considerations, the following SCSs were selected to assess the soil, groundwater and sediment quality at the phase two property:

- **For soil:** MECP Soil, Ground water and Sediment Standards for Use Under Part XV.1 of the *Environmental Protection Act*, Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Industrial/Commercial/Community Property Use, coarse-textured soils, 2011 (MOECC Table 3 ICC).
- **For groundwater:** MECP Soil, Ground water and Sediment Standards for Use Under Part XV.1 of the *Environmental Protection Act*, Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, All Types of Property Use, coarse-textured soils, 2011 (MOECC Table 3).

As this phase two property may be scheduled for redevelopment, the analytical results were also compared to the more stringent soil standards associated with residential land use. These include:

- **For soil:** MECP Soil, Ground water and Sediment Standards for Use Under Part XV.1 of the *Environmental Protection Act*, Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Residential/Parkland/Institutional Property Use, coarse-textured soils, 2011 (MOECC Table 3 RPI).

Soil TCLP results were compared to Schedule 4: Leachate Quality Criteria of the *General – Waste Management Regulation*, RRO 1990, Reg. 347 under the *Environmental Protection Act*.

### 3.3.5 Soil Analytical Results

The soil analytical results for metals and inorganics, PAH, PHC and VOC are presented in **Tables F1, F2, F3 and F4** in **Appendix F**. The analytical results from the TCLP analyses are presented in **Table F8** in **Appendix F**. The soil analytical results compared to MOECC Table 3 RPI standards are also shown on **Figure 4** in **Appendix A**.

Laboratory Certificates of Analysis for soil and the TCLP analyses are provided in **Appendix G**.

### 3.3.6 Groundwater Analytical Results

The groundwater analytical results for metals, PHC and VOC are presented in **Tables F5, F6 and F7** in **Appendix F**. The groundwater analytical results are also shown on **Figure 4** in **Appendix A**.

Laboratory Certificates of Analysis for groundwater are provided in **Appendix G**.

### 3.3.7 Quality Assurance/Quality Control

The field QC samples included one (1) blind duplicate soil sample (BS-5 SA21) submitted for analysis of PHC and VOC, and one (1) duplicate groundwater sample (EW-5D) submitted for analysis of metals, PHC and VOC.

Acceptable RPD values were obtained for the groundwater duplicate but two (2) parameters (PHC F1 and PHC F2) for the soil duplicate had RPD values outside the acceptable limits. Neither the parent nor the duplicate soil sample had concentrations above any site condition standard, but these results demonstrate the heterogeneity of the soil.

## 3.4 Evaluation of Results

The phase two ESA was performed to address APECs that were deemed to be of high concern. These APECs are listed below, along with the boreholes and monitoring wells that were sampled to determine their environmental impacts. The results were evaluated against the more stringent SCSs (MOECC Table 3 RPI) and are discussed below.

### ***1119-1129 Baxter Road (Operation of Dry Cleaning Equipment)***

Borehole and monitoring well BS-1 was advanced to determine if any contaminants from this off-site PCA had migrated on-site. Soil and groundwater samples were submitted for PHC and VOC analysis. With the exception of PHC F2 in soil, all analyzed parameters were below the laboratory reported detection limit. This

includes dry cleaning solvents and their degradation by-products, such as tetrachloroethylene, trichloroethylene and vinyl chloride. The measured PHC F2 concentration in soil was well below the MOECC Table 3 RPI standard.

#### ***Former On-Site Private Fuel Outlet***

Borehole BS-2 was advanced to determine if there were any impacts from the historical operation of the private fuel outlet and UST nest. One (1) soil sample from this borehole was submitted for PHC and VOC analysis. All analyzed parameters were below the laboratory reported detection limit.

#### ***Plate Room, Printing Press Room and Ink Storage***

Borehole BS-4 and existing monitoring wells EW-3 and EW-4 were sampled to determine if there were any impacts from the printing operation and ink storage. A thick concrete slab (0.5 m) was encountered in the printing press room during the drilling of borehole BS-4. This slab reduces the likelihood of any spilled ink, hydraulic fluid, lubricating oils or solvents from having reached the subsurface.

Soil from borehole BS-4 was submitted for metals, PAH, PHC and VOC analysis, while groundwater from EW-3 was submitted for metals, PHC and VOC analysis. This borehole and monitoring well were located between the printing presses in close proximity to the plate room. All PAH, PHC and VOC parameters in the soil sample, and all PHC and VOC parameters in the groundwater sample were below the laboratory reported detection limits. Select metal parameters in the soil and groundwater were measured at concentrations exceeding the laboratory reported detection limit, but all metals parameters met the applicable MECP Table 3 standards.

The groundwater sample from EW-4, which was located in the vicinity of the black ink vats, was submitted for metals, PHC and VOC analysis. As with the EW-3 results, all PHC and VOC parameters were below the laboratory reported detection limit and all metals parameters met the MECP Table 3 standards.

#### ***Former New and Used Varsol Tank Nest***

Borehole BS-5 and existing monitoring wells EW-2 and EW-5 were sampled to determine the impacts from the former varsol UST tank nest, used to store new and used mineral solvents. As per the information outlined in the phase one ESA portion of this report, a leak in the waste varsol UST was confirmed in April 1993 and the USTs were subsequently removed around 1993/1994. It is our understanding that a remedial excavation was undertaken when the tanks were removed, however it was not confirmed if all impacts were delineated and addressed as part of this excavation.

Monitoring well EW-2 was situated outside the building in the immediate vicinity of the former tank nest, while borehole BS-5 and monitoring well EW-5 were located inside the building, in the present day paper storage room and north of the assumed limits of the remedial excavation.

The groundwater sample from EW-2 was submitted for dissolved metals, PHC and VOC analysis. All PHC and VOC parameters were below the laboratory reported detection limit and all metal parameters met the MOECC Table 3 RPI standards.

Borehole BS-5 and monitoring well EW-5 were located inside the paper storage room, adjacent to the former varsol UST nest. Soil from borehole BS-5 was submitted for metals, PAH, PHC and VOC analysis. Significant observations of contamination were observed in soil from this borehole around the water table (3.0 – 3.7 m depth) and as such a second sample, collected from a lower depth, was submitted to vertically delineate the anticipated impacts.

The sample collected from the water table (BS-5 SA6) had two (2) PAH parameters (1+2-methylnaphthalene and naphthalene) and PHC F1 to PHC F3 present at concentrations exceeding the MECF Table 3 RPI standards. All these parameters, with the exception of 1+2 methylnaphthalene also exceeded the less stringent MECF Table 3 ICC standards indicating the soil is still considered contaminated given the current industrial use of the phase two property. No metal or VOC parameters exceeded the MECF Table 3 standards in this sample

PHC F1, F2 and F3 were also detected in the deeper sample (BS-5 SA10), which was submitted from a depth range of 5.5 – 6.1m, but none of these concentrations exceeded the MECF Table 3 RPI standards. As such the soil contamination appears to be limited to a depth of 5.5m below ground surface.

The groundwater from EW-5 was submitted for metals, PHC and VOC analysis. No metal or VOC parameters exceeded the MECF Table 3 standards but PHC F2 was present in the parent and duplicate sample from EW-5 at concentrations exceeding these standards.

#### ***1050-1051 Baxter Road (Metal Treatment, Coating, Plating and Finishing) and Downgradient of Former Varsol Tank Nest***

Borehole and monitoring well BS-3 was advanced to determine if any contaminants from the off-site APEC at 1050-1051 Baxter Road had migrated on-site. This borehole was also used to determine the spatial distribution of any impacts from the former varsol UST nest. Soil and groundwater samples were submitted for metals, PHC and VOC analysis. All PHC and VOC parameters, in both the soil and groundwater samples, were below the laboratory reported detection limits. Similarly, all metals parameters in the soil and groundwater samples met the applicable MECF Table 3 standards.

### **3.5 Conclusions**

Based on the soil and groundwater analytical results, the following conclusions can be made about the phase two property and the investigated APECs:

- The former dry cleaning operation at 1119 – 1129 Baxter Road does not appear to be adversely impacting the soil and groundwater quality at the property.

- The former on-site private fuel outlet does not appear to have adversely impacted the soil and groundwater quality at the property.
- No soil or groundwater quality issues were identified beneath the floor slab in the vicinity of the plate room, printing press room or near the ink storage. Pockets of contamination may however still be present at these locations.
- Soil and groundwater contamination was confirmed in the vicinity of the former waste varsol UST nest. The former location of the tanks (which was apparently subject to a remedial excavation) does not appear to be impacted but the area immediately downgradient, which is currently beneath the paper storage room, has contamination which manifests itself in the form of PAH and PHC impacts in the soil and PHC F2 impacts in the groundwater. This contamination appears to be most prominent at the depth of the water table and extends to roughly 5.5 m below ground surface.
- The spatial extent of this contamination is unknown but is presumed to be limited (no more than one or two tens of metres from the highest measured concentrations).
- There does not appear to be any significant subsurface environmental impacts from the adjacent property to the east (1050-1051 Baxter Road) which is categorized as a metal treatment, coating, plating and finishing PCA.

### 3.6 Recommendations

Contaminated soil and groundwater was identified beneath the floor slab in the area of the paper storage room, which is presumed to be of limited extent, as mentioned above. Based on the concentrations of volatile contaminants (PHC F1, PHC F2 and naphthalene) in the soil, the exposure pathway of greatest concern is partitioning of contaminants from soil into the vapour phase and subsequent migration of that vapour through the concrete building slab and into the indoor air breathing space.

Recommendations for addressing the identified contamination vary depending on whether the phase two property will remain as is, will be used for a different industrial or commercial use, or will be redeveloped.

If the phase two property is to continue as a printing facility, removal of the contaminated material is considered impractical and further investigation and remediation are not considered warranted. Considering that the contaminants of concern are used on a daily basis in mineral solvents (i.e. varsol) and hydraulic oil as part of the printing operations, the incremental contributions of the contaminants from the subsurface are considered minimal and will be addressed by the health and safety measures needed to operate the printing facility. That is to say, so long as the building configuration and use remains unchanged, the impacted materials are unlikely to pose a significant risk to building occupants.

If the phase two property is used for a different commercial or industrial purpose (e.g., if the paper storage room is converted to an office space), assessment of the risk posed by the contaminated soil and groundwater will be required. This could

include performing a sub-slab vapour monitoring program to determine the contaminant vapour concentrations accumulating beneath the slab and the affect that they may have on indoor air quality.

If the phase two property is to be redeveloped to a more sensitive land use (such as residential), completion of a phase one and two ESA in compliance with O.Reg. 153/04 will be required to support the filing of Record of Site Condition (RSC). As part of the RSC process, the extent of contamination may need to be further delineated and development and execution of a remedial action plan will be carried out. Assuming the existing building is demolished as part of the redevelopment, the most feasible remedial method will likely be to excavate and dispose of the contaminated soil at a licensed landfill. Based on disposal of 2,000 tonnes of soil at an all-in cost of \$100/tonne (includes site work and engineering fees for RSC investigations and filing), an order of magnitude estimate of the remedial cost is \$200,000.

As part of the redevelopment process, and following building demolition, it is also advised to further investigate the soils beneath the printing press and plate room for pockets of contamination resulting from the printing operation.

### ***Well decommissioning***

If redevelopment is planned for the site, maintaining the existing monitoring well network is advisable as these wells will assist with the phase two ESA needed to achieve Record of Site Condition.

If the monitoring wells are not planned for future use, they should be abandoned in accordance with the requirements of O.Reg. 903.

## 4. STATEMENT OF LIMITATIONS AND USE

This report has been prepared for the exclusive use of Regional Group (the Client) by Morrison Hershfield Limited (Morrison Hershfield). Morrison Hershfield hereby disclaims any liability or responsibility to any person or party, other than the Client, for any loss, damage, expense, fines, or penalties which may arise from the use of any information or recommendations contained in this report.

In preparing this report Morrison Hershfield has relied in good faith on information provided by individuals and companies noted in this report. Morrison Hershfield assumes that the information provided is factual and accurate, and accepts no responsibility for any deficiency, misstatements or inaccuracies contained in this report as a result of omissions, misinterpretations or fraudulent acts of the persons interviewed or contacted.

The report, which specifically includes all tables, figures and appendices is based on data and information collected during investigations conducted by Morrison Hershfield and is based solely on the conditions of the site at the time of the investigation, supplemented by historical information and data obtained by Morrison Hershfield as described in this report. Limitations of the data and information include the fact that conditions between and beyond the limited number of sampling locations may vary; that the assessment is dependent upon the accuracy of the analytical data generated through sample analysis; and that contaminants may exist for which no analyses have been conducted. Furthermore, no assurance is made regarding changes in conditions and/or the regulatory regime (standards, guidelines, etc.), subsequent to the time of investigation.

Morrison Hershfield has exercised professional judgment in collecting and analyzing the information and formulating recommendations based on the results of the study. The services performed as described in this report were conducted in a manner consistent with that level of care and skill normally exercised by other members of the engineering and science professions currently practicing under similar conditions, subject to the time limits and financial and physical constraints applicable to this study. No other warranty or representation, either expressed or implied, as to the accuracy of the information or recommendations included or intended in this report.

## 5. CLOSURE

We trust the information presented in this report meets your requirements. If you have any further questions or need addition details, please do not hesitate to contact the undersigned.

Respectfully submitted,  
Morrison Hershfield Limited

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## 6. REFERENCES

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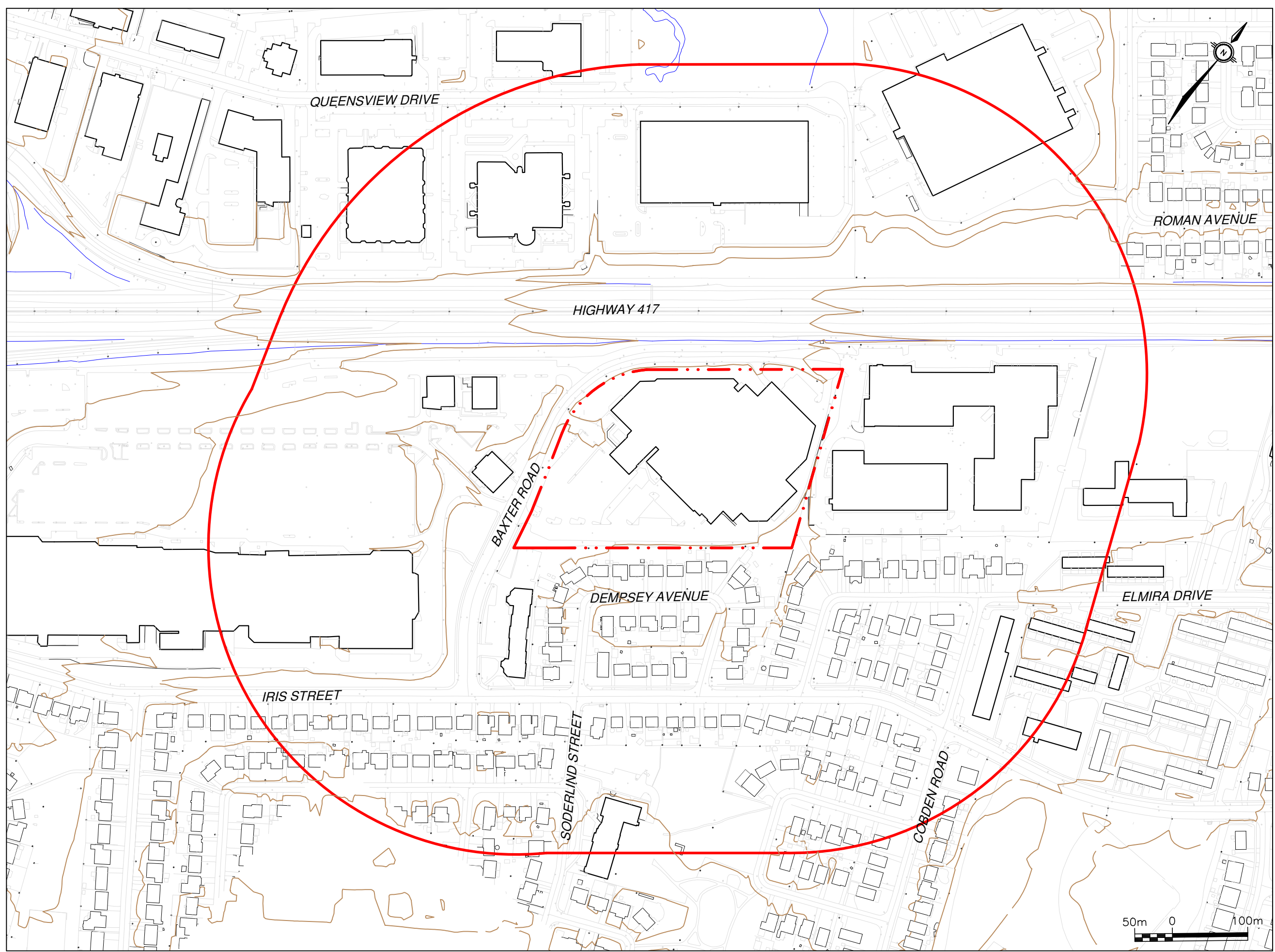
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<https://www.pressreader.com/canada/ottawa-citizen/20091222/282664683498698>>

## **APPENDIX A: Figures**



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LEGEND

- - - PHASE ONE PROPERTY
- PHASE ONE STUDY AREA
- TOPOGRAPHIC CONTOURS



PROJECT:  
**Phase One and Two ESA  
 - 1101 Baxter Road**



DESIGNED BY: M.D

DRAWN BY: R.H

CHECKED BY: A.W

DATE: 10/15/18

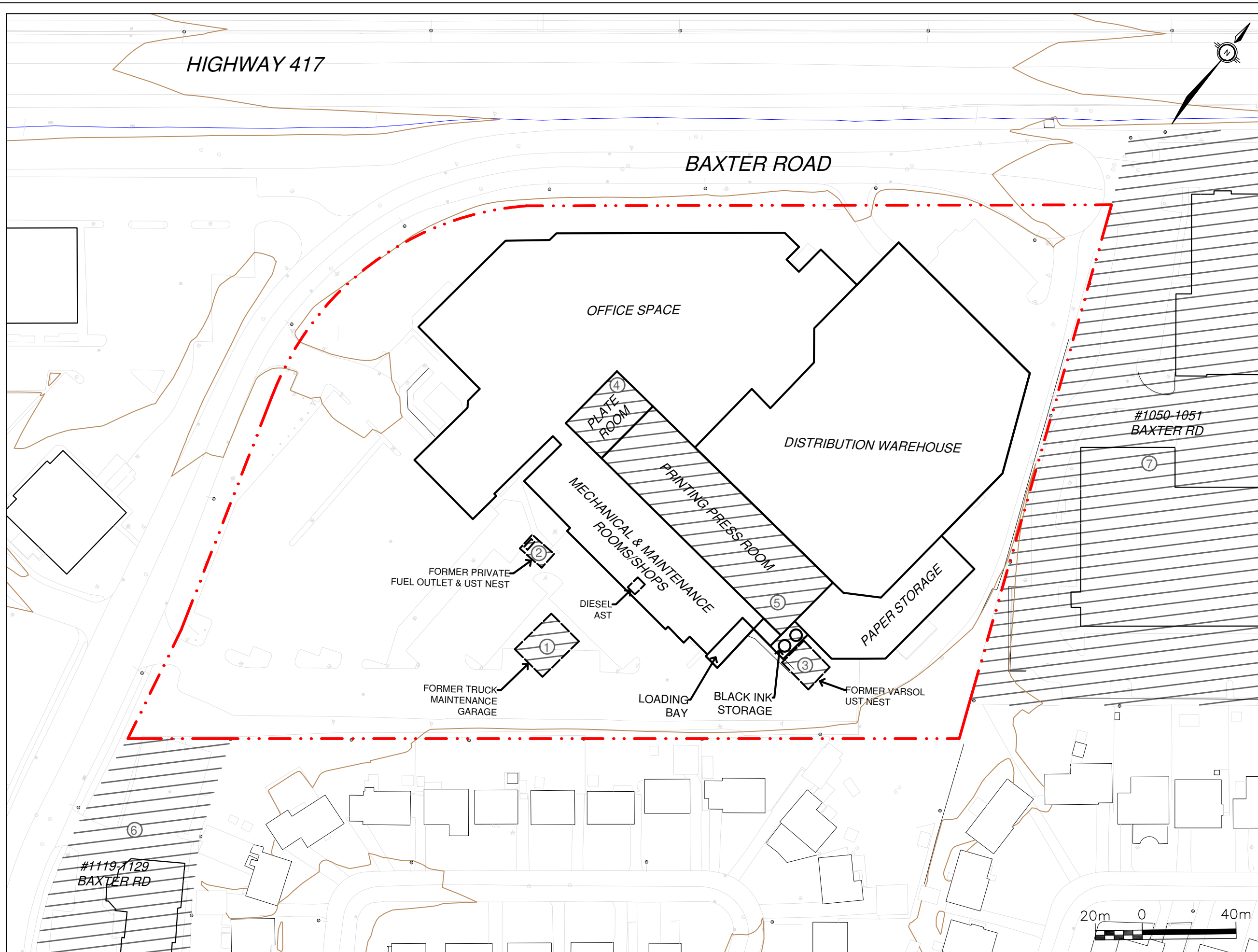
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PROJECT NO: 180564700

TITLE:  
**Phase One Property  
 and Study Area**

FIGURE NO: 1

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- LEGEND**
- - - PHASE ONE PROPERTY
  - POTENTIALLY CONTAMINATING ACTIVITY (PCA)
  - ① Former Maintenance Garage - Storage, maintenance, fuelling and repair of equipment, vehicles, and material used to maintain transportation systems.
  - ② Former Private Fuel Outlet - Gasoline and Associated Products Storage in Fixed Tanks
  - ③ Former Varsol Fuel Tank Nest - Gasoline and Associated Products Storage in Fixed Tanks
  - ④ Plate Room - Metal Treatment, Coating, Plating and Finishing
  - ⑤ Printing Press Room and Ink Storage - Ink Manufacturing, Processing and Bulk Storage
  - ⑥ 1119-1129 Baxter Road - Operation of Dry Cleaning Equipment
  - ⑦ 1050-1051 Baxter Road - Metal Treatment, Coating, Plating and Finishing, and Electronic and Computer Equipment Manufacturing



PROJECT:  
Phase One and Two ESA  
- 1101 Baxter Road

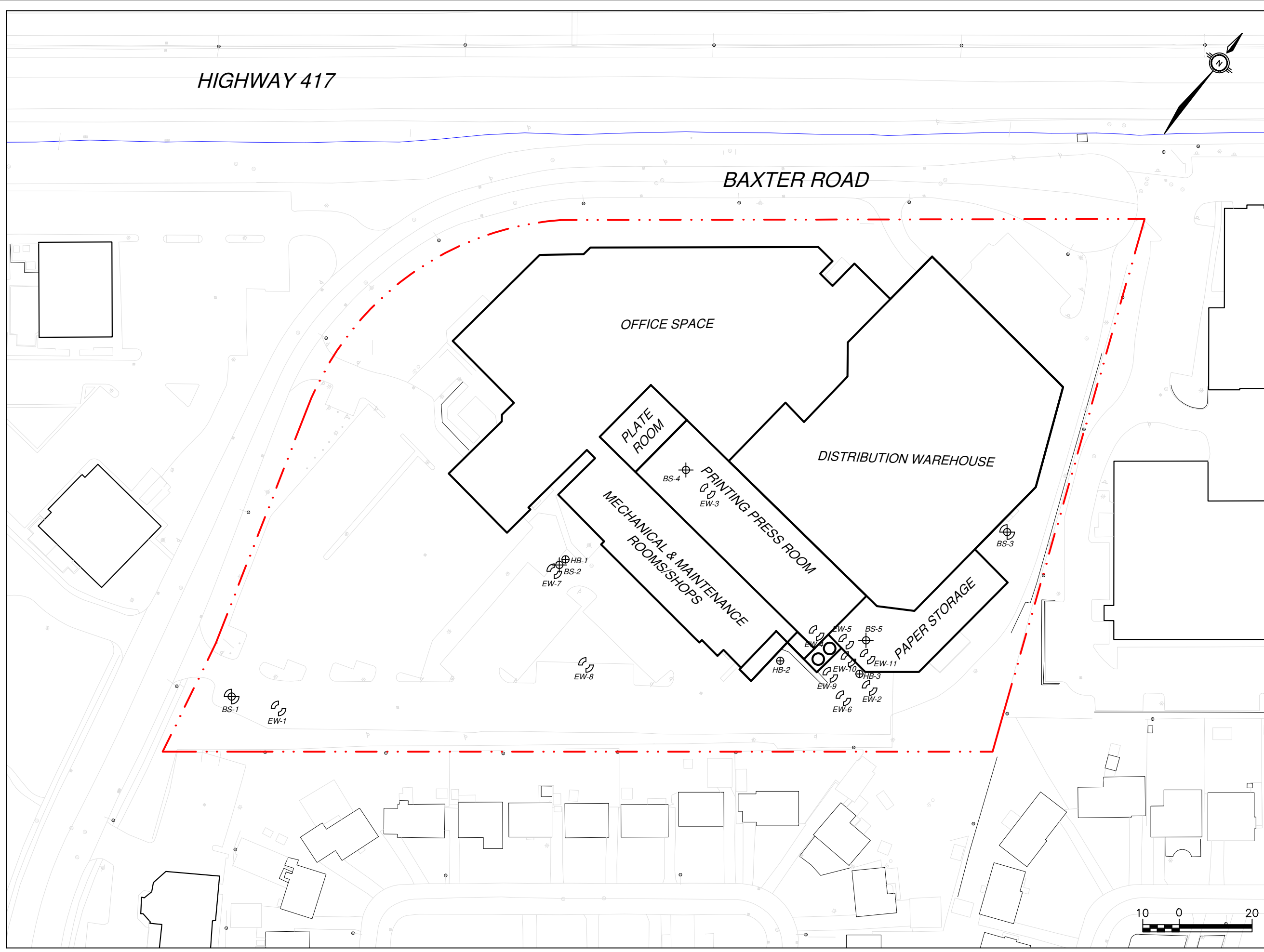


DESIGNED BY: M.D  
DRAWN BY: R.H  
CHECKED BY: A.W  
DATE: 10/15/18  
SCALE: 1:1500  
PROJECT NO: 180564700

TITLE:  
**Potentially Contaminating Activities (PCA)**

FIGURE NO: 2

\\mh.local\data\Proj\2018\180564700-1101 Baxter Rd. - Due Diligence\08. Working\01. Draft\Phase II ESA\1. Figures\1101 Baxter Phase II ESA Figure.dwg



<b>LEGEND</b>	
	Geo-Environmental Borehole
	Geo-Environmental Borehole and Monitoring Well
	Historical Monitoring Well Installed by Others
	Historical Borehole Drilled by Others
	Phase Two Property
<b>NOTES</b>	
 <b>MORRISON HERSHFIELD</b>	
<b>PROJECT:</b> Phase One and Two ESA -1101 Baxter Road	
<b>PREPARED FOR:</b>  <b>REGIONAL</b>	
<b>DESIGNED BY:</b>	M.D
<b>DRAWN BY:</b>	M.D
<b>CHECKED BY:</b>	C.G
<b>DATE:</b>	Oct 2018
<b>SCALE:</b>	1:1000
<b>PROJECT NO:</b>	180564700
<b>TITLE:</b>	
1101 Baxter Road - Site Plan	
<b>FIGURE NO:</b>	3

HIGHWAY 417

BAXTER ROAD

- LEGEND**
- Geo-Environmental Borehole
  - Indicates Concentration(s) Measured in Soil that Exceed the Site Condition Standard(s)
  - Geo-Environmental Monitoring Well or Existing Monitoring Well
  - Indicates Concentration(s) Measured in Groundwater that Exceed the Site Condition Standard(s)
  - Phase Two Property

**NOTES**

<sup>1</sup>Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Ministry of the Environment, April 15, 2011. Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Coarse-Grained Soil Standard for Residential/Parkland/Institutional Property Use

PAH - Polycyclic Aromatic Hydrocarbons  
 PHC - Petroleum Hydrocarbons  
 VOC - Volatile Organic Compounds  
 mbgs - Meters Below Ground Surface



**PROJECT:**  
 Phase One and Two ESA  
 - 1101 Baxter Road



**DESIGNED BY:** M.D

**DRAWN BY:** M.D

**CHECKED BY:** C.G

**DATE:** Oct 2018

**SCALE:** 1:1000

**PROJECT NO:** 180564700

**TITLE:**  
 1101 Baxter Road -  
 Analytical Results

**FIGURE NO:**  
 4

**BS-1 Soil Results Compared to MECP Table 3 Standards<sup>1</sup>**

Sample ID	Sample Depth (mbgs)	Concentrations Above and/or Parameter Suites Below Table 3 <sup>1</sup>
SA10	6.9 - 7.6	PHC, VOC < Table 3

**BS-1 GW Results Compared to MECP Table 3 Standards<sup>1</sup>**

Sample ID	Screen Depth (mbgs)	Concentrations Above and/or Parameter Suites Below Table 3 <sup>1</sup>
BS-1	5.5 - 8.5	PHC, VOC < Table 3

**BS-2 Soil Results Compared to MECP Table 3 Standards<sup>1</sup>**

Sample ID	Sample Depth (mbgs)	Concentrations Above and/or Parameter Suites Below Table 3 <sup>1</sup>
SA3	2.3 - 3.0	PHC, VOC < Table 3

**BS-4 Soil Results Compared to MECP Table 3 Standards<sup>1</sup>**

Sample ID	Sample Depth (mbgs)	Concentrations Above and/or Parameter Suites Below Table 3 <sup>1</sup>
SA4	2.4 - 3.0	Metals < Table 3
SA6	3.7 - 4.3	PAH, PHC, VOC < Table 3

**BS-3 Soil Results Compared to MECP Table 3 Standards<sup>1</sup>**

Sample ID	Sample Depth (mbgs)	Concentrations Above and/or Parameter Suites Below Table 3 <sup>1</sup>
SA5	3.0 - 3.8	Metals, PHC, VOC < Table 3

**BS-3 GW Results Compared to MECP Table 3 Standards<sup>1</sup>**

Sample ID	Screen Depth (mbgs)	Concentrations Above and/or Parameter Suites Below Table 3 <sup>1</sup>
BS-3	2.4 - 5.5	Metals, PHC, VOC < Table 3

**BS-5 Soil Results Compared to MECP Table 3 Standards<sup>1</sup>**

Sample ID	Sample Depth (mbgs)	Concentrations Above and/or Parameter Suites Below Table 3 <sup>1</sup>
SA6	3.0 - 3.7	1+2-Methylnaphthalene: 4.29 Naphthalene: 11.5 PHC F1: 909 PHC F2: 3170 PHC F3: 1950 Metals, VOC < Table 3
SA10	5.5 - 6.1	PHC, VOC < Table 3
SA21 (SA10 DUP)	5.5 - 6.1	PHC, VOC < Table 3

**EW-4 GW Results Compared to MECP Table 3 Standards<sup>1</sup>**

Sample ID	Screen Depth (mbgs)	Concentrations Above and/or Parameter Suites Below Table 3 <sup>1</sup>
EW-4	Unknown	Metals, PHC, VOC < Table 3

**EW-3 GW Results Compared to MECP Table 3 Standards<sup>1</sup>**

Sample ID	Screen Depth (mbgs)	Concentrations Above and/or Parameter Suites Below Table 3 <sup>1</sup>
EW-3	Unknown	Metals, PHC, VOC < Table 3

**EW-5 GW Results Compared to MECP Table 3 Standards<sup>1</sup>**

Sample ID	Screen Depth (mbgs)	Concentrations Above and/or Parameter Suites Below Table 3 <sup>1</sup>
EW-5	Unknown	PHC F2: 200 Metals, VOC < Table 3
EW-5D	Unknown	PHC F2: 240 Metals, VOC < Table 3

**EW-2 GW Results Compared to MECP Table 3 Standards<sup>1</sup>**

Sample ID	Screen Depth (mbgs)	Concentrations Above and/or Parameter Suites Below Table 3 <sup>1</sup>
EW-2	Unknown	Metals, PHC, VOC < Table 3

**MECP Table 3 Soil Standards<sup>1</sup>**

CONTAMINANT	STANDARD (ug/g)
1+2-Methylnaphthalene	0.99
Naphthalene	0.6
PHC F1	55
PHC F2	98
PHC F3	300

**MECP Table 3 Groundwater Standards<sup>1</sup>**

CONTAMINANT	STANDARD (ug/L)
PHC F2	150



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## **APPENDIX B: EcoLog ERIS Report**



NOTE: The complete EcoLog ERIS Report is available upon request.



# DATABASE REPORT

**Project Property:** *Phase II Environmental Site Assessment -  
1101 Baxter Road, Ottawa, ON  
1101 baxter road  
Ottawa ON K2C 3Z3  
180564700*

**Project No:** *180564700*

**Report Type:** *Standard Report*

**Order No:** *20180926198*

**Requested by:** *Morrison Hershfield*

**Date Completed:** *October 2, 2018*

**Environmental Risk  
Information Services**  
A division of Glacier Media Inc.  
P: 1.866.517.5204  
E: [info@erisinfo.com](mailto:info@erisinfo.com)



**[www.erisinfo.com](http://www.erisinfo.com)**

## **APPENDIX C: Aerial Photographs**





**Legend**


-  Phase One Property
-  Phase One Study Area (250 m Buffer)

---

Project Name:  
**Phase One and Two Environmental Site Assessment (ESA) - 1101 Baxter Road**

Photo Title:  
**1958 Aerial Photo**

Reference:  
**GeoOttawa**

  
**MORRISON HERSHFIELD**



Scale:  
 N.T.S

Project No: 180564700	Photo No: 1
Department: Environmental	Date: September 2018



Distressed  
Land

**Legend**

-  Phase One Property
-  Phase One Study Area (250 m Buffer)

Project Name:  
**Phase One and Two  
 Environmental Site  
 Assessment (ESA) - 1101  
 Baxter Road**

Photo Title:  
**1965 Aerial Photo**

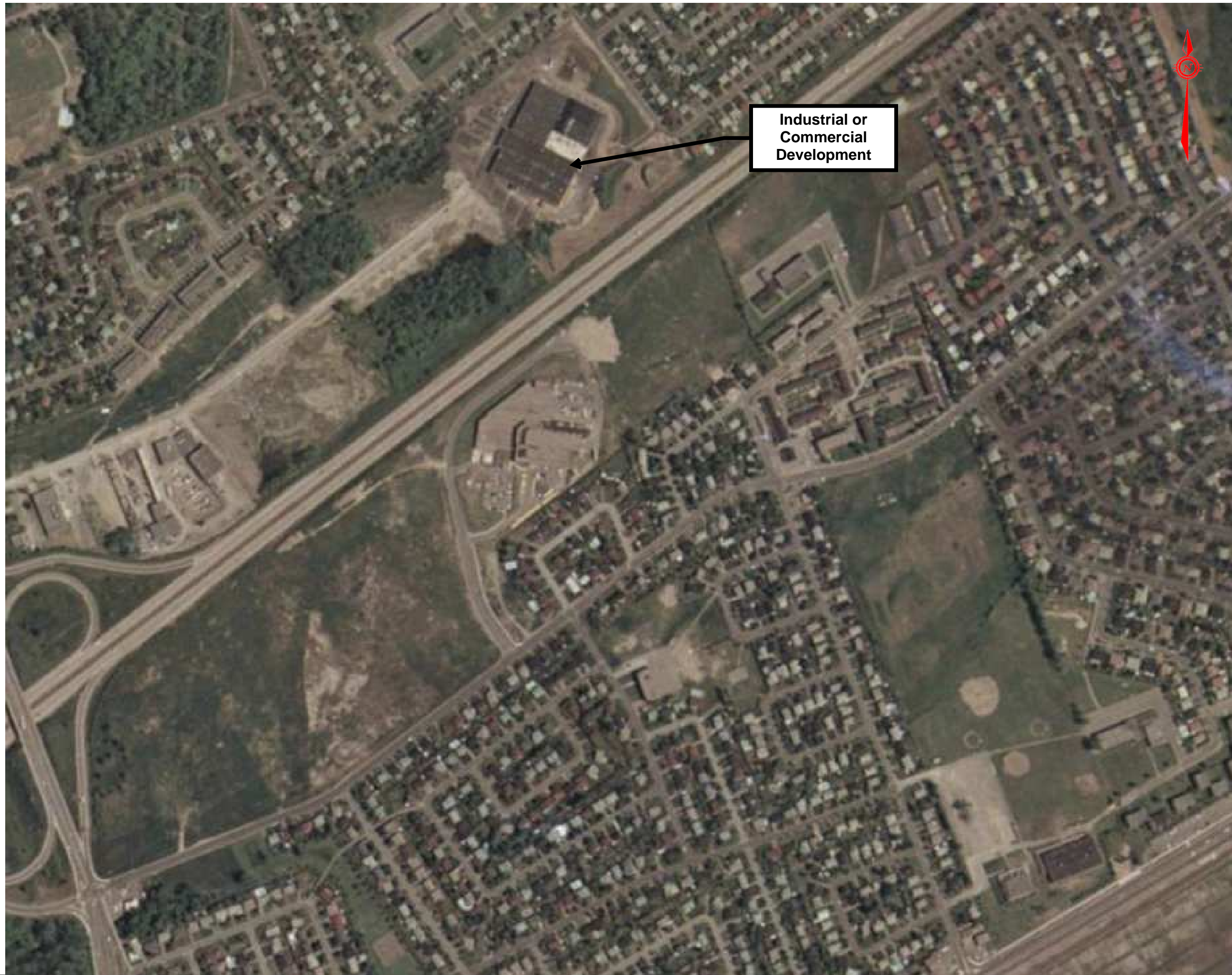
Reference:  
**GeoOttawa**



Scale:  
 N.T.S

Project No: 180564700	Photo No: 2
--------------------------	----------------

Department: Environmental	Date: September 2018
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**Legend**

- Phase One Property
- Phase One Study Area (250 m Buffer)

Project Name:  
**Phase One and Two  
Environmental Site  
Assessment (ESA) - 1101  
Baxter Road**

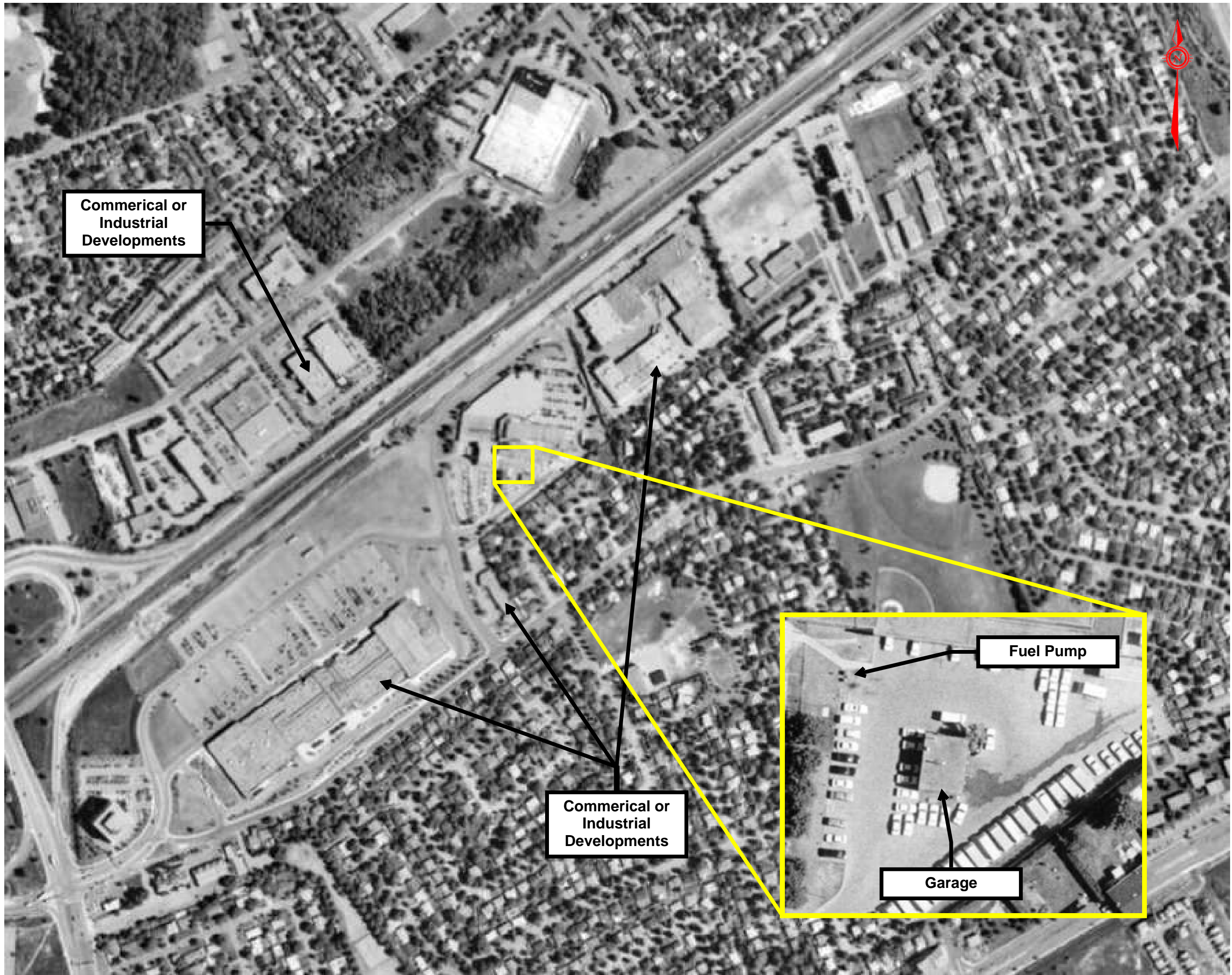
Photo Title:  
**1976 Aerial Photo**

Reference:  
**GeoOttawa**



Scale:  
N.T.S

Project No: 180564700	Photo No: 3
Department: Environmental	Date: September 2018



**Legend**

- Phase One Property
- - - Phase One Study Area (250 m Buffer)

**Commerical or Industrial Developments**

**Commerical or Industrial Developments**

**Fuel Pump**

**Garage**

Project Name:  
**Phase One and Two Environmental Site Assessment (ESA) - 1101 Baxter Road**

Photo Title:  
**1991 Aerial Photo**

Reference:  
**GeoOttawa**



Scale:  
 N.T.S




Project No: 180564700	Photo No: 4
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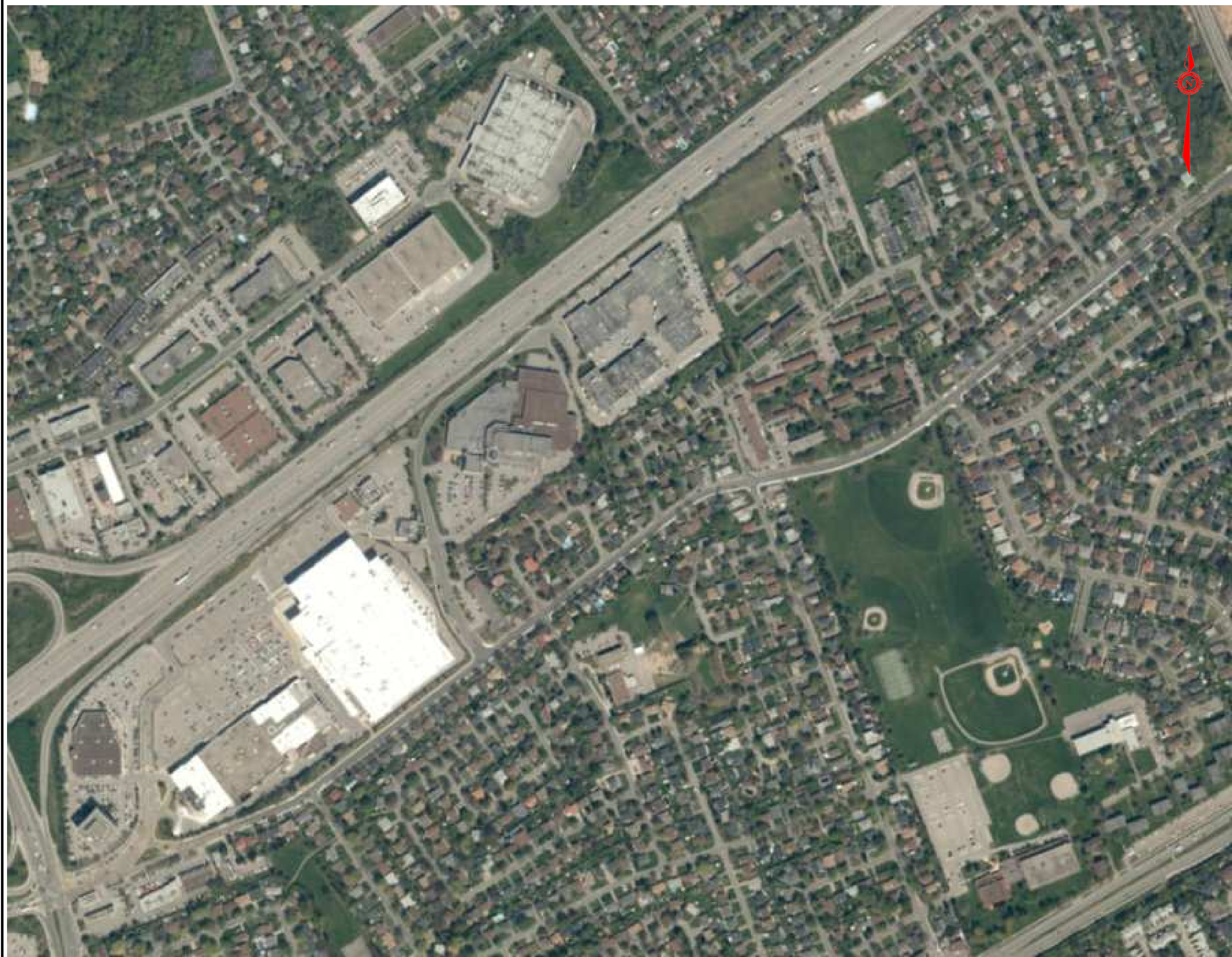
Department: Environmental	Date: September 2018
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Commerical or Industrial Developments


Commerical or Industrial Developments

<b>Legend</b>	
	Phase One Property
	Phase One Study Area (250 m Buffer)
Project Name: <b>Phase One and Two Environmental Site Assessment (ESA) - 1101 Baxter Road</b>	
Photo Title: <b>2007 Aerial Photo</b>	
Reference: <b>GeoOttawa</b>	
 <b>MORRISON HERSHFIELD</b>	
Scale: N.T.S	
Project No: 180564700	Photo No: 5
Department: Environmental	Date: September 2018



**Legend**

 Phase One Property

 Phase One Study Area (250 m Buffer)

Project Name:

**Phase One and Two Environmental Site Assessment (ESA) - 1101 Baxter Road**

Photo Title:

**2017 Aerial Photo**

Reference:

**GeoOttawa**



Scale:

**N.T.S**

Project No: <b>180564700</b>	Photo No: <b>6</b>
Department: <b>Environmental</b>	Date: <b>September 2018</b>

## **APPENDIX D: Site Photos**





Photo 1: Chemical Storage in Plate Room



Photo 2: Plate Room



Photo 3: Chemical Storage in Plate Room



Photo 4: Diesel AST and part of brick enclosure



Photo 5: One of the mechanical/maintenance rooms/shops



Photo 6: Loading dock



Photo 7: Varsol Waste Tote

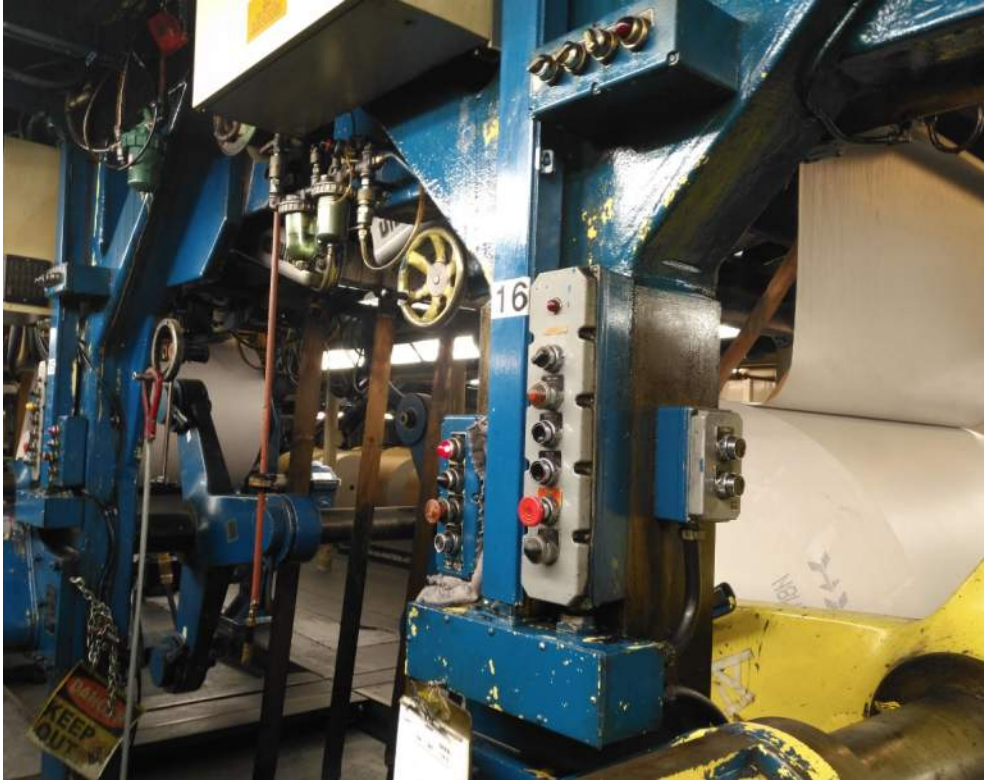


Photo 8: Printing Press

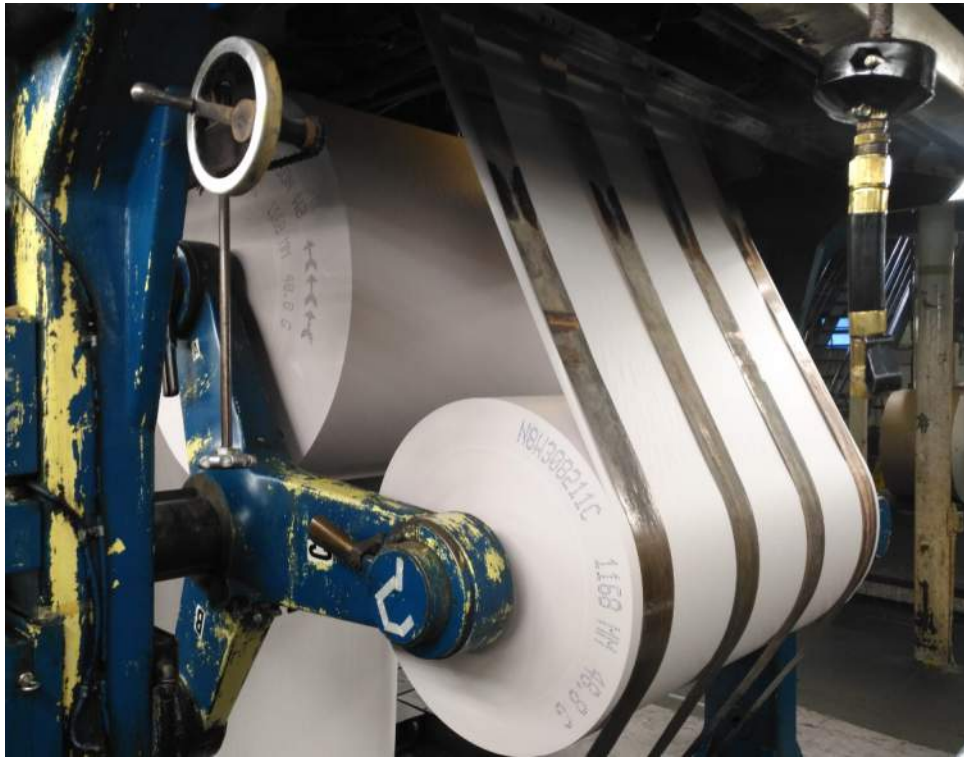


Photo 9: Printing Press



Photo 10: Adsorbent sheets and visible grease/oil on printing press



Photo 11: Waste printing plates



Photo 12: Oil storage in press room



Photo 13: Coloured ink storage in press room



Photo 14: Coloured ink piping for dispensing



Photo 15: Two black ink vats



Photo 16: Some paper storage in press room



Photo 17: Paper storage area and existing monitoring well



Photo 18: Distribution warehouse



Photo 19: Stained brick and pavement with black ink at black ink fill pipes



Photo 20: Former location of private fuel outlet



Photo 21: Ground surface at approximate location of former varsol UST nest



Photo 22: View of subject property from southwest corner of the parking area, facing northeast

## **APPENDIX E: Borehole Logs**





Morrison Hershfield  
 2440 Don Reid Drive  
 Ottawa, ON K1H 1E1  
 Telephone: 613-739-2910

# RECORD OF BOREHOLE BS-1 (ENVIRONMENTAL)

**CLIENT** Regional Group  
**PROJECT NUMBER** 180564700  
**DATE STARTED** 10/15/18 **COMPLETED** 10/15/18  
**DRILLING CONTRACTOR** Strata Drilling Group  
**METHOD** Direct Push - DT35 Dual Tube Sampling System  
**LOGGED BY** MD **CHECKED BY** CG  
**DRILLING SUPERVISED BY: MORRISON HERSHFIELD**

**PROJECT NAME** 1101 Baxter Road Limited Phase II ESA  
**PROJECT LOCATION** 1101 Baxter Road, Ottawa, ON  
**MTM** Zone9 361020.12m E 5023750.97m N **ELEVATION** \_\_\_\_\_  
**GROUNDWATER LEVELS:**  
 ▽ **STATIC WATER LEVEL** 2.21 m below ground surface  
**MEASUREMENT DATE** 10/17/2018

DEPTH (m)	GRAPHIC LOG	SOIL DESCRIPTION	SAMPLE NUMBER	Headspace Organic Vapour Concentrations	Headspace Combustible Vapour Concentrations	ANALYSES	WELL DIAGRAM
				▲ IBL (ppm)	✱ HEX (ppm) 2500 5000 7500		
0				500 1000 1500 2000			
0.2	ASPHALTIC CONCRETE						
0.3	FILL - (SP) SAND; light brown; moist		SA1	1	0		Flush Mount Casing
	(ML) SANDY SILT, trace gravel; brownish grey; moist to wet		SA2	0	0		
			SA3	0	0		
2.4	(SM/ML) SILTY SAND to SANDY SILT, trace gravel; grey; wet		SA4	0	0		Bentonite Seal
			SA5	0	0		
			SA6	1	0		
			SA7	1	0		
			SA8	1	0		
			SA9	0	0		
			SA10	1	0	PHC, VOC	50mm Diam. PVC #10 Slot Screen
8.2	(SM) SILTY SAND, some gravel, trace clay (GLACIAL TILL); grey; wet		SA11	0	120		Silica Sand #1
			SA12	0	10		Silica Sand #1
							Cave

ENVIRONMENTAL BH PLOTS BAXTER ROAD PROJECT FILE.GPJ GINT STD CANADA LAB.GDT 10/22/18

(Continued Next Page)



Morrison Hershfield  
 2440 Don Reid Drive  
 Ottawa, ON K1H 1E1  
 Telephone: 613-739-2910



# RECORD OF BOREHOLE BS-1 (ENVIRONMENTAL)

CLIENT Regional Group

PROJECT NAME 1101 Baxter Road Limited Phase II ESA

PROJECT NUMBER 180564700

PROJECT LOCATION 1101 Baxter Road, Ottawa, ON

DEPTH (m)	GRAPHIC LOG	SOIL DESCRIPTION	SAMPLE NUMBER	Headspace Organic Vapour Concentrations				Headspace Combustible Vapour Concentrations			ANALYSES	WELL DIAGRAM
				▲ IBL (ppm)				✕ HEX (ppm)				
10				500	1000	1500	2000	2500	5000	7500		
				● HEX (%LEL)								
				25				50 75				
		(SM) SILTY SAND, some gravel, trace clay (GLACIAL TILL); grey; wet (continued)	SA13 ▲	0				0				

End of Borehole at 10.7m.

\*Density of material increased around 6.0m. Drillers had difficulty advancing outer casing and switched from a dual tube sampling system to a macro-core sampling system.

\*\*Soil from sample SA11 was submit for VOC and benzo(a)pyrene TCLP analysis.



Morrison Hershfield  
 2440 Don Reid Drive  
 Ottawa, ON K1H 1E1  
 Telephone: 613-739-2910

# RECORD OF BOREHOLE BS-2 (ENVIRONMENTAL)

**CLIENT** Regional Group  
**PROJECT NUMBER** 180564700  
**DATE STARTED** 10/15/18 **COMPLETED** 10/15/18  
**DRILLING CONTRACTOR** Strata Drilling Group  
**METHOD** Direct Push - DT35 Dual Tube Sampling System  
**LOGGED BY** MD **CHECKED BY** CG

**PROJECT NAME** 1101 Baxter Road Limited Phase II ESA  
**PROJECT LOCATION** 1101 Baxter Road, Ottawa, ON  
**MTM** Zone9 361068.82m E 5023834.77m N **ELEVATION** \_\_\_\_\_  
**GROUNDWATER LEVELS:**  
 ▽ **STATIC WATER LEVEL** ---  
**MEASUREMENT DATE** \_\_\_\_\_

**DRILLING SUPERVISED BY: MORRISON HERSHFIELD**

DEPTH (m)	GRAPHIC LOG	SOIL DESCRIPTION	SAMPLE NUMBER	Headspace Organic Vapour Concentrations		Headspace Combustible Vapour Concentrations			ANALYSES	WELL DIAGRAM
				▲ IBL (ppm)	500 1000 1500 2000	✱ HEX (ppm)	2500 5000 7500	● HEX (%LEL)		
0										
0.1		ASPHALTIC CONCRETE								
0.3		FILL - (GP) SANDY GRAVEL; greyish brown; moist								
		FILL - (SP) SAND, some silt; light brown; moist	SA1	▲ 0		✱ 0				
1										
2			SA2	▲ 0		✱ 0				
3			SA3	▲ 0		✱ 0			PHC, VOC	
2.9		FILL - (SP) SAND; black staining from decaying organic matter								
3.1		FILL - 1 m long piece of decaying wood in liner and clogging cutting shoe								
4			SA4	▲ 0		✱ 0				
4.0		(SM/ML) SILTY SAND to SANDY SILT, trace clay; grey; wet								
5			SA5	▲ 0		✱ 0				
6			SA6	▲ 0		✱ 10				
7			SA7	▲ 0		✱ 0				
7.6										

End of Borehole at 7.6 m.



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# RECORD OF BOREHOLE BS-3 (ENVIRONMENTAL)

**CLIENT** Regional Group  
**PROJECT NUMBER** 180564700  
**DATE STARTED** 10/15/18 **COMPLETED** 10/15/18  
**DRILLING CONTRACTOR** Strata Drilling Group  
**METHOD** Direct Push - DT35 Dual Tube Sampling System  
**LOGGED BY** MD **CHECKED BY** CG  
**DRILLING SUPERVISED BY: MORRISON HERSHFIELD**

**PROJECT NAME** 1101 Baxter Road Limited Phase II ESA  
**PROJECT LOCATION** 1101 Baxter Road, Ottawa, ON  
**MTM** Zone9 361160.25m E 5023917.43m N **ELEVATION** \_\_\_\_\_  
**GROUNDWATER LEVELS:**  
 ▽ **STATIC WATER LEVEL** 2.42 m below ground surface  
**MEASUREMENT DATE** 10/17/2018

DEPTH (m)	GRAPHIC LOG	SOIL DESCRIPTION	SAMPLE NUMBER	Headspace Organic Vapour Concentrations		ANALYSES	WELL DIAGRAM
				▲ IBL (ppm)	✖ HEX (ppm) 2500 5000 7500 ● HEX (%LEL) 25 50 75		
0				500 1000 1500 2000			
0.2	ASPHALTIC CONCRETE						Flush Mount Casing
0.8	FILL - (GP) SANDY GRAVEL, some silt; angular; greyish brown; moist		SA1	▲ 5	✖ 320		
1.5	FILL - (SP) SAND, trace gravel; light brown; moist		SA2	▲ 3	✖ 0		Bentonite Seal
2.3	(SM) SILTY SAND; brown; moist		SA3	▲ 3	✖ 0		
3.0	(SM/ML) SILTY SAND to SANDY SILT; grey; wet		SA4	▲ 4	✖ 0		Silica Sand #1
4.0	*Soil from sample SA4 was submit for metals, inorganics and benzo(a)pyrene TCLP analysis.		SA5	▲ 1	✖ 0	Metals, PHC, VOC	
5.0			SA6	▲ 0	✖ 0		50mm Diam. PVC #10 Slot Screen
6.0			SA7	▲ 1	✖ 0		
7.0			SA8	▲ 4	✖ 0		Silica Sand #1
8.0			SA9	▲ 0	✖ 0		
9.0			SA10	▲ 0	✖ 0		Cave
9.1			SA11	▲ 4	✖ 0		
9.5	(SM) SILTY SAND, trace gravel, trace clay (GLACIAL TILL); grey; wet		SA12	▲ 3	✖ 0		
End of Borehole at 9.45 m due to bedrock.							

ENVIRONMENTAL BH PLOTS BAXTER ROAD PROJECT FILE.GPJ GINT STD CANADA LAB.GDT 10/22/18



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# RECORD OF BOREHOLE BS-4 (ENVIRONMENTAL)

CLIENT Regional Group  
 PROJECT NUMBER 180564700  
 DATE STARTED 10/19/18 COMPLETED 10/19/18  
 DRILLING CONTRACTOR Strata Drilling Group  
 METHOD Direct Push - Macro Core Sampling System  
 LOGGED BY MD CHECKED BY CG  
 DRILLING SUPERVISED BY: **MORRISON HERSHFIELD**

PROJECT NAME 1101 Baxter Road Limited Phase II ESA  
 PROJECT LOCATION 1101 Baxter Road, Ottawa, ON  
 MTM Zone9 361080.23m E 5023876.72m N ELEVATION \_\_\_\_\_  
 GROUNDWATER LEVELS:  
 ▽ STATIC WATER LEVEL ---  
 MEASUREMENT DATE \_\_\_\_\_

DEPTH (m)	GRAPHIC LOG	SOIL DESCRIPTION	SAMPLE NUMBER	Headspace Organic Vapour Concentrations				Headspace Combustible Vapour Concentrations			ANALYSES	WELL DIAGRAM			
				▲ IBL (ppm)				✱ HEX (ppm)					● HEX (%LEL)		
0				500	1000	1500	2000	2500	5000	7500	25	50	75		
0		REINFORCED CONCRETE													
0.5		FILL - (SP) SAND, trace gravel, trace silt; brown; moist	SA1	19				0							
1			SA2	26				0							
2			SA3	28				0							
2.5		(SM) SILTY SAND, trace clay; brown to dark brown; moist	SA4	38				0						Metals	
3			SA5	22				0							
3.8		(SM) SILTY SAND, trace clay; brownish grey to grey; wet	SA6	43				0						PHC, VOC, PAH	
4			SA7	38				0							
5			SA8	15				0							
5.8		(ML) SILT, some clay; grey; wet	SA9	11				0							
6															
6.1		End of Borehole at 6.1 m.													

ENVIRONMENTAL BH PLOTS BAXTER ROAD PROJECT FILE.GPJ GINT STD CANADA LAB.GDT 10/22/18



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# RECORD OF BOREHOLE BS-5 (ENVIRONMENTAL)

CLIENT Regional Group  
 PROJECT NUMBER 180564700  
 DATE STARTED 10/19/18 COMPLETED 10/19/18  
 DRILLING CONTRACTOR Strata Drilling Group  
 METHOD Direct Push - Macro Core Sampling System  
 LOGGED BY MD CHECKED BY CG  
 DRILLING SUPERVISED BY: **MORRISON HERSHFIELD**

PROJECT NAME 1101 Baxter Road Limited Phase II ESA  
 PROJECT LOCATION 1101 Baxter Road, Ottawa, ON  
 MTM Zone9 361147.95m E 5023870.2m N ELEVATION \_\_\_\_\_  
 GROUNDWATER LEVELS:  
 ▽ STATIC WATER LEVEL ---  
 MEASUREMENT DATE \_\_\_\_\_

DEPTH (m)	GRAPHIC LOG	SOIL DESCRIPTION	SAMPLE NUMBER	Headspace Organic Vapour Concentrations				Headspace Combustible Vapour Concentrations			ANALYSES	WELL DIAGRAM
				▲ IBL (ppm)				✱ HEX (ppm)				
				500	1000	1500	2000	2500	5000	7500		
0								● HEX (%LEL)				
								25	50	75		
0.3		REINFORCED CONCRETE										
0.6		FILL - (GP) SANDY GRAVEL, some silt; angular to subangular; light grey; moist	SA1	167				0				
0.8		FILL - (SW) GRAVELLY SAND, trace silt; brown; moist	SA2	223				0				
		FILL - (SM) SILTY SAND; light brown; moist	SA3	25				0				
			SA4	49				0				
2.7		FILL - (SM) SILTY SAND; dark grey; moist to wet; hydrocarbon odour; dark staining	SA5	308				530				
3.5		FILL - (MH) CLAYEY SILT; grey; w>PL; hydrocarbon odour; dark staining	SA6	1144				3600			Metals, PAH, PHC, VOC	
3.7		FILL - (SM) SILTY SAND; grey; wet; slight hydrocarbon odour	SA7	170				95				
			SA8	100				115				
			SA9	177				165				
			SA10	42				80			PHC, VOC	
6.1		(ML) CLAYEY SILT; grey; wet; slight to trace hydrocarbon odour	SA11	27				0				
			SA12	9				0				

End of Borehole at 7.3 m.

\*A blind duplicate of sample SA10 was submitted to the lab under the ID SA21 for analysis of PHC and VOCs.

## **APPENDIX F: Analytical Tables**



**Table F1: Soil Analytical Results - Metals and Inorganics**

		MECP		BS-3	BS-4	BS-5
		Table 3 RPI <sup>(1)</sup>	Table 3 ICC <sup>(2)</sup>			
<b>Sampling Location:</b>				BS-3	BS-4	BS-5
<b>Sample ID:</b>				BS-3 SA5	BS-4 SA4	BS-5 SA6
<b>Date of Collection</b>				15-Oct-18	19-Oct-18	19-Oct-18
<b>Sample Depth (mbgs)</b>				3.0 - 3.8	2.4 - 3.0	3.0 - 3.7
Parameter	Units	MECP Table 3 RPI <sup>(1)</sup>	MECP Table 3 ICC <sup>(2)</sup>			
Antimony	µg/g	7.5	40	<1.0	<1.0	<1.0
Arsenic	µg/g	18	18	1.3	1.2	1
Barium	µg/g	390	670	128	76.3	53.9
Beryllium	µg/g	4	8	<0.50	<0.50	<0.50
Boron (HWS)	µg/g	1.5	2	<0.10	<0.10	<0.10
Boron	µg/g	120	120	<5.0	<5.0	<5.0
Cadmium	µg/g	1.2	1.9	<0.50	<0.50	<0.50
Chromium	µg/g	160	160	21.8	18.2	12.1
Cobalt	µg/g	22	80	7.1	5.3	4.5
Copper	µg/g	140	230	14.8	12.3	10.7
Lead	µg/g	120	120	2.8	2.7	2
Mercury	µg/g	0.27	3.9	<0.0050	<0.0050	<0.0050
Molybdenum	µg/g	6.9	40	<1.0	<1.0	<1.0
Nickel	µg/g	100	270	12.3	10.6	7.6
Selenium	µg/g	2.4	5.5	<1.0	<1.0	<1.0
Silver	µg/g	20	40	<0.20	<0.20	<0.20
Thallium	µg/g	1	3.3	<0.50	<0.50	<0.50
Uranium	µg/g	23	33	3.1	<1.0	<1.0
Vanadium	µg/g	86	86	38.3	29.7	26.7
Zinc	µg/g	340	340	30.6	23.3	17
Chromium (VI)	µg/g	8	8	<0.20	0.23	<0.20
pH	pH Units	NA	NA	8.02	11.07	-
Cyanide, WAD	µg/g	0.051	0.051	<0.050	<0.050	-
Electrical Conductivity	mS/cm	0.7	1.4	0.18	0.412	-
Sodium Adsorption Ratio		5	12	0.39	4.32	-

<b>MECP Table 3 RPI Exceedances</b>	0	0	0
<b>MECP Table 3 ICC Exceedances</b>	0	0	0
<b>RDL Exceedances of Table 3 RPI</b>	0	0	0

**Bold Values** Exceed MECP Table 3 RPI Standards

**Values Underlined in Bold and Shaded** Exceed MECP Table 3 ICC Standards

**Notes:** (1) Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Ministry of the Environment, April 15, 2011. Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Coarse-Grained Soil Standards for Residential/Parkland/Institutional Property Use

(2) Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Ministry of the Environment, April 15, 2011. Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Coarse-Grained Soil Standard for Industrial/Commercial/Community Property Use

mbgs - Meters below ground surface

µg/g - Micrograms per gram

NA - Not applicable

< xx - Less than laboratory reported detection limit of 'xx'

RDL - Laboratory reported detection limit



**Table F2: Soil Analytical Results - Polycyclic Aromatic Hydrocarbons**

		Sampling Location:		BS-4	BS-5
		Sample ID:		BS-4 SA6	BS-5 SA6
		Date of Collection		19-Oct-18	19-Oct-18
		Sample Depth (mbgs)		3.7 - 4.3	3.0 - 3.7
Parameter	Units	MECP Table 3 RPI <sup>(1)</sup>	MECP Table 3 ICC <sup>(2)</sup>		
Acenaphthene	µg/g	7.9	96	<0.050	<0.050
Acenaphthylene	µg/g	0.15	0.15	<0.050	<0.050
Anthracene	µg/g	0.67	0.67	<0.050	<0.050
Benzo(a)anthracene	µg/g	0.5	0.96	<0.050	<0.050
Benzo(a)pyrene	µg/g	0.3	0.3	<0.050	<0.050
Benzo(b)fluoranthene	µg/g	0.78	0.96	<0.050	<0.050
Benzo(g,h,i)perylene	µg/g	6.6	9.6	<0.050	<0.050
Benzo(k)fluoranthene	µg/g	0.78	0.96	<0.050	<0.050
Chrysene	µg/g	7	9.6	<0.050	0.126
Dibenzo(a,h)anthracene	µg/g	0.1	0.1	<0.050	<0.050
Fluoranthene	µg/g	0.69	9.6	<0.050	0.061
Fluorene	µg/g	62	62	<0.050	0.064
Indeno(1,2,3,-cd)pyrene	µg/g	0.38	0.76	<0.050	<0.050
1+2-Methylnaphthalene	µg/g	0.99	76	<0.042	<b>4.29</b>
1-Methylnaphthalene	µg/g	0.99	76	<0.030	<b>1.47</b>
2-Methylnaphthalene	µg/g	0.99	76	<0.030	<b>2.82</b>
Naphthalene	µg/g	0.6	9.6	<0.013	<b>11.5</b>
Phenanthrene	µg/g	6.2	12	<0.046	0.21
Pyrene	µg/g	78	96	<0.050	0.112

<b>MECP Table 3 RPI Exceedances</b>	0	4
<b>MECP Table 3 ICC Exceedances</b>	0	1
<b>RDL Exceedances of Table 3 RPI</b>	0	0

**Bold Values** Exceed MECP Table 3 RPI Standards

**Values Underlined in Bold and Shaded** Exceed MECP Table 3 ICC Standards

**Notes:** (1) Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Ministry of the Environment, April 15, 2011. Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Coarse-Grained Soil Standards for Residential/Parkland/Institutional Property Use

(2) Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Ministry of the Environment, April 15, 2011. Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Coarse-Grained Soil Standard for Industrial/Commercial/Community Property Use

mbgs - Meters below ground surface

µg/g - Micrograms per gram

< xx - Less than laboratory reported detection limit of 'xx'

RDL - Laboratory reported detection limit



		Sampling Location:								
		BS-1	BS-2	BS-3	BS-4	BS-5	BS-5	BS-5		
		BS-1 SA10	BS-2 SA3	BS-3 SA5	BS-4 SA6	BS-5 SA6	BS-5 SA10	BS-5 SA21 (SA10 DUP)		
		15-Oct-18	15-Oct-18	15-Oct-18	19-Oct-18	19-Oct-18	19-Oct-18	19-Oct-18		
		6.9 - 7.6	2.3 - 3.0	3.0 - 3.8	3.7 - 4.3	3.0 - 3.7	5.5 - 6.1	5.5 - 6.1		
Parameter	Units	MECP Table 3 RPI <sup>(1)</sup>	MECP Table 3 ICC <sup>(2)</sup>							
PHC F1 (C6-C10)	µg/g	55	55	<5.0	<5.0	<5.0	<5.0	<b>909</b>	44.1	12
PHC F2 (C10-C16)	µg/g	98	230	11	<10	<10	<10	<b>3170</b>	39	90
PHC F3 (C16-C34)	µg/g	300	1700	<50	<50	<50	<50	<b>1950</b>	<50	66
PHC F4 (C34-C50)	µg/g	2800	3300	<50	<50	<50	<50	760	<50	<50
F4G-SG (GHH-Silica)	µg/g	2800	3300	-	-	-	-	1930	-	-
		<b>MECP Table 3 RPI Exceedances</b>		0	0	0	0	3	0	0
		<b>MECP Table 3 ICC Exceedances</b>		0	0	0	0	3	0	0
		<b>RDL Exceedances of Table 3 RPI</b>		0	0	0	0	0	0	0

**Bold Values** Exceed MECP Table 3 RPI Standards

**Values Underlined in Bold and Shaded** Exceed MECP Table 3 ICC Standards

**Notes:** (1) Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Ministry of the Environment, April 15, 2011. Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Coarse-Grained Soil Standards for Residential/Parkland/Institutional Property Use

(2) Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Ministry of the Environment, April 15, 2011. Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Coarse-Grained Soil Standard for Industrial/Commercial/Community Property Use

mbgs - Meters below ground surface

µg/g - Micrograms per gram

< xx - Less than laboratory reported detection limit of 'xx'

RDL - Laboratory reported detection limit



**Table F4: Soil Analytical Results - Volatile Organic Compounds**

		Sample Location:							
		BS-1	BS-2	BS-3	BS-4	BS-5	BS-5	BS-5	
		BS-1 SA10	BS-2 SA3	BS-3 SA5	BS-4 SA6	BS-5 SA6	BS-5 SA10	BS-5 SA21 (SA10 DUP)	
		15-Oct-18	15-Oct-18	15-Oct-18	19-Oct-18	19-Oct-18	19-Oct-18	19-Oct-18	
		6.9 - 7.6	2.3 - 3.0	3.0 - 3.8	3.7 - 4.3	3.0 - 3.7	5.5 - 6.1	5.5 - 6.1	
Parameter	Units	MECP Table 3 RPI <sup>(1)</sup>	MECP Table 3 ICC <sup>(2)</sup>						
Acetone	µg/g	16	16	<0.50	<0.50	<0.50	<0.50	<0.50	
Benzene	µg/g	0.21	0.32	<0.0068	<0.0068	<0.0068	<0.0068	<0.0068	
Bromodichloromethane	µg/g	13	18	<0.050	<0.050	<0.050	<0.83	<0.050	
Bromoform	µg/g	0.27	0.61	<0.050	<0.050	<0.050	<0.050	<0.050	
Bromomethane	µg/g	0.05	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	
Carbon tetrachloride	µg/g	0.05	0.21	<0.050	<0.050	<0.050	<0.050	<0.050	
Chlorobenzene	µg/g	2.4	2.4	<0.050	<0.050	<0.050	<0.050	<0.050	
Dibromochloromethane	µg/g	9.4	13	<0.050	<0.050	<0.050	<0.050	<0.050	
Chloroform	µg/g	0.05	0.47	<0.050	<0.050	<0.050	<0.050	<0.050	
1,2-Dibromoethane	µg/g	0.05	0.05	<0.050	<0.050	<0.050	<0.22	<0.050	
1,2-Dichlorobenzene	µg/g	3.4	6.8	<0.050	<0.050	<0.050	<8.0	<0.050	
1,3-Dichlorobenzene	µg/g	4.8	9.6	<0.050	<0.050	<0.050	<8.0	<0.050	
1,4-Dichlorobenzene	µg/g	0.083	0.2	<0.050	<0.050	<0.050	<8.0	<0.050	
Dichlorodifluoromethane	µg/g	16	16	<0.050	<0.050	<0.050	<0.050	<0.050	
1,1-Dichloroethane	µg/g	3.5	17	<0.050	<0.050	<0.050	<0.050	<0.050	
1,2-Dichloroethane	µg/g	0.05	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	
1,1-Dichloroethylene	µg/g	0.05	0.064	<0.050	<0.050	<0.050	<0.050	<0.050	
cis-1,2-Dichloroethylene	µg/g	3.4	55	<0.050	<0.050	<0.050	<0.050	<0.050	
trans-1,2-Dichloroethylene	µg/g	0.084	1.3	<0.050	<0.050	<0.050	<0.050	<0.050	
Methylene Chloride	µg/g	0.1	1.6	<0.050	<0.050	<0.050	<0.050	<0.050	
1,2-Dichloropropane	µg/g	0.05	0.16	<0.050	<0.050	<0.050	<0.050	<0.050	
cis-1,3-Dichloropropene	µg/g	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	
trans-1,3-Dichloropropene	µg/g	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	
1,3-Dichloropropene (cis & trans)	µg/g	0.05	0.18	<0.042	<0.042	<0.042	<0.042	<0.042	
Ethylbenzene	µg/g	2	9.5	<0.018	<0.018	<0.018	0.579	0.049	
n-Hexane	µg/g	2.8	46	<0.050	<0.050	<0.050	<0.050	<0.050	
Methyl Ethyl Ketone	µg/g	16	70	<0.50	<0.50	<0.50	<0.50	<0.50	
Methyl Isobutyl Ketone	µg/g	1.7	31	<0.50	<0.50	<0.50	<0.50	<0.50	
MTBE	µg/g	0.75	11	<0.050	<0.050	<0.050	<0.050	<0.050	
Styrene	µg/g	0.7	34	<0.050	<0.050	<0.050	<0.050	<0.050	
1,1,1,2-Tetrachloroethane	µg/g	0.058	0.087	<0.050	<0.050	<0.050	<0.050	<0.050	
1,1,1,2,2-Tetrachloroethane	µg/g	0.05	0.05	<0.050	<0.050	<0.050	<7.1	<0.32	
Tetrachloroethylene	µg/g	0.28	4.5	<0.050	<0.050	<0.050	<0.050	<0.050	
Toluene	µg/g	2.3	68	<0.080	<0.080	<0.080	<0.080	<0.080	
1,1,1-Trichloroethane	µg/g	0.38	6.1	<0.050	<0.050	<0.050	<0.050	<0.050	
1,1,2-Trichloroethane	µg/g	0.05	0.05	<0.050	<0.050	<0.050	<2.5	<0.16	
Trichloroethylene	µg/g	0.061	0.91	<0.010	<0.010	<0.010	<0.010	<0.010	
Trichlorofluoromethane	µg/g	4	4	<0.050	<0.050	<0.050	<0.050	<0.050	
Vinyl chloride	µg/g	0.02	0.032	<0.020	<0.020	<0.020	<0.020	<0.020	
o-Xylene	µg/g	-	-	<0.020	<0.020	<0.020	<0.16	<0.020	
m+p-Xylenes	µg/g	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	
Xylenes (Total)	µg/g	3.1	26	<0.050	<0.050	<0.050	<0.16	<0.050	
<b>MECP Table 3 RPI Exceedances</b>		0	0	0	0	0	0	0	
<b>MECP Table 3 ICC Exceedances</b>		0	0	0	0	0	0	0	
<b>RDL Exceedances of Table 3 RPI</b>		0	0	0	0	6	2	0	

**Bold Values** Exceed MECP Table 3 RPI Standards  
**Values Underlined in Bold and Shaded** Exceed MECP Table 3 ICC Standards

**Notes:** (1) Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Ministry of the Environment, April 15, 2011. Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Coarse-Grained Soil Standards for Residential/Parkland/Institutional Property Use  
(2) Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Ministry of the Environment, April 15, 2011. Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Coarse-Grained Soil Standard for Industrial/Commercial/Community Property Use  
mbgs - Meters below ground surface  
µg/g - Micrograms per gram  
< xx - Less than laboratory reported detection limit of 'xx'  
RDL - Laboratory reported detection limit



**Table F5: Groundwater Analytical Results - Dissolved Metals**

	Sample ID		EW-2	EW-3	EW-4	EW-5	EW-5D	BS-3
	Date of Collection		9-Oct-18	9-Oct-18	9-Oct-18	9-Oct-18	9-Oct-18	17-Oct-18
Parameters	Unit	MECP Table 3 <sup>(1)</sup>						
Antimony	µg/L	20000	<0.10	<1.0	<1.0	0.1	<0.10	0.15
Arsenic	µg/L	1900	<0.10	<1.0	<1.0	0.79	0.8	0.73
Barium	µg/L	29000	186	124	261	200	196	137
Beryllium	µg/L	67	<0.10	<1.0	<1.0	<0.10	<0.10	<0.10
Boron	µg/L	45000	23	<100	<100	27	26	75
Cadmium	µg/L	2.7	0.011	<0.050	<0.050	<0.010	<0.010	0.029
Chromium	µg/L	810	1.18	<5.0	<5.0	<0.50	<0.50	0.83
Cobalt	µg/L	66	0.18	<1.0	<1.0	1.78	1.79	1.62
Copper	µg/L	87	1.12	<2.0	2.5	0.33	0.3	1.54
Lead	µg/L	25	<0.050	<0.50	<0.50	<0.050	<0.050	0.059
Mercury	µg/L	0.29	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Molybdenum	µg/L	9200	1.09	2.57	2.58	1.73	1.68	4.79
Nickel	µg/L	490	1.29	<5.0	<5.0	2.29	2.28	4.53
Selenium	µg/L	63	0.209	0.64	<0.50	0.88	0.909	0.515
Silver	µg/L	1.5	<0.050	<0.50	<0.50	<0.050	<0.050	<0.050
Sodium	µg/L	2300000	110000	375000	675000	136000	141000	276000
Thallium	µg/L	510	0.021	<0.10	<0.10	<0.010	<0.010	0.026
Uranium	µg/L	420	1.8	27.1	2.62	5.54	5.84	9.76
Vanadium	µg/L	250	1.1	<5.0	<5.0	2.25	2.2	1.08
Zinc	µg/L	1100	<1.0	<10	<10	<1.0	<1.0	9.5
Chromium, Hexavalent	µg/L	140	1.32	1.04	2.61	<0.50	<0.50	1.18
<b>MECP Table 3 Exceedances</b>			0	0	0	0	0	0
<b>RDL Exceedances of Table 3</b>			0	0	0	0	0	0

**Values Underlined in Bold and Shaded** Exceed MECP Table 3 Standards

**Notes:** (1) Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Ministry of the Environment, April 15, 2011. Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition - Ground Water Standards for coarse textured soils and All Types of Property Use

mbgs - Meters below ground surface

µg/L - Micrograms per litre

<xx - Less than laboratory reported detection limit of 'xx'

RDL - Laboratory reported detection limit



**Table F6: Groundwater Analytical Results - Petroleum Hydrocarbons**

Sample ID	EW-2	EW-3	EW-4	EW-5	EW-5D	BS-1	BS-3
Date of Collection	9-Oct-18	9-Oct-18	9-Oct-18	9-Oct-18	9-Oct-18	17-Oct-18	17-Oct-18
Parameters	Unit	MECP Table 3 <sup>(3)</sup>					
PHC F1 (C6-C10)	µg/L	750	<25	<25	<25	<25	<25
PHC F2 (C10-C16)	µg/L	150	<100	<100	<100	<b>200</b>	<b>240</b>
PHC F3 (C16-C34)	µg/L	500	<250	<250	<250	250	300
PHC F4 (C34-C50)	µg/L	500	<250	<250	<250	<250	<250
<b>MECP Table 3 Exceedances</b>			0	0	0	1	1
<b>RDL Exceedances of Table 3</b>			0	0	0	0	0

**Values Underlined in Bold and Shaded** Exceed MECP Table 3 Standards

**Notes:** (1) Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Ministry of the Environment, April 15, 2011. Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition - Ground Water Standards for coarse textured soils and All Types of Property Use

mbgs - Meters below ground surface

µg/L - Micrograms per litre

<xx - Less than laboratory reported detection limit of 'xx'

RDL - Laboratory reported detection limit



**Table F7: Groundwater Analytical Results - Volatile Organic Compounds**

Parameters	Unit	MECP Table 3 <sup>(3)</sup>	Sample ID	EW-2	EW-3	EW-4	EW-5	EW-5D	BS-1	BS-3
			Date of Collection	9-Oct-18	9-Oct-18	9-Oct-18	9-Oct-18	9-Oct-18	17-Oct-18	17-Oct-18
Acetone	µg/L	130000		<30	<30	<30	<30	<30	<30	<30
Benzene	µg/L	44		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromodichloromethane	µg/L	85000		<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Bromoform	µg/L	380		<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Bromomethane	µg/L	5.6		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Carbon tetrachloride	µg/L	0.79		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Chlorobenzene	µg/L	630		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dibromochloromethane	µg/L	82000		<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Chloroform	µg/L	2.4		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dibromoethane	µg/L	0.25		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,2-Dichlorobenzene	µg/L	4600		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,3-Dichlorobenzene	µg/L	9600		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,4-Dichlorobenzene	µg/L	8		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dichlorodifluoromethane	µg/L	4400		<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
1,1-Dichloroethane	µg/L	320		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichloroethane	µg/L	1.6		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethylene	µg/L	1.6		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
cis-1,2-Dichloroethylene	µg/L	1.6		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
trans-1,2-Dichloroethylene	µg/L	1.6		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methylene Chloride	µg/L	610		<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,2-Dichloropropane	µg/L	16		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
cis-1,3-Dichloropropene	µg/L	NV		<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
trans-1,3-Dichloropropene	µg/L	NV		<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
1,3-Dichloropropene (cis & trans)	µg/L	5.2		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Ethylbenzene	µg/L	2300		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
n-Hexane	µg/L	51		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methyl Ethyl Ketone	µg/L	470000		<20	<20	<20	<20	<20	<20	<20
Methyl Isobutyl Ketone	µg/L	140000		<20	<20	<20	<20	<20	<20	<20
MTBE	µg/L	190		<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Styrene	µg/L	1300		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,1,2-Tetrachloroethane	µg/L	3.3		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2,2-Tetrachloroethane	µg/L	3.2		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Tetrachloroethylene	µg/L	1.6		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Toluene	µg/L	18000		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,1-Trichloroethane	µg/L	640		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	µg/L	4.7		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Trichloroethylene	µg/L	1.6		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Trichlorofluoromethane	µg/L	2500		<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Vinyl chloride	µg/L	0.5		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
o-Xylene	µg/L	NV		<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
m+p-Xylenes	µg/L	NV		<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Xylenes (Total)	µg/L	4200		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
<b>MECP Table 3 Exceedances</b>				0	0	0	0	0	0	0
<b>RDL Exceedances of Table 3</b>				0	0	0	0	0	0	0

**Values Underlined in Bold and Shaded** Exceed MECP Table 3 Standards

**Notes:** (1) Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Ministry of the Environment, April 15, 2011. Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition - Ground Water Standards for coarse textured soils and All Types of Property Use  
 mbgs - Meters below ground surface  
 µg/L - Micrograms per litre  
 <xx - Less than laboratory reported detection limit of 'xx'  
 RDL - Laboratory reported detection limit



**Table F8: Soil Analytical Results - Toxicity Characteristic Leaching Procedure (TCLP)**

		Sampling Location:	BS-TCLP
		Date of Collection	15-Oct-18
TCLP Parameter	Units	Schedule 4 Leachate Quality Criteria <sup>(1)</sup>	
Arsenic	mg/L	2.5	<0.050
Barium	mg/L	100	0.83
Boron	mg/L	500	<2.5
Cadmium	mg/L	0.5	<0.0050
Chromium	mg/L	5	<0.050
Lead	mg/L	5	<0.050
Mercury	mg/L	0.1	<0.00010
Selenium	mg/L	1	<0.025
Silver	mg/L	5	<0.0050
Uranium	mg/L	10	<0.25
Benzene	mg/L	0.5	<0.025
Carbon Tetrachloride	mg/L	0.5	<0.025
Monochlorobenzene (Chlorobenzene)	mg/L	8	<0.025
Chloroform	mg/L	10	<0.10
Dichlorobenzene, 1,2-	mg/L	20	<0.025
Dichlorobenzene, 1,4-	mg/L	0.5	<0.025
Dichloroethane, 1,2-	mg/L	0.5	<0.025
Dichloroethene, 1,1-	mg/L	1.4	<0.025
Dichloromethane (Methylene Chloride)	mg/L	5	<0.50
Methyl Ethyl Ketone	mg/L	200	<1.0
Tetrachloroethylene	mg/L	3	<0.025
Trichloroethylene	mg/L	5	<0.025
Vinyl Chloride	mg/L	0.2	<0.050
Benzo(a)pyrene	mg/L	0.001	<0.0010
Fluoride	mg/L	150	<10
Nitrate + Nitrite (N)	mg/L	1000	<4.0
Cyanide, Weak Acid Diss	mg/L	20	<0.10

**Values Underlined in Bold and Shaded** Exceed Schedule 4 Leachate Quality Criteria

**Notes:**

(1) R.R.O. 1990, Reg 347/90: General - Waste Management Act, Schedule 4: Leachate Quality

mg/L - Milligrams per litre

< xx - Less than laboratory reported detection limit of 'xx'

RDL - Laboratory reported detection limit



## **APPENDIX G: Laboratory Certificates of Analysis**





Morrison Hershfield Limited (Ottawa)  
ATTN: Mitchell Dawley  
2440 Don Reid Drive  
Ottawa ON K1H 1E1

Date Received: 16- OCT- 18  
Report Date: 23- OCT- 18 12:28 (MT)  
Version: FINAL

Client Phone: 613- 739- 2910

## Certificate of Analysis

Lab Work Order #: L2182363  
Project P.O. #: NOT SUBMITTED  
Job Reference: 180564799  
C of C Numbers:  
Legal Site Desc:

Melanie Moshi  
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ADDRESS: 190 Colonnade Road, Unit 7, Ottawa, ON K2E 7J5 Canada | Phone: + 1 613 225 8279 | Fax: + 1 613 225 2801  
ALSCANADA LTD Part of the ALS Group An ALS Limited Company

**Summary of Guideline Exceedances**

Guideline		Client ID	Grouping	Analyte	Result	Guideline Limit	Unit
ALS ID							
<b>Ontario Regulation 153/04 - April 15, 2011 Standards - T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use</b>							
L2182363-1		BS-1 SA10	Hydrocarbons	F2 (C10-C16)	11	10	ug/g
L2182363-2		BS-3 SA5	Metals	Uranium (U)	3.1	2.5	ug/g
<b>Ontario Regulation 153/04 - April 15, 2011 Standards - T3-Soil-Ind/Com/Commu. Property Use (Fine)</b>							
(No parameter exceedances)							


## Physical Tests - SOIL


Lab ID	L2182363-1	L2182363-2	L2182363-3
Sample Date	15-OCT-18	15-OCT-18	15-OCT-18
Sample ID	BS-1 SA10	BS-3 SA5	BS-2 SA3

Analyte	Unit	Guide Limits				
		#1	#2			
Conductivity	mS/cm	0.57	1.4		0.180	
% Moisture	%	-	-	20.7	25.0	14.2
pH	pH units	-	-		8.02	

**Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use**

**Guide Limit #2: T3-Soil-Ind/Com/Commu. Property Use (Fine)**

 Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.

 Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

**Cyanides - SOIL**



**Lab ID** L2182363-2  
**Sample Date** 15-OCT-18  
**Sample ID** BS-3 SA5

**Guide Limits**  
**Unit #1 #2**

Analyte	Unit	#1	#2	
Cyanide, Weak Acid Diss	ug/g	0.051	0.051	<0.050

**Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use**

**Guide Limit #2: T3-Soil-Ind/Com/Commu. Property Use (Fine)**

 Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.  
 Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

## Saturated Paste Extractables - SOIL

**Lab ID** L2182363-2  
**Sample Date** 15-OCT-18  
**Sample ID** BS-3 SA5

Analyte	Unit	Guide Limits		
		#1	#2	#3
SAR	SAR	2.4	12	0.39
Calcium (Ca)	mg/L	-	-	7.3
Magnesium (Mg)	mg/L	-	-	2.1
Sodium (Na)	mg/L	-	-	4.6

**Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use**

**Guide Limit #2: T3-Soil-Ind/Com/Commu. Property Use (Fine)**

- Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
- Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

## Metals - SOIL

**Lab ID** L2182363-2  
**Sample Date** 15-OCT-18  
**Sample ID** BS-3 SA5

Analyte	Unit	Guide Limits		
		#1	#2	
Antimony (Sb)	ug/g	1.3	50	<1.0
Arsenic (As)	ug/g	18	18	1.3
Barium (Ba)	ug/g	220	670	128
Beryllium (Be)	ug/g	2.5	10	<0.50
Boron (B)	ug/g	36	120	<5.0
Boron (B), Hot Water Ext.	ug/g	36	2	<0.10
Cadmium (Cd)	ug/g	1.2	1.9	<0.50
Chromium (Cr)	ug/g	70	160	21.8
Cobalt (Co)	ug/g	21	100	7.1
Copper (Cu)	ug/g	92	300	14.8
Lead (Pb)	ug/g	120	120	2.8
Mercury (Hg)	ug/g	0.27	20	<0.0050
Molybdenum (Mo)	ug/g	2	40	<1.0
Nickel (Ni)	ug/g	82	340	12.3
Selenium (Se)	ug/g	1.5	5.5	<1.0
Silver (Ag)	ug/g	0.5	50	<0.20
Thallium (Tl)	ug/g	1	3.3	<0.50
Uranium (U)	ug/g	2.5	33	3.1
Vanadium (V)	ug/g	86	86	38.3
Zinc (Zn)	ug/g	290	340	30.6

**Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use**

**Guide Limit #2: T3-Soil-Ind/Com/Commu. Property Use (Fine)**

- Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
- Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.


**Speciated Metals - SOIL**


**Lab ID** L2182363-2  
**Sample Date** 15-OCT-18  
**Sample ID** BS-3 SA5

Analyte	Unit	Guide Limits		
		#1	#2	
Chromium, Hexavalent	ug/g	0.66	10	<0.20

**Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use**

**Guide Limit #2: T3-Soil-Ind/Com/Commu. Property Use (Fine)**

 Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.

 Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

## Volatile Organic Compounds - SOIL

Analyte	Unit	Guide Limits		Lab ID	L2182363-1	L2182363-2	L2182363-3
		#1	#2	Sample Date	15-OCT-18	15-OCT-18	15-OCT-18
				Sample ID	BS-1 SA10	BS-3 SA5	BS-2 SA3
Acetone	ug/g	0.5	28		<0.50	<0.50	<0.50
Benzene	ug/g	0.02	0.4		<0.0068	<0.0068	<0.0068
Bromodichloromethane	ug/g	0.05	18		<0.050	<0.050	<0.050
Bromoform	ug/g	0.05	1.7		<0.050	<0.050	<0.050
Bromomethane	ug/g	0.05	0.05		<0.050	<0.050	<0.050
Carbon tetrachloride	ug/g	0.05	1.5		<0.050	<0.050	<0.050
Chlorobenzene	ug/g	0.05	2.7		<0.050	<0.050	<0.050
Dibromochloromethane	ug/g	0.05	13		<0.050	<0.050	<0.050
Chloroform	ug/g	0.05	0.18		<0.050	<0.050	<0.050
1,2-Dibromoethane	ug/g	0.05	0.05		<0.050	<0.050	<0.050
1,2-Dichlorobenzene	ug/g	0.05	8.5		<0.050	<0.050	<0.050
1,3-Dichlorobenzene	ug/g	0.05	12		<0.050	<0.050	<0.050
1,4-Dichlorobenzene	ug/g	0.05	0.84		<0.050	<0.050	<0.050
Dichlorodifluoromethane	ug/g	0.05	25		<0.050	<0.050	<0.050
1,1-Dichloroethane	ug/g	0.05	21		<0.050	<0.050	<0.050
1,2-Dichloroethane	ug/g	0.05	0.05		<0.050	<0.050	<0.050
1,1-Dichloroethylene	ug/g	0.05	0.48		<0.050	<0.050	<0.050
cis-1,2-Dichloroethylene	ug/g	0.05	37		<0.050	<0.050	<0.050
trans-1,2-Dichloroethylene	ug/g	0.05	9.3		<0.050	<0.050	<0.050
Methylene Chloride	ug/g	0.05	2		<0.050	<0.050	<0.050
1,2-Dichloropropane	ug/g	0.05	0.68		<0.050	<0.050	<0.050
cis-1,3-Dichloropropene	ug/g	-	-		<0.030	<0.030	<0.030
trans-1,3-Dichloropropene	ug/g	-	-		<0.030	<0.030	<0.030
1,3-Dichloropropene (cis & trans)	ug/g	0.05	0.21		<0.042	<0.042	<0.042
Ethylbenzene	ug/g	0.05	19		<0.018	<0.018	<0.018
n-Hexane	ug/g	0.05	88		<0.050	<0.050	<0.050
Methyl Ethyl Ketone	ug/g	0.5	88		<0.50	<0.50	<0.50
Methyl Isobutyl Ketone	ug/g	0.5	210		<0.50	<0.50	<0.50
MTBE	ug/g	0.05	3.2		<0.050	<0.050	<0.050
Styrene	ug/g	0.05	43		<0.050	<0.050	<0.050

Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use  
 Guide Limit #2: T3-Soil-Ind/Com/Commu. Property Use (Fine)

## Volatile Organic Compounds - SOIL

Analyte	Unit	Guide Limits		Lab ID	L2182363-1	L2182363-2	L2182363-3
		#1	#2	Sample Date	15-OCT-18	15-OCT-18	15-OCT-18
				Sample ID	BS-1 SA10	BS-3 SA5	BS-2 SA3
1,1,1,2-Tetrachloroethane	ug/g	0.05	0.11	<0.050	<0.050	<0.050	<0.050
1,1,2,2-Tetrachloroethane	ug/g	0.05	0.094	<0.050	<0.050	<0.050	<0.050
Tetrachloroethylene	ug/g	0.05	21	<0.050	<0.050	<0.050	<0.050
Toluene	ug/g	0.2	78	<0.080	<0.080	<0.080	<0.080
1,1,1-Trichloroethane	ug/g	0.05	12	<0.050	<0.050	<0.050	<0.050
1,1,2-Trichloroethane	ug/g	0.05	0.11	<0.050	<0.050	<0.050	<0.050
Trichloroethylene	ug/g	0.05	0.61	<0.010	<0.010	<0.010	<0.010
Trichlorofluoromethane	ug/g	0.25	5.8	<0.050	<0.050	<0.050	<0.050
Vinyl chloride	ug/g	0.02	0.25	<0.020	<0.020	<0.020	<0.020
o-Xylene	ug/g	-	-	<0.020	<0.020	<0.020	<0.020
m+p-Xylenes	ug/g	-	-	<0.030	<0.030	<0.030	<0.030
Xylenes (Total)	ug/g	0.05	30	<0.050	<0.050	<0.050	<0.050
Surrogate: 4-Bromofluorobenzene	%	-	-	99.0	102.0	106.5	
Surrogate: 1,4-Difluorobenzene	%	-	-	104.8	108.4	112.6	

**Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use**

**Guide Limit #2: T3-Soil-Ind/Com/Commu. Property Use (Fine)**

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.

Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

## Hydrocarbons - SOIL

Analyte	Unit	Guide Limits				
		#1	#2			
		<b>Lab ID</b>	L2182363-1	L2182363-2	L2182363-3	
		<b>Sample Date</b>	15-OCT-18	15-OCT-18	15-OCT-18	
		<b>Sample ID</b>	BS-1 SA10	BS-3 SA5	BS-2 SA3	
F1 (C6-C10)	ug/g	25	65	<5.0	<5.0	<5.0
F1-BTEX	ug/g	25	65	<5.0	<5.0	<5.0
F2 (C10-C16)	ug/g	10	250	11	<10	<10
F3 (C16-C34)	ug/g	240	2500	<50	<50	<50
F4 (C34-C50)	ug/g	120	6600	<50	<50	<50
Total Hydrocarbons (C6-C50)	ug/g	-	-	<72	<72	<72
Chrom. to baseline at nC50		-	-	YES	YES	YES
Surrogate: 2-Bromobenzotrifluoride	%	-	-	77.6	81.7	72.4
Surrogate: 3,4-Dichlorotoluene	%	-	-	81.1	83.0	80.2

**Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use**

**Guide Limit #2: T3-Soil-Ind/Com/Commu. Property Use (Fine)**

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.

Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

# Reference Information

**Methods Listed (if applicable):**

ALS Test Code	Matrix	Test Description	Method Reference**
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<b>B-HWS-R511-WT</b>	Soil	Boron-HWE-O.Reg 153/04 (July 2011) HW EXTR, EPA 6010B	
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A dried solid sample is extracted with calcium chloride, the sample undergoes a heating process. After cooling the sample is filtered and analyzed by ICP/OES.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

<b>CN-WAD-R511-WT</b>	Soil	Cyanide (WAD)-O.Reg 153/04 (July 2011)	MOE 3015/APHA 4500CN I-WAD
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The sample is extracted with a strong base for 16 hours, and then filtered. The filtrate is then distilled where the cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

<b>CR-CR6-IC-WT</b>	Soil	Hexavalent Chromium in Soil	SW846 3060A/7199
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This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 7199, published by the United States Environmental Protection Agency (EPA). The procedure involves analysis for chromium (VI) by ion chromatography using diphenylcarbazide in a sulphuric acid solution.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

<b>EC-WT</b>	Soil	Conductivity (EC)	MOEE E3138
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A representative subsample is tumbled with de-ionized (DI) water. The ratio of water to soil is 2:1 v/w. After tumbling the sample is then analyzed by a conductivity meter.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

<b>F1-F4-511-CALC-WT</b>	Soil	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-S
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Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

Hydrocarbon results are expressed on a dry weight basis.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.

In samples where BTEX and F1 were analyzed, F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:

1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:

1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

# Reference Information

**Methods Listed (if applicable):**

ALS Test Code	Matrix	Test Description	Method Reference**
<b>F1-HS-511-WT</b>	Soil	F1-O.Reg 153/04 (July 2011)	E3398/CCME TIER 1-HS
<p>Fraction F1 is determined by extracting a soil or sediment sample as received with methanol, then analyzing by headspace-GC/FID.</p> <p>Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).</p>			
<b>F2-F4-511-WT</b>	Soil	F2-F4-O.Reg 153/04 (July 2011)	CCME Tier 1
<p>Petroleum Hydrocarbons (F2-F4 fractions) are extracted from soil with 1:1 hexane:acetone using a rotary extractor. Extracts are treated with silica gel to remove polar organic interferences. F2, F3, &amp; F4 are analyzed by GC-FID. F4G-sg is analyzed gravimetrically.</p> <p>Notes:</p> <ol style="list-style-type: none"> <li>1. F2 (C10-C16): Sum of all hydrocarbons that elute between nC10 and nC16.</li> <li>2. F3 (C16-C34): Sum of all hydrocarbons that elute between nC16 and nC34.</li> <li>3. F4 (C34-C50): Sum of all hydrocarbons that elute between nC34 and nC50.</li> <li>4. F4G: Gravimetric Heavy Hydrocarbons</li> <li>5. F4G-sg: Gravimetric Heavy Hydrocarbons (F4G) after silica gel treatment.</li> <li>6. Where both F4 (C34-C50) and F4G-sg are reported for a sample, the larger of the two values is used for comparison against the relevant CCME guideline for F4.</li> <li>7. F4G-sg cannot be added to the C6 to C50 hydrocarbon results to obtain an estimate of total extractable hydrocarbons.</li> <li>8. This method is validated for use.</li> <li>9. Data from analysis of validation and quality control samples is available upon request.</li> <li>10. Reported results are expressed as milligrams per dry kilogram, unless otherwise indicated.</li> </ol> <p>Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).</p>			
<b>HG-200.2-CVAA-WT</b>	Soil	Mercury in Soil by CVAAS	EPA 200.2/1631E (mod)
<p>Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CVAAS.</p> <p>Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).</p>			
<b>MET-200.2-CCMS-WT</b>	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020A (mod)
<p>Soil/sediment is dried, disaggregated, and sieved (2 mm). For tests intended to support Ontario regulations, the &lt;2mm fraction is ground to pass through a 0.355 mm sieve. Strong Acid Leachable Metals in the &lt;2mm fraction are solubilized by heated digestion with nitric and hydrochloric acids. Instrumental analysis is by Collision / Reaction Cell ICPMS.</p> <p>Limitations: This method is intended to liberate environmentally available metals. Silicate minerals are not solubilized. Some metals may be only partially recovered (matrix dependent), including Al, Ba, Be, Cr, S, Sr, Ti, Tl, V, W, and Zr. Elemental Sulfur may be poorly recovered by this method. Volatile forms of sulfur (e.g. sulfide, H<sub>2</sub>S) may be excluded if lost during sampling, storage, or digestion.</p> <p>Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).</p>			
<b>MOISTURE-WT</b>	Soil	% Moisture	Gravimetric: Oven Dried
<b>PH-WT</b>	Soil	pH	MOEE E3137A
<p>A minimum 10g portion of the sample is extracted with 20mL of 0.01M calcium chloride solution by shaking for at least 30 minutes. The aqueous layer is separated from the soil and then analyzed using a pH meter and electrode.</p> <p>Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).</p>			
<b>SAR-R511-WT</b>	Soil	SAR-O.Reg 153/04 (July 2011)	SW846 6010C

# Reference Information

## Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**
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A dried, disaggregated solid sample is extracted with deionized water, the aqueous extract is separated from the solid, acidified and then analyzed using a ICP/OES. The concentrations of Na, Ca and Mg are reported as per CALA requirements for calculated parameters. These individual parameters are not for comparison to any guideline.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

**VOC-1,3-DCP-CALC-WT** Soil Regulation 153 VOCs SW8260B/SW8270C

**VOC-511-HS-WT** Soil VOC-O.Reg 153/04 (July 2011) SW846 8260 (511)

Soil and sediment samples are extracted in methanol and analyzed by headspace-GC/MS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

**XYLENES-SUM-CALC-WT** Soil Sum of Xylene Isomer Concentrations CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

\*\*ALS test methods may incorporate modifications from specified reference methods to improve performance.

## Chain of Custody Numbers:

*The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:*

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

## GLOSSARY OF REPORT TERMS

*Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.*

*mg/kg - milligrams per kilogram based on dry weight of sample*

*mg/kg wwt - milligrams per kilogram based on wet weight of sample*

*mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight*

*mg/L - unit of concentration based on volume, parts per million.*

*< - Less than.*

*D.L. - The reporting limit.*

*N/A - Result not available. Refer to qualifier code and definition for explanation.*

*Test results reported relate only to the samples as received by the laboratory.*

*UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.*

*Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.*

*Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guideline limits are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.*





## Quality Control Report

Workorder: L2182363

Report Date: 23-OCT-18

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Client: Morrison Hershfield Limited (Ottawa)  
 2440 Don Reid Drive  
 Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
EC-WT	Soil							
<b>Batch</b>	<b>R4292910</b>							
<b>WG2909992-1</b>	<b>MB</b>							
Conductivity			<0.0040		mS/cm		0.004	22-OCT-18
F1-HS-511-WT	Soil							
<b>Batch</b>	<b>R4291729</b>							
<b>WG2907153-4</b>	<b>DUP</b>	<b>WG2907153-3</b>						
F1 (C6-C10)		<5.0	<5.0	RPD-NA	ug/g	N/A	30	22-OCT-18
<b>WG2907153-2</b>	<b>LCS</b>							
F1 (C6-C10)			109.3		%		80-120	22-OCT-18
<b>WG2907153-1</b>	<b>MB</b>							
F1 (C6-C10)			<5.0		ug/g		5	22-OCT-18
Surrogate: 3,4-Dichlorotoluene			93.0		%		60-140	22-OCT-18
<b>WG2907153-6</b>	<b>MS</b>	<b>L2182348-3</b>						
F1 (C6-C10)			125.5		%		60-140	22-OCT-18
F2-F4-511-WT	Soil							
<b>Batch</b>	<b>R4287935</b>							
<b>WG2906456-3</b>	<b>DUP</b>	<b>WG2906456-5</b>						
F2 (C10-C16)		<10	<10	RPD-NA	ug/g	N/A	30	18-OCT-18
F3 (C16-C34)		<50	<50	RPD-NA	ug/g	N/A	30	18-OCT-18
F4 (C34-C50)		<50	<50	RPD-NA	ug/g	N/A	30	18-OCT-18
<b>WG2906456-2</b>	<b>LCS</b>							
F2 (C10-C16)			108.6		%		80-120	18-OCT-18
F3 (C16-C34)			105.2		%		80-120	18-OCT-18
F4 (C34-C50)			110.5		%		80-120	18-OCT-18
<b>WG2906456-1</b>	<b>MB</b>							
F2 (C10-C16)			<10		ug/g		10	18-OCT-18
F3 (C16-C34)			<50		ug/g		50	18-OCT-18
F4 (C34-C50)			<50		ug/g		50	18-OCT-18
Surrogate: 2-Bromobenzotrifluoride			76.6		%		60-140	18-OCT-18
<b>WG2906456-4</b>	<b>MS</b>	<b>WG2906456-5</b>						
F2 (C10-C16)			107.1		%		60-140	18-OCT-18
F3 (C16-C34)			103.4		%		60-140	18-OCT-18
F4 (C34-C50)			106.7		%		60-140	18-OCT-18
HG-200.2-CVAA-WT	Soil							



# Quality Control Report

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Client: Morrison Hershfield Limited (Ottawa)  
 2440 Don Reid Drive  
 Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-200.2-CVAA-WT	Soil							
<b>Batch</b>	<b>R4291768</b>							
<b>WG2909127-2</b>	<b>CRM</b>	<b>WT-CANMET-TILL1</b>						
Mercury (Hg)			100.2		%		70-130	22-OCT-18
<b>WG2909127-6</b>	<b>DUP</b>	<b>WG2909127-5</b>						
Mercury (Hg)		0.0072	0.0075		ug/g	4.3	40	22-OCT-18
<b>WG2909127-3</b>	<b>LCS</b>							
Mercury (Hg)			102.0		%		80-120	22-OCT-18
<b>WG2909127-1</b>	<b>MB</b>							
Mercury (Hg)			<0.0050		mg/kg		0.005	22-OCT-18
MET-200.2-CCMS-WT	Soil							
<b>Batch</b>	<b>R4294487</b>							
<b>WG2909127-2</b>	<b>CRM</b>	<b>WT-CANMET-TILL1</b>						
Antimony (Sb)			109.5		%		70-130	22-OCT-18
Arsenic (As)			105.6		%		70-130	22-OCT-18
Barium (Ba)			103.5		%		70-130	22-OCT-18
Beryllium (Be)			102.0		%		70-130	22-OCT-18
Boron (B)			3.2		mg/kg		0-8.2	22-OCT-18
Cadmium (Cd)			107.1		%		70-130	22-OCT-18
Chromium (Cr)			104.5		%		70-130	22-OCT-18
Cobalt (Co)			105.7		%		70-130	22-OCT-18
Copper (Cu)			108.3		%		70-130	22-OCT-18
Lead (Pb)			108.7		%		70-130	22-OCT-18
Molybdenum (Mo)			104.7		%		70-130	22-OCT-18
Nickel (Ni)			98.3		%		70-130	22-OCT-18
Selenium (Se)			0.32		mg/kg		0.11-0.51	22-OCT-18
Silver (Ag)			0.25		mg/kg		0.13-0.33	22-OCT-18
Thallium (Tl)			0.136		mg/kg		0.077-0.18	22-OCT-18
Uranium (U)			103.7		%		70-130	22-OCT-18
Vanadium (V)			102.7		%		70-130	22-OCT-18
Zinc (Zn)			102.0		%		70-130	22-OCT-18
<b>WG2909127-6</b>	<b>DUP</b>	<b>WG2909127-5</b>						
Antimony (Sb)		<0.10	<0.10	RPD-NA	ug/g	N/A	30	22-OCT-18
Arsenic (As)		3.48	4.10		ug/g	16	30	22-OCT-18
Barium (Ba)		58.3	71.1		ug/g	20	40	22-OCT-18
Beryllium (Be)		0.33	0.43		ug/g	25	30	22-OCT-18
Boron (B)		<5.0	5.9	RPD-NA	ug/g	N/A	30	22-OCT-18





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Client: Morrison Hershfield Limited (Ottawa)  
 2440 Don Reid Drive  
 Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	Soil							
<b>Batch</b>	<b>R4294487</b>							
<b>WG2909127-1</b>	<b>MB</b>							
Antimony (Sb)			<0.10		mg/kg		0.1	22-OCT-18
Arsenic (As)			<0.10		mg/kg		0.1	22-OCT-18
Barium (Ba)			<0.50		mg/kg		0.5	22-OCT-18
Beryllium (Be)			<0.10		mg/kg		0.1	22-OCT-18
Boron (B)			<5.0		mg/kg		5	22-OCT-18
Cadmium (Cd)			<0.020		mg/kg		0.02	22-OCT-18
Chromium (Cr)			<0.50		mg/kg		0.5	22-OCT-18
Cobalt (Co)			<0.10		mg/kg		0.1	22-OCT-18
Copper (Cu)			<0.50		mg/kg		0.5	22-OCT-18
Lead (Pb)			<0.50		mg/kg		0.5	22-OCT-18
Molybdenum (Mo)			<0.10		mg/kg		0.1	22-OCT-18
Nickel (Ni)			<0.50	B	mg/kg		0.5	22-OCT-18
Selenium (Se)			<0.20		mg/kg		0.2	22-OCT-18
Silver (Ag)			<0.10		mg/kg		0.1	22-OCT-18
Thallium (Tl)			<0.050		mg/kg		0.05	22-OCT-18
Uranium (U)			<0.050		mg/kg		0.05	22-OCT-18
Vanadium (V)			<0.20		mg/kg		0.2	22-OCT-18
Zinc (Zn)			<2.0		mg/kg		2	22-OCT-18
MOISTURE-WT	Soil							
<b>Batch</b>	<b>R4283921</b>							
<b>WG2906616-3</b>	<b>DUP</b>	<b>L2182548-4</b>						
% Moisture		6.11	5.86		%	4.2	20	18-OCT-18
<b>WG2906616-2</b>	<b>LCS</b>							
% Moisture			101.8		%		90-110	18-OCT-18
<b>WG2906616-1</b>	<b>MB</b>							
% Moisture			<0.10		%		0.1	18-OCT-18
PH-WT	Soil							
<b>Batch</b>	<b>R4292568</b>							
<b>WG2906312-1</b>	<b>DUP</b>	<b>L2182348-2</b>						
pH		7.58	7.66	J	pH units	0.08	0.3	22-OCT-18
<b>WG2907020-1</b>	<b>LCS</b>							
pH			6.99		pH units		6.9-7.1	22-OCT-18
SAR-R511-WT	Soil							



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Client: Morrison Hershfield Limited (Ottawa)  
 2440 Don Reid Drive  
 Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SAR-R511-WT	Soil							
<b>Batch</b>	<b>R4294010</b>							
<b>WG2909992-4</b>	<b>DUP</b>	<b>WG2909992-3</b>						
Calcium (Ca)		27.9	31.3		mg/L	12	30	22-OCT-18
Sodium (Na)		21.2	21.4		mg/L	1.1	30	22-OCT-18
Magnesium (Mg)		<1.0	<1.0	RPD-NA	mg/L	N/A	30	22-OCT-18
<b>WG2909992-2</b>	<b>IRM</b>	<b>WT SAR2</b>						
Calcium (Ca)			89.2		%		70-130	22-OCT-18
Sodium (Na)			100.0		%		70-130	22-OCT-18
Magnesium (Mg)			86.7		%		70-130	22-OCT-18
<b>WG2909992-1</b>	<b>MB</b>							
Calcium (Ca)			<1.0		mg/L		1	22-OCT-18
Sodium (Na)			<1.0		mg/L		1	22-OCT-18
Magnesium (Mg)			<1.0		mg/L		1	22-OCT-18
VOC-511-HS-WT	Soil							
<b>Batch</b>	<b>R4291729</b>							
<b>WG2907153-4</b>	<b>DUP</b>	<b>WG2907153-3</b>						
1,1,1,2-Tetrachloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	22-OCT-18
1,1,2,2-Tetrachloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	22-OCT-18
1,1,1-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	22-OCT-18
1,1,2-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	22-OCT-18
1,1-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	22-OCT-18
1,1-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	22-OCT-18
1,2-Dibromoethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	22-OCT-18
1,2-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	22-OCT-18
1,2-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	22-OCT-18
1,2-Dichloropropane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	22-OCT-18
1,3-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	22-OCT-18
1,4-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	22-OCT-18
Acetone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	22-OCT-18
Benzene		<0.0068	<0.0068	RPD-NA	ug/g	N/A	40	22-OCT-18
Bromodichloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	22-OCT-18
Bromoform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	22-OCT-18
Bromomethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	22-OCT-18
Carbon tetrachloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	22-OCT-18
Chlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	22-OCT-18



# Quality Control Report

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Client: Morrison Hershfield Limited (Ottawa)  
2440 Don Reid Drive  
Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	Soil							
<b>Batch</b>	<b>R4291729</b>							
<b>WG2907153-4</b>	<b>DUP</b>	<b>WG2907153-3</b>						
Chloroform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	22-OCT-18
cis-1,2-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	22-OCT-18
cis-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	22-OCT-18
Dibromochloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	22-OCT-18
Dichlorodifluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	22-OCT-18
Ethylbenzene		<0.018	<0.018	RPD-NA	ug/g	N/A	40	22-OCT-18
n-Hexane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	22-OCT-18
Methylene Chloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	22-OCT-18
MTBE		<0.050	<0.050	RPD-NA	ug/g	N/A	40	22-OCT-18
m+p-Xylenes		<0.030	<0.030	RPD-NA	ug/g	N/A	40	22-OCT-18
Methyl Ethyl Ketone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	22-OCT-18
Methyl Isobutyl Ketone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	22-OCT-18
o-Xylene		<0.020	<0.020	RPD-NA	ug/g	N/A	40	22-OCT-18
Styrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	22-OCT-18
Tetrachloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	22-OCT-18
Toluene		<0.080	<0.080	RPD-NA	ug/g	N/A	40	22-OCT-18
trans-1,2-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	22-OCT-18
trans-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	22-OCT-18
Trichloroethylene		<0.010	<0.010	RPD-NA	ug/g	N/A	40	22-OCT-18
Trichlorofluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	22-OCT-18
Vinyl chloride		<0.020	<0.020	RPD-NA	ug/g	N/A	40	22-OCT-18
<b>WG2907153-2</b>	<b>LCS</b>							
1,1,1,2-Tetrachloroethane			110.8		%		60-130	22-OCT-18
1,1,2,2-Tetrachloroethane			114.1		%		60-130	22-OCT-18
1,1,1-Trichloroethane			112.8		%		60-130	22-OCT-18
1,1,2-Trichloroethane			112.3		%		60-130	22-OCT-18
1,1-Dichloroethane			113.1		%		60-130	22-OCT-18
1,1-Dichloroethylene			108.8		%		60-130	22-OCT-18
1,2-Dibromoethane			109.8		%		70-130	22-OCT-18
1,2-Dichlorobenzene			115.7		%		70-130	22-OCT-18
1,2-Dichloroethane			110.5		%		60-130	22-OCT-18
1,2-Dichloropropane			113.6		%		70-130	22-OCT-18
1,3-Dichlorobenzene			110.6		%		70-130	22-OCT-18



## Quality Control Report

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Client: Morrison Hershfield Limited (Ottawa)  
 2440 Don Reid Drive  
 Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	Soil							
<b>Batch</b>	<b>R4291729</b>							
<b>WG2907153-2</b>	<b>LCS</b>							
1,4-Dichlorobenzene			113.3		%		70-130	22-OCT-18
Acetone			108.5		%		60-140	22-OCT-18
Benzene			116.3		%		70-130	22-OCT-18
Bromodichloromethane			112.5		%		50-140	22-OCT-18
Bromoform			101.3		%		70-130	22-OCT-18
Bromomethane			104.8		%		50-140	22-OCT-18
Carbon tetrachloride			110.2		%		70-130	22-OCT-18
Chlorobenzene			115.5		%		70-130	22-OCT-18
Chloroform			114.5		%		70-130	22-OCT-18
cis-1,2-Dichloroethylene			114.5		%		70-130	22-OCT-18
cis-1,3-Dichloropropene			107.3		%		70-130	22-OCT-18
Dibromochloromethane			107.3		%		60-130	22-OCT-18
Dichlorodifluoromethane			74.8		%		50-140	22-OCT-18
Ethylbenzene			116.1		%		70-130	22-OCT-18
n-Hexane			88.4		%		70-130	22-OCT-18
Methylene Chloride			111.9		%		70-130	22-OCT-18
MTBE			115.4		%		70-130	22-OCT-18
m+p-Xylenes			114.6		%		70-130	22-OCT-18
Methyl Ethyl Ketone			108.9		%		60-140	22-OCT-18
Methyl Isobutyl Ketone			107.8		%		60-140	22-OCT-18
o-Xylene			112.9		%		70-130	22-OCT-18
Styrene			116.4		%		70-130	22-OCT-18
Tetrachloroethylene			111.1		%		60-130	22-OCT-18
Toluene			115.5		%		70-130	22-OCT-18
trans-1,2-Dichloroethylene			112.8		%		60-130	22-OCT-18
trans-1,3-Dichloropropene			103.6		%		70-130	22-OCT-18
Trichloroethylene			116.2		%		60-130	22-OCT-18
Trichlorofluoromethane			110.5		%		50-140	22-OCT-18
Vinyl chloride			105.3		%		60-140	22-OCT-18
<b>WG2907153-1</b>	<b>MB</b>							
1,1,1,2-Tetrachloroethane			<0.050		ug/g		0.05	22-OCT-18
1,1,2,2-Tetrachloroethane			<0.050		ug/g		0.05	22-OCT-18
1,1,1-Trichloroethane			<0.050		ug/g		0.05	22-OCT-18
1,1,2-Trichloroethane			<0.050		ug/g		0.05	22-OCT-18



# Quality Control Report

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Client: Morrison Hershfield Limited (Ottawa)  
 2440 Don Reid Drive  
 Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	Soil							
<b>Batch</b>	<b>R4291729</b>							
<b>WG2907153-1 MB</b>								
1,1-Dichloroethane			<0.050		ug/g		0.05	22-OCT-18
1,1-Dichloroethylene			<0.050		ug/g		0.05	22-OCT-18
1,2-Dibromoethane			<0.050		ug/g		0.05	22-OCT-18
1,2-Dichlorobenzene			<0.050		ug/g		0.05	22-OCT-18
1,2-Dichloroethane			<0.050		ug/g		0.05	22-OCT-18
1,2-Dichloropropane			<0.050		ug/g		0.05	22-OCT-18
1,3-Dichlorobenzene			<0.050		ug/g		0.05	22-OCT-18
1,4-Dichlorobenzene			<0.050		ug/g		0.05	22-OCT-18
Acetone			<0.50		ug/g		0.5	22-OCT-18
Benzene			<0.0068		ug/g		0.0068	22-OCT-18
Bromodichloromethane			<0.050		ug/g		0.05	22-OCT-18
Bromoform			<0.050		ug/g		0.05	22-OCT-18
Bromomethane			<0.050		ug/g		0.05	22-OCT-18
Carbon tetrachloride			<0.050		ug/g		0.05	22-OCT-18
Chlorobenzene			<0.050		ug/g		0.05	22-OCT-18
Chloroform			<0.050		ug/g		0.05	22-OCT-18
cis-1,2-Dichloroethylene			<0.050		ug/g		0.05	22-OCT-18
cis-1,3-Dichloropropene			<0.030		ug/g		0.03	22-OCT-18
Dibromochloromethane			<0.050		ug/g		0.05	22-OCT-18
Dichlorodifluoromethane			<0.050		ug/g		0.05	22-OCT-18
Ethylbenzene			<0.018		ug/g		0.018	22-OCT-18
n-Hexane			<0.050		ug/g		0.05	22-OCT-18
Methylene Chloride			<0.050		ug/g		0.05	22-OCT-18
MTBE			<0.050		ug/g		0.05	22-OCT-18
m+p-Xylenes			<0.030		ug/g		0.03	22-OCT-18
Methyl Ethyl Ketone			<0.50		ug/g		0.5	22-OCT-18
Methyl Isobutyl Ketone			<0.50		ug/g		0.5	22-OCT-18
o-Xylene			<0.020		ug/g		0.02	22-OCT-18
Styrene			<0.050		ug/g		0.05	22-OCT-18
Tetrachloroethylene			<0.050		ug/g		0.05	22-OCT-18
Toluene			<0.080		ug/g		0.08	22-OCT-18
trans-1,2-Dichloroethylene			<0.050		ug/g		0.05	22-OCT-18
trans-1,3-Dichloropropene			<0.030		ug/g		0.03	22-OCT-18



## Quality Control Report

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Client: Morrison Hershfield Limited (Ottawa)  
 2440 Don Reid Drive  
 Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	Soil							
<b>Batch</b>	<b>R4291729</b>							
<b>WG2907153-1 MB</b>								
Trichloroethylene			<0.010		ug/g		0.01	22-OCT-18
Trichlorofluoromethane			<0.050		ug/g		0.05	22-OCT-18
Vinyl chloride			<0.020		ug/g		0.02	22-OCT-18
Surrogate: 1,4-Difluorobenzene			119.9		%		50-140	22-OCT-18
Surrogate: 4-Bromofluorobenzene			112.9		%		50-140	22-OCT-18
<b>WG2907153-5 MS</b>		<b>L2182348-1</b>						
1,1,1,2-Tetrachloroethane			110.9		%		50-140	22-OCT-18
1,1,2,2-Tetrachloroethane			112.9		%		50-140	22-OCT-18
1,1,1-Trichloroethane			114.0		%		50-140	22-OCT-18
1,1,2-Trichloroethane			112.0		%		50-140	22-OCT-18
1,1-Dichloroethane			114.8		%		50-140	22-OCT-18
1,1-Dichloroethylene			111.0		%		50-140	22-OCT-18
1,2-Dibromoethane			109.3		%		50-140	22-OCT-18
1,2-Dichlorobenzene			116.6		%		50-140	22-OCT-18
1,2-Dichloroethane			110.5		%		50-140	22-OCT-18
1,2-Dichloropropane			113.8		%		50-140	22-OCT-18
1,3-Dichlorobenzene			113.0		%		50-140	22-OCT-18
1,4-Dichlorobenzene			113.9		%		50-140	22-OCT-18
Acetone			100.9		%		50-140	22-OCT-18
Benzene			117.2		%		50-140	22-OCT-18
Bromodichloromethane			112.3		%		50-140	22-OCT-18
Bromoform			100.3		%		50-140	22-OCT-18
Bromomethane			106.7		%		50-140	22-OCT-18
Carbon tetrachloride			111.4		%		50-140	22-OCT-18
Chlorobenzene			115.3		%		50-140	22-OCT-18
Chloroform			115.1		%		50-140	22-OCT-18
cis-1,2-Dichloroethylene			114.6		%		50-140	22-OCT-18
cis-1,3-Dichloropropene			105.1		%		50-140	22-OCT-18
Dibromochloromethane			106.7		%		50-140	22-OCT-18
Dichlorodifluoromethane			85.6		%		50-140	22-OCT-18
Ethylbenzene			116.7		%		50-140	22-OCT-18
n-Hexane			92.5		%		50-140	22-OCT-18
Methylene Chloride			112.6		%		50-140	22-OCT-18
MTBE			116.1		%		50-140	22-OCT-18



# Quality Control Report

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Client: Morrison Hershfield Limited (Ottawa)  
 2440 Don Reid Drive  
 Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	Soil							
<b>Batch</b>	<b>R4291729</b>							
<b>WG2907153-5 MS</b>		<b>L2182348-1</b>						
m+p-Xylenes			114.9		%		50-140	22-OCT-18
Methyl Ethyl Ketone			102.8		%		50-140	22-OCT-18
Methyl Isobutyl Ketone			105.2		%		50-140	22-OCT-18
o-Xylene			113.2		%		50-140	22-OCT-18
Styrene			115.6		%		50-140	22-OCT-18
Tetrachloroethylene			111.7		%		50-140	22-OCT-18
Toluene			117.4		%		50-140	22-OCT-18
trans-1,2-Dichloroethylene			113.0		%		50-140	22-OCT-18
trans-1,3-Dichloropropene			102.5		%		50-140	22-OCT-18
Trichloroethylene			115.7		%		50-140	22-OCT-18
Trichlorofluoromethane			114.6		%		50-140	22-OCT-18
Vinyl chloride			109.5		%		50-140	22-OCT-18

# Quality Control Report

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Report Date: 23-OCT-18

Client: Morrison Hershfield Limited (Ottawa)  
2440 Don Reid Drive  
Ottawa ON K1H 1E1

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Contact: Mitchell Dawley

## Legend:

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Limit ALS Control Limit (Data Quality Objectives)  
DUP Duplicate  
RPD Relative Percent Difference  
N/A Not Available  
LCS Laboratory Control Sample  
SRM Standard Reference Material  
MS Matrix Spike  
MSD Matrix Spike Duplicate  
ADE Average Desorption Efficiency  
MB Method Blank  
IRM Internal Reference Material  
CRM Certified Reference Material  
CCV Continuing Calibration Verification  
CVS Calibration Verification Standard  
LCSD Laboratory Control Sample Duplicate

## Sample Parameter Qualifier Definitions:

---

Qualifier	Description
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.
J	Duplicate results and limits are expressed in terms of absolute difference.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

---

## Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

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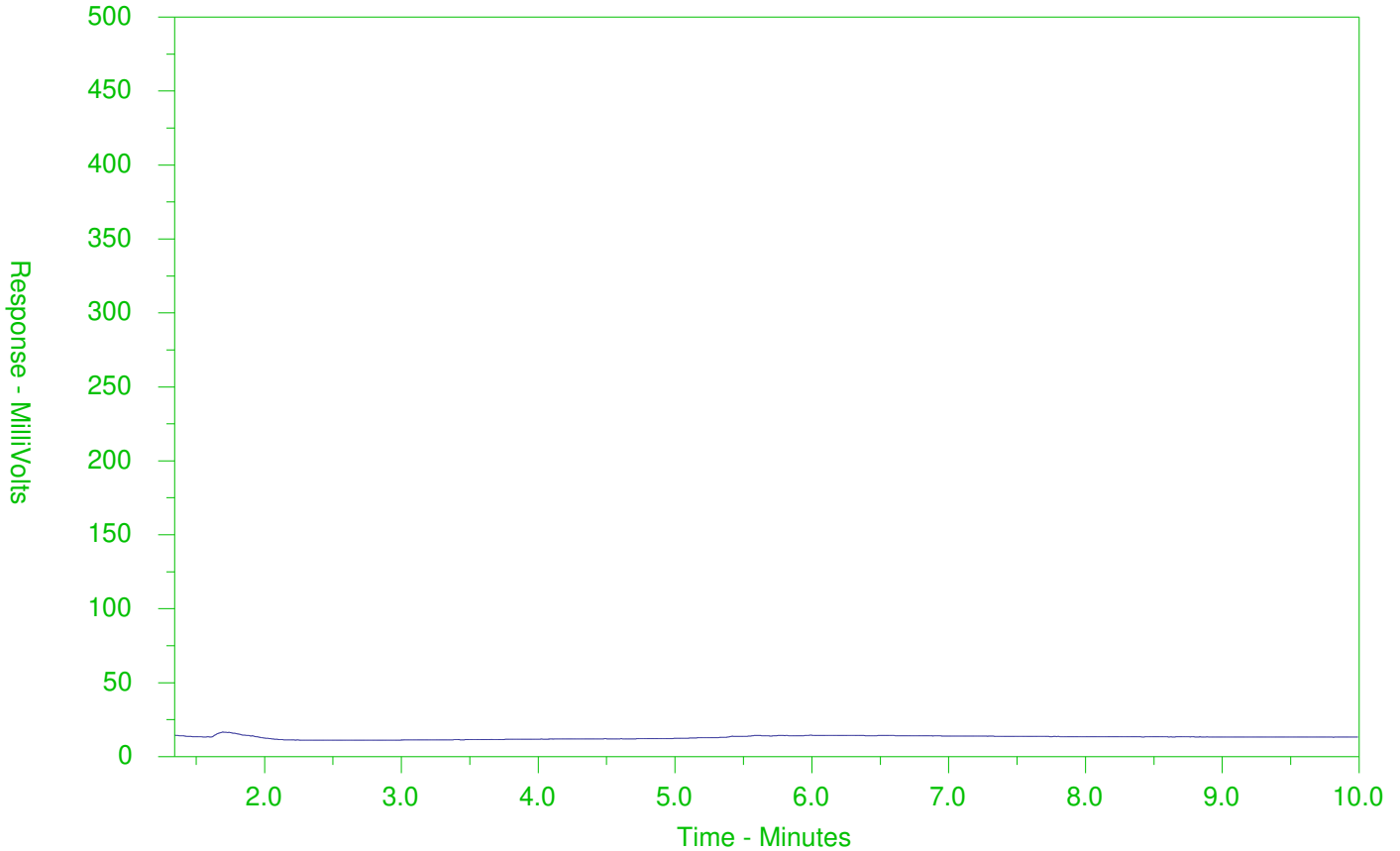
The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

# CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: L2182363-1  
 Client Sample ID: BS-1 SA10



← F2 →		← F3 →		← F4 →	
nC10	nC16		nC34		nC50
174°C	287°C		481°C		575°C
346°F	549°F		898°F		1067°F
Gasoline →			← Motor Oils/Lube Oils/Grease		
← Diesel/Jet Fuels →					

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

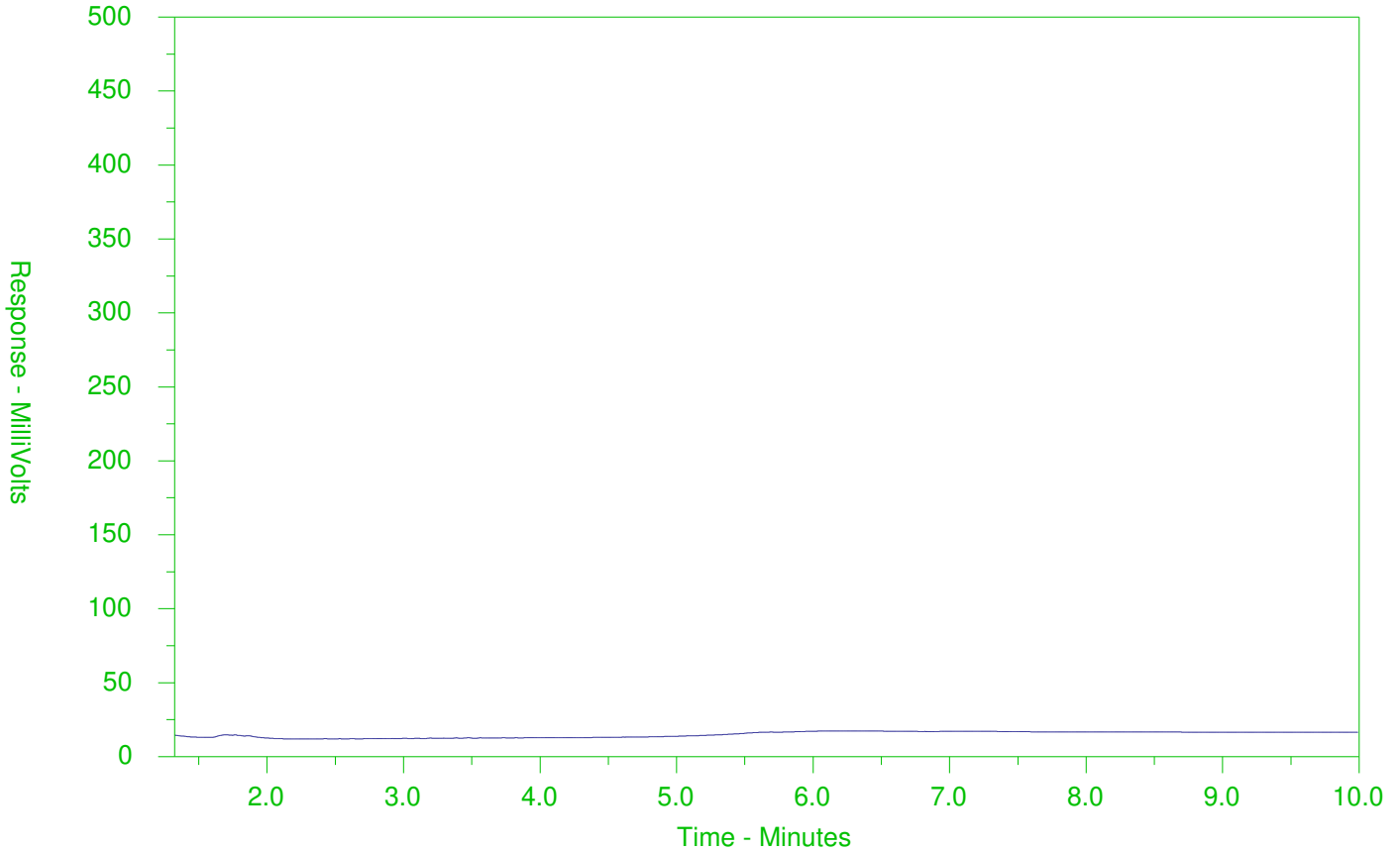
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at [www.alsglobal.com](http://www.alsglobal.com).

# CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: L2182363-2  
 Client Sample ID: BS-3 SA5



← F2 →		← F3 →		← F4 →	
nC10	nC16		nC34		nC50
174°C	287°C		481°C		575°C
346°F	549°F		898°F		1067°F
Gasoline →			← Motor Oils/Lube Oils/Grease		
← Diesel/Jet Fuels →					

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

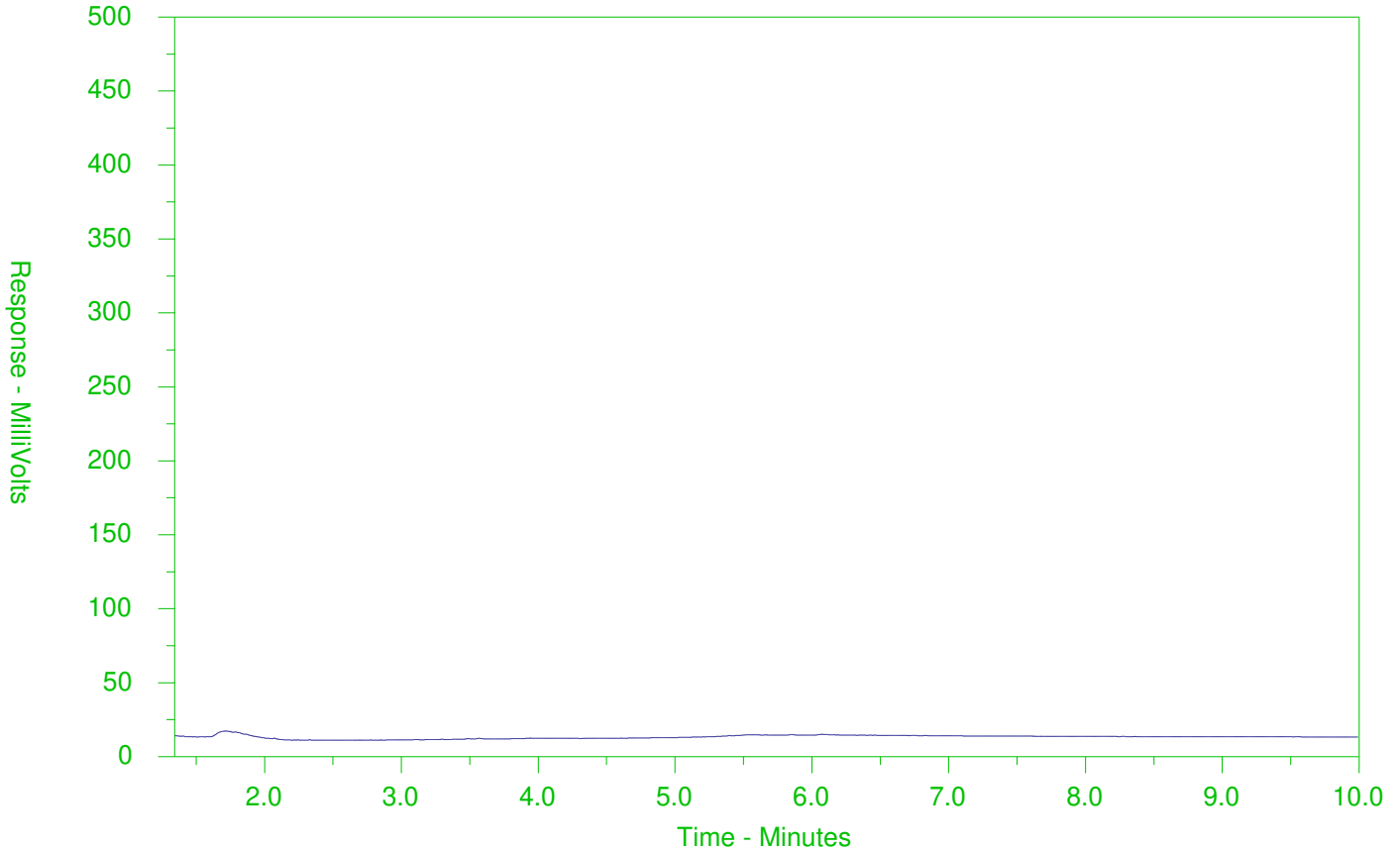
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at [www.alsglobal.com](http://www.alsglobal.com).

# CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: L2182363-3  
 Client Sample ID: BS-2 SA3



← F2 →		← F3 →		← F4 →	
nC10	nC16		nC34		nC50
174°C	287°C		481°C		575°C
346°F	549°F		898°F		1067°F
Gasoline →			← Motor Oils/Lube Oils/Grease		
← Diesel/Jet Fuels →					

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at [www.alsglobal.com](http://www.alsglobal.com).



Chain-of-Custody (COC) Analytical Request Form

Canada Toll Free: 1 800 668 9878

L2182363-COFC

Page of

COC Number: 15 -

www.alsglobal.com

Contact and company name below will appear on the final report

Report Format / Distribution

Select Service Level below - Please confirm an eBP TATs with your AM - surcharges will apply

Select Report Format:  PDF  EXCEL  EDD (DIGITAL)

Regular (R)  Standard TAT if received by 3 pm - business days - no surcharges apply

Quality Control (QC) Report with Report  YES  NO

4 day (P4)  3 day (P3)  2 day (P2)

Compare Results to Criteria on Report - provide details below if box checked

EMERGENCY  1 Business day (E1)  Same Day, Weekend or Statutory holiday (E0)

Select Distribution:  EMAIL  MAIL  FAX

Date and Time Required for all eBP TATs:

Email 1 or Fax: M.Dawley@morrisonherstfield.com

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (FP) below

Email 2: CGroulx@morrisonherstfield.com

Analysis Request

Email 3

Regular (R)  Standard TAT if received by 3 pm - business days - no surcharges apply

Invoice Distribution

1 Business day (E1)

Select Invoice Distribution:  EMAIL  MAIL  FAX

Same Day, Weekend or Statutory holiday (E0)

Email 1 or Fax: M.Dawley@morrisonherstfield.com

2 day (P2)

Email 2: CGroulx@morrisonherstfield.com

3 day (P3)

Email 3

4 day (P4)

Oil and Gas Required Fields (client use)

Metals and Inorganics

AFE/Cost Center:

TCLP - b(a)p

Major/Minor Code:

TCLP - Metals and Inorganics

Requisitioner:

TCLP - VOCs

Location:

Metals and Inorganics

ALS Lab Work Order # (lab use only) L2182363

Number of Containers

ALS Sample # (lab use only)

Reg. 153 complete Metals

Sample Identification and/or Coordinates (This description will appear on the report)

VOC / F1-F4

BS-1 SAO

PAH

BS-3 SA5

Metals and Inorganics

BS-2 SA3

TCLP - b(a)p

BS-TCLP

TCLP - Metals and Inorganics

BS-TCLP

TCLP - VOCs

BS-TCLP

Metals and Inorganics

BS-TCLP

TCLP - b(a)p

BS-TCLP

TCLP - Metals and Inorganics

BS-TCLP

TCLP - VOCs

BS-TCLP

Metals and Inorganics

BS-TCLP

TCLP - b(a)p

BS-TCLP

TCLP - Metals and Inorganics

BS-TCLP

TCLP - VOCs

BS-TCLP

Metals and Inorganics

BS-TCLP

TCLP - b(a)p

BS-TCLP

TCLP - Metals and Inorganics

BS-TCLP

TCLP - VOCs

BS-TCLP

Metals and Inorganics

BS-TCLP

TCLP - b(a)p

BS-TCLP

TCLP - Metals and Inorganics

BS-TCLP

TCLP - VOCs

BS-TCLP

Metals and Inorganics

BS-TCLP

TCLP - b(a)p

Drinking Water (DW) Samples (client use)

SAMPLE CONDITION AS RECEIVED (lab use only)

Are samples taken from a Regulated DW System?  YES  NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Frozen  Ice Packs  Ice Cubes  Custody seal intact  Yes  No

Are samples for human drinking water use?  YES  NO

More T1 Price

Cooling Inhibited  INITIAL COOLER TEMPERATURES -C  FINAL COOLER TEMPERATURES -C

SHIPMENT RELEASE (client use)

DATE SHIPMENT RECEIVED (lab use only)

Time: 9:00

Released by: [Signature]

DATE SHIPMENT RECEIVED (lab use only)

Time: 9:00

Date: 10/15/18

Time: 9 AM

Received by: [Signature]

Date: 10/15/18

Time: 9 AM

Received by: [Signature]

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

DATE SHIPMENT RECEIVED (lab use only)

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

DATE SHIPMENT RECEIVED (lab use only)



Morrison Hershfield Limited (Ottawa)  
ATTN: Mitchell Dawley  
2440 Don Reid Drive  
Ottawa ON K1H 1E1

Date Received: 22-OCT-18  
Report Date: 24-OCT-18 15:00 (MT)  
Version: FINAL

Client Phone: 613-739-2910

## Certificate of Analysis

**Lab Work Order #:** L2185217  
Project P.O. #: NOT SUBMITTED  
Job Reference: 180564799  
C of C Numbers:  
Legal Site Desc:

Melanie Moshi  
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

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ANALYTICAL GUIDELINE REPORT

180564799

Table with columns: Sample Details Grouping, Analyte, Result, Qualifier, D.L., Units, Analyzed, Guideline Limits (#1, #2, #3). Rows include Physical Tests, Metals, Speciated Metals, and Volatile Organic Compounds.

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\* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T1/T3-SOIL-RPIICC-COARSE

#1: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use

#2: T3-Soil-Res/Park/Inst. Property Use (Coarse)

#3: T3-Soil-Ind/Com/Commu. Property Use (Coarse)



# ANALYTICAL GUIDELINE REPORT

180564799

Sample Details		Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits		
Grouping	Analyte						#1	#2	#3
L2185217-1 BS-5 SA6									
Sampled By: CLIENT on 19-OCT-18 @ 10:00									
Matrix: SOIL									
<b>Volatile Organic Compounds</b>									
	1,2-Dichloropropane	<0.050		0.050	ug/g	24-OCT-18	0.05	0.05	0.16
	cis-1,3-Dichloropropene	<0.030		0.030	ug/g	24-OCT-18			
	trans-1,3-Dichloropropene	<0.030		0.030	ug/g	24-OCT-18			
	1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	24-OCT-18	0.05	0.05	0.18
	Ethylbenzene	0.579		0.018	ug/g	24-OCT-18	*0.05	2	9.5
	n-Hexane	<0.050		0.050	ug/g	24-OCT-18	0.05	2.8	46
	Methyl Ethyl Ketone	<0.50		0.50	ug/g	24-OCT-18	0.5	16	70
	Methyl Isobutyl Ketone	<0.50		0.50	ug/g	24-OCT-18	0.5	1.7	31
	MTBE	<0.050		0.050	ug/g	24-OCT-18	0.05	0.75	11
	Styrene	<0.050		0.050	ug/g	24-OCT-18	0.05	0.7	34
	1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	24-OCT-18	0.05	0.058	0.087
	1,1,2,2-Tetrachloroethane	<7.1	DLVH	7.1	ug/g	24-OCT-18	**0.05	**0.05	**0.05
	Tetrachloroethylene	<0.050		0.050	ug/g	24-OCT-18	0.05	0.28	4.5
	Toluene	<0.080		0.080	ug/g	24-OCT-18	0.2	2.3	68
	1,1,1-Trichloroethane	<0.050		0.050	ug/g	24-OCT-18	0.05	0.38	6.1
	1,1,2-Trichloroethane	<2.5	DLVH	2.5	ug/g	24-OCT-18	**0.05	**0.05	**0.05
	Trichloroethylene	<0.010		0.010	ug/g	24-OCT-18	0.05	0.061	0.91
	Trichlorofluoromethane	<0.050		0.050	ug/g	24-OCT-18	0.25	4	4
	Vinyl chloride	<0.020		0.020	ug/g	24-OCT-18	0.02	0.02	0.032
	o-Xylene	<0.16	DLVH	0.16	ug/g	24-OCT-18			
	m+p-Xylenes	<0.030		0.030	ug/g	24-OCT-18			
	Xylenes (Total)	<0.16		0.16	ug/g	24-OCT-18	**0.05	3.1	26
	Surrogate: 4-Bromofluorobenzene	94.4		50-140	%	24-OCT-18			
	Surrogate: 1,4-Difluorobenzene	101.6		50-140	%	24-OCT-18			
<b>Hydrocarbons</b>									
	F1 (C6-C10)	909	DLHC	80	ug/g	24-OCT-18	*25	*55	*55
	F1-BTEX	908		80	ug/g	24-OCT-18	*25	*55	*55
	F2 (C10-C16)	3170		10	ug/g	24-OCT-18	*10	*98	*230
	F2-Naphth	3160		10	ug/g	24-OCT-18			
	F3 (C16-C34)	1950		50	ug/g	24-OCT-18	*240	*300	*1700
	F3-PAH	1950		50	ug/g	24-OCT-18			
	F4 (C34-C50)	760		50	ug/g	24-OCT-18	*120	2800	3300
	F4G-SG (GHH-Silica)	1930		250	ug/g	23-OCT-18	*120	2800	3300
	Total Hydrocarbons (C6-C50)	6790		110	ug/g	24-OCT-18			
	Chrom. to baseline at nC50	NO			No Unit	24-OCT-18			
	Surrogate: 2-Bromobenzotrifluoride	N/A	SMI	-	%	24-OCT-18			
	Surrogate: 3,4-Dichlorotoluene	N/A	SDO:RN A	60-140	%	24-OCT-18			
<b>Polycyclic Aromatic Hydrocarbons</b>									
	Acenaphthene	<0.050		0.050	ug/g	24-OCT-18	0.072	7.9	96
	Acenaphthylene	<0.050		0.050	ug/g	24-OCT-18	0.093	0.15	0.15
	Anthracene	<0.050		0.050	ug/g	24-OCT-18	0.16	0.67	0.67
	Benzo(a)anthracene	<0.050		0.050	ug/g	24-OCT-18	0.36	0.5	0.96
	Benzo(a)pyrene	<0.050		0.050	ug/g	24-OCT-18	0.3	0.3	0.3
	Benzo(b)fluoranthene	<0.050		0.050	ug/g	24-OCT-18	0.47	0.78	0.96
	Benzo(g,h,i)perylene	<0.050		0.050	ug/g	24-OCT-18	0.68	6.6	9.6

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#1: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use

#2: T3-Soil-Res/Park/Inst. Property Use (Coarse)

#3: T3-Soil-Ind/Com/Commu. Property Use (Coarse)



# ANALYTICAL GUIDELINE REPORT

180564799

Sample Details		Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits		
Grouping	Analyte						#1	#2	#3
L2185217-1	BS-5 SA6								
Sampled By: CLIENT on 19-OCT-18 @ 10:00									
Matrix: SOIL									
<b>Polycyclic Aromatic Hydrocarbons</b>									
	Benzo(k)fluoranthene	<0.050		0.050	ug/g	24-OCT-18	0.48	0.78	0.96
	Chrysene	0.126		0.050	ug/g	24-OCT-18	2.8	7	9.6
	Dibenzo(ah)anthracene	<0.050		0.050	ug/g	24-OCT-18	0.1	0.1	0.1
	Fluoranthene	0.061		0.050	ug/g	24-OCT-18	0.56	0.69	9.6
	Fluorene	0.064		0.050	ug/g	24-OCT-18	0.12	62	62
	Indeno(1,2,3-cd)pyrene	<0.050		0.050	ug/g	24-OCT-18	0.23	0.38	0.76
	1+2-Methylnaphthalenes	4.29		0.042	ug/g	24-OCT-18	*0.59	*0.99	76
	1-Methylnaphthalene	1.47		0.030	ug/g	24-OCT-18	*0.59	*0.99	76
	2-Methylnaphthalene	2.82		0.030	ug/g	24-OCT-18	*0.59	*0.99	76
	Naphthalene	11.5		0.013	ug/g	24-OCT-18	*0.09	*0.6	*9.6
	Phenanthrene	0.210		0.046	ug/g	24-OCT-18	0.69	6.2	12
	Pyrene	0.112		0.050	ug/g	24-OCT-18	1	78	96
	Surrogate: 2-Fluorobiphenyl	58.8		50-140	%	24-OCT-18			
	Surrogate: p-Terphenyl d14	70.2		50-140	%	24-OCT-18			
L2185217-2	BS-5 SA10								
Sampled By: CLIENT on 19-OCT-18 @ 10:30									
Matrix: SOIL									
<b>Physical Tests</b>									
	% Moisture	23.0		0.10	%	24-OCT-18			
<b>Volatile Organic Compounds</b>									
	Acetone	<0.50		0.50	ug/g	24-OCT-18	0.5	16	16
	Benzene	<0.0068		0.0068	ug/g	24-OCT-18	0.02	0.21	0.32
	Bromodichloromethane	<0.050		0.050	ug/g	24-OCT-18	0.05	13	18
	Bromoform	<0.050		0.050	ug/g	24-OCT-18	0.05	0.27	0.61
	Bromomethane	<0.050		0.050	ug/g	24-OCT-18	0.05	0.05	0.05
	Carbon tetrachloride	<0.050		0.050	ug/g	24-OCT-18	0.05	0.05	0.21
	Chlorobenzene	<0.050		0.050	ug/g	24-OCT-18	0.05	2.4	2.4
	Dibromochloromethane	<0.050		0.050	ug/g	24-OCT-18	0.05	9.4	13
	Chloroform	<0.050		0.050	ug/g	24-OCT-18	0.05	0.05	0.47
	1,2-Dibromoethane	<0.050		0.050	ug/g	24-OCT-18	0.05	0.05	0.05
	1,2-Dichlorobenzene	<0.050		0.050	ug/g	24-OCT-18	0.05	3.4	6.8
	1,3-Dichlorobenzene	<0.050		0.050	ug/g	24-OCT-18	0.05	4.8	9.6
	1,4-Dichlorobenzene	<0.050		0.050	ug/g	24-OCT-18	0.05	0.083	0.2
	Dichlorodifluoromethane	<0.050		0.050	ug/g	24-OCT-18	0.05	16	16
	1,1-Dichloroethane	<0.050		0.050	ug/g	24-OCT-18	0.05	3.5	17
	1,2-Dichloroethane	<0.050		0.050	ug/g	24-OCT-18	0.05	0.05	0.05
	1,1-Dichloroethylene	<0.050		0.050	ug/g	24-OCT-18	0.05	0.05	0.064
	cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	24-OCT-18	0.05	3.4	55
	trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	24-OCT-18	0.05	0.084	1.3
	Methylene Chloride	<0.050		0.050	ug/g	24-OCT-18	0.05	0.1	1.6
	1,2-Dichloropropane	<0.050		0.050	ug/g	24-OCT-18	0.05	0.05	0.16
	cis-1,3-Dichloropropene	<0.030		0.030	ug/g	24-OCT-18			
	trans-1,3-Dichloropropene	<0.030		0.030	ug/g	24-OCT-18			
	1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	24-OCT-18	0.05	0.05	0.18
	Ethylbenzene	0.049		0.018	ug/g	24-OCT-18	0.05	2	9.5

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#2: T3-Soil-Res/Park/Inst. Property Use (Coarse)

#3: T3-Soil-Ind/Com/Commu. Property Use (Coarse)



ANALYTICAL GUIDELINE REPORT

180564799

Table with columns: Sample Details Grouping, Analyte, Result, Qualifier, D.L., Units, Analyzed, Guideline Limits (#1, #2, #3). Includes sections for Volatile Organic Compounds and Hydrocarbons for two samples (L2185217-2 and L2185217-3).

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T1/T3-SOIL-RPIICC-COARSE

#1: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use

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ANALYTICAL GUIDELINE REPORT

180564799

Table with columns: Sample Details Grouping, Analyte, Result, Qualifier, D.L., Units, Analyzed, Guideline Limits #1, #2, #3. Includes sections for Volatile Organic Compounds and Hydrocarbons.

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#2: T3-Soil-Res/Park/Inst. Property Use (Coarse)

#3: T3-Soil-Ind/Com/Commu. Property Use (Coarse)



# ANALYTICAL GUIDELINE REPORT

180564799

Sample Details		Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits		
Grouping	Analyte						#1	#2	#3
L2185217-4	BS-4 SA4								
Sampled By: CLIENT on 19-OCT-18 @ 14:30									
Matrix: SOIL									
<b>Physical Tests</b>									
Conductivity		0.412		0.0040	mS/cm	24-OCT-18	0.57	0.7	1.4
% Moisture		10.4		0.10	%	24-OCT-18			
pH		11.07		0.10	pH units	24-OCT-18			
<b>Cyanides</b>									
Cyanide, Weak Acid Diss		<0.050		0.050	ug/g	24-OCT-18	0.051	0.051	0.051
<b>Saturated Paste Extractables</b>									
SAR		4.32		0.10	SAR	24-OCT-18	*2.4	5	12
Calcium (Ca)		9.4		1.0	mg/L	24-OCT-18			
Magnesium (Mg)		12.8		1.0	mg/L	24-OCT-18			
Sodium (Na)		86.6		1.0	mg/L	24-OCT-18			
<b>Metals</b>									
Antimony (Sb)		<1.0		1.0	ug/g	24-OCT-18	1.3	7.5	40
Arsenic (As)		1.2		1.0	ug/g	24-OCT-18	18	18	18
Barium (Ba)		76.3		1.0	ug/g	24-OCT-18	220	390	670
Beryllium (Be)		<0.50		0.50	ug/g	24-OCT-18	2.5	4	8
Boron (B)		<5.0		5.0	ug/g	24-OCT-18	36	120	120
Boron (B), Hot Water Ext.		<0.10		0.10	ug/g	24-OCT-18	36	1.5	2
Cadmium (Cd)		<0.50		0.50	ug/g	24-OCT-18	1.2	1.2	1.9
Chromium (Cr)		18.2		1.0	ug/g	24-OCT-18	70	160	160
Cobalt (Co)		5.3		1.0	ug/g	24-OCT-18	21	22	80
Copper (Cu)		12.3		1.0	ug/g	24-OCT-18	92	140	230
Lead (Pb)		2.7		1.0	ug/g	24-OCT-18	120	120	120
Mercury (Hg)		<0.0050		0.0050	ug/g	24-OCT-18	0.27	0.27	3.9
Molybdenum (Mo)		<1.0		1.0	ug/g	24-OCT-18	2	6.9	40
Nickel (Ni)		10.6		1.0	ug/g	24-OCT-18	82	100	270
Selenium (Se)		<1.0		1.0	ug/g	24-OCT-18	1.5	2.4	5.5
Silver (Ag)		<0.20		0.20	ug/g	24-OCT-18	0.5	20	40
Thallium (Tl)		<0.50		0.50	ug/g	24-OCT-18	1	1	3.3
Uranium (U)		<1.0		1.0	ug/g	24-OCT-18	2.5	23	33
Vanadium (V)		29.7		1.0	ug/g	24-OCT-18	86	86	86
Zinc (Zn)		23.3		5.0	ug/g	24-OCT-18	290	340	340
<b>Speciated Metals</b>									
Chromium, Hexavalent		0.23		0.20	ug/g	24-OCT-18	0.66	8	8
L2185217-5	BS-4 SA6								
Sampled By: CLIENT on 19-OCT-18 @ 15:30									
Matrix: SOIL									
<b>Physical Tests</b>									
% Moisture		23.8		0.10	%	24-OCT-18			
<b>Volatile Organic Compounds</b>									
Acetone		<0.50		0.50	ug/g	24-OCT-18	0.5	16	16
Benzene		<0.0068		0.0068	ug/g	24-OCT-18	0.02	0.21	0.32
Bromodichloromethane		<0.050		0.050	ug/g	24-OCT-18	0.05	13	18
Bromoform		<0.050		0.050	ug/g	24-OCT-18	0.05	0.27	0.61
Bromomethane		<0.050		0.050	ug/g	24-OCT-18	0.05	0.05	0.05

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#2: T3-Soil-Res/Park/Inst. Property Use (Coarse)

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ANALYTICAL GUIDELINE REPORT

180564799

Table with columns: Sample Details Grouping, Analyte, Result, Qualifier, D.L., Units, Analyzed, and Guideline Limits (#1, #2, #3). Rows include Volatile Organic Compounds and Hydrocarbons.

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T1/T3-SOIL-RPIICC-COARSE

#1: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use

#2: T3-Soil-Res/Park/Inst. Property Use (Coarse)

#3: T3-Soil-Ind/Com/Commu. Property Use (Coarse)



# ANALYTICAL GUIDELINE REPORT

180564799

Sample Details		Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits		
Grouping	Analyte						#1	#2	#3
L2185217-5	BS-4 SA6								
Sampled By: CLIENT on 19-OCT-18 @ 15:30									
Matrix: SOIL									
<b>Hydrocarbons</b>									
	F4 (C34-C50)	<50		50	ug/g	24-OCT-18	120	2800	3300
	Total Hydrocarbons (C6-C50)	<72		72	ug/g	24-OCT-18			
	Chrom. to baseline at nC50	YES			No Unit	24-OCT-18			
	Surrogate: 2-Bromobenzotrifluoride	76.4		60-140	%	24-OCT-18			
	Surrogate: 3,4-Dichlorotoluene	83.3		60-140	%	24-OCT-18			
<b>Polycyclic Aromatic Hydrocarbons</b>									
	Acenaphthene	<0.050		0.050	ug/g	24-OCT-18	0.072	7.9	96
	Acenaphthylene	<0.050		0.050	ug/g	24-OCT-18	0.093	0.15	0.15
	Anthracene	<0.050		0.050	ug/g	24-OCT-18	0.16	0.67	0.67
	Benzo(a)anthracene	<0.050		0.050	ug/g	24-OCT-18	0.36	0.5	0.96
	Benzo(a)pyrene	<0.050		0.050	ug/g	24-OCT-18	0.3	0.3	0.3
	Benzo(b)fluoranthene	<0.050		0.050	ug/g	24-OCT-18	0.47	0.78	0.96
	Benzo(g,h,i)perylene	<0.050		0.050	ug/g	24-OCT-18	0.68	6.6	9.6
	Benzo(k)fluoranthene	<0.050		0.050	ug/g	24-OCT-18	0.48	0.78	0.96
	Chrysene	<0.050		0.050	ug/g	24-OCT-18	2.8	7	9.6
	Dibenzo(ah)anthracene	<0.050		0.050	ug/g	24-OCT-18	0.1	0.1	0.1
	Fluoranthene	<0.050		0.050	ug/g	24-OCT-18	0.56	0.69	9.6
	Fluorene	<0.050		0.050	ug/g	24-OCT-18	0.12	62	62
	Indeno(1,2,3-cd)pyrene	<0.050		0.050	ug/g	24-OCT-18	0.23	0.38	0.76
	1+2-Methylnaphthalenes	<0.042		0.042	ug/g	24-OCT-18	0.59	0.99	76
	1-Methylnaphthalene	<0.030		0.030	ug/g	24-OCT-18	0.59	0.99	76
	2-Methylnaphthalene	<0.030		0.030	ug/g	24-OCT-18	0.59	0.99	76
	Naphthalene	<0.013		0.013	ug/g	24-OCT-18	0.09	0.6	9.6
	Phenanthrene	<0.046		0.046	ug/g	24-OCT-18	0.69	6.2	12
	Pyrene	<0.050		0.050	ug/g	24-OCT-18	1	78	96
	Surrogate: 2-Fluorobiphenyl	68.4		50-140	%	24-OCT-18			
	Surrogate: p-Terphenyl d14	68.2		50-140	%	24-OCT-18			

\*\* Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.

\* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

**Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T1/T3-SOIL-RPIICC-COARSE**

#1: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use

#2: T3-Soil-Res/Park/Inst. Property Use (Coarse)

#3: T3-Soil-Ind/Com/Commu. Property Use (Coarse)

## Reference Information

**Sample Parameter Qualifier key listed:**

Qualifier	Description
DLVH	Detection Limit raised due to interference from Volatile Hydrocarbons on VOC method. Chromatographic elution of interfering peaks in the same region as test analytes prevents a determination of whether VOC analyte is present or absent (above/below regular detection limits).
DLI	Detection Limit Raised: Dilution required to address Internal Standard response problems caused by matrix interference.
SMI	Surrogate recovery could not be measured due to sample matrix interference.
SDO:RNA	Surrogate diluted out:% recovery not available
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).

**Methods Listed (if applicable):**

ALS Test Code	Matrix	Test Description	Method Reference***
B-HWS-R511-WT	Soil	Boron-HWE-O.Reg 153/04 (July 2011)	HW EXTR, EPA 6010B

A dried solid sample is extracted with calcium chloride, the sample undergoes a heating process. After cooling the sample is filtered and analyzed by ICP/OES.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CN-WAD-R511-WT	Soil	Cyanide (WAD)-O.Reg 153/04 (July 2011)	MOE 3015/APHA 4500CN I-WAD
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The sample is extracted with a strong base for 16 hours, and then filtered. The filtrate is then distilled where the cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CR-CR6-IC-WT	Soil	Hexavalent Chromium in Soil	SW846 3060A/7199
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This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 7199, published by the United States Environmental Protection Agency (EPA). The procedure involves analysis for chromium (VI) by ion chromatography using diphenylcarbazide in a sulphuric acid solution.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

EC-WT	Soil	Conductivity (EC)	MOEE E3138
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A representative subsample is tumbled with de-ionized (DI) water. The ratio of water to soil is 2:1 v/w. After tumbling the sample is then analyzed by a conductivity meter.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

## Reference Information

F1-F4-511-CALC-WT      Soil      F1-F4 Hydrocarbon Calculated      CCME CWS-PHC, Pub #1310, Dec 2001-S Parameters

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

Hydrocarbon results are expressed on a dry weight basis.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.

In samples where BTEX and F1 were analyzed, F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:

1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:

1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT      Soil      F1-O.Reg 153/04 (July 2011)      E3398/CCME TIER 1-HS

Fraction F1 is determined by extracting a soil or sediment sample as received with methanol, then analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-511-WT      Soil      F2-F4-O.Reg 153/04 (July 2011)      CCME Tier 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from soil with 1:1 hexane:acetone using a rotary extractor. Extracts are treated with silica gel to remove polar organic interferences. F2, F3, & F4 are analyzed by GC-FID. F4G-sg is analyzed gravimetrically.

Notes:

1. F2 (C10-C16): Sum of all hydrocarbons that elute between nC10 and nC16.
2. F3 (C16-C34): Sum of all hydrocarbons that elute between nC16 and nC34.
3. F4 (C34-C50): Sum of all hydrocarbons that elute between nC34 and nC50.
4. F4G: Gravimetric Heavy Hydrocarbons
5. F4G-sg: Gravimetric Heavy Hydrocarbons (F4G) after silica gel treatment.
6. Where both F4 (C34-C50) and F4G-sg are reported for a sample, the larger of the two values is used for comparison against the relevant CCME guideline for F4.
7. F4G-sg cannot be added to the C6 to C50 hydrocarbon results to obtain an estimate of total extractable hydrocarbons.
8. This method is validated for use.
9. Data from analysis of validation and quality control samples is available upon request.
10. Reported results are expressed as milligrams per dry kilogram, unless otherwise indicated.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F4G-ADD-511-WT      Soil      F4G SG-O.Reg 153/04 (July 2011)      MOE DECPH-E3398/CCME TIER 1

F4G, gravimetric analysis, is determined if the chromatogram does not return to baseline at or before C50. A soil sample is extracted with a solvent mix, the solvent is evaporated and the weight of the residue is determined.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

HG-200.2-CVAA-WT      Soil      Mercury in Soil by CVAAS      EPA 200.2/1631E (mod)

Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

## Reference Information

MET-200.2-CCMS-WT Soil Metals in Soil by CRC ICPMS EPA 200.2/6020A (mod)

Soil/sediment is dried, disaggregated, and sieved (2 mm). For tests intended to support Ontario regulations, the <2mm fraction is ground to pass through a 0.355 mm sieve. Strong Acid Leachable Metals in the <2mm fraction are solubilized by heated digestion with nitric and hydrochloric acids. Instrumental analysis is by Collision / Reaction Cell ICPMS.

Limitations: This method is intended to liberate environmentally available metals. Silicate minerals are not solubilized. Some metals may be only partially recovered (matrix dependent), including Al, Ba, Be, Cr, S, Sr, Ti, Tl, V, W, and Zr. Elemental Sulfur may be poorly recovered by this method. Volatile forms of sulfur (e.g. sulfide, H<sub>2</sub>S) may be excluded if lost during sampling, storage, or digestion.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

METHYLNAPS-CALC-WT	Soil	ABN-Calculated Parameters	SW846 8270
MOISTURE-WT	Soil	% Moisture	Gravimetric: Oven Dried
PAH-511-WT	Soil	PAH-O.Reg 153/04 (July 2011)	SW846 3510/8270

A representative sub-sample of soil is fortified with deuterium-labelled surrogates and a mechanical shaking technique is used to extract the sample with a mixture of methanol and toluene. The extracts are concentrated and analyzed by GC/MS. Results for benzo(b) fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

PH-WT	Soil	pH	MOEE E3137A
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A minimum 10g portion of the sample is extracted with 20mL of 0.01M calcium chloride solution by shaking for at least 30 minutes. The aqueous layer is separated from the soil and then analyzed using a pH meter and electrode.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

SAR-R511-WT	Soil	SAR-O.Reg 153/04 (July 2011)	SW846 6010C
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A dried, disaggregated solid sample is extracted with deionized water, the aqueous extract is separated from the solid, acidified and then analyzed using a ICP/OES. The concentrations of Na, Ca and Mg are reported as per CALA requirements for calculated parameters. These individual parameters are not for comparison to any guideline.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

VOC-1,3-DCP-CALC-WT	Soil	Regulation 153 VOCs	SW8260B/SW8270C
VOC-511-HS-WT	Soil	VOC-O.Reg 153/04 (July 2011)	SW846 8260 (511)

Soil and sediment samples are extracted in methanol and analyzed by headspace-GC/MS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

XYLENES-SUM-CALC-WT	Soil	Sum of Xylene Isomer Concentrations	CALCULATION
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Total xylenes represents the sum of o-xylene and m&p-xylene.

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\*\*\* ALS test methods may incorporate modifications from specified reference methods to improve performance.

Chain of Custody numbers:

*The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:*

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
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WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA		
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## Reference Information

### GLOSSARY OF REPORT TERMS

*Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.*

*mg/kg - milligrams per kilogram based on dry weight of sample*

*mg/kg wwt - milligrams per kilogram based on wet weight of sample*

*mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight*

*mg/L - unit of concentration based on volume, parts per million.*

*< - Less than.*

*D.L. - The reporting limit.*

*N/A - Result not available. Refer to qualifier code and definition for explanation.*

*Test results reported relate only to the samples as received by the laboratory.*

*UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.*

*Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.*

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guideline limits are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.





# Quality Control Report

Workorder: L2185217

Report Date: 24-OCT-18

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Client: Morrison Hershfield Limited (Ottawa)  
 2440 Don Reid Drive  
 Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
EC-WT	Soil							
<b>Batch</b>	<b>R4295599</b>							
<b>WG2912219-1</b>	<b>MB</b>							
Conductivity			<0.0040		mS/cm		0.004	24-OCT-18
F1-HS-511-WT	Soil							
<b>Batch</b>	<b>R4295760</b>							
<b>WG2911092-4</b>	<b>DUP</b>	<b>WG2911092-3</b>						
F1 (C6-C10)		<5.0	<5.0	RPD-NA	ug/g	N/A	30	24-OCT-18
<b>WG2911092-2</b>	<b>LCS</b>		89.0		%		80-120	24-OCT-18
F1 (C6-C10)								
<b>WG2911092-1</b>	<b>MB</b>		<5.0		ug/g		5	24-OCT-18
F1 (C6-C10)								
Surrogate: 3,4-Dichlorotoluene			83.8		%		60-140	24-OCT-18
<b>WG2911092-6</b>	<b>MS</b>	<b>L2185089-1</b>						
F1 (C6-C10)			100.2		%		60-140	24-OCT-18
F2-F4-511-WT	Soil							
<b>Batch</b>	<b>R4296408</b>							
<b>WG2911246-8</b>	<b>DUP</b>	<b>WG2911246-10</b>						
F2 (C10-C16)		26	<10	DUP-H	ug/g	N/A	30	24-OCT-18
F3 (C16-C34)		240	<50	DUP-H	ug/g	N/A	30	24-OCT-18
F4 (C34-C50)		68	<50	RPD-NA	ug/g	N/A	30	24-OCT-18
<b>WG2911246-7</b>	<b>LCS</b>		104.8		%		80-120	24-OCT-18
F2 (C10-C16)								
F3 (C16-C34)			109.5		%		80-120	24-OCT-18
F4 (C34-C50)			114.4		%		80-120	24-OCT-18
<b>WG2911246-6</b>	<b>MB</b>		<10		ug/g		10	24-OCT-18
F2 (C10-C16)								
F3 (C16-C34)			<50		ug/g		50	24-OCT-18
F4 (C34-C50)			<50		ug/g		50	24-OCT-18
Surrogate: 2-Bromobenzotrifluoride			85.3		%		60-140	24-OCT-18
<b>WG2911246-9</b>	<b>MS</b>	<b>WG2911246-10</b>						
F2 (C10-C16)			109.5		%		60-140	24-OCT-18
F3 (C16-C34)			65.4		%		60-140	24-OCT-18
F4 (C34-C50)			114.7		%		60-140	24-OCT-18
F4G-ADD-511-WT	Soil							



## Quality Control Report

Workorder: L2185217

Report Date: 24-OCT-18

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Client: Morrison Hershfield Limited (Ottawa)  
 2440 Don Reid Drive  
 Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F4G-ADD-511-WT	Soil							
<b>Batch</b>	<b>R4296810</b>							
<b>WG2913045-3</b>	<b>DUP</b>	<b>L2185205-1</b>						
F4G-SG (GHH-Silica)		<250	<250	RPD-NA	ug/g	N/A	40	23-OCT-18
<b>WG2913045-2</b>	<b>LCS</b>		86.0		%		60-140	23-OCT-18
F4G-SG (GHH-Silica)								
<b>WG2913045-1</b>	<b>MB</b>		<250		ug/g		250	23-OCT-18
F4G-SG (GHH-Silica)								
HG-200.2-CVAA-WT	Soil							
<b>Batch</b>	<b>R4295773</b>							
<b>WG2912191-2</b>	<b>CRM</b>	<b>WT-CANMET-TILL1</b>						
Mercury (Hg)			101.1		%		70-130	24-OCT-18
<b>WG2912191-6</b>	<b>DUP</b>	<b>WG2912191-5</b>						
Mercury (Hg)		0.141	0.122		ug/g	15	40	24-OCT-18
<b>WG2912191-3</b>	<b>LCS</b>		104.5		%		80-120	24-OCT-18
Mercury (Hg)								
<b>WG2912191-1</b>	<b>MB</b>		<0.0050		mg/kg		0.005	24-OCT-18
Mercury (Hg)								
MET-200.2-CCMS-WT	Soil							
<b>Batch</b>	<b>R4295851</b>							
<b>WG2912191-2</b>	<b>CRM</b>	<b>WT-CANMET-TILL1</b>						
Antimony (Sb)			103.1		%		70-130	24-OCT-18
Arsenic (As)			109.0		%		70-130	24-OCT-18
Barium (Ba)			108.8		%		70-130	24-OCT-18
Beryllium (Be)			105.4		%		70-130	24-OCT-18
Boron (B)			3.0		mg/kg		0-8.2	24-OCT-18
Cadmium (Cd)			101.0		%		70-130	24-OCT-18
Chromium (Cr)			106.7		%		70-130	24-OCT-18
Cobalt (Co)			104.4		%		70-130	24-OCT-18
Copper (Cu)			111.4		%		70-130	24-OCT-18
Lead (Pb)			102.6		%		70-130	24-OCT-18
Molybdenum (Mo)			109.5		%		70-130	24-OCT-18
Nickel (Ni)			107.3		%		70-130	24-OCT-18
Selenium (Se)			0.31		mg/kg		0.11-0.51	24-OCT-18
Silver (Ag)			0.24		mg/kg		0.13-0.33	24-OCT-18
Thallium (Tl)			0.130		mg/kg		0.077-0.18	24-OCT-18
Uranium (U)			98.7		%		70-130	24-OCT-18
Vanadium (V)			108.7		%		70-130	24-OCT-18



# Quality Control Report

Workorder: L2185217

Report Date: 24-OCT-18

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Client: Morrison Hershfield Limited (Ottawa)  
 2440 Don Reid Drive  
 Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	Soil							
<b>Batch</b>	<b>R4295851</b>							
<b>WG2912191-2</b>	<b>CRM</b>	<b>WT-CANMET-TILL1</b>						
Zinc (Zn)			104.5		%		70-130	24-OCT-18
<b>WG2912191-6</b>	<b>DUP</b>	<b>WG2912191-5</b>						
Antimony (Sb)		0.51	0.59		ug/g	15	30	24-OCT-18
Arsenic (As)		3.44	3.47		ug/g	1.1	30	24-OCT-18
Barium (Ba)		73.1	72.7		ug/g	0.6	40	24-OCT-18
Beryllium (Be)		0.31	0.31		ug/g	0.2	30	24-OCT-18
Boron (B)		<5.0	<5.0	RPD-NA	ug/g	N/A	30	24-OCT-18
Cadmium (Cd)		0.128	0.121		ug/g	5.1	30	24-OCT-18
Chromium (Cr)		21.8	20.9		ug/g	4.1	30	24-OCT-18
Cobalt (Co)		5.48	5.49		ug/g	0.1	30	24-OCT-18
Copper (Cu)		15.1	15.6		ug/g	2.9	30	24-OCT-18
Lead (Pb)		81.2	75.7		ug/g	7.0	40	24-OCT-18
Molybdenum (Mo)		0.46	0.51		ug/g	10	40	24-OCT-18
Nickel (Ni)		12.2	12.2		ug/g	0.4	30	24-OCT-18
Selenium (Se)		<0.20	<0.20	RPD-NA	ug/g	N/A	30	24-OCT-18
Silver (Ag)		0.14	0.12		ug/g	13	40	24-OCT-18
Thallium (Tl)		0.117	0.117		ug/g	0.4	30	24-OCT-18
Uranium (U)		0.555	0.526		ug/g	5.5	30	24-OCT-18
Vanadium (V)		29.1	28.4		ug/g	2.7	30	24-OCT-18
Zinc (Zn)		52.6	52.1		ug/g	0.9	30	24-OCT-18
<b>WG2912191-4</b>	<b>LCS</b>							
Antimony (Sb)			110.6		%		80-120	24-OCT-18
Arsenic (As)			110.7		%		80-120	24-OCT-18
Barium (Ba)			103.6		%		80-120	24-OCT-18
Beryllium (Be)			107.8		%		80-120	24-OCT-18
Boron (B)			104.0		%		80-120	24-OCT-18
Cadmium (Cd)			106.9		%		80-120	24-OCT-18
Chromium (Cr)			105.9		%		80-120	24-OCT-18
Cobalt (Co)			101.9		%		80-120	24-OCT-18
Copper (Cu)			103.8		%		80-120	24-OCT-18
Lead (Pb)			106.6		%		80-120	24-OCT-18
Molybdenum (Mo)			106.8		%		80-120	24-OCT-18
Nickel (Ni)			104.6		%		80-120	24-OCT-18



# Quality Control Report

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Client: Morrison Hershfield Limited (Ottawa)  
 2440 Don Reid Drive  
 Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	Soil							
<b>Batch</b>	<b>R4295851</b>							
<b>WG2912191-4</b>	<b>LCS</b>							
Selenium (Se)			103.4		%		80-120	24-OCT-18
Silver (Ag)			93.0		%		80-120	24-OCT-18
Thallium (Tl)			110.3		%		80-120	24-OCT-18
Uranium (U)			98.2		%		80-120	24-OCT-18
Vanadium (V)			111.3		%		80-120	24-OCT-18
Zinc (Zn)			98.8		%		80-120	24-OCT-18
<b>WG2912191-1</b>	<b>MB</b>							
Antimony (Sb)			<0.10		mg/kg		0.1	24-OCT-18
Arsenic (As)			<0.10		mg/kg		0.1	24-OCT-18
Barium (Ba)			<0.50		mg/kg		0.5	24-OCT-18
Beryllium (Be)			<0.10		mg/kg		0.1	24-OCT-18
Boron (B)			<5.0		mg/kg		5	24-OCT-18
Cadmium (Cd)			<0.020		mg/kg		0.02	24-OCT-18
Chromium (Cr)			<0.50		mg/kg		0.5	24-OCT-18
Cobalt (Co)			<0.10		mg/kg		0.1	24-OCT-18
Copper (Cu)			<0.50		mg/kg		0.5	24-OCT-18
Lead (Pb)			<0.50		mg/kg		0.5	24-OCT-18
Molybdenum (Mo)			<0.10		mg/kg		0.1	24-OCT-18
Nickel (Ni)			<0.50		mg/kg		0.5	24-OCT-18
Selenium (Se)			<0.20		mg/kg		0.2	24-OCT-18
Silver (Ag)			<0.10		mg/kg		0.1	24-OCT-18
Thallium (Tl)			<0.050		mg/kg		0.05	24-OCT-18
Uranium (U)			<0.050		mg/kg		0.05	24-OCT-18
Vanadium (V)			<0.20		mg/kg		0.2	24-OCT-18
Zinc (Zn)			<2.0		mg/kg		2	24-OCT-18
MOISTURE-WT	Soil							
<b>Batch</b>	<b>R4295466</b>							
<b>WG2911585-3</b>	<b>DUP</b>	<b>L2185217-1</b>						
% Moisture		15.6	16.3		%	4.8	20	24-OCT-18
<b>WG2911585-2</b>	<b>LCS</b>							
% Moisture			100.5		%		90-110	24-OCT-18
<b>WG2911585-1</b>	<b>MB</b>							
% Moisture			<0.10		%		0.1	24-OCT-18
PAH-511-WT	Soil							



# Quality Control Report

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Client: Morrison Hershfield Limited (Ottawa)  
 2440 Don Reid Drive  
 Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	Soil							
<b>Batch</b>	<b>R4295747</b>							
<b>WG2911407-3</b>	<b>DUP</b>	<b>WG2911407-5</b>						
1-Methylnaphthalene		<0.030	0.041	RPD-NA	ug/g	N/A	40	24-OCT-18
2-Methylnaphthalene		<0.030	0.037	RPD-NA	ug/g	N/A	40	24-OCT-18
Acenaphthene		<0.050	0.109	DUP-H	ug/g	N/A	40	24-OCT-18
Acenaphthylene		<0.050	0.050	RPD-NA	ug/g	N/A	40	24-OCT-18
Anthracene		0.068	0.249	DUP-H,J	ug/g	0.181	0.1	24-OCT-18
Benzo(a)anthracene		0.221	0.664	DUP-H	ug/g	100	40	24-OCT-18
Benzo(a)pyrene		0.187	0.499	DUP-H	ug/g	91	40	24-OCT-18
Benzo(b)fluoranthene		0.224	0.593	DUP-H	ug/g	90	40	24-OCT-18
Benzo(g,h,i)perylene		0.097	0.225	DUP-H,J	ug/g	0.128	0.1	24-OCT-18
Benzo(k)fluoranthene		0.099	0.251	DUP-H,J	ug/g	0.153	0.1	24-OCT-18
Chrysene		0.278	0.739	DUP-H	ug/g	91	40	24-OCT-18
Dibenzo(ah)anthracene		<0.050	0.076	RPD-NA	ug/g	N/A	40	24-OCT-18
Fluoranthene		0.439	1.52	DUP-H	ug/g	111	40	24-OCT-18
Fluorene		<0.050	0.083	RPD-NA	ug/g	N/A	40	24-OCT-18
Indeno(1,2,3-cd)pyrene		0.096	0.231	DUP-H,J	ug/g	0.136	0.1	24-OCT-18
Naphthalene		<0.013	0.036	DUP-H	ug/g	N/A	40	24-OCT-18
Phenanthrene		0.271	1.30	DUP-H	ug/g	131	40	24-OCT-18
Pyrene		0.382	1.25	DUP-H	ug/g	106	40	24-OCT-18
<b>WG2911407-2</b>	<b>LCS</b>							
1-Methylnaphthalene			96.3		%		50-140	24-OCT-18
2-Methylnaphthalene			96.1		%		50-140	24-OCT-18
Acenaphthene			96.5		%		50-140	24-OCT-18
Acenaphthylene			92.8		%		50-140	24-OCT-18
Anthracene			100.9		%		50-140	24-OCT-18
Benzo(a)anthracene			95.9		%		50-140	24-OCT-18
Benzo(a)pyrene			90.8		%		50-140	24-OCT-18
Benzo(b)fluoranthene			93.0		%		50-140	24-OCT-18
Benzo(g,h,i)perylene			84.8		%		50-140	24-OCT-18
Benzo(k)fluoranthene			94.0		%		50-140	24-OCT-18
Chrysene			111.9		%		50-140	24-OCT-18
Dibenzo(ah)anthracene			87.3		%		50-140	24-OCT-18
Fluoranthene			100.3		%		50-140	24-OCT-18
Fluorene			73.9		%		50-140	24-OCT-18



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Client: Morrison Hershfield Limited (Ottawa)  
 2440 Don Reid Drive  
 Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	Soil							
<b>Batch</b>	<b>R4295747</b>							
<b>WG2911407-2 LCS</b>								
Indeno(1,2,3-cd)pyrene			85.9		%		50-140	24-OCT-18
Naphthalene			95.1		%		50-140	24-OCT-18
Phenanthrene			98.9		%		50-140	24-OCT-18
Pyrene			100.7		%		50-140	24-OCT-18
<b>WG2911407-1 MB</b>								
1-Methylnaphthalene			<0.030		ug/g		0.03	24-OCT-18
2-Methylnaphthalene			<0.030		ug/g		0.03	24-OCT-18
Acenaphthene			<0.050		ug/g		0.05	24-OCT-18
Acenaphthylene			<0.050		ug/g		0.05	24-OCT-18
Anthracene			<0.050		ug/g		0.05	24-OCT-18
Benzo(a)anthracene			<0.050		ug/g		0.05	24-OCT-18
Benzo(a)pyrene			<0.050		ug/g		0.05	24-OCT-18
Benzo(b)fluoranthene			<0.050		ug/g		0.05	24-OCT-18
Benzo(g,h,i)perylene			<0.050		ug/g		0.05	24-OCT-18
Benzo(k)fluoranthene			<0.050		ug/g		0.05	24-OCT-18
Chrysene			<0.050		ug/g		0.05	24-OCT-18
Dibenzo(ah)anthracene			<0.050		ug/g		0.05	24-OCT-18
Fluoranthene			<0.050		ug/g		0.05	24-OCT-18
Fluorene			<0.050		ug/g		0.05	24-OCT-18
Indeno(1,2,3-cd)pyrene			<0.050		ug/g		0.05	24-OCT-18
Naphthalene			<0.013		ug/g		0.013	24-OCT-18
Phenanthrene			<0.046		ug/g		0.046	24-OCT-18
Pyrene			<0.050		ug/g		0.05	24-OCT-18
Surrogate: 2-Fluorobiphenyl			69.5		%		50-140	24-OCT-18
Surrogate: p-Terphenyl d14			66.7		%		50-140	24-OCT-18
<b>WG2911407-4 MS</b>		<b>WG2911407-5</b>						
1-Methylnaphthalene			88.3		%		50-140	24-OCT-18
2-Methylnaphthalene			88.4		%		50-140	24-OCT-18
Acenaphthene			90.6		%		50-140	24-OCT-18
Acenaphthylene			87.5		%		50-140	24-OCT-18
Anthracene			96.6		%		50-140	24-OCT-18
Benzo(a)anthracene			95.4		%		50-140	24-OCT-18
Benzo(a)pyrene			91.8		%		50-140	24-OCT-18
Benzo(b)fluoranthene			79.7		%		50-140	24-OCT-18



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Client: Morrison Hershfield Limited (Ottawa)  
 2440 Don Reid Drive  
 Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	Soil							
<b>Batch</b>	<b>R4295747</b>							
<b>WG2911407-4 MS</b>		<b>WG2911407-5</b>						
Benzo(g,h,i)perylene			80.9		%		50-140	24-OCT-18
Benzo(k)fluoranthene			104.2		%		50-140	24-OCT-18
Chrysene			112.3		%		50-140	24-OCT-18
Dibenzo(ah)anthracene			83.5		%		50-140	24-OCT-18
Fluoranthene			109.6		%		50-140	24-OCT-18
Fluorene			70.7		%		50-140	24-OCT-18
Indeno(1,2,3-cd)pyrene			86.4		%		50-140	24-OCT-18
Naphthalene			86.7		%		50-140	24-OCT-18
Phenanthrene			100.6		%		50-140	24-OCT-18
Pyrene			109.4		%		50-140	24-OCT-18
PH-WT	Soil							
<b>Batch</b>	<b>R4295604</b>							
<b>WG2911400-1 DUP</b>		<b>L2185217-4</b>						
pH		11.07	11.04	J	pH units	0.03	0.3	24-OCT-18
<b>WG2912344-1 LCS</b>								
pH			6.97		pH units		6.9-7.1	24-OCT-18
SAR-R511-WT	Soil							
<b>Batch</b>	<b>R4295718</b>							
<b>WG2912219-4 DUP</b>		<b>WG2912219-3</b>						
Calcium (Ca)		8.5	8.9		mg/L	4.7	30	24-OCT-18
Sodium (Na)		109	122		mg/L	11	30	24-OCT-18
Magnesium (Mg)		8.1	8.0		mg/L	1.0	30	24-OCT-18
<b>WG2912219-2 IRM</b>		<b>WT SAR2</b>						
Calcium (Ca)			90.9		%		70-130	24-OCT-18
Sodium (Na)			101.2		%		70-130	24-OCT-18
Magnesium (Mg)			88.8		%		70-130	24-OCT-18
<b>WG2912219-1 MB</b>								
Calcium (Ca)			<1.0		mg/L		1	24-OCT-18
Sodium (Na)			<1.0		mg/L		1	24-OCT-18
Magnesium (Mg)			<1.0		mg/L		1	24-OCT-18
VOC-511-HS-WT	Soil							
<b>Batch</b>	<b>R4295760</b>							
<b>WG2911092-4 DUP</b>		<b>WG2911092-3</b>						
1,1,1,2-Tetrachloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-18



# Quality Control Report

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Client: Morrison Hershfield Limited (Ottawa)  
 2440 Don Reid Drive  
 Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	Soil							
<b>Batch</b>	<b>R4295760</b>							
<b>WG2911092-4</b>	<b>DUP</b>	<b>WG2911092-3</b>						
1,1,2,2-Tetrachloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-18
1,1,1-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-18
1,1,2-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-18
1,1-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-18
1,1-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-18
1,2-Dibromoethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-18
1,2-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-18
1,2-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-18
1,2-Dichloropropane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-18
1,3-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-18
1,4-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-18
Acetone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	24-OCT-18
Benzene		<0.0068	<0.0068	RPD-NA	ug/g	N/A	40	24-OCT-18
Bromodichloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-18
Bromoform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-18
Bromomethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-18
Carbon tetrachloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-18
Chlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-18
Chloroform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-18
cis-1,2-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-18
cis-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	24-OCT-18
Dibromochloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-18
Dichlorodifluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-18
Ethylbenzene		<0.018	<0.018	RPD-NA	ug/g	N/A	40	24-OCT-18
n-Hexane		<0.10	<0.10	RPD-NA	ug/g	N/A	40	24-OCT-18
Methylene Chloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-18
MTBE		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-18
m+p-Xylenes		<0.030	<0.030	RPD-NA	ug/g	N/A	40	24-OCT-18
Methyl Ethyl Ketone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	24-OCT-18
Methyl Isobutyl Ketone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	24-OCT-18
o-Xylene		<0.020	<0.020	RPD-NA	ug/g	N/A	40	24-OCT-18
Styrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-18
Tetrachloroethylene		<0.050	<0.050		ug/g			24-OCT-18



## Quality Control Report

Workorder: L2185217

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Client: Morrison Hershfield Limited (Ottawa)  
 2440 Don Reid Drive  
 Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	Soil							
<b>Batch</b>	<b>R4295760</b>							
<b>WG2911092-4 DUP</b>		<b>WG2911092-3</b>						
Tetrachloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-18
Toluene		<0.080	<0.080	RPD-NA	ug/g	N/A	40	24-OCT-18
trans-1,2-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-18
trans-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	24-OCT-18
Trichloroethylene		<0.010	<0.010	RPD-NA	ug/g	N/A	40	24-OCT-18
Trichlorofluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-18
Vinyl chloride		<0.020	<0.020	RPD-NA	ug/g	N/A	40	24-OCT-18
<b>WG2911092-2 LCS</b>								
1,1,1,2-Tetrachloroethane			107.3		%		60-130	24-OCT-18
1,1,2,2-Tetrachloroethane			97.5		%		60-130	24-OCT-18
1,1,1-Trichloroethane			114.7		%		60-130	24-OCT-18
1,1,2-Trichloroethane			101.8		%		60-130	24-OCT-18
1,1-Dichloroethane			111.8		%		60-130	24-OCT-18
1,1-Dichloroethylene			110.1		%		60-130	24-OCT-18
1,2-Dibromoethane			98.1		%		70-130	24-OCT-18
1,2-Dichlorobenzene			116.4		%		70-130	24-OCT-18
1,2-Dichloroethane			102.3		%		60-130	24-OCT-18
1,2-Dichloropropane			108.4		%		70-130	24-OCT-18
1,3-Dichlorobenzene			119.0		%		70-130	24-OCT-18
1,4-Dichlorobenzene			119.2		%		70-130	24-OCT-18
Acetone			88.3		%		60-140	24-OCT-18
Benzene			114.7		%		70-130	24-OCT-18
Bromodichloromethane			107.4		%		50-140	24-OCT-18
Bromoform			89.5		%		70-130	24-OCT-18
Bromomethane			102.0		%		50-140	24-OCT-18
Carbon tetrachloride			114.2		%		70-130	24-OCT-18
Chlorobenzene			114.9		%		70-130	24-OCT-18
Chloroform			112.6		%		70-130	24-OCT-18
cis-1,2-Dichloroethylene			112.4		%		70-130	24-OCT-18
cis-1,3-Dichloropropene			107.8		%		70-130	24-OCT-18
Dibromochloromethane			99.0		%		60-130	24-OCT-18
Dichlorodifluoromethane			64.8		%		50-140	24-OCT-18
Ethylbenzene			120.4		%		70-130	24-OCT-18



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Client: Morrison Hershfield Limited (Ottawa)  
 2440 Don Reid Drive  
 Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	Soil							
<b>Batch</b>	<b>R4295760</b>							
<b>WG2911092-2</b>	<b>LCS</b>							
n-Hexane			91.4		%		70-130	24-OCT-18
Methylene Chloride			106.4		%		70-130	24-OCT-18
MTBE			113.5		%		70-130	24-OCT-18
m+p-Xylenes			119.6		%		70-130	24-OCT-18
Methyl Ethyl Ketone			87.8		%		60-140	24-OCT-18
Methyl Isobutyl Ketone			86.0		%		60-140	24-OCT-18
o-Xylene			114.3		%		70-130	24-OCT-18
Styrene			113.8		%		70-130	24-OCT-18
Tetrachloroethylene			120.0		%		60-130	24-OCT-18
Toluene			117.7		%		70-130	24-OCT-18
trans-1,2-Dichloroethylene			116.6		%		60-130	24-OCT-18
trans-1,3-Dichloropropene			104.6		%		70-130	24-OCT-18
Trichloroethylene			119.3		%		60-130	24-OCT-18
Trichlorofluoromethane			111.4		%		50-140	24-OCT-18
Vinyl chloride			100.5		%		60-140	24-OCT-18
<b>WG2911092-1</b>	<b>MB</b>							
1,1,1,2-Tetrachloroethane			<0.050		ug/g		0.05	24-OCT-18
1,1,2,2-Tetrachloroethane			<0.050		ug/g		0.05	24-OCT-18
1,1,1-Trichloroethane			<0.050		ug/g		0.05	24-OCT-18
1,1,2-Trichloroethane			<0.050		ug/g		0.05	24-OCT-18
1,1-Dichloroethane			<0.050		ug/g		0.05	24-OCT-18
1,1-Dichloroethylene			<0.050		ug/g		0.05	24-OCT-18
1,2-Dibromoethane			<0.050		ug/g		0.05	24-OCT-18
1,2-Dichlorobenzene			<0.050		ug/g		0.05	24-OCT-18
1,2-Dichloroethane			<0.050		ug/g		0.05	24-OCT-18
1,2-Dichloropropane			<0.050		ug/g		0.05	24-OCT-18
1,3-Dichlorobenzene			<0.050		ug/g		0.05	24-OCT-18
1,4-Dichlorobenzene			<0.050		ug/g		0.05	24-OCT-18
Acetone			<0.50		ug/g		0.5	24-OCT-18
Benzene			<0.0068		ug/g		0.0068	24-OCT-18
Bromodichloromethane			<0.050		ug/g		0.05	24-OCT-18
Bromoform			<0.050		ug/g		0.05	24-OCT-18
Bromomethane			<0.050		ug/g		0.05	24-OCT-18
Carbon tetrachloride			<0.050		ug/g		0.05	24-OCT-18



# Quality Control Report

Workorder: L2185217

Report Date: 24-OCT-18

Page 12 of 14

Client: Morrison Hershfield Limited (Ottawa)  
 2440 Don Reid Drive  
 Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	Soil							
<b>Batch</b>	<b>R4295760</b>							
<b>WG2911092-1 MB</b>								
Chlorobenzene			<0.050		ug/g		0.05	24-OCT-18
Chloroform			<0.050		ug/g		0.05	24-OCT-18
cis-1,2-Dichloroethylene			<0.050		ug/g		0.05	24-OCT-18
cis-1,3-Dichloropropene			<0.030		ug/g		0.03	24-OCT-18
Dibromochloromethane			<0.050		ug/g		0.05	24-OCT-18
Dichlorodifluoromethane			<0.050		ug/g		0.05	24-OCT-18
Ethylbenzene			<0.018		ug/g		0.018	24-OCT-18
n-Hexane			<0.050		ug/g		0.05	24-OCT-18
Methylene Chloride			<0.050		ug/g		0.05	24-OCT-18
MTBE			<0.050		ug/g		0.05	24-OCT-18
m+p-Xylenes			<0.030		ug/g		0.03	24-OCT-18
Methyl Ethyl Ketone			<0.50		ug/g		0.5	24-OCT-18
Methyl Isobutyl Ketone			<0.50		ug/g		0.5	24-OCT-18
o-Xylene			<0.020		ug/g		0.02	24-OCT-18
Styrene			<0.050		ug/g		0.05	24-OCT-18
Tetrachloroethylene			<0.050		ug/g		0.05	24-OCT-18
Toluene			<0.080		ug/g		0.08	24-OCT-18
trans-1,2-Dichloroethylene			<0.050		ug/g		0.05	24-OCT-18
trans-1,3-Dichloropropene			<0.030		ug/g		0.03	24-OCT-18
Trichloroethylene			<0.010		ug/g		0.01	24-OCT-18
Trichlorofluoromethane			<0.050		ug/g		0.05	24-OCT-18
Vinyl chloride			<0.020		ug/g		0.02	24-OCT-18
Surrogate: 1,4-Difluorobenzene			118.1		%		50-140	24-OCT-18
Surrogate: 4-Bromofluorobenzene			109.2		%		50-140	24-OCT-18
<b>WG2911092-5 MS</b>		<b>L2184461-6</b>						
1,1,1,2-Tetrachloroethane			113.0		%		50-140	24-OCT-18
1,1,2,2-Tetrachloroethane			97.5		%		50-140	24-OCT-18
1,1,1-Trichloroethane			122.6		%		50-140	24-OCT-18
1,1,2-Trichloroethane			103.8		%		50-140	24-OCT-18
1,1-Dichloroethane			115.6		%		50-140	24-OCT-18
1,1-Dichloroethylene			116.4		%		50-140	24-OCT-18
1,2-Dibromoethane			99.0		%		50-140	24-OCT-18
1,2-Dichlorobenzene			123.0		%		50-140	24-OCT-18
1,2-Dichloroethane			101.2		%		50-140	24-OCT-18



# Quality Control Report

Workorder: L2185217

Report Date: 24-OCT-18

Page 13 of 14

Client: Morrison Hershfield Limited (Ottawa)  
 2440 Don Reid Drive  
 Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	Soil							
<b>Batch</b>	<b>R4295760</b>							
<b>WG2911092-5 MS</b>		<b>L2184461-6</b>						
1,2-Dichloropropane			110.5		%		50-140	24-OCT-18
1,3-Dichlorobenzene			125.8		%		50-140	24-OCT-18
1,4-Dichlorobenzene			125.8		%		50-140	24-OCT-18
Acetone			82.2		%		50-140	24-OCT-18
Benzene			119.5		%		50-140	24-OCT-18
Bromodichloromethane			109.3		%		50-140	24-OCT-18
Bromoform			90.3		%		50-140	24-OCT-18
Bromomethane			105.9		%		50-140	24-OCT-18
Carbon tetrachloride			122.4		%		50-140	24-OCT-18
Chlorobenzene			120.0		%		50-140	24-OCT-18
Chloroform			117.1		%		50-140	24-OCT-18
cis-1,2-Dichloroethylene			116.2		%		50-140	24-OCT-18
cis-1,3-Dichloropropene			104.9		%		50-140	24-OCT-18
Dibromochloromethane			101.5		%		50-140	24-OCT-18
Dichlorodifluoromethane			74.6		%		50-140	24-OCT-18
Ethylbenzene			128.3		%		50-140	24-OCT-18
n-Hexane			103.0		%		50-140	24-OCT-18
Methylene Chloride			108.9		%		50-140	24-OCT-18
MTBE			117.6		%		50-140	24-OCT-18
m+p-Xylenes			126.7		%		50-140	24-OCT-18
Methyl Ethyl Ketone			86.3		%		50-140	24-OCT-18
Methyl Isobutyl Ketone			81.5		%		50-140	24-OCT-18
o-Xylene			121.1		%		50-140	24-OCT-18
Styrene			117.9		%		50-140	24-OCT-18
Tetrachloroethylene			127.8		%		50-140	24-OCT-18
Toluene			126.4		%		50-140	24-OCT-18
trans-1,2-Dichloroethylene			118.9		%		50-140	24-OCT-18
trans-1,3-Dichloropropene			102.1		%		50-140	24-OCT-18
Trichloroethylene			125.1		%		50-140	24-OCT-18
Trichlorofluoromethane			121.8		%		50-140	24-OCT-18
Vinyl chloride			107.6		%		50-140	24-OCT-18

# Quality Control Report

Workorder: L2185217

Report Date: 24-OCT-18

Client: Morrison Hershfield Limited (Ottawa)  
2440 Don Reid Drive  
Ottawa ON K1H 1E1

Page 14 of 14

Contact: Mitchell Dawley

## Legend:

---

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

## Sample Parameter Qualifier Definitions:

---

Qualifier	Description
DUP-H	Duplicate results outside ALS DQO, due to sample heterogeneity.
DUP-H,J	Duplicate results outside ALS DQO, due to sample heterogeneity. Duplicate results and limits are expressed in terms of absolute difference.
J	Duplicate results and limits are expressed in terms of absolute difference.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

---

## Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

---

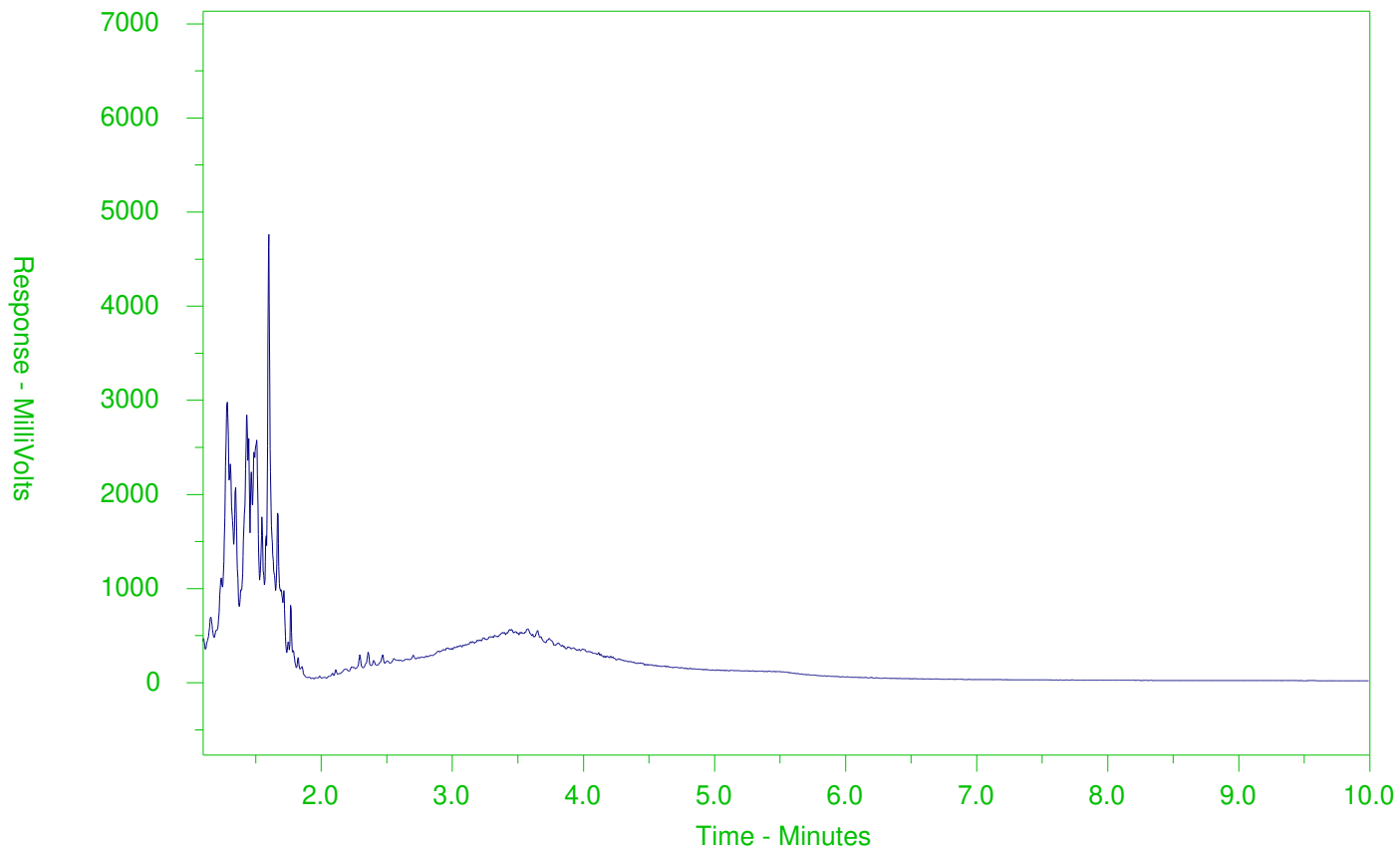
The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

# CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: L2185217-1  
 Client Sample ID: BS-5 SA6



← F2 →		← F3 →		← F4 →	
nC10	nC16		nC34		nC50
174°C	287°C		481°C		575°C
346°F	549°F		898°F		1067°F
Gasoline →			← Motor Oils/Lube Oils/Grease		
← Diesel/Jet Fuels →					

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

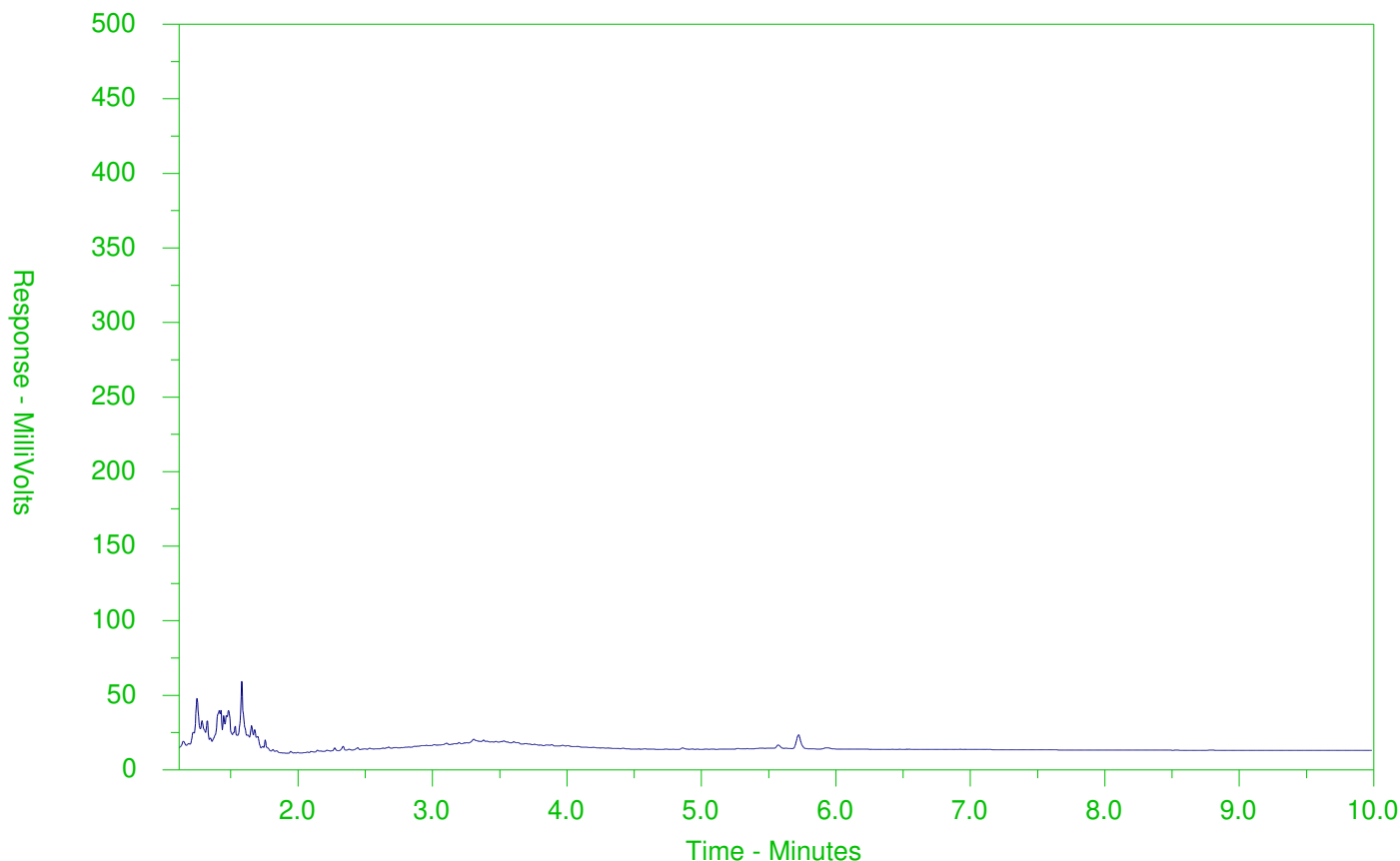
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at [www.alsglobal.com](http://www.alsglobal.com).

# CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: L2185217-2  
 Client Sample ID: BS-5 SA10



← F2 →		← F3 →		← F4 →	
nC10	nC16		nC34		nC50
174°C	287°C		481°C		575°C
346°F	549°F		898°F		1067°F
Gasoline →			← Motor Oils/Lube Oils/Grease		
← Diesel/Jet Fuels →					

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

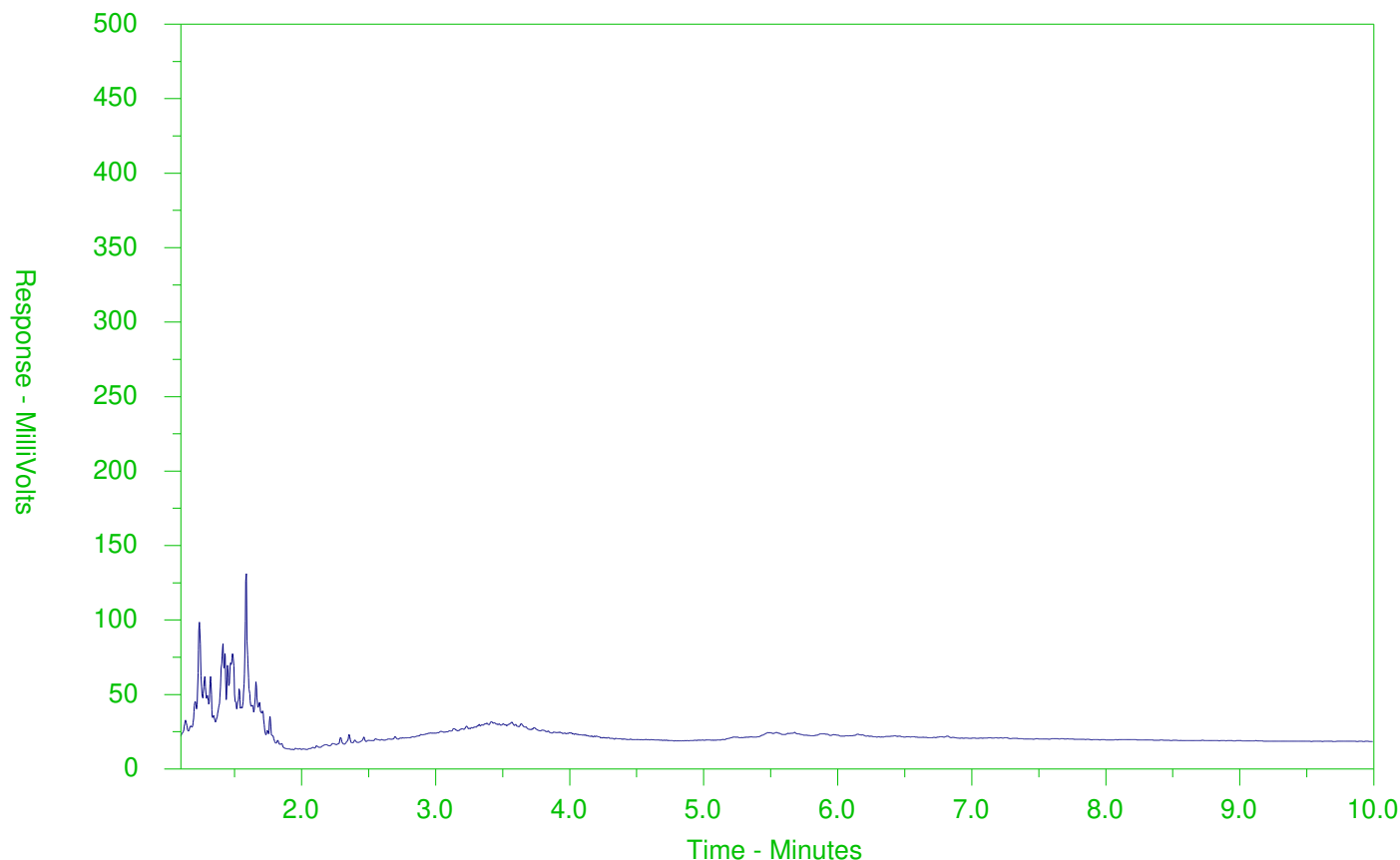
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at [www.alsglobal.com](http://www.alsglobal.com).

# CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: L2185217-3  
 Client Sample ID: BS-5 SA21



← F2 →		← F3 →		← F4 →	
nC10	nC16		nC34		nC50
174°C	287°C		481°C		575°C
346°F	549°F		898°F		1067°F
Gasoline →			← Motor Oils/Lube Oils/Grease		
← Diesel/Jet Fuels →					

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

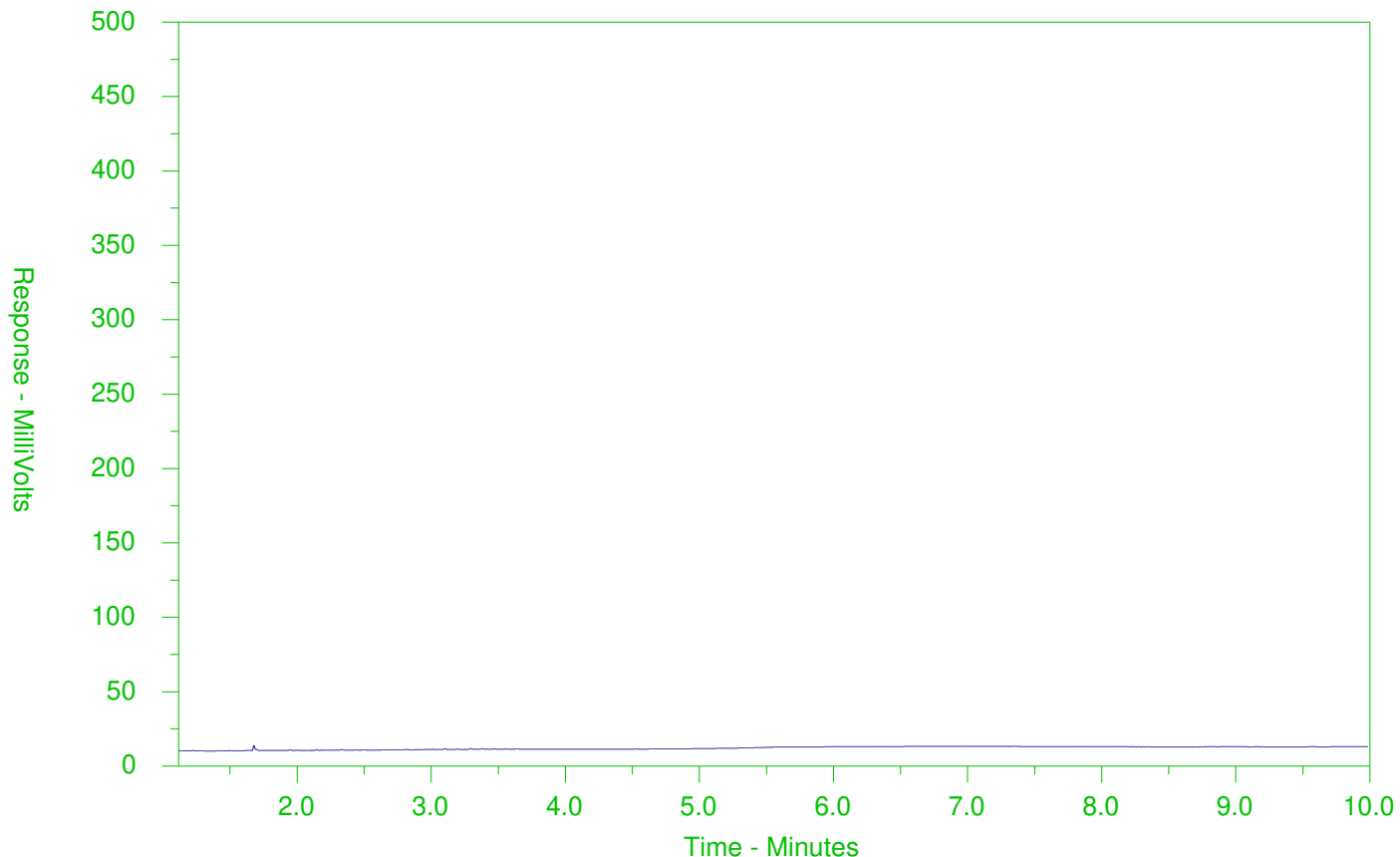
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at [www.alsglobal.com](http://www.alsglobal.com).

# CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: L2185217-5  
 Client Sample ID: BS-4 SA6



← F2 →		← F3 →		← F4 →	
nC10	nC16		nC34		nC50
174°C	287°C		481°C		575°C
346°F	549°F		898°F		1067°F
Gasoline →			← Motor Oils/Lube Oils/Grease		
← Diesel/Jet Fuels →					

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at [www.alsglobal.com](http://www.alsglobal.com).



# Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

www.alsglobal.com



COC Number: 15 -

Page of

<b>Report To</b> Contact and company name below will appear on the final report		<b>Report Format / Distribution</b>			<b>Select Service Level Below - Please confirm all E&amp;P TATs with your AM - surcharges will apply</b>																																				
Company: Morrison Hershfield (Ottawa) - 24800		Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL)			<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="5" style="text-align: center;"><b>Regular [R]</b> <i>AM</i> Standard TAT if received by 3 pm - business days - no surcharges apply</td> </tr> <tr> <td rowspan="3" style="writing-mode: vertical-rl; transform: rotate(180deg);">PRIORITY (Business Days)</td> <td>4 day [P4]</td> <td><input type="checkbox"/></td> <td rowspan="3" style="writing-mode: vertical-rl; transform: rotate(180deg);">EMERGENCY</td> <td colspan="2">1 Business day [E1]</td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td>3 day [P3]</td> <td><input type="checkbox"/></td> <td colspan="2">Same Day, Weekend or Statutory holiday [E0]</td> <td><input type="checkbox"/></td> </tr> <tr> <td>2 day [P2]</td> <td><input type="checkbox"/></td> <td colspan="2"></td> <td></td> </tr> </table>					<b>Regular [R]</b> <i>AM</i> Standard TAT if received by 3 pm - business days - no surcharges apply					PRIORITY (Business Days)	4 day [P4]	<input type="checkbox"/>	EMERGENCY	1 Business day [E1]		<input checked="" type="checkbox"/>	3 day [P3]	<input type="checkbox"/>	Same Day, Weekend or Statutory holiday [E0]		<input type="checkbox"/>	2 day [P2]	<input type="checkbox"/>													
<b>Regular [R]</b> <i>AM</i> Standard TAT if received by 3 pm - business days - no surcharges apply																																									
PRIORITY (Business Days)	4 day [P4]	<input type="checkbox"/>	EMERGENCY	1 Business day [E1]		<input checked="" type="checkbox"/>																																			
	3 day [P3]	<input type="checkbox"/>		Same Day, Weekend or Statutory holiday [E0]		<input type="checkbox"/>																																			
	2 day [P2]	<input type="checkbox"/>																																							
Contact: Mitchell Dawley		Quality Control (QC) Report with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO			Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm																																				
Phone: 613-739-2910 x1022235		<input checked="" type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked			For tests that can not be performed according to the service level selected, you will be contacted.																																				
Company address below will appear on the final report		Select Distribution: <input type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX			<b>Analysis Request</b>																																				
Street: 2440 Don Reid Drive		Email 1 or Fax: MDawley@morrisonhershfield.com			Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below																																				
City/Province: Ottawa, ON		Email 2: CGroulx@morrisonhershfield.com			<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">Reg. 153 complete Metals</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">VOC / FI-F4</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">PAH</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">Metals and Inorganics</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">TCLP - b1a/p</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">TCLP - Metals and Inorganics</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">TCLP - VOCs</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">Number of Containers</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>					Reg. 153 complete Metals	VOC / FI-F4	PAH	Metals and Inorganics	TCLP - b1a/p	TCLP - Metals and Inorganics	TCLP - VOCs	Number of Containers																								
Reg. 153 complete Metals	VOC / FI-F4	PAH	Metals and Inorganics	TCLP - b1a/p						TCLP - Metals and Inorganics	TCLP - VOCs	Number of Containers																													
Postal Code: K1H 1E1		Email 3:																																							
<b>Invoice To</b>		<b>Invoice Distribution</b>																																							
Same as Report To <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX																																							
Copy of Invoice with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		Email 1 or Fax: MDawley@morrisonhershfield.com																																							
Company:		Email 2: CGroulx@morrisonhershfield.com																																							
Contact:																																									
<b>Project Information</b>				<b>Oil and Gas Required Fields (client use)</b>																																					
ALS Account # / Quote #: Q70413		AFE/Cost Center:		PO#:																																					
Job #: 180564799		Major/Minor Code:		Routing Code:																																					
PO / AFE:		Requisitioner:																																							
LSD:		Location:																																							
ALS Lab Work Order # (lab use only) <b>L2185217</b>		ALS Contact: Melanie Moshl		Sampler:																																					
ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)			Date (dd-mmm-yy)	Time (hh:mm)	Sample Type																																			
	BS-5 SA6			19-10-18	10:00 AM	Soil	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	4																																
	BS-5 SA10			"	11:30 AM	"	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	3																																
	BS-5 SA21			"	12:20	"	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	3																																
	BS-4 SA4			"	2:30	"	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1																																
	BS-4 SA6			"	3:30	"	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	3																																
<b>Drinking Water (DW) Samples<sup>1</sup> (client use)</b>		<b>Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)</b>			<b>SAMPLE CONDITION AS RECEIVED (lab use only)</b>																																				
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		MOECC T1 APIC; MOECC T3 ILL CAMS and MOECC Table 1 Perform Metals analysis for BS-5 SA 6			Frozen <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/>																																				
Are samples for human drinking water use? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO					Ice Packs <input type="checkbox"/> Ice Cubes <input type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>																																				
					Cooling Initiated <input type="checkbox"/>																																				
					INITIAL COOLER TEMPERATURES °C		FINAL COOLER TEMPERATURES °C																																		
					4.1		5.1																																		
<b>SHIPMENT RELEASE (client use)</b>				<b>INITIAL SHIPMENT RECEPTION (lab use only)</b>			<b>FINAL SHIPMENT RECEPTION (lab use only)</b>																																		
Released by: <i>[Signature]</i>		Date: 10/19/18	Time: 5:30 PM	Received by: <i>[Signature]</i>		Date: 20/10/18	Time: 1:30 PM	Received by: <i>[Signature]</i>		Date: 23-10-18	Time: 4:00 PM																														

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION  
 Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.  
 1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.  
 WHITE - LABORATORY COPY    YELLOW - CLIENT COPY    OCTOBER 2015 FRONT



Morrison Hershfield Limited (Ottawa)  
ATTN: Mitchell Dawley  
2440 Don Reid Drive  
Ottawa ON K1H 1E1

Date Received: 10- OCT- 18  
Report Date: 18- OCT- 18 10:32 (MT)  
Version: FINAL

Client Phone: 613- 739- 2910

## Certificate of Analysis

Lab Work Order #: L2178991  
Project P.O. #: NOT SUBMITTED  
Job Reference: 180564799  
C of C Numbers:  
Legal Site Desc:

Melanie Moshi  
Account Manager

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ADDRESS: 190 Colonnade Road, Unit 7, Ottawa, ON K2E 7J5 Canada | Phone: + 1 613 225 8279 | Fax: + 1 613 225 2801  
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ANALYTICAL GUIDELINE REPORT

180564799

Table with columns: Sample Details Grouping, Analyte, Result, Qualifier, D.L., Units, Analyzed, Guideline Limits (#1, #2, #3). Rows include Dissolved Metals (Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Chromium, Cobalt, Copper, Lead, Mercury, Molybdenum, Nickel, Selenium, Silver, Sodium, Thallium, Uranium, Vanadium, Zinc) and Speciated Metals (Chromium, Hexavalent). Also includes Volatile Organic Compounds (Acetone, Benzene, Bromodichloromethane, Bromoform, Bromomethane, Carbon tetrachloride, Chlorobenzene, Dibromochloromethane, Chloroform, 1,2-Dibromoethane, 1,2-Dichlorobenzene, 1,3-Dichlorobenzene, 1,4-Dichlorobenzene, Dichlorodifluoromethane, 1,1-Dichloroethane, 1,2-Dichloroethane, 1,1-Dichloroethylene, cis-1,2-Dichloroethylene, trans-1,2-Dichloroethylene, Methylene Chloride).

\*\* Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.

\* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T1/T3-WATER

#1: T1-Ground Water-All Types of Property Uses

#2: T3-Non-Potable Ground Water-All Types of Property Uses (Coarse)

#3: T3-Non-Potable Ground Water-All Types of Property Uses (Fine)



ANALYTICAL GUIDELINE REPORT

180564799

Table with columns: Sample Details Grouping, Analyte, Result, Qualifier, D.L., Units, Analyzed, Guideline Limits (#1, #2, #3). Includes sections for Volatile Organic Compounds and Hydrocarbons.

\*\* Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.

\* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T1/T3-WATER

#1: T1-Ground Water-All Types of Property Uses

#2: T3-Non-Potable Ground Water-All Types of Property Uses (Coarse)

#3: T3-Non-Potable Ground Water-All Types of Property Uses (Fine)



ANALYTICAL GUIDELINE REPORT

180564799

Table with columns: Sample Details Grouping, Analyte, Result, Qualifier, D.L., Units, Analyzed, and Guideline Limits (#1, #2, #3). Rows include Dissolved Metals (Cadmium, Chromium, Cobalt, Copper, Lead, Mercury, Molybdenum, Nickel, Selenium, Silver, Sodium, Thallium, Uranium, Vanadium, Zinc) and Speciated Metals (Chromium, Hexavalent). Volatile Organic Compounds include Acetone, Benzene, Bromodichloromethane, Bromoform, Bromomethane, Carbon tetrachloride, Chlorobenzene, Dibromochloromethane, Chloroform, 1,2-Dibromoethane, 1,2-Dichlorobenzene, 1,3-Dichlorobenzene, 1,4-Dichlorobenzene, Dichlorodifluoromethane, 1,1-Dichloroethane, 1,2-Dichloroethane, 1,1-Dichloroethylene, cis-1,2-Dichloroethylene, trans-1,2-Dichloroethylene, Methylene Chloride, 1,2-Dichloropropane, cis-1,3-Dichloropropene, trans-1,3-Dichloropropene, 1,3-Dichloropropene (cis & trans), Ethylbenzene, n-Hexane, Methyl Ethyl Ketone.

\*\* Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.

\* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T1/T3-WATER

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#2: T3-Non-Potable Ground Water-All Types of Property Uses (Coarse)

#3: T3-Non-Potable Ground Water-All Types of Property Uses (Fine)



ANALYTICAL GUIDELINE REPORT

180564799

Table with columns: Sample Details Grouping, Analyte, Result, Qualifier, D.L., Units, Analyzed, Guideline Limits (#1, #2, #3). Includes sections for Volatile Organic Compounds and Dissolved Metals.

\*\* Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.

\* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T1/T3-WATER

#1: T1-Ground Water-All Types of Property Uses

#2: T3-Non-Potable Ground Water-All Types of Property Uses (Coarse)

#3: T3-Non-Potable Ground Water-All Types of Property Uses (Fine)



ANALYTICAL GUIDELINE REPORT

180564799

Sample Details		Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits		
Grouping	Analyte						#1	#2	#3
L2178991-3	EW-5								
Sampled By: CLIENT on 09-OCT-18 @ 16:20									
Matrix: WATER									
<b>Dissolved Metals</b>									
	Nickel (Ni)-Dissolved	2.29		0.50	ug/L	15-OCT-18	14	490	490
	Selenium (Se)-Dissolved	0.880		0.050	ug/L	15-OCT-18	5	63	63
	Silver (Ag)-Dissolved	<0.050		0.050	ug/L	15-OCT-18	0.3	1.5	1.5
	Sodium (Na)-Dissolved	136000	DLHC	500	ug/L	15-OCT-18	490000	2300000	2300000
	Thallium (Tl)-Dissolved	<0.010		0.010	ug/L	15-OCT-18	0.5	510	510
	Uranium (U)-Dissolved	5.54		0.010	ug/L	15-OCT-18	8.9	420	420
	Vanadium (V)-Dissolved	2.25		0.50	ug/L	15-OCT-18	3.9	250	250
	Zinc (Zn)-Dissolved	<1.0		1.0	ug/L	15-OCT-18	160	1100	1100
<b>Speciated Metals</b>									
	Chromium, Hexavalent	<0.50		0.50	ug/L	11-OCT-18	25	140	140
<b>Volatile Organic Compounds</b>									
	Acetone	<30	OWP	30	ug/L	18-OCT-18	2700	130000	130000
	Benzene	<0.50	OWP	0.50	ug/L	18-OCT-18	0.5	44	430
	Bromodichloromethane	<2.0	OWP	2.0	ug/L	18-OCT-18	2	85000	85000
	Bromoform	<5.0	OWP	5.0	ug/L	18-OCT-18	5	380	770
	Bromomethane	<0.50	OWP	0.50	ug/L	18-OCT-18	0.89	5.6	56
	Carbon tetrachloride	<0.20	OWP	0.20	ug/L	18-OCT-18	0.2	0.79	8.4
	Chlorobenzene	<0.50	OWP	0.50	ug/L	18-OCT-18	0.5	630	630
	Dibromochloromethane	<2.0	OWP	2.0	ug/L	18-OCT-18	2	82000	82000
	Chloroform	<1.0	OWP	1.0	ug/L	18-OCT-18	2	2.4	22
	1,2-Dibromoethane	<0.20	OWP	0.20	ug/L	18-OCT-18	0.2	0.25	0.83
	1,2-Dichlorobenzene	<0.50	OWP	0.50	ug/L	18-OCT-18	0.5	4600	9600
	1,3-Dichlorobenzene	<0.50	OWP	0.50	ug/L	18-OCT-18	0.5	9600	9600
	1,4-Dichlorobenzene	<0.50	OWP	0.50	ug/L	18-OCT-18	0.5	8	67
	Dichlorodifluoromethane	<2.0	OWP	2.0	ug/L	18-OCT-18	590	4400	4400
	1,1-Dichloroethane	<0.50	OWP	0.50	ug/L	18-OCT-18	0.5	320	3100
	1,2-Dichloroethane	<0.50	OWP	0.50	ug/L	18-OCT-18	0.5	1.6	12
	1,1-Dichloroethylene	<0.50	OWP	0.50	ug/L	18-OCT-18	0.5	1.6	17
	cis-1,2-Dichloroethylene	<0.50	OWP	0.50	ug/L	18-OCT-18	1.6	1.6	17
	trans-1,2-Dichloroethylene	<0.50	OWP	0.50	ug/L	18-OCT-18	1.6	1.6	17
	Methylene Chloride	<5.0	OWP	5.0	ug/L	18-OCT-18	5	610	5500
	1,2-Dichloropropane	<0.50	OWP	0.50	ug/L	18-OCT-18	0.5	16	140
	cis-1,3-Dichloropropene	<0.30	OWP	0.30	ug/L	18-OCT-18			
	trans-1,3-Dichloropropene	<0.30	OWP	0.30	ug/L	18-OCT-18			
	1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	18-OCT-18	0.5	5.2	45
	Ethylbenzene	<0.50	OWP	0.50	ug/L	18-OCT-18	0.5	2300	2300
	n-Hexane	<0.50	OWP	0.50	ug/L	18-OCT-18	5	51	520
	Methyl Ethyl Ketone	<20	OWP	20	ug/L	18-OCT-18	400	470000	1500000
	Methyl Isobutyl Ketone	<20	OWP	20	ug/L	18-OCT-18	640	140000	580000
	MTBE	<2.0	OWP	2.0	ug/L	18-OCT-18	15	190	1400
	Styrene	<0.50	OWP	0.50	ug/L	18-OCT-18	0.5	1300	9100
	1,1,1,2-Tetrachloroethane	<0.50	OWP	0.50	ug/L	18-OCT-18	1.1	3.3	28
	1,1,2,2-Tetrachloroethane	<0.50	OWP	0.50	ug/L	18-OCT-18	0.5	3.2	15
	Tetrachloroethylene	<0.50	OWP	0.50	ug/L	18-OCT-18	0.5	1.6	17
	Toluene	<0.50	OWP	0.50	ug/L	18-OCT-18	0.8	18000	18000

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T1/T3-WATER

#1: T1-Ground Water-All Types of Property Uses

#2: T3-Non-Potable Ground Water-All Types of Property Uses (Coarse)

#3: T3-Non-Potable Ground Water-All Types of Property Uses (Fine)



# ANALYTICAL GUIDELINE REPORT

180564799

Sample Details		Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits		
Grouping	Analyte						#1	#2	#3
L2178991-3	EW-5								
Sampled By: CLIENT on 09-OCT-18 @ 16:20									
Matrix: WATER									
<b>Volatile Organic Compounds</b>									
	1,1,1-Trichloroethane	<0.50	OWP	0.50	ug/L	18-OCT-18	0.5	640	6700
	1,1,2-Trichloroethane	<0.50	OWP	0.50	ug/L	18-OCT-18	0.5	4.7	30
	Trichloroethylene	<0.50	OWP	0.50	ug/L	18-OCT-18	0.5	1.6	17
	Trichlorofluoromethane	<5.0	OWP	5.0	ug/L	18-OCT-18	150	2500	2500
	Vinyl chloride	<0.50	OWP	0.50	ug/L	18-OCT-18	0.5	0.5	1.7
	o-Xylene	<0.30	OWP	0.30	ug/L	18-OCT-18			
	m+p-Xylenes	<0.40	OWP	0.40	ug/L	18-OCT-18			
	Xylenes (Total)	<0.50		0.50	ug/L	18-OCT-18	72	4200	4200
	Surrogate: 4-Bromofluorobenzene	90.5		70-130	%	18-OCT-18			
	Surrogate: 1,4-Difluorobenzene	95.6		70-130	%	18-OCT-18			
<b>Hydrocarbons</b>									
	F1 (C6-C10)	<25	OWP	25	ug/L	18-OCT-18	420	750	750
	F1-BTEX	<25		25	ug/L	18-OCT-18	420	750	750
	F2 (C10-C16)	200		100	ug/L	12-OCT-18	*150	*150	*150
	F3 (C16-C34)	250		250	ug/L	12-OCT-18	500	500	500
	F4 (C34-C50)	<250		250	ug/L	12-OCT-18	500	500	500
	Total Hydrocarbons (C6-C50)	460		370	ug/L	18-OCT-18			
	Chrom. to baseline at nC50	YES			No Unit	12-OCT-18			
	Surrogate: 2-Bromobenzotrifluoride	84.3		60-140	%	12-OCT-18			
	Surrogate: 3,4-Dichlorotoluene	70.8		60-140	%	18-OCT-18			
L2178991-4	EW-5D								
Sampled By: CLIENT on 09-OCT-18 @ 16:30									
Matrix: WATER									
<b>Dissolved Metals</b>									
	Dissolved Mercury Filtration Location	FIELD			No Unit	12-OCT-18			
	Dissolved Metals Filtration Location	FIELD			No Unit	12-OCT-18			
	Antimony (Sb)-Dissolved	<0.10		0.10	ug/L	15-OCT-18	1.5	20000	20000
	Arsenic (As)-Dissolved	0.80		0.10	ug/L	15-OCT-18	13	1900	1900
	Barium (Ba)-Dissolved	196		0.10	ug/L	15-OCT-18	610	29000	29000
	Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	15-OCT-18	0.5	67	67
	Boron (B)-Dissolved	26		10	ug/L	15-OCT-18	1700	45000	45000
	Cadmium (Cd)-Dissolved	<0.010		0.010	ug/L	15-OCT-18	0.5	2.7	2.7
	Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	15-OCT-18	11	810	810
	Cobalt (Co)-Dissolved	1.79		0.10	ug/L	15-OCT-18	3.8	66	66
	Copper (Cu)-Dissolved	0.30		0.20	ug/L	15-OCT-18	5	87	87
	Lead (Pb)-Dissolved	<0.050		0.050	ug/L	15-OCT-18	1.9	25	25
	Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	12-OCT-18	0.1	0.29	2.8
	Molybdenum (Mo)-Dissolved	1.68		0.050	ug/L	15-OCT-18	23	9200	9200
	Nickel (Ni)-Dissolved	2.28		0.50	ug/L	15-OCT-18	14	490	490
	Selenium (Se)-Dissolved	0.909		0.050	ug/L	15-OCT-18	5	63	63
	Silver (Ag)-Dissolved	<0.050		0.050	ug/L	15-OCT-18	0.3	1.5	1.5
	Sodium (Na)-Dissolved	141000	DLHC	500	ug/L	15-OCT-18	490000	2300000	2300000
	Thallium (Tl)-Dissolved	<0.010		0.010	ug/L	15-OCT-18	0.5	510	510
	Uranium (U)-Dissolved	5.84		0.010	ug/L	15-OCT-18	8.9	420	420
	Vanadium (V)-Dissolved	2.20		0.50	ug/L	15-OCT-18	3.9	250	250

\*\* Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.

\* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

**Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T1/T3-WATER**

#1: T1-Ground Water-All Types of Property Uses

#2: T3-Non-Potable Ground Water-All Types of Property Uses (Coarse)

#3: T3-Non-Potable Ground Water-All Types of Property Uses (Fine)



ANALYTICAL GUIDELINE REPORT

180564799

Table with columns: Sample Details Grouping, Analyte, Result, Qualifier, D.L., Units, Analyzed, Guideline Limits (#1, #2, #3). Rows include Dissolved Metals (Zinc), Speciated Metals (Chromium), and Volatile Organic Compounds (Acetone, Benzene, etc.).

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\* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T1/T3-WATER

#1: T1-Ground Water-All Types of Property Uses

#2: T3-Non-Potable Ground Water-All Types of Property Uses (Coarse)

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# ANALYTICAL GUIDELINE REPORT

180564799

Sample Details		Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits		
Grouping	Analyte						#1	#2	#3
L2178991-4	EW-5D								
Sampled By: CLIENT on 09-OCT-18 @ 16:30									
Matrix: WATER									
<b>Volatile Organic Compounds</b>									
Surrogate: 4-Bromofluorobenzene		90.8		70-130	%	18-OCT-18			
Surrogate: 1,4-Difluorobenzene		94.9		70-130	%	18-OCT-18			
<b>Hydrocarbons</b>									
F1 (C6-C10)		<25	OWP	25	ug/L	18-OCT-18	420	750	750
F1-BTEX		<25		25	ug/L	18-OCT-18	420	750	750
F2 (C10-C16)		240		100	ug/L	12-OCT-18	*150	*150	*150
F3 (C16-C34)		300		250	ug/L	12-OCT-18	500	500	500
F4 (C34-C50)		<250		250	ug/L	12-OCT-18	500	500	500
Total Hydrocarbons (C6-C50)		540		370	ug/L	18-OCT-18			
Chrom. to baseline at nC50		YES			No Unit	12-OCT-18			
Surrogate: 2-Bromobenzotrifluoride		88.1		60-140	%	12-OCT-18			
Surrogate: 3,4-Dichlorotoluene		73.6		60-140	%	18-OCT-18			
L2178991-5	EW-2								
Sampled By: CLIENT on 09-OCT-18 @ 18:00									
Matrix: WATER									
<b>Dissolved Metals</b>									
Dissolved Mercury Filtration Location		FIELD			No Unit	12-OCT-18			
Dissolved Metals Filtration Location		FIELD			No Unit	12-OCT-18			
Antimony (Sb)-Dissolved		<0.10		0.10	ug/L	15-OCT-18	1.5	20000	20000
Arsenic (As)-Dissolved		<0.10		0.10	ug/L	15-OCT-18	13	1900	1900
Barium (Ba)-Dissolved		186		0.10	ug/L	15-OCT-18	610	29000	29000
Beryllium (Be)-Dissolved		<0.10		0.10	ug/L	15-OCT-18	0.5	67	67
Boron (B)-Dissolved		23		10	ug/L	15-OCT-18	1700	45000	45000
Cadmium (Cd)-Dissolved		0.011		0.010	ug/L	15-OCT-18	0.5	2.7	2.7
Chromium (Cr)-Dissolved		1.18		0.50	ug/L	15-OCT-18	11	810	810
Cobalt (Co)-Dissolved		0.18		0.10	ug/L	15-OCT-18	3.8	66	66
Copper (Cu)-Dissolved		1.12		0.20	ug/L	15-OCT-18	5	87	87
Lead (Pb)-Dissolved		<0.050		0.050	ug/L	15-OCT-18	1.9	25	25
Mercury (Hg)-Dissolved		<0.010		0.010	ug/L	12-OCT-18	0.1	0.29	2.8
Molybdenum (Mo)-Dissolved		1.09		0.050	ug/L	15-OCT-18	23	9200	9200
Nickel (Ni)-Dissolved		1.29		0.50	ug/L	15-OCT-18	14	490	490
Selenium (Se)-Dissolved		0.209		0.050	ug/L	15-OCT-18	5	63	63
Silver (Ag)-Dissolved		<0.050		0.050	ug/L	15-OCT-18	0.3	1.5	1.5
Sodium (Na)-Dissolved		110000	DLHC	500	ug/L	15-OCT-18	490000	2300000	2300000
Thallium (Tl)-Dissolved		0.021		0.010	ug/L	15-OCT-18	0.5	510	510
Uranium (U)-Dissolved		1.80		0.010	ug/L	15-OCT-18	8.9	420	420
Vanadium (V)-Dissolved		1.10		0.50	ug/L	15-OCT-18	3.9	250	250
Zinc (Zn)-Dissolved		<1.0		1.0	ug/L	15-OCT-18	160	1100	1100
<b>Speciated Metals</b>									
Chromium, Hexavalent		1.32		0.50	ug/L	11-OCT-18	25	140	140
<b>Volatile Organic Compounds</b>									
Acetone		<30	OWP	30	ug/L	17-OCT-18	2700	130000	130000
Benzene		<0.50	OWP	0.50	ug/L	17-OCT-18	0.5	44	430
Bromodichloromethane		<2.0	OWP	2.0	ug/L	17-OCT-18	2	85000	85000
Bromoform		<5.0	OWP	5.0	ug/L	17-OCT-18			

\*\* Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.

\* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

**Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T1/T3-WATER**

#1: T1-Ground Water-All Types of Property Uses

#2: T3-Non-Potable Ground Water-All Types of Property Uses (Coarse)

#3: T3-Non-Potable Ground Water-All Types of Property Uses (Fine)



ANALYTICAL GUIDELINE REPORT

180564799

Table with columns: Sample Details Grouping, Analyte, Result, Qualifier, D.L., Units, Analyzed, and Guideline Limits (#1, #2, #3). Rows include Volatile Organic Compounds and Hydrocarbons.

\*\* Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T1/T3-WATER

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#3: T3-Non-Potable Ground Water-All Types of Property Uses (Fine)



# ANALYTICAL GUIDELINE REPORT

180564799

Sample Details		Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits		
Grouping	Analyte						#1	#2	#3
L2178991-5	EW-2								
Sampled By: CLIENT on 09-OCT-18 @ 18:00									
Matrix: WATER									
<b>Hydrocarbons</b>									
F4 (C34-C50)		<250		250	ug/L	12-OCT-18	500	500	500
Total Hydrocarbons (C6-C50)		<370		370	ug/L	17-OCT-18			
Chrom. to baseline at nC50		YES			No Unit	12-OCT-18			
Surrogate: 2-Bromobenzotrifluoride		80.6		60-140	%	12-OCT-18			
Surrogate: 3,4-Dichlorotoluene		80.2		60-140	%	17-OCT-18			

\*\* Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.

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**Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T1/T3-WATER**

#1: T1-Ground Water-All Types of Property Uses

#2: T3-Non-Potable Ground Water-All Types of Property Uses (Coarse)

#3: T3-Non-Potable Ground Water-All Types of Property Uses (Fine)

## Reference Information

**Sample Parameter Qualifier key listed:**

Qualifier	Description
OWP	Organic water sample contained visible sediment (must be included as part of analysis). Measured concentrations of organic substances in water can be biased high due to presence of sediment.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).

**Methods Listed (if applicable):**

ALS Test Code	Matrix	Test Description	Method Reference***
CR-CR6-IC-R511-WT	Water	Hex Chrom-O.Reg 153/04 (July 2011)	EPA 7199
<p>This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 7199, published by the United States Environmental Protection Agency (EPA). The procedure involves analysis for chromium (VI) by ion chromatography using diphenylcarbazide in a sulphuric acid solution. Chromium (III) is calculated as the difference between the total chromium and the chromium (VI) results.</p> <p>Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).</p>			
F1-F4-511-CALC-WT	Water	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-L

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.  
 In samples where BTEX and F1 were analyzed, F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:

1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:

1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT	Water	F1-O.Reg 153/04 (July 2011)	E3398/CCME TIER 1-HS
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Fraction F1 is determined by analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-511-WT	Water	F2-F4-O.Reg 153/04 (July 2011)	EPA 3511/CCME Tier 1
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Petroleum Hydrocarbons (F2-F4 fractions) are extracted from water using a hexane micro-extraction technique. Instrumental analysis is by GC-FID, as per the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Tier 1 Method, CCME, 2001.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

HG-D-UG/L-CVAA-WT	Water	Diss. Mercury in Water by CVAAS (ug/L)	EPA 1631E (mod)
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Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

MET-D-UG/L-MS-WT	Water	Diss. Metals in Water by ICPMS (ug/L)	EPA 200.8
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The metal constituents of a non-acidified sample that pass through a membrane filter prior to ICP/MS analysis.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

VOC-1,3-DCP-CALC-WT	Water	Regulation 153 VOCs	SW8260B/SW8270C
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## Reference Information

VOC-511-HS-WT      Water      VOC by GCMS HS O.Reg      SW846 8260  
 153/04 (July 2011)

Liquid samples are analyzed by headspace GC/MSD.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

XYLENES-SUM-CALC-      Water      Sum of Xylene Isomer      CALCULATION  
 WT      Concentrations

Total xylenes represents the sum of o-xylene and m&p-xylene.

\*\*\* ALS test methods may incorporate modifications from specified reference methods to improve performance.

Chain of Custody numbers:

*The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:*

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA		

#### GLOSSARY OF REPORT TERMS

*Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.*

*mg/kg - milligrams per kilogram based on dry weight of sample*

*mg/kg wwt - milligrams per kilogram based on wet weight of sample*

*mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight*

*mg/L - unit of concentration based on volume, parts per million.*

*< - Less than.*

*D.L. - The reporting limit.*

*N/A - Result not available. Refer to qualifier code and definition for explanation.*

*Test results reported relate only to the samples as received by the laboratory.*

*UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.*

*Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.*

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guideline limits are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.



# Quality Control Report

Workorder: L2178991

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Client: Morrison Hershfield Limited (Ottawa)  
 2440 Don Reid Drive  
 Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CR-CR6-IC-R511-WT	Water							
<b>Batch</b>	<b>R4273888</b>							
<b>WG2900949-4</b>	<b>DUP</b>	<b>WG2900949-3</b>						
Chromium, Hexavalent		<0.50	<0.50	RPD-NA	ug/L	N/A	20	11-OCT-18
<b>WG2900949-2</b>	<b>LCS</b>							
Chromium, Hexavalent			100.2		%		80-120	11-OCT-18
<b>WG2900949-1</b>	<b>MB</b>							
Chromium, Hexavalent			<0.50		ug/L		0.5	11-OCT-18
<b>WG2900949-5</b>	<b>MS</b>	<b>WG2900949-3</b>						
Chromium, Hexavalent			98.7		%		70-130	11-OCT-18
F1-HS-511-WT	Water							
<b>Batch</b>	<b>R4283278</b>							
<b>WG2901883-4</b>	<b>DUP</b>	<b>WG2901883-3</b>						
F1 (C6-C10)		<25	<25	RPD-NA	ug/L	N/A	30	17-OCT-18
<b>WG2901883-1</b>	<b>LCS</b>							
F1 (C6-C10)			100.0		%		80-120	17-OCT-18
<b>WG2901883-2</b>	<b>MB</b>							
F1 (C6-C10)			<25		ug/L		25	17-OCT-18
Surrogate: 3,4-Dichlorotoluene			75.6		%		60-140	17-OCT-18
<b>WG2901883-5</b>	<b>MS</b>	<b>WG2901883-3</b>						
F1 (C6-C10)			86.6		%		60-140	18-OCT-18
F2-F4-511-WT	Water							
<b>Batch</b>	<b>R4275376</b>							
<b>WG2900968-2</b>	<b>LCS</b>							
F2 (C10-C16)			118.2		%		70-130	12-OCT-18
F3 (C16-C34)			123.6		%		70-130	12-OCT-18
F4 (C34-C50)			119.1		%		70-130	12-OCT-18
<b>WG2900968-3</b>	<b>LCSD</b>	<b>WG2900968-2</b>						
F2 (C10-C16)		118.2	115.3		%	2.6	50	12-OCT-18
F3 (C16-C34)		123.6	118.6		%	4.1	50	12-OCT-18
F4 (C34-C50)		119.1	113.9		%	4.5	50	12-OCT-18
<b>WG2900968-1</b>	<b>MB</b>							
F2 (C10-C16)			<100		ug/L		100	12-OCT-18
F3 (C16-C34)			<250		ug/L		250	12-OCT-18
F4 (C34-C50)			<250		ug/L		250	12-OCT-18
Surrogate: 2-Bromobenzotrifluoride			85.3		%		60-140	12-OCT-18
HG-D-UG/L-CVAA-WT	Water							



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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-D-UG/L-CVAA-WT Water								
<b>Batch R4274953</b>								
<b>WG2901702-3 DUP</b>		<b>L2178853-1</b>						
Mercury (Hg)-Dissolved		<0.010	<0.010	RPD-NA	ug/L	N/A	20	12-OCT-18
<b>WG2901702-2 LCS</b>								
Mercury (Hg)-Dissolved			92.4		%		80-120	12-OCT-18
<b>WG2901702-1 MB</b>								
Mercury (Hg)-Dissolved			<0.010		ug/L		0.01	12-OCT-18
<b>WG2901702-4 MS</b>		<b>L2178853-2</b>						
Mercury (Hg)-Dissolved			96.2		%		70-130	12-OCT-18
MET-D-UG/L-MS-WT Water								
<b>Batch R4278129</b>								
<b>WG2901491-4 DUP</b>		<b>WG2901491-3</b>						
Antimony (Sb)-Dissolved		<1.0	<1.0	RPD-NA	ug/L	N/A	20	15-OCT-18
Arsenic (As)-Dissolved		<1.0	<1.0	RPD-NA	ug/L	N/A	20	15-OCT-18
Barium (Ba)-Dissolved		124	130		ug/L	4.6	20	15-OCT-18
Beryllium (Be)-Dissolved		<1.0	<1.0	RPD-NA	ug/L	N/A	20	15-OCT-18
Boron (B)-Dissolved		<100	<100	RPD-NA	ug/L	N/A	20	15-OCT-18
Cadmium (Cd)-Dissolved		<0.050	<0.050	RPD-NA	ug/L	N/A	20	15-OCT-18
Chromium (Cr)-Dissolved		<5.0	<5.0	RPD-NA	ug/L	N/A	20	15-OCT-18
Cobalt (Co)-Dissolved		<1.0	<1.0	RPD-NA	ug/L	N/A	20	15-OCT-18
Copper (Cu)-Dissolved		<2.0	<2.0	RPD-NA	ug/L	N/A	20	15-OCT-18
Lead (Pb)-Dissolved		<0.50	<0.50	RPD-NA	ug/L	N/A	20	15-OCT-18
Molybdenum (Mo)-Dissolved		2.57	2.58		ug/L	0.1	20	15-OCT-18
Nickel (Ni)-Dissolved		<5.0	<5.0	RPD-NA	ug/L	N/A	20	15-OCT-18
Selenium (Se)-Dissolved		0.64	0.52	J	ug/L	0.12	1	15-OCT-18
Silver (Ag)-Dissolved		<0.50	<0.50	RPD-NA	ug/L	N/A	20	15-OCT-18
Sodium (Na)-Dissolved		375000	361000		ug/L	3.6	20	15-OCT-18
Thallium (Tl)-Dissolved		<0.10	<0.10	RPD-NA	ug/L	N/A	20	15-OCT-18
Uranium (U)-Dissolved		27.1	26.2		ug/L	3.6	20	15-OCT-18
Vanadium (V)-Dissolved		<5.0	<5.0	RPD-NA	ug/L	N/A	20	15-OCT-18
Zinc (Zn)-Dissolved		<10	<10	RPD-NA	ug/L	N/A	20	15-OCT-18
<b>WG2901491-2 LCS</b>								
Antimony (Sb)-Dissolved			109.8		%		80-120	15-OCT-18
Arsenic (As)-Dissolved			99.7		%		80-120	15-OCT-18
Barium (Ba)-Dissolved			101.0		%		80-120	15-OCT-18
Beryllium (Be)-Dissolved			103.7		%		80-120	15-OCT-18



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 2440 Don Reid Drive  
 Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	Water							
<b>Batch</b>	<b>R4278129</b>							
<b>WG2901491-2 LCS</b>								
Boron (B)-Dissolved			98.3		%		80-120	15-OCT-18
Cadmium (Cd)-Dissolved			100.3		%		80-120	15-OCT-18
Chromium (Cr)-Dissolved			100.0		%		80-120	15-OCT-18
Cobalt (Co)-Dissolved			99.6		%		80-120	15-OCT-18
Copper (Cu)-Dissolved			100.6		%		80-120	15-OCT-18
Lead (Pb)-Dissolved			103.7		%		80-120	15-OCT-18
Molybdenum (Mo)-Dissolved			104.3		%		80-120	15-OCT-18
Nickel (Ni)-Dissolved			99.9		%		80-120	15-OCT-18
Selenium (Se)-Dissolved			99.8		%		80-120	15-OCT-18
Silver (Ag)-Dissolved			105.7		%		80-120	15-OCT-18
Sodium (Na)-Dissolved			106.0		%		80-120	15-OCT-18
Thallium (Tl)-Dissolved			101.4		%		80-120	15-OCT-18
Uranium (U)-Dissolved			100.6		%		80-120	15-OCT-18
Vanadium (V)-Dissolved			101.3		%		80-120	15-OCT-18
Zinc (Zn)-Dissolved			100.9		%		80-120	15-OCT-18
<b>WG2901491-1 MB</b>								
Antimony (Sb)-Dissolved			<0.10		ug/L		0.1	15-OCT-18
Arsenic (As)-Dissolved			<0.10		ug/L		0.1	15-OCT-18
Barium (Ba)-Dissolved			<0.10		ug/L		0.1	15-OCT-18
Beryllium (Be)-Dissolved			<0.10		ug/L		0.1	15-OCT-18
Boron (B)-Dissolved			<10		ug/L		10	15-OCT-18
Cadmium (Cd)-Dissolved			<0.0050		ug/L		0.005	15-OCT-18
Chromium (Cr)-Dissolved			<0.50		ug/L		0.5	15-OCT-18
Cobalt (Co)-Dissolved			<0.10		ug/L		0.1	15-OCT-18
Copper (Cu)-Dissolved			<0.20		ug/L		0.2	15-OCT-18
Lead (Pb)-Dissolved			<0.050		ug/L		0.05	15-OCT-18
Molybdenum (Mo)-Dissolved			<0.050		ug/L		0.05	15-OCT-18
Nickel (Ni)-Dissolved			<0.50		ug/L		0.5	15-OCT-18
Selenium (Se)-Dissolved			<0.050		ug/L		0.05	15-OCT-18
Silver (Ag)-Dissolved			<0.050		ug/L		0.05	15-OCT-18
Sodium (Na)-Dissolved			<50		ug/L		50	15-OCT-18
Thallium (Tl)-Dissolved			<0.010		ug/L		0.01	15-OCT-18
Uranium (U)-Dissolved			<0.010		ug/L		0.01	15-OCT-18
Vanadium (V)-Dissolved			<0.50		ug/L		0.5	15-OCT-18



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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT		Water						
<b>Batch R4278129</b>								
<b>WG2901491-1 MB</b>								
Zinc (Zn)-Dissolved			<1.0		ug/L		1	15-OCT-18
<b>WG2901491-5 MS</b>		<b>WG2901491-6</b>						
Antimony (Sb)-Dissolved			101.3		%		70-130	15-OCT-18
Arsenic (As)-Dissolved			93.2		%		70-130	15-OCT-18
Barium (Ba)-Dissolved			N/A	MS-B	%		-	15-OCT-18
Beryllium (Be)-Dissolved			100.2		%		70-130	15-OCT-18
Cadmium (Cd)-Dissolved			94.7		%		70-130	15-OCT-18
Chromium (Cr)-Dissolved			72.8		%		70-130	15-OCT-18
Cobalt (Co)-Dissolved			89.3		%		70-130	15-OCT-18
Copper (Cu)-Dissolved			71.5		%		70-130	15-OCT-18
Lead (Pb)-Dissolved			96.5		%		70-130	15-OCT-18
Molybdenum (Mo)-Dissolved			82.6		%		70-130	15-OCT-18
Nickel (Ni)-Dissolved			90.1		%		70-130	15-OCT-18
Selenium (Se)-Dissolved			92.8		%		70-130	15-OCT-18
Silver (Ag)-Dissolved			95.8		%		70-130	15-OCT-18
Sodium (Na)-Dissolved			N/A	MS-B	%		-	15-OCT-18
Thallium (Tl)-Dissolved			95.5		%		70-130	15-OCT-18
Uranium (U)-Dissolved			N/A	MS-B	%		-	15-OCT-18
Vanadium (V)-Dissolved			89.3		%		70-130	15-OCT-18
Zinc (Zn)-Dissolved			70.5		%		70-130	15-OCT-18
VOC-511-HS-WT		Water						
<b>Batch R4283278</b>								
<b>WG2901883-4 DUP</b>		<b>WG2901883-3</b>						
1,1,1,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-OCT-18
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-OCT-18
1,1,1-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-OCT-18
1,1,2-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-OCT-18
1,1-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-OCT-18
1,1-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-OCT-18
1,2-Dibromoethane		<0.20	<0.20	RPD-NA	ug/L	N/A	30	17-OCT-18
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-OCT-18
1,2-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-OCT-18
1,2-Dichloropropane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-OCT-18
1,3-Dichlorobenzene		<0.50	<0.50					



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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	Water							
<b>Batch</b>	<b>R4283278</b>							
<b>WG2901883-4 DUP</b>		<b>WG2901883-3</b>						
1,3-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-OCT-18
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-OCT-18
Acetone		<30	<30	RPD-NA	ug/L	N/A	30	17-OCT-18
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-OCT-18
Bromodichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	17-OCT-18
Bromoform		<5.0	<5.0	RPD-NA	ug/L	N/A	30	17-OCT-18
Bromomethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-OCT-18
Carbon tetrachloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	17-OCT-18
Chlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-OCT-18
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	17-OCT-18
cis-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-OCT-18
cis-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	17-OCT-18
Dibromochloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	17-OCT-18
Dichlorodifluoromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	17-OCT-18
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-OCT-18
n-Hexane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-OCT-18
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	17-OCT-18
Methyl Ethyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	17-OCT-18
Methyl Isobutyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	17-OCT-18
Methylene Chloride		<5.0	<5.0	RPD-NA	ug/L	N/A	30	17-OCT-18
MTBE		<2.0	<2.0	RPD-NA	ug/L	N/A	30	17-OCT-18
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	17-OCT-18
Styrene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-OCT-18
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-OCT-18
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-OCT-18
trans-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-OCT-18
trans-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	17-OCT-18
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-OCT-18
Trichlorofluoromethane		<5.0	<5.0	RPD-NA	ug/L	N/A	30	17-OCT-18
Vinyl chloride		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-OCT-18
<b>WG2901883-1 LCS</b>								
1,1,1,2-Tetrachloroethane			107.2		%		70-130	17-OCT-18
1,1,2,2-Tetrachloroethane			97.0		%		70-130	17-OCT-18



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 2440 Don Reid Drive  
 Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	Water							
<b>Batch</b>	<b>R4283278</b>							
<b>WG2901883-1</b>	<b>LCS</b>							
1,1,1-Trichloroethane			106.6		%		70-130	17-OCT-18
1,1,2-Trichloroethane			107.7		%		70-130	17-OCT-18
1,1-Dichloroethane			106.3		%		70-130	17-OCT-18
1,1-Dichloroethylene			111.2		%		70-130	17-OCT-18
1,2-Dibromoethane			102.9		%		70-130	17-OCT-18
1,2-Dichlorobenzene			108.1		%		70-130	17-OCT-18
1,2-Dichloroethane			98.9		%		70-130	17-OCT-18
1,2-Dichloropropane			112.0		%		70-130	17-OCT-18
1,3-Dichlorobenzene			108.6		%		70-130	17-OCT-18
1,4-Dichlorobenzene			110.0		%		70-130	17-OCT-18
Acetone			105.5		%		60-140	17-OCT-18
Benzene			109.3		%		70-130	17-OCT-18
Bromodichloromethane			108.3		%		70-130	17-OCT-18
Bromoform			88.2		%		70-130	17-OCT-18
Bromomethane			88.0		%		60-140	17-OCT-18
Carbon tetrachloride			113.1		%		70-130	17-OCT-18
Chlorobenzene			110.3		%		70-130	17-OCT-18
Chloroform			108.9		%		70-130	17-OCT-18
cis-1,2-Dichloroethylene			105.7		%		70-130	17-OCT-18
cis-1,3-Dichloropropene			98.9		%		70-130	17-OCT-18
Dibromochloromethane			101.4		%		70-130	17-OCT-18
Dichlorodifluoromethane			153.4	LCS-H	%		50-140	17-OCT-18
Ethylbenzene			121.4		%		70-130	17-OCT-18
n-Hexane			109.2		%		70-130	17-OCT-18
m+p-Xylenes			120.8		%		70-130	17-OCT-18
Methyl Ethyl Ketone			85.3		%		60-140	17-OCT-18
Methyl Isobutyl Ketone			83.9		%		60-140	17-OCT-18
Methylene Chloride			104.3		%		70-130	17-OCT-18
MTBE			109.8		%		70-130	17-OCT-18
o-Xylene			115.2		%		70-130	17-OCT-18
Styrene			103.0		%		70-130	17-OCT-18
Tetrachloroethylene			120.7		%		70-130	17-OCT-18
Toluene			110.5		%		70-130	17-OCT-18



## Quality Control Report

Workorder: L2178991

Report Date: 18-OCT-18

Page 7 of 10

Client: Morrison Hershfield Limited (Ottawa)  
 2440 Don Reid Drive  
 Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	Water							
<b>Batch</b>	<b>R4283278</b>							
<b>WG2901883-1</b>	<b>LCS</b>							
trans-1,2-Dichloroethylene			111.7		%		70-130	17-OCT-18
trans-1,3-Dichloropropene			107.0		%		70-130	17-OCT-18
Trichloroethylene			109.0		%		70-130	17-OCT-18
Trichlorofluoromethane			124.9		%		60-140	17-OCT-18
Vinyl chloride			127.3		%		60-140	17-OCT-18
<b>WG2901883-2</b>	<b>MB</b>							
1,1,1,2-Tetrachloroethane			<0.50		ug/L		0.5	17-OCT-18
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	17-OCT-18
1,1,1-Trichloroethane			<0.50		ug/L		0.5	17-OCT-18
1,1,2-Trichloroethane			<0.50		ug/L		0.5	17-OCT-18
1,1-Dichloroethane			<0.50		ug/L		0.5	17-OCT-18
1,1-Dichloroethylene			<0.50		ug/L		0.5	17-OCT-18
1,2-Dibromoethane			<0.20		ug/L		0.2	17-OCT-18
1,2-Dichlorobenzene			<0.50		ug/L		0.5	17-OCT-18
1,2-Dichloroethane			<0.50		ug/L		0.5	17-OCT-18
1,2-Dichloropropane			<0.50		ug/L		0.5	17-OCT-18
1,3-Dichlorobenzene			<0.50		ug/L		0.5	17-OCT-18
1,4-Dichlorobenzene			<0.50		ug/L		0.5	17-OCT-18
Acetone			<30		ug/L		30	17-OCT-18
Benzene			<0.50		ug/L		0.5	17-OCT-18
Bromodichloromethane			<2.0		ug/L		2	17-OCT-18
Bromoform			<5.0		ug/L		5	17-OCT-18
Bromomethane			<0.50		ug/L		0.5	17-OCT-18
Carbon tetrachloride			<0.20		ug/L		0.2	17-OCT-18
Chlorobenzene			<0.50		ug/L		0.5	17-OCT-18
Chloroform			<1.0		ug/L		1	17-OCT-18
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	17-OCT-18
cis-1,3-Dichloropropene			<0.30		ug/L		0.3	17-OCT-18
Dibromochloromethane			<2.0		ug/L		2	17-OCT-18
Dichlorodifluoromethane			<2.0		ug/L		2	17-OCT-18
Ethylbenzene			<0.50		ug/L		0.5	17-OCT-18
n-Hexane			<0.50		ug/L		0.5	17-OCT-18
m+p-Xylenes			<0.40		ug/L		0.4	17-OCT-18
Methyl Ethyl Ketone			<20		ug/L		20	17-OCT-18



# Quality Control Report

Workorder: L2178991

Report Date: 18-OCT-18

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Client: Morrison Hershfield Limited (Ottawa)  
 2440 Don Reid Drive  
 Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	Water							
<b>Batch</b>	<b>R4283278</b>							
<b>WG2901883-2 MB</b>								
Methyl Isobutyl Ketone			<20		ug/L		20	17-OCT-18
Methylene Chloride			<5.0		ug/L		5	17-OCT-18
MTBE			<2.0		ug/L		2	17-OCT-18
o-Xylene			<0.30		ug/L		0.3	17-OCT-18
Styrene			<0.50		ug/L		0.5	17-OCT-18
Tetrachloroethylene			<0.50		ug/L		0.5	17-OCT-18
Toluene			<0.50		ug/L		0.5	17-OCT-18
trans-1,2-Dichloroethylene			<0.50		ug/L		0.5	17-OCT-18
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	17-OCT-18
Trichloroethylene			<0.50		ug/L		0.5	17-OCT-18
Trichlorofluoromethane			<5.0		ug/L		5	17-OCT-18
Vinyl chloride			<0.50		ug/L		0.5	17-OCT-18
Surrogate: 1,4-Difluorobenzene			97.2		%		70-130	17-OCT-18
Surrogate: 4-Bromofluorobenzene			90.3		%		70-130	17-OCT-18
<b>WG2901883-5 MS</b>		<b>WG2901883-3</b>						
1,1,1,2-Tetrachloroethane			107.3		%		50-140	18-OCT-18
1,1,2,2-Tetrachloroethane			126.2		%		50-140	18-OCT-18
1,1,1-Trichloroethane			102.9		%		50-140	18-OCT-18
1,1,2-Trichloroethane			117.9		%		50-140	18-OCT-18
1,1-Dichloroethane			109.7		%		50-140	18-OCT-18
1,1-Dichloroethylene			105.7		%		50-140	18-OCT-18
1,2-Dibromoethane			115.5		%		50-140	18-OCT-18
1,2-Dichlorobenzene			107.2		%		50-140	18-OCT-18
1,2-Dichloroethane			111.5		%		50-140	18-OCT-18
1,2-Dichloropropane			120.3		%		50-140	18-OCT-18
1,3-Dichlorobenzene			101.4		%		50-140	18-OCT-18
1,4-Dichlorobenzene			104.1		%		50-140	18-OCT-18
Acetone			133.2		%		50-140	18-OCT-18
Benzene			111.6		%		50-140	18-OCT-18
Bromodichloromethane			115.6		%		50-140	18-OCT-18
Bromoform			107.8		%		50-140	18-OCT-18
Bromomethane			83.5		%		50-140	18-OCT-18
Carbon tetrachloride			107.7		%		50-140	18-OCT-18
Chlorobenzene			108.1		%		50-140	18-OCT-18



## Quality Control Report

Workorder: L2178991

Report Date: 18-OCT-18

Page 9 of 10

Client: Morrison Hershfield Limited (Ottawa)  
 2440 Don Reid Drive  
 Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	Water							
<b>Batch</b>	<b>R4283278</b>							
<b>WG2901883-5 MS</b>		<b>WG2901883-3</b>						
Chloroform			113.1		%		50-140	18-OCT-18
cis-1,2-Dichloroethylene			109.0		%		50-140	18-OCT-18
cis-1,3-Dichloropropene			101.8		%		50-140	18-OCT-18
Dibromochloromethane			110.6		%		50-140	18-OCT-18
Dichlorodifluoromethane			129.1		%		50-140	18-OCT-18
Ethylbenzene			113.5		%		50-140	18-OCT-18
n-Hexane			99.8		%		50-140	18-OCT-18
m+p-Xylenes			114.0		%		50-140	18-OCT-18
Methyl Ethyl Ketone			103.9		%		50-140	18-OCT-18
Methyl Isobutyl Ketone			111.9		%		50-140	18-OCT-18
Methylene Chloride			110.9		%		50-140	18-OCT-18
MTBE			109.5		%		50-140	18-OCT-18
o-Xylene			109.9		%		50-140	18-OCT-18
Styrene			101.2		%		50-140	18-OCT-18
Tetrachloroethylene			105.3		%		50-140	18-OCT-18
Toluene			104.4		%		50-140	18-OCT-18
trans-1,2-Dichloroethylene			106.9		%		50-140	18-OCT-18
trans-1,3-Dichloropropene			103.3		%		50-140	18-OCT-18
Trichloroethylene			104.8		%		50-140	18-OCT-18
Trichlorofluoromethane			112.9		%		50-140	18-OCT-18
Vinyl chloride			116.4		%		50-140	18-OCT-18

# Quality Control Report

Workorder: L2178991

Report Date: 18-OCT-18

Client: Morrison Hershfield Limited (Ottawa)  
2440 Don Reid Drive  
Ottawa ON K1H 1E1

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Contact: Mitchell Dawley

## Legend:

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Limit ALS Control Limit (Data Quality Objectives)  
DUP Duplicate  
RPD Relative Percent Difference  
N/A Not Available  
LCS Laboratory Control Sample  
SRM Standard Reference Material  
MS Matrix Spike  
MSD Matrix Spike Duplicate  
ADE Average Desorption Efficiency  
MB Method Blank  
IRM Internal Reference Material  
CRM Certified Reference Material  
CCV Continuing Calibration Verification  
CVS Calibration Verification Standard  
LCSD Laboratory Control Sample Duplicate

## Sample Parameter Qualifier Definitions:

---

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
LCS-H	Lab Control Sample recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

---

## Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

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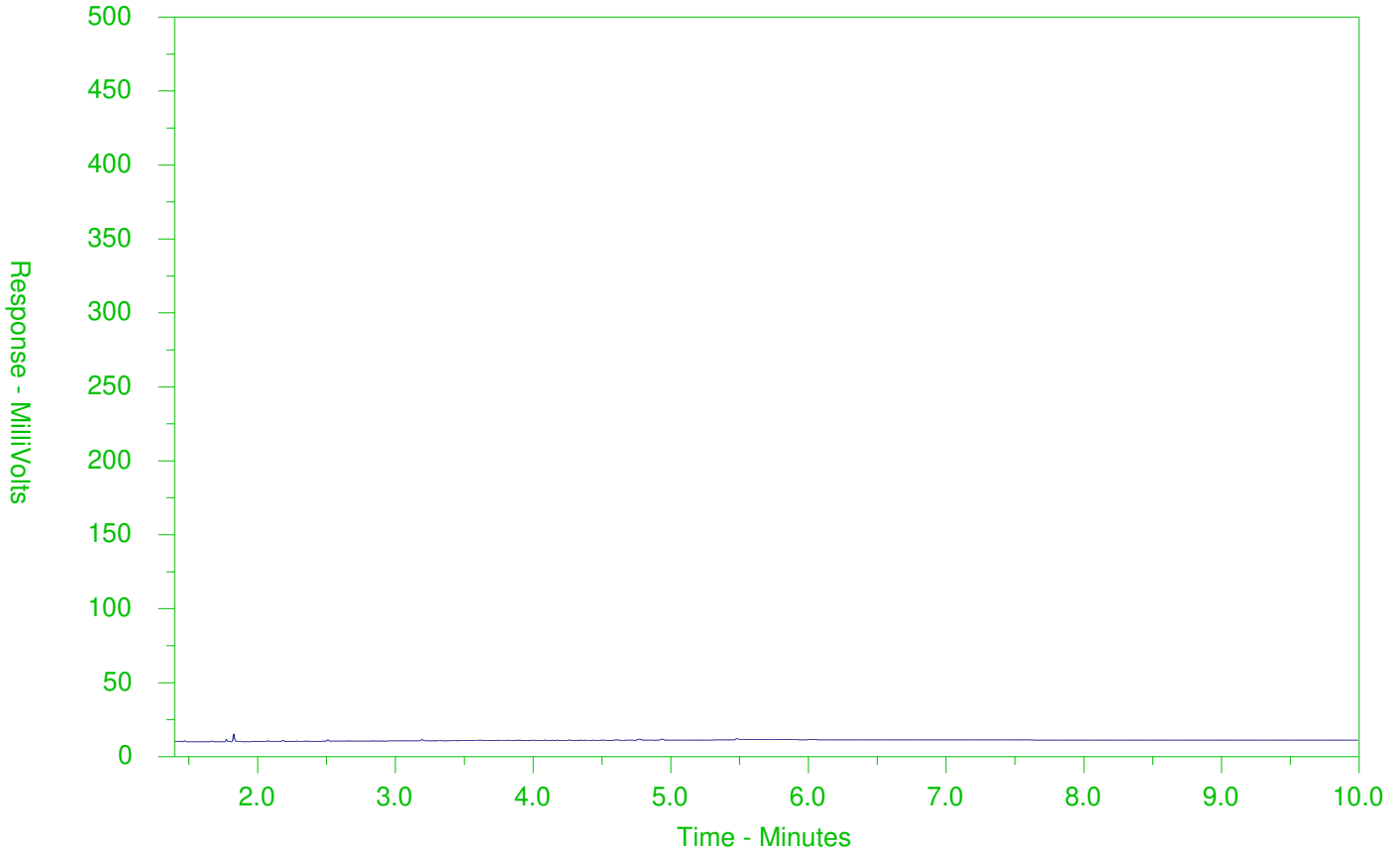
The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

# CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: L2178991-1  
 Client Sample ID: EW-3



← F2 →		← F3 →		← F4 →	
nC10	nC16		nC34		nC50
174°C	287°C		481°C		575°C
346°F	549°F		898°F		1067°F
Gasoline →			← Motor Oils/Lube Oils/Grease		
← Diesel/Jet Fuels →					

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

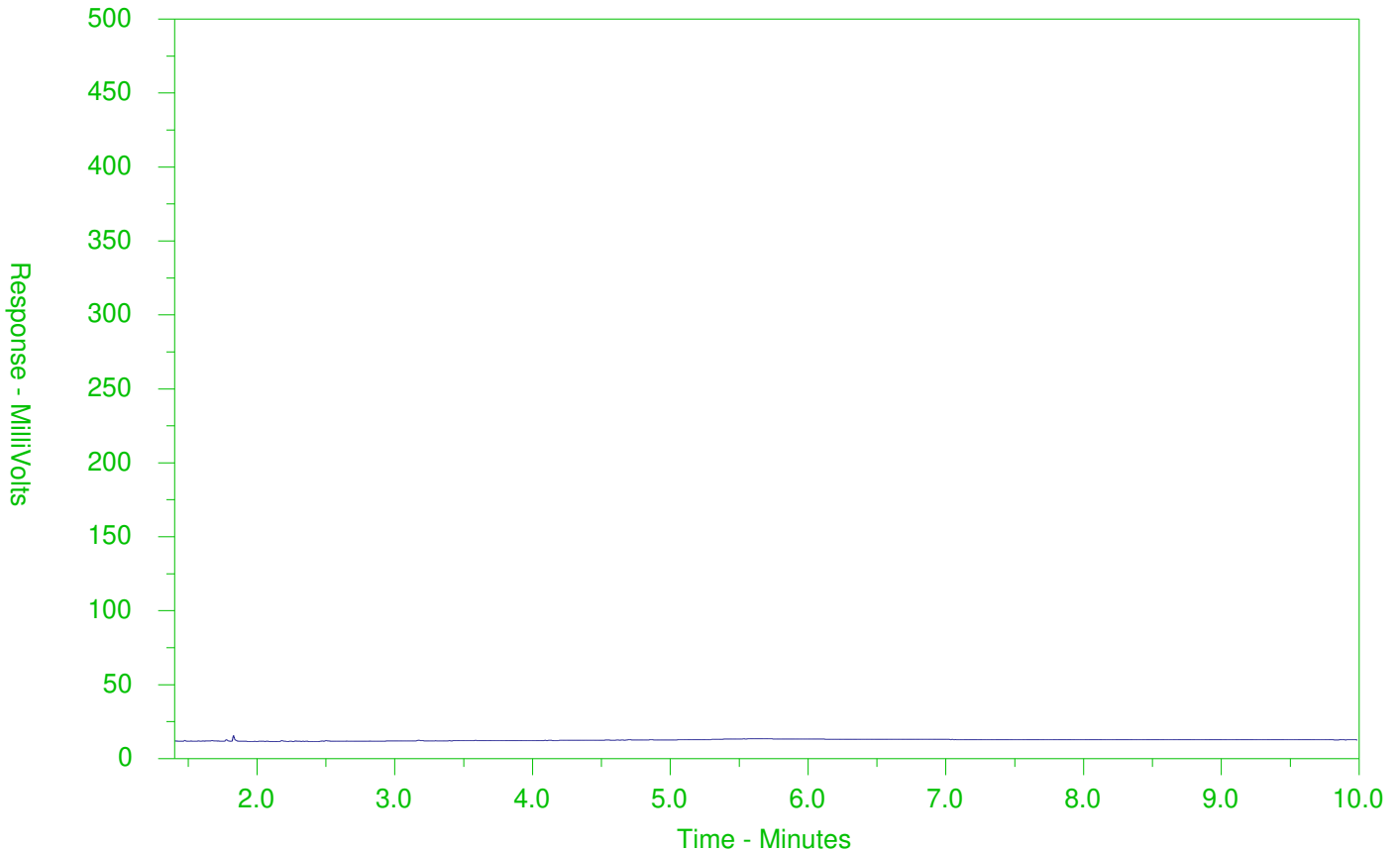
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at [www.alsglobal.com](http://www.alsglobal.com).

# CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: L2178991-2  
 Client Sample ID: EW-4



← F2 →		← F3 →		← F4 →	
nC10	nC16	nC34	nC50		
174°C	287°C	481°C	575°C		
346°F	549°F	898°F	1067°F		
Gasoline →			← Motor Oils/Lube Oils/Grease		
← Diesel/Jet Fuels →					

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

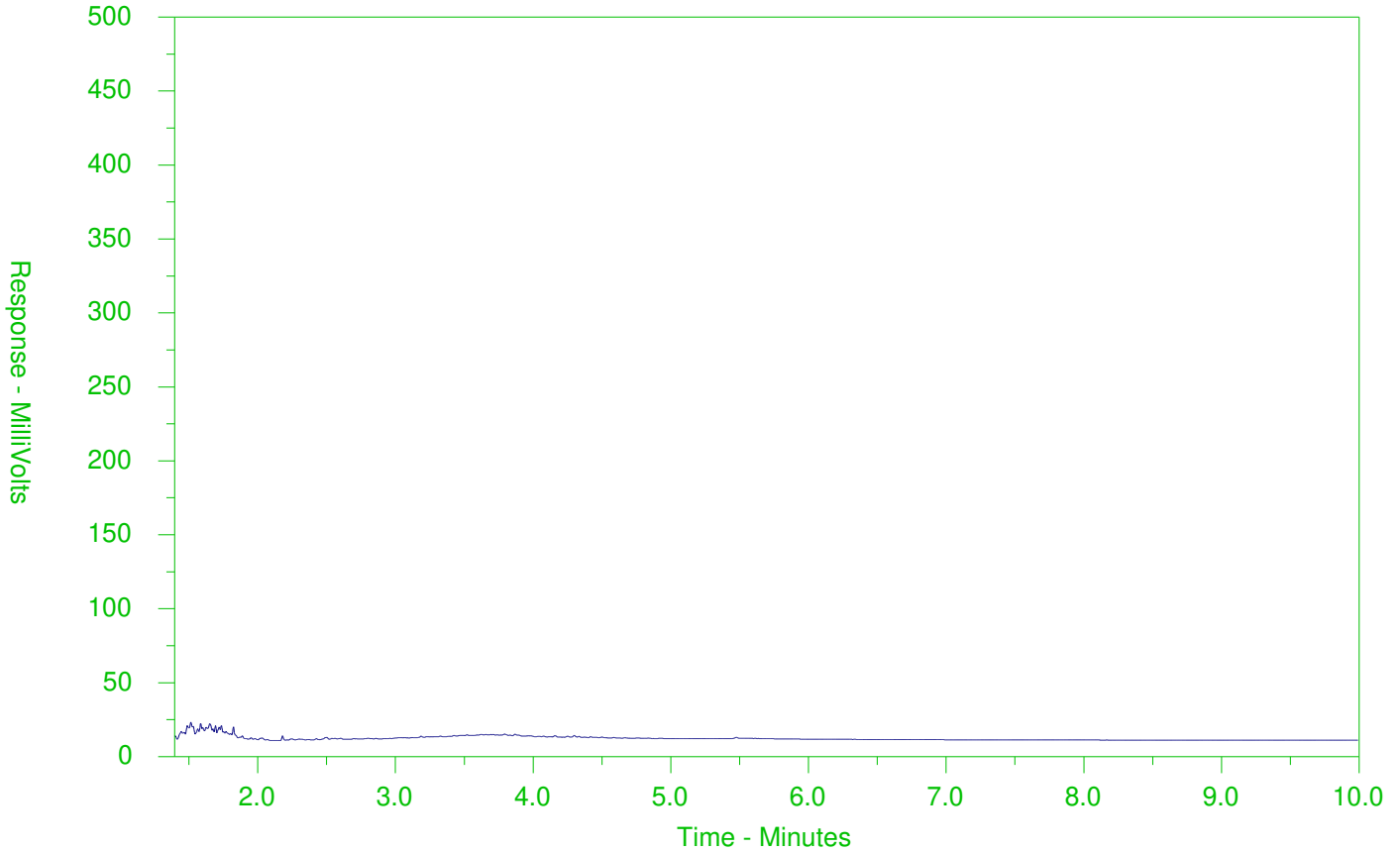
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at [www.alsglobal.com](http://www.alsglobal.com).

# CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: L2178991-3  
 Client Sample ID: EW-5



← F2 →		← F3 →		← F4 →	
nC10	nC16		nC34		nC50
174°C	287°C		481°C		575°C
346°F	549°F		898°F		1067°F
Gasoline →			← Motor Oils/Lube Oils/Grease		
← Diesel/Jet Fuels →					

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

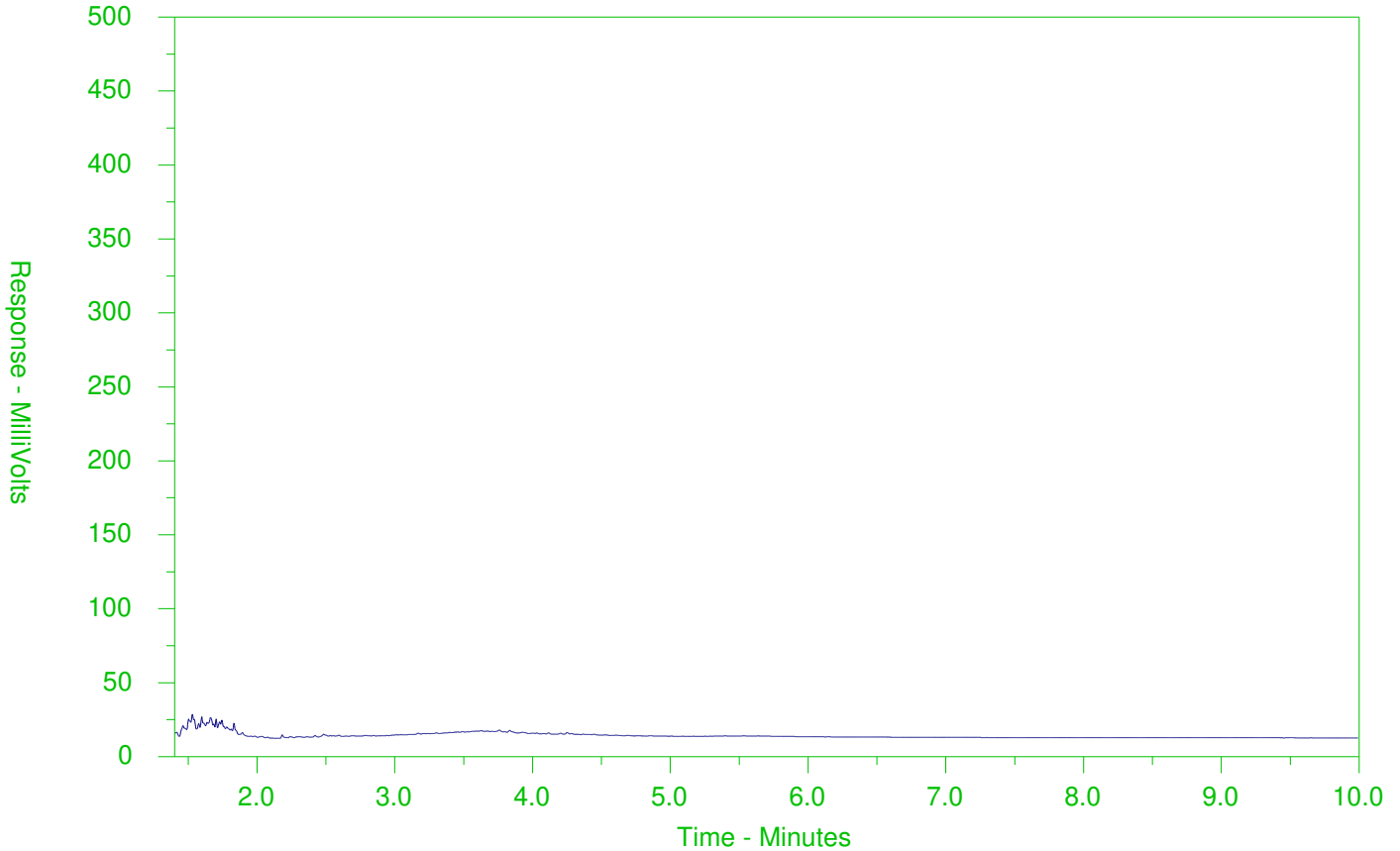
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at [www.alsglobal.com](http://www.alsglobal.com).

# CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: L2178991-4  
 Client Sample ID: EW-5D



← F2 →		← F3 →		← F4 →	
nC10	nC16		nC34		nC50
174°C	287°C		481°C		575°C
346°F	549°F		898°F		1067°F
Gasoline →			← Motor Oils/Lube Oils/Grease		
← Diesel/Jet Fuels →					

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

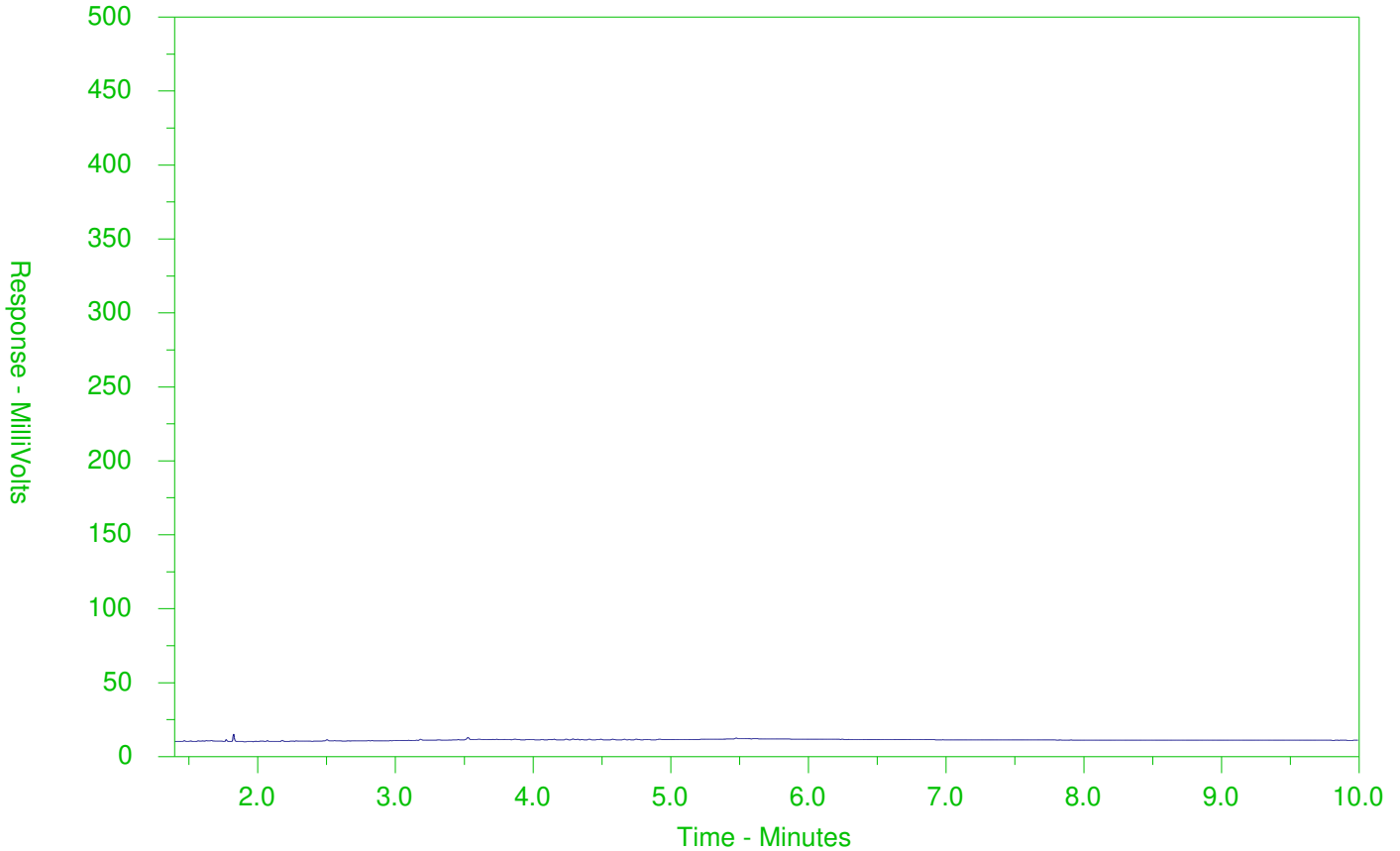
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at [www.alsglobal.com](http://www.alsglobal.com).

# CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: L2178991-5  
 Client Sample ID: EW-2



← F2 →		← F3 →		← F4 →	
nC10	nC16	nC34	nC50		
174°C	287°C	481°C	575°C		
346°F	549°F	898°F	1067°F		
Gasoline →			← Motor Oils/Lube Oils/Grease		
← Diesel/Jet Fuels →					

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at [www.alsglobal.com](http://www.alsglobal.com).



ALS Environmental

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

L2178991-COFC

COC-Number: 15

Page of

www.alsglobal.com

<b>Report To</b> Contact and company name below will appear on the final report		<b>Report Format</b> Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL)		Standard TAT with your AM - surcharges will apply			
Company:	Morrison Hershfield (Ottawa) - 24800	Quality Control (QC) Report with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply			
Contact:	Mitchell Dawley	<input checked="" type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked		4 day [P4] <input type="checkbox"/>			
Phone:	613-739-2910 x1022235	Select Distribution: <input type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX		3 day [P3] <input type="checkbox"/>			
Company address below will appear on the final report		Email 1 or Fax MDawley@morrisonhershfield.com		1 Business day [E1] <input type="checkbox"/>			
Street:	2440 Don Reid Drive	Email 2 CGroulx@morrisonhershfield.com		2 day [P2] <input type="checkbox"/>			
City/Province:	Ottawa, ON	Email 3 CGroulx@morrisonhershfield.com		EMERGENCY Same Day, Weekend or Statutory holiday [E0] <input type="checkbox"/>			
Postal Code:	K1H 1E1	Invoice Distribution		Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm			
Invoice To	Same as Report To <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX		For tests that can not be performed according to the service level selected, you will be contacted.			
Copy of Invoice with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		Oil and Gas Required Fields (client use)		<b>Analysis Request</b>			
Company:		AFE/Cost Center: PO#		Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below			
Contact:		Major/Minor Code: Routing Code:		F/P P			
<b>Project Information</b>		Requisitioner: Location:		Reg. 153 complete Metals			
ALS Account # / Quote #:	Q70413	ALS Contact: Melanie Moshi		VOC / FI-F4			
Job #:	180564799	Sampler:		PAH			
PO / AFE:				Metals and Inorganics			
LSD:				TCLP - biep			
ALS Lab Work Order # (lab use only)	L2178991			TCLP - Metals and Inorganics			
ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	TCLP - VOCs	Number of Containers	
EW-3		09-10-18	2pm	GW			7
EW-4		"	3:45pm	"			7
EW-5		"	4:30	"			7
EW-SD		"	4:30	"			7
EW-2		"	6:00pm	"		7	
<b>Drinking Water (DW) Samples<sup>1</sup> (client use)</b>		<b>Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)</b>		<b>SAMPLE CONDITION AS RECEIVED (lab use only)</b>			
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		MOECC Table 1 RRCC and MOECC Table 3 Ice		Frozen <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/>			
Are samples for human drinking water use? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		DWA and WOC		Ice Packs <input type="checkbox"/> Ice Cubes <input checked="" type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>			
				Cooling Initiated <input type="checkbox"/>			
				INITIAL COOLER TEMPERATURES °C			
				FINAL COOLER TEMPERATURES °C			
				6.0			
				6.1			
<b>SHIPMENT RELEASE (client use)</b>		<b>INITIAL SHIPMENT RECEPTION (lab use only)</b>		<b>FINAL SHIPMENT RECEPTION (lab use only)</b>			
Released by:	Date: 10/9/18	Time:	Received by: Tammy Andrews	Date: Oct 10 <sup>th</sup> 2018	Time: 9:30	Received by: WS	
				Date: Oct 11/18	Time: 10:15		

REFER TO BACK-PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

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1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 PRINT



Morrison Hershfield Limited (Ottawa)  
ATTN: Mitchell Dawley  
2440 Don Reid Drive  
Ottawa ON K1H 1E1

Date Received: 19-OCT-18  
Report Date: 23-OCT-18 11:03 (MT)  
Version: FINAL

Client Phone: 613-739-2910

## Certificate of Analysis

**Lab Work Order #:** L2183807  
Project P.O. #: NOT SUBMITTED  
Job Reference: 180564799  
C of C Numbers:  
Legal Site Desc:

Melanie Moshi  
Account Manager

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ADDRESS: 190 Colonnade Road, Unit 7, Ottawa, ON K2E 7J5 Canada | Phone: +1 613 225 8279 | Fax: +1 613 225 2801  
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## Summary of Guideline Exceedances

Guideline							
ALS ID	Client ID	Grouping	Analyte	Result	Guideline Limit	Unit	
<b>Ontario Regulation 153/04 - April 15, 2011 Standards - T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use</b>							
(No parameter exceedances)							
<b>Ontario Regulation 153/04 - April 15, 2011 Standards - T3-Soil-Ind/Com/Commu. Property Use (Fine)</b>							
(No parameter exceedances)							

## Dissolved Metals - WATER

		<b>Lab ID</b>	L2183807-1
		<b>Sample Date</b>	17-OCT-18
		<b>Sample ID</b>	BS-3
<b>Analyte</b>	<b>Unit</b>	<b>Guide Limits</b>	
		<b>#1</b>	<b>#2</b>
Dissolved Mercury Filtration Location	-	-	FIELD
Dissolved Metals Filtration Location	-	-	FIELD
Antimony (Sb)-Dissolved	ug/L	-	0.15
Arsenic (As)-Dissolved	ug/L	-	0.73
Barium (Ba)-Dissolved	ug/L	-	137
Beryllium (Be)-Dissolved	ug/L	-	<0.10
Boron (B)-Dissolved	ug/L	-	75
Cadmium (Cd)-Dissolved	ug/L	-	0.029
Chromium (Cr)-Dissolved	ug/L	-	0.83
Cobalt (Co)-Dissolved	ug/L	-	1.62
Copper (Cu)-Dissolved	ug/L	-	1.54
Lead (Pb)-Dissolved	ug/L	-	0.059
Mercury (Hg)-Dissolved	ug/L	-	<0.010
Molybdenum (Mo)-Dissolved	ug/L	-	4.79
Nickel (Ni)-Dissolved	ug/L	-	4.53
Selenium (Se)-Dissolved	ug/L	-	0.515
Silver (Ag)-Dissolved	ug/L	-	<0.050
Sodium (Na)-Dissolved	ug/L	-	276000 <sup>DLHC</sup>
Thallium (Tl)-Dissolved	ug/L	-	0.026
Uranium (U)-Dissolved	ug/L	-	9.76
Vanadium (V)-Dissolved	ug/L	-	1.08
Zinc (Zn)-Dissolved	ug/L	-	9.5

**Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use**

**Guide Limit #2: T3-Soil-Ind/Com/Commu. Property Use (Fine)**

- Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
- Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

\* Please refer to the Reference Information section for an explanation of any qualifiers noted.

**Speciated Metals - WATER**


**Lab ID** L2183807-1  
**Sample Date** 17-OCT-18  
**Sample ID** BS-3


**Guide Limits**  
**Unit #1 #2**

Analyte	Unit	#1	#2	
Chromium, Hexavalent	ug/L	-	-	1.18

**Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use**

**Guide Limit #2: T3-Soil-Ind/Com/Commu. Property Use (Fine)**

 Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.

 Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

\* Please refer to the Reference Information section for an explanation of any qualifiers noted.

## Volatile Organic Compounds - WATER

Analyte	Unit	Guide Limits		Lab ID	L2183807-1	L2183807-2
		#1	#2	Sample Date	17-OCT-18	17-OCT-18
				Sample ID	BS-3	BS-1
Acetone	ug/L	-	-	<30	<sup>OWP</sup>	<30 <sup>OWP</sup>
Benzene	ug/L	-	-	<0.50	<sup>OWP</sup>	<0.50 <sup>OWP</sup>
Bromodichloromethane	ug/L	-	-	<2.0	<sup>OWP</sup>	<2.0 <sup>OWP</sup>
Bromoform	ug/L	-	-	<5.0	<sup>OWP</sup>	<5.0 <sup>OWP</sup>
Bromomethane	ug/L	-	-	<0.50	<sup>OWP</sup>	<0.50 <sup>OWP</sup>
Carbon tetrachloride	ug/L	-	-	<0.20	<sup>OWP</sup>	<0.20 <sup>OWP</sup>
Chlorobenzene	ug/L	-	-	<0.50	<sup>OWP</sup>	<0.50 <sup>OWP</sup>
Dibromochloromethane	ug/L	-	-	<2.0	<sup>OWP</sup>	<2.0 <sup>OWP</sup>
Chloroform	ug/L	-	-	<1.0	<sup>OWP</sup>	<1.0 <sup>OWP</sup>
1,2-Dibromoethane	ug/L	-	-	<0.20	<sup>OWP</sup>	<0.20 <sup>OWP</sup>
1,2-Dichlorobenzene	ug/L	-	-	<0.50	<sup>OWP</sup>	<0.50 <sup>OWP</sup>
1,3-Dichlorobenzene	ug/L	-	-	<0.50	<sup>OWP</sup>	<0.50 <sup>OWP</sup>
1,4-Dichlorobenzene	ug/L	-	-	<0.50	<sup>OWP</sup>	<0.50 <sup>OWP</sup>
Dichlorodifluoromethane	ug/L	-	-	<2.0	<sup>OWP</sup>	<2.0 <sup>OWP</sup>
1,1-Dichloroethane	ug/L	-	-	<0.50	<sup>OWP</sup>	<0.50 <sup>OWP</sup>
1,2-Dichloroethane	ug/L	-	-	<0.50	<sup>OWP</sup>	<0.50 <sup>OWP</sup>
1,1-Dichloroethylene	ug/L	-	-	<0.50	<sup>OWP</sup>	<0.50 <sup>OWP</sup>
cis-1,2-Dichloroethylene	ug/L	-	-	<0.50	<sup>OWP</sup>	<0.50 <sup>OWP</sup>
trans-1,2-Dichloroethylene	ug/L	-	-	<0.50	<sup>OWP</sup>	<0.50 <sup>OWP</sup>
Methylene Chloride	ug/L	-	-	<5.0	<sup>OWP</sup>	<5.0 <sup>OWP</sup>
1,2-Dichloropropane	ug/L	-	-	<0.50	<sup>OWP</sup>	<0.50 <sup>OWP</sup>
cis-1,3-Dichloropropene	ug/L	-	-	<0.30	<sup>OWP</sup>	<0.30 <sup>OWP</sup>
trans-1,3-Dichloropropene	ug/L	-	-	<0.30	<sup>OWP</sup>	<0.30 <sup>OWP</sup>
1,3-Dichloropropene (cis & trans)	ug/L	-	-	<0.50		<0.50
Ethylbenzene	ug/L	-	-	<0.50	<sup>OWP</sup>	<0.50 <sup>OWP</sup>
n-Hexane	ug/L	-	-	<0.50	<sup>OWP</sup>	<0.50 <sup>OWP</sup>
Methyl Ethyl Ketone	ug/L	-	-	<20	<sup>OWP</sup>	<20 <sup>OWP</sup>
Methyl Isobutyl Ketone	ug/L	-	-	<20	<sup>OWP</sup>	<20 <sup>OWP</sup>
MTBE	ug/L	-	-	<2.0	<sup>OWP</sup>	<2.0 <sup>OWP</sup>
Styrene	ug/L	-	-	<0.50	<sup>OWP</sup>	<0.50 <sup>OWP</sup>

**Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use**

**Guide Limit #2: T3-Soil-Ind/Com/Commu. Property Use (Fine)**

\* Please refer to the Reference Information section for an explanation of any qualifiers noted.

## Volatile Organic Compounds - WATER

Analyte	Unit	Guide Limits		Lab ID	Sample Date	Sample ID
		#1	#2	L2183807-1	L2183807-2	BS-3
1,1,1,2-Tetrachloroethane	ug/L	-	-	<0.50 <sup>OWP</sup>	<0.50 <sup>OWP</sup>	
1,1,2,2-Tetrachloroethane	ug/L	-	-	<0.50 <sup>OWP</sup>	<0.50 <sup>OWP</sup>	
Tetrachloroethylene	ug/L	-	-	<0.50 <sup>OWP</sup>	<0.50 <sup>OWP</sup>	
Toluene	ug/L	-	-	<0.50 <sup>OWP</sup>	<0.50 <sup>OWP</sup>	
1,1,1-Trichloroethane	ug/L	-	-	<0.50 <sup>OWP</sup>	<0.50 <sup>OWP</sup>	
1,1,2-Trichloroethane	ug/L	-	-	<0.50 <sup>OWP</sup>	<0.50 <sup>OWP</sup>	
Trichloroethylene	ug/L	-	-	<0.50 <sup>OWP</sup>	<0.50 <sup>OWP</sup>	
Trichlorofluoromethane	ug/L	-	-	<5.0 <sup>OWP</sup>	<5.0 <sup>OWP</sup>	
Vinyl chloride	ug/L	-	-	<0.50 <sup>OWP</sup>	<0.50 <sup>OWP</sup>	
o-Xylene	ug/L	-	-	<0.30 <sup>OWP</sup>	<0.30 <sup>OWP</sup>	
m+p-Xylenes	ug/L	-	-	<0.40 <sup>OWP</sup>	<0.40 <sup>OWP</sup>	
Xylenes (Total)	ug/L	-	-	<0.50	<0.50	
Surrogate: 4-Bromofluorobenzene	%	-	-	96.0	95.3	
Surrogate: 1,4-Difluorobenzene	%	-	-	97.7	98.6	

**Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use**

**Guide Limit #2: T3-Soil-Ind/Com/Commu. Property Use (Fine)**

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.

Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

\* Please refer to the Reference Information section for an explanation of any qualifiers noted.

## Hydrocarbons - WATER

Analyte	Unit	Guide Limits			
		#1	#2		
				Lab ID	L2183807-1    L2183807-2
				Sample Date	17-OCT-18    17-OCT-18
				Sample ID	BS-3    BS-1
F1 (C6-C10)	ug/L	-	-	<25 <sup>OWP</sup>	<25 <sup>OWP</sup>
F1-BTEX	ug/L	-	-	<25	<25
F2 (C10-C16)	ug/L	-	-	<100	<100
F3 (C16-C34)	ug/L	-	-	<250	<250
F4 (C34-C50)	ug/L	-	-	<250	<250
Total Hydrocarbons (C6-C50)	ug/L	-	-	<370	<370
Chrom. to baseline at nC50		-	-	YES	YES
Surrogate: 2-Bromobenzotrifluoride	%	-	-	81.7	86.9
Surrogate: 3,4-Dichlorotoluene	%	-	-	83.0	80.5

**Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use**

**Guide Limit #2: T3-Soil-Ind/Com/Commu. Property Use (Fine)**

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.

Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

\* Please refer to the Reference Information section for an explanation of any qualifiers noted.

# Reference Information

**Qualifiers for Individual Parameters Listed:**

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Qualifier	Description
OWP	Organic water sample contained visible sediment (must be included as part of analysis). Measured concentrations of organic substances in water can be biased high due to presence of

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# Reference Information

sediment.

DLHC Detection Limit Raised: Dilution required due to high concentration of test analyte(s).

**Methods Listed (if applicable):**

ALS Test Code	Matrix	Test Description	Method Reference**
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<b>CR-CR6-IC-R511-WT</b>	Water	Hex Chrom-O.Reg 153/04 (July 2011)	EPA 7199
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This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 7199, published by the United States Environmental Protection Agency (EPA). The procedure involves analysis for chromium (VI) by ion chromatography using diphenylcarbazide in a sulphuric acid solution. Chromium (III) is calculated as the difference between the total chromium and the chromium (VI) results.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

<b>F1-F4-511-CALC-WT</b>	Water	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-L
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Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.

In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:

1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:

1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

<b>F1-HS-511-WT</b>	Water	F1-O.Reg 153/04 (July 2011)	E3398/CCME TIER 1-HS
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Fraction F1 is determined by analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

<b>F2-F4-511-WT</b>	Water	F2-F4-O.Reg 153/04 (July 2011)	EPA 3511/CCME Tier 1
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Petroleum Hydrocarbons (F2-F4 fractions) are extracted from water using a hexane micro-extraction technique. Instrumental analysis is by GC-FID, as per the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Tier 1 Method, CCME, 2001.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

<b>HG-D-UG/L-CVAA-WT</b>	Water	Diss. Mercury in Water by CVAAS (ug/L)	EPA 1631E (mod)
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Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

# Reference Information

**Methods Listed (if applicable):**

ALS Test Code	Matrix	Test Description	Method Reference**
Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).			
<b>MET-D-UG/L-MS-WT</b>	Water	Diss. Metals in Water by ICPMS (ug/L)	EPA 200.8
The metal constituents of a non-acidified sample that pass through a membrane filter prior to ICP/MS analysis.			
Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).			
<b>VOC-1,3-DCP-CALC-WT</b>	Water	Regulation 153 VOCs	SW8260B/SW8270C
<b>VOC-511-HS-WT</b>	Water	VOC by GCMS HS O.Reg 153/04 (July 2011)	SW846 8260
Liquid samples are analyzed by headspace GC/MSD.			
Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).			
<b>XYLENES-SUM-CALC-WT</b>	Water	Sum of Xylene Isomer Concentrations	CALCULATION
Total xylenes represents the sum of o-xylene and m&p-xylene.			

\*\*ALS test methods may incorporate modifications from specified reference methods to improve performance.

Chain of Custody Numbers:

*The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:*

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

**GLOSSARY OF REPORT TERMS**

*Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.*

- mg/kg - milligrams per kilogram based on dry weight of sample*
- mg/kg wwt - milligrams per kilogram based on wet weight of sample*
- mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight*
- mg/L - unit of concentration based on volume, parts per million.*
- < - Less than.*
- D.L. - The reporting limit.*
- N/A - Result not available. Refer to qualifier code and definition for explanation.*

*Test results reported relate only to the samples as received by the laboratory.  
 UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.  
 Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.*

*Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guideline limits are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.*



# Quality Control Report

Workorder: L2183807

Report Date: 23-OCT-18

Page 1 of 10

Client: Morrison Hershfield Limited (Ottawa)  
 2440 Don Reid Drive  
 Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CR-CR6-IC-R511-WT	Water							
<b>Batch R4291569</b>								
<b>WG2908944-14 DUP</b>		<b>WG2908944-13</b>						
Chromium, Hexavalent		<0.50	<0.50	RPD-NA	ug/L	N/A	20	19-OCT-18
<b>WG2908944-12 LCS</b>								
Chromium, Hexavalent			101.4		%		80-120	19-OCT-18
<b>WG2908944-11 MB</b>								
Chromium, Hexavalent			<0.50		ug/L		0.5	19-OCT-18
<b>WG2908944-15 MS</b>		<b>WG2908944-13</b>						
Chromium, Hexavalent			98.1		%		70-130	19-OCT-18
F1-HS-511-WT	Water							
<b>Batch R4294135</b>								
<b>WG2908068-4 DUP</b>		<b>WG2908068-3</b>						
F1 (C6-C10)		<25	<25	RPD-NA	ug/L	N/A	30	23-OCT-18
<b>WG2908068-1 LCS</b>								
F1 (C6-C10)			112.0		%		80-120	23-OCT-18
<b>WG2908068-2 MB</b>								
F1 (C6-C10)			<25		ug/L		25	23-OCT-18
Surrogate: 3,4-Dichlorotoluene			104.9		%		60-140	23-OCT-18
<b>WG2908068-5 MS</b>		<b>WG2908068-3</b>						
F1 (C6-C10)			100.1		%		60-140	23-OCT-18
F2-F4-511-WT	Water							
<b>Batch R4291229</b>								
<b>WG2908130-2 LCS</b>								
F2 (C10-C16)			110.8		%		70-130	19-OCT-18
F3 (C16-C34)			112.0		%		70-130	19-OCT-18
F4 (C34-C50)			111.3		%		70-130	19-OCT-18
<b>WG2908130-3 LCSD</b>		<b>WG2908130-2</b>						
F2 (C10-C16)		110.8	112.8		%	1.8	50	19-OCT-18
F3 (C16-C34)		112.0	115.1		%	2.7	50	19-OCT-18
F4 (C34-C50)		111.3	111.5		%	0.2	50	19-OCT-18
<b>WG2908130-1 MB</b>								
F2 (C10-C16)			<100		ug/L		100	19-OCT-18
F3 (C16-C34)			<250		ug/L		250	19-OCT-18
F4 (C34-C50)			<250		ug/L		250	19-OCT-18
Surrogate: 2-Bromobenzotrifluoride			87.4		%		60-140	19-OCT-18
HG-D-UG/L-CVAA-WT	Water							



## Quality Control Report

Workorder: L2183807

Report Date: 23-OCT-18

Page 2 of 10

Client: Morrison Hershfield Limited (Ottawa)  
 2440 Don Reid Drive  
 Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-D-UG/L-CVAA-WT Water								
<b>Batch</b>	<b>R4291094</b>							
<b>WG2908695-4 DUP</b>		<b>WG2908695-3</b>						
Mercury (Hg)-Dissolved		<0.010	<0.010	RPD-NA	ug/L	N/A	20	22-OCT-18
<b>WG2908695-2 LCS</b>								
Mercury (Hg)-Dissolved			107.0		%		80-120	22-OCT-18
<b>WG2908695-1 MB</b>								
Mercury (Hg)-Dissolved			<0.010		ug/L		0.01	22-OCT-18
<b>WG2908695-6 MS</b>		<b>WG2908695-5</b>						
Mercury (Hg)-Dissolved			109.9		%		70-130	22-OCT-18
MET-D-UG/L-MS-WT Water								
<b>Batch</b>	<b>R4293513</b>							
<b>WG2909995-4 DUP</b>		<b>WG2909995-3</b>						
Antimony (Sb)-Dissolved		<10	<10	RPD-NA	ug/L	N/A	20	22-OCT-18
Arsenic (As)-Dissolved		<10	<10	RPD-NA	ug/L	N/A	20	22-OCT-18
Barium (Ba)-Dissolved		411	417		ug/L	1.3	20	22-OCT-18
Beryllium (Be)-Dissolved		<10	<10	RPD-NA	ug/L	N/A	20	22-OCT-18
Boron (B)-Dissolved		<1000	<1000	RPD-NA	ug/L	N/A	20	22-OCT-18
Cadmium (Cd)-Dissolved		<0.50	<0.50	RPD-NA	ug/L	N/A	20	22-OCT-18
Chromium (Cr)-Dissolved		<50	<50	RPD-NA	ug/L	N/A	20	22-OCT-18
Cobalt (Co)-Dissolved		<10	<10	RPD-NA	ug/L	N/A	20	22-OCT-18
Copper (Cu)-Dissolved		<20	<20	RPD-NA	ug/L	N/A	20	22-OCT-18
Lead (Pb)-Dissolved		<5.0	<5.0	RPD-NA	ug/L	N/A	20	22-OCT-18
Molybdenum (Mo)-Dissolved		7.7	7.2		ug/L	6.3	20	22-OCT-18
Nickel (Ni)-Dissolved		<50	<50	RPD-NA	ug/L	N/A	20	22-OCT-18
Selenium (Se)-Dissolved		<5.0	<5.0	RPD-NA	ug/L	N/A	20	22-OCT-18
Silver (Ag)-Dissolved		<5.0	<5.0	RPD-NA	ug/L	N/A	20	22-OCT-18
Sodium (Na)-Dissolved		3270000	3130000		ug/L	4.5	20	22-OCT-18
Thallium (Tl)-Dissolved		<1.0	<1.0	RPD-NA	ug/L	N/A	20	22-OCT-18
Uranium (U)-Dissolved		3.3	3.1		ug/L	6.0	20	22-OCT-18
Vanadium (V)-Dissolved		<50	<50	RPD-NA	ug/L	N/A	20	22-OCT-18
Zinc (Zn)-Dissolved		<100	<100	RPD-NA	ug/L	N/A	20	22-OCT-18
<b>WG2909995-2 LCS</b>								
Antimony (Sb)-Dissolved			94.3		%		80-120	22-OCT-18
Arsenic (As)-Dissolved			95.2		%		80-120	22-OCT-18
Barium (Ba)-Dissolved			98.7		%		80-120	22-OCT-18
Beryllium (Be)-Dissolved			96.7		%		80-120	22-OCT-18



## Quality Control Report

Workorder: L2183807

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Client: Morrison Hershfield Limited (Ottawa)  
 2440 Don Reid Drive  
 Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	Water							
<b>Batch</b>	<b>R4293513</b>							
<b>WG2909995-2</b>	<b>LCS</b>							
Boron (B)-Dissolved			96.3		%		80-120	22-OCT-18
Cadmium (Cd)-Dissolved			95.5		%		80-120	22-OCT-18
Chromium (Cr)-Dissolved			95.4		%		80-120	22-OCT-18
Cobalt (Co)-Dissolved			93.0		%		80-120	22-OCT-18
Copper (Cu)-Dissolved			93.9		%		80-120	22-OCT-18
Lead (Pb)-Dissolved			101.7		%		80-120	22-OCT-18
Molybdenum (Mo)-Dissolved			95.9		%		80-120	22-OCT-18
Nickel (Ni)-Dissolved			92.7		%		80-120	22-OCT-18
Selenium (Se)-Dissolved			97.6		%		80-120	22-OCT-18
Silver (Ag)-Dissolved			99.8		%		80-120	22-OCT-18
Sodium (Na)-Dissolved			96.6		%		80-120	22-OCT-18
Thallium (Tl)-Dissolved			97.4		%		80-120	22-OCT-18
Uranium (U)-Dissolved			100.4		%		80-120	22-OCT-18
Vanadium (V)-Dissolved			97.7		%		80-120	22-OCT-18
Zinc (Zn)-Dissolved			87.5		%		80-120	22-OCT-18
<b>WG2909995-1</b>	<b>MB</b>							
Antimony (Sb)-Dissolved			<0.10		ug/L		0.1	22-OCT-18
Arsenic (As)-Dissolved			<0.10		ug/L		0.1	22-OCT-18
Barium (Ba)-Dissolved			<0.10		ug/L		0.1	22-OCT-18
Beryllium (Be)-Dissolved			<0.10		ug/L		0.1	22-OCT-18
Boron (B)-Dissolved			<10		ug/L		10	22-OCT-18
Cadmium (Cd)-Dissolved			<0.0050		ug/L		0.005	22-OCT-18
Chromium (Cr)-Dissolved			<0.50		ug/L		0.5	22-OCT-18
Cobalt (Co)-Dissolved			<0.10		ug/L		0.1	22-OCT-18
Copper (Cu)-Dissolved			<0.20		ug/L		0.2	22-OCT-18
Lead (Pb)-Dissolved			<0.050		ug/L		0.05	22-OCT-18
Molybdenum (Mo)-Dissolved			<0.050		ug/L		0.05	22-OCT-18
Nickel (Ni)-Dissolved			<0.50		ug/L		0.5	22-OCT-18
Selenium (Se)-Dissolved			<0.050		ug/L		0.05	22-OCT-18
Silver (Ag)-Dissolved			<0.050		ug/L		0.05	22-OCT-18
Sodium (Na)-Dissolved			<50		ug/L		50	22-OCT-18
Thallium (Tl)-Dissolved			<0.010		ug/L		0.01	22-OCT-18
Uranium (U)-Dissolved			<0.010		ug/L		0.01	22-OCT-18
Vanadium (V)-Dissolved			<0.50		ug/L		0.5	22-OCT-18



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Client: Morrison Hershfield Limited (Ottawa)  
 2440 Don Reid Drive  
 Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT		Water						
<b>Batch R4293513</b>								
<b>WG2909995-1 MB</b>								
Zinc (Zn)-Dissolved			<1.0		ug/L		1	22-OCT-18
<b>WG2909995-5 MS</b>		<b>WG2909995-3</b>						
Antimony (Sb)-Dissolved			91.6		%		70-130	22-OCT-18
Arsenic (As)-Dissolved			92.5		%		70-130	22-OCT-18
Barium (Ba)-Dissolved			N/A	MS-B	%		-	22-OCT-18
Beryllium (Be)-Dissolved			94.6		%		70-130	22-OCT-18
Boron (B)-Dissolved			N/A	MS-B	%		-	22-OCT-18
Cadmium (Cd)-Dissolved			92.3		%		70-130	22-OCT-18
Chromium (Cr)-Dissolved			86.3		%		70-130	22-OCT-18
Cobalt (Co)-Dissolved			76.1		%		70-130	22-OCT-18
Lead (Pb)-Dissolved			94.8		%		70-130	22-OCT-18
Selenium (Se)-Dissolved			94.6		%		70-130	22-OCT-18
Silver (Ag)-Dissolved			93.5		%		70-130	22-OCT-18
Sodium (Na)-Dissolved			N/A	MS-B	%		-	22-OCT-18
Thallium (Tl)-Dissolved			94.6		%		70-130	22-OCT-18
Uranium (U)-Dissolved			N/A	MS-B	%		-	22-OCT-18
Vanadium (V)-Dissolved			93.3		%		70-130	22-OCT-18
VOC-511-HS-WT		Water						
<b>Batch R4294135</b>								
<b>WG2908068-4 DUP</b>		<b>WG2908068-3</b>						
1,1,1,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-OCT-18
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-OCT-18
1,1,1-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-OCT-18
1,1,2-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-OCT-18
1,1-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-OCT-18
1,1-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-OCT-18
1,2-Dibromoethane		<0.20	<0.20	RPD-NA	ug/L	N/A	30	23-OCT-18
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-OCT-18
1,2-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-OCT-18
1,2-Dichloropropane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-OCT-18
1,3-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-OCT-18
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-OCT-18
Acetone		<30	<30	RPD-NA	ug/L	N/A	30	23-OCT-18



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Client: Morrison Hershfield Limited (Ottawa)  
2440 Don Reid Drive  
Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	Water							
<b>Batch</b>	<b>R4294135</b>							
<b>WG2908068-4 DUP</b>		<b>WG2908068-3</b>						
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-OCT-18
Bromodichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	23-OCT-18
Bromoform		<5.0	<5.0	RPD-NA	ug/L	N/A	30	23-OCT-18
Bromomethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-OCT-18
Carbon tetrachloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	23-OCT-18
Chlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-OCT-18
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	23-OCT-18
cis-1,2-Dichloroethylene		0.60	0.62		ug/L	3.3	30	23-OCT-18
cis-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	23-OCT-18
Dibromochloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	23-OCT-18
Dichlorodifluoromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	23-OCT-18
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-OCT-18
n-Hexane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-OCT-18
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	23-OCT-18
Methyl Ethyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	23-OCT-18
Methyl Isobutyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	23-OCT-18
Methylene Chloride		<5.0	<5.0	RPD-NA	ug/L	N/A	30	23-OCT-18
MTBE		<2.0	<2.0	RPD-NA	ug/L	N/A	30	23-OCT-18
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	23-OCT-18
Styrene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-OCT-18
Tetrachloroethylene		1.90	1.84		ug/L	3.2	30	23-OCT-18
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-OCT-18
trans-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-OCT-18
trans-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	23-OCT-18
Trichloroethylene		10.9	10.2		ug/L	6.5	30	23-OCT-18
Trichlorofluoromethane		<5.0	<5.0	RPD-NA	ug/L	N/A	30	23-OCT-18
Vinyl chloride		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-OCT-18
<b>WG2908068-1 LCS</b>								
1,1,1,2-Tetrachloroethane			110.2		%		70-130	23-OCT-18
1,1,2,2-Tetrachloroethane			93.4		%		70-130	23-OCT-18
1,1,1-Trichloroethane			113.2		%		70-130	23-OCT-18
1,1,2-Trichloroethane			115.5		%		70-130	23-OCT-18
1,1-Dichloroethane			117.2		%		70-130	23-OCT-18



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Client: Morrison Hershfield Limited (Ottawa)  
 2440 Don Reid Drive  
 Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	Water							
<b>Batch</b>	<b>R4294135</b>							
<b>WG2908068-1</b>	<b>LCS</b>							
1,1-Dichloroethylene			109.0		%		70-130	23-OCT-18
1,2-Dibromoethane			124.9		%		70-130	23-OCT-18
1,2-Dichlorobenzene			111.1		%		70-130	23-OCT-18
1,2-Dichloroethane			123.7		%		70-130	23-OCT-18
1,2-Dichloropropane			115.0		%		70-130	23-OCT-18
1,3-Dichlorobenzene			107.8		%		70-130	23-OCT-18
1,4-Dichlorobenzene			111.5		%		70-130	23-OCT-18
Acetone			128.8		%		60-140	23-OCT-18
Benzene			114.2		%		70-130	23-OCT-18
Bromodichloromethane			122.8		%		70-130	23-OCT-18
Bromoform			125.2		%		70-130	23-OCT-18
Bromomethane			97.1		%		60-140	23-OCT-18
Carbon tetrachloride			112.6		%		70-130	23-OCT-18
Chlorobenzene			109.0		%		70-130	23-OCT-18
Chloroform			118.6		%		70-130	23-OCT-18
cis-1,2-Dichloroethylene			114.6		%		70-130	23-OCT-18
cis-1,3-Dichloropropene			117.7		%		70-130	23-OCT-18
Dibromochloromethane			115.8		%		70-130	23-OCT-18
Dichlorodifluoromethane			133.9		%		50-140	23-OCT-18
Ethylbenzene			99.2		%		70-130	23-OCT-18
n-Hexane			104.4		%		70-130	23-OCT-18
m+p-Xylenes			101.9		%		70-130	23-OCT-18
Methyl Ethyl Ketone			140.5	MES	%		60-140	23-OCT-18
Methyl Isobutyl Ketone			124.3		%		60-140	23-OCT-18
Methylene Chloride			122.9		%		70-130	23-OCT-18
MTBE			107.4		%		70-130	23-OCT-18
o-Xylene			100.1		%		70-130	23-OCT-18
Styrene			105.5		%		70-130	23-OCT-18
Tetrachloroethylene			105.2		%		70-130	23-OCT-18
Toluene			101.1		%		70-130	23-OCT-18
trans-1,2-Dichloroethylene			115.7		%		70-130	23-OCT-18
trans-1,3-Dichloropropene			109.8		%		70-130	23-OCT-18
Trichloroethylene			117.8		%		70-130	23-OCT-18



## Quality Control Report

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Client: Morrison Hershfield Limited (Ottawa)  
 2440 Don Reid Drive  
 Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	Water							
<b>Batch</b>	<b>R4294135</b>							
<b>WG2908068-1</b>	<b>LCS</b>							
Trichlorofluoromethane			124.0		%		60-140	23-OCT-18
Vinyl chloride			113.0		%		60-140	23-OCT-18
<b>WG2908068-2</b>	<b>MB</b>							
1,1,1,2-Tetrachloroethane			<0.50		ug/L		0.5	23-OCT-18
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	23-OCT-18
1,1,1-Trichloroethane			<0.50		ug/L		0.5	23-OCT-18
1,1,2-Trichloroethane			<0.50		ug/L		0.5	23-OCT-18
1,1-Dichloroethane			<0.50		ug/L		0.5	23-OCT-18
1,1-Dichloroethylene			<0.50		ug/L		0.5	23-OCT-18
1,2-Dibromoethane			<0.20		ug/L		0.2	23-OCT-18
1,2-Dichlorobenzene			<0.50		ug/L		0.5	23-OCT-18
1,2-Dichloroethane			<0.50		ug/L		0.5	23-OCT-18
1,2-Dichloropropane			<0.50		ug/L		0.5	23-OCT-18
1,3-Dichlorobenzene			<0.50		ug/L		0.5	23-OCT-18
1,4-Dichlorobenzene			<0.50		ug/L		0.5	23-OCT-18
Acetone			<30		ug/L		30	23-OCT-18
Benzene			<0.50		ug/L		0.5	23-OCT-18
Bromodichloromethane			<2.0		ug/L		2	23-OCT-18
Bromoform			<5.0		ug/L		5	23-OCT-18
Bromomethane			<0.50		ug/L		0.5	23-OCT-18
Carbon tetrachloride			<0.20		ug/L		0.2	23-OCT-18
Chlorobenzene			<0.50		ug/L		0.5	23-OCT-18
Chloroform			<1.0		ug/L		1	23-OCT-18
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	23-OCT-18
cis-1,3-Dichloropropene			<0.30		ug/L		0.3	23-OCT-18
Dibromochloromethane			<2.0		ug/L		2	23-OCT-18
Dichlorodifluoromethane			<2.0		ug/L		2	23-OCT-18
Ethylbenzene			<0.50		ug/L		0.5	23-OCT-18
n-Hexane			<0.50		ug/L		0.5	23-OCT-18
m+p-Xylenes			<0.40		ug/L		0.4	23-OCT-18
Methyl Ethyl Ketone			<20		ug/L		20	23-OCT-18
Methyl Isobutyl Ketone			<20		ug/L		20	23-OCT-18
Methylene Chloride			<5.0		ug/L		5	23-OCT-18
MTBE			<2.0		ug/L		2	23-OCT-18



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Client: Morrison Hershfield Limited (Ottawa)  
 2440 Don Reid Drive  
 Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	Water							
<b>Batch</b>	<b>R4294135</b>							
<b>WG2908068-2 MB</b>								
o-Xylene			<0.30		ug/L		0.3	23-OCT-18
Styrene			<0.50		ug/L		0.5	23-OCT-18
Tetrachloroethylene			<0.50		ug/L		0.5	23-OCT-18
Toluene			<0.50		ug/L		0.5	23-OCT-18
trans-1,2-Dichloroethylene			<0.50		ug/L		0.5	23-OCT-18
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	23-OCT-18
Trichloroethylene			<0.50		ug/L		0.5	23-OCT-18
Trichlorofluoromethane			<5.0		ug/L		5	23-OCT-18
Vinyl chloride			<0.50		ug/L		0.5	23-OCT-18
Surrogate: 1,4-Difluorobenzene			97.2		%		70-130	23-OCT-18
Surrogate: 4-Bromofluorobenzene			95.0		%		70-130	23-OCT-18
<b>WG2908068-5 MS</b>		<b>WG2908068-3</b>						
1,1,1,2-Tetrachloroethane			110.3		%		50-140	23-OCT-18
1,1,1,2,2-Tetrachloroethane			93.7		%		50-140	23-OCT-18
1,1,1-Trichloroethane			115.7		%		50-140	23-OCT-18
1,1,2-Trichloroethane			114.4		%		50-140	23-OCT-18
1,1-Dichloroethane			119.2		%		50-140	23-OCT-18
1,1-Dichloroethylene			109.7		%		50-140	23-OCT-18
1,2-Dibromoethane			123.1		%		50-140	23-OCT-18
1,2-Dichlorobenzene			110.1		%		50-140	23-OCT-18
1,2-Dichloroethane			125.3		%		50-140	23-OCT-18
1,2-Dichloropropane			115.7		%		50-140	23-OCT-18
1,3-Dichlorobenzene			107.0		%		50-140	23-OCT-18
1,4-Dichlorobenzene			109.5		%		50-140	23-OCT-18
Acetone			132.0		%		50-140	23-OCT-18
Benzene			115.6		%		50-140	23-OCT-18
Bromodichloromethane			123.3		%		50-140	23-OCT-18
Bromoform			123.1		%		50-140	23-OCT-18
Bromomethane			94.0		%		50-140	23-OCT-18
Carbon tetrachloride			115.2		%		50-140	23-OCT-18
Chlorobenzene			107.8		%		50-140	23-OCT-18
Chloroform			121.1		%		50-140	23-OCT-18
cis-1,2-Dichloroethylene			115.4		%		50-140	23-OCT-18
cis-1,3-Dichloropropene			110.5		%		50-140	23-OCT-18



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Client: Morrison Hershfield Limited (Ottawa)  
 2440 Don Reid Drive  
 Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	Water							
<b>Batch</b>	<b>R4294135</b>							
<b>WG2908068-5 MS</b>		<b>WG2908068-3</b>						
Dibromochloromethane			115.5		%		50-140	23-OCT-18
Dichlorodifluoromethane			130.3		%		50-140	23-OCT-18
Ethylbenzene			97.2		%		50-140	23-OCT-18
n-Hexane			104.9		%		50-140	23-OCT-18
m+p-Xylenes			100.3		%		50-140	23-OCT-18
Methyl Ethyl Ketone			126.8		%		50-140	23-OCT-18
Methyl Isobutyl Ketone			119.2		%		50-140	23-OCT-18
Methylene Chloride			123.8		%		50-140	23-OCT-18
MTBE			108.3		%		50-140	23-OCT-18
o-Xylene			97.9		%		50-140	23-OCT-18
Styrene			102.3		%		50-140	23-OCT-18
Tetrachloroethylene			103.5		%		50-140	23-OCT-18
Toluene			100.4		%		50-140	23-OCT-18
trans-1,2-Dichloroethylene			114.4		%		50-140	23-OCT-18
trans-1,3-Dichloropropene			99.98		%		50-140	23-OCT-18
Trichloroethylene			117.0		%		50-140	23-OCT-18
Trichlorofluoromethane			125.8		%		50-140	23-OCT-18
Vinyl chloride			111.0		%		50-140	23-OCT-18

# Quality Control Report

Workorder: L2183807

Report Date: 23-OCT-18

Client: Morrison Hershfield Limited (Ottawa)  
2440 Don Reid Drive  
Ottawa ON K1H 1E1

Page 10 of 10

Contact: Mitchell Dawley

## Legend:

---

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

## Sample Parameter Qualifier Definitions:

---

Qualifier	Description
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

---

## Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

---

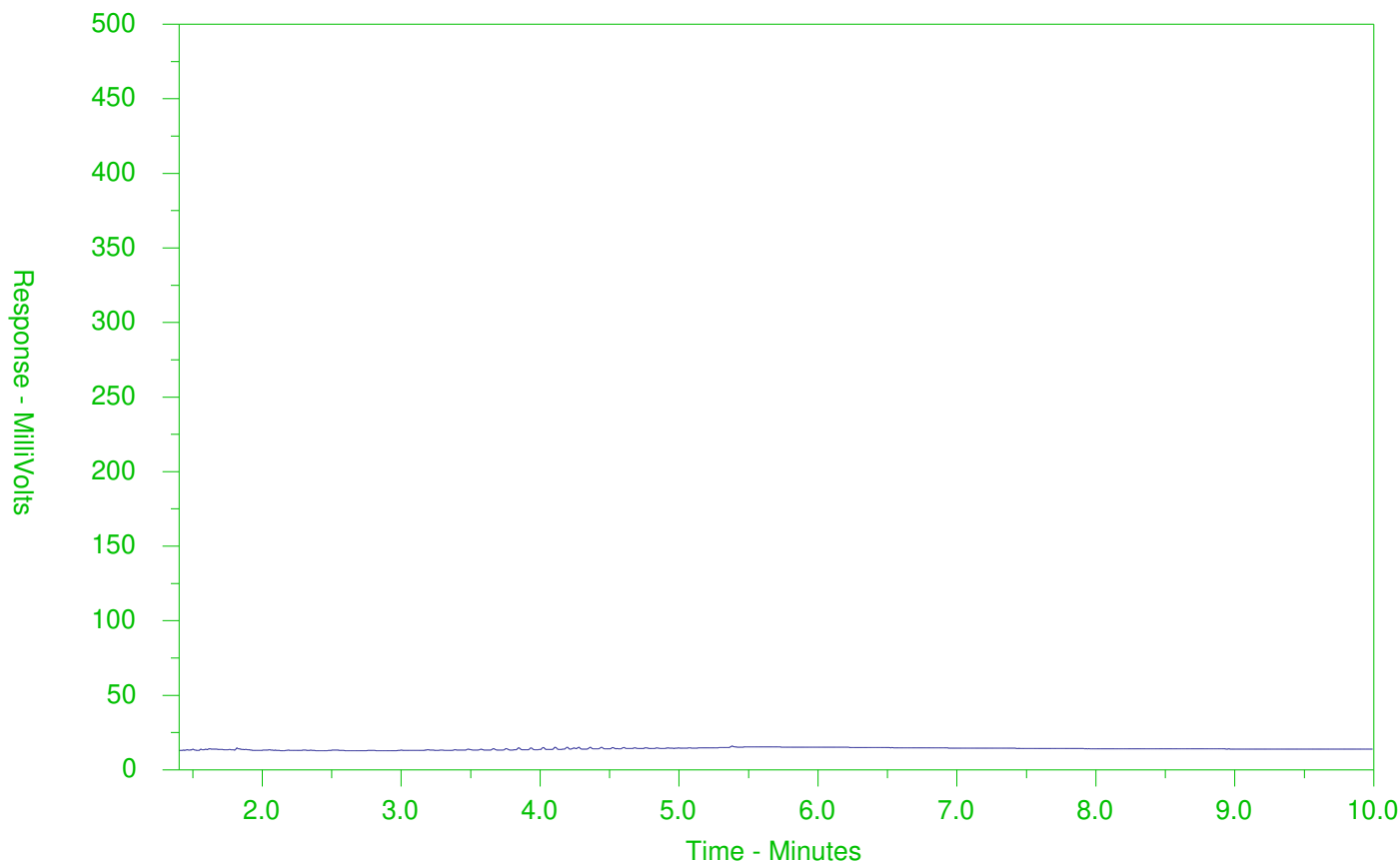
The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

# CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: L2183807-1  
 Client Sample ID: BS-3



← F2 →		← F3 →		← F4 →	
nC10	nC16	nC34	nC50		
174°C	287°C	481°C	575°C		
346°F	549°F	898°F	1067°F		
Gasoline →			← Motor Oils/Lube Oils/Grease		
← Diesel/Jet Fuels →					

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

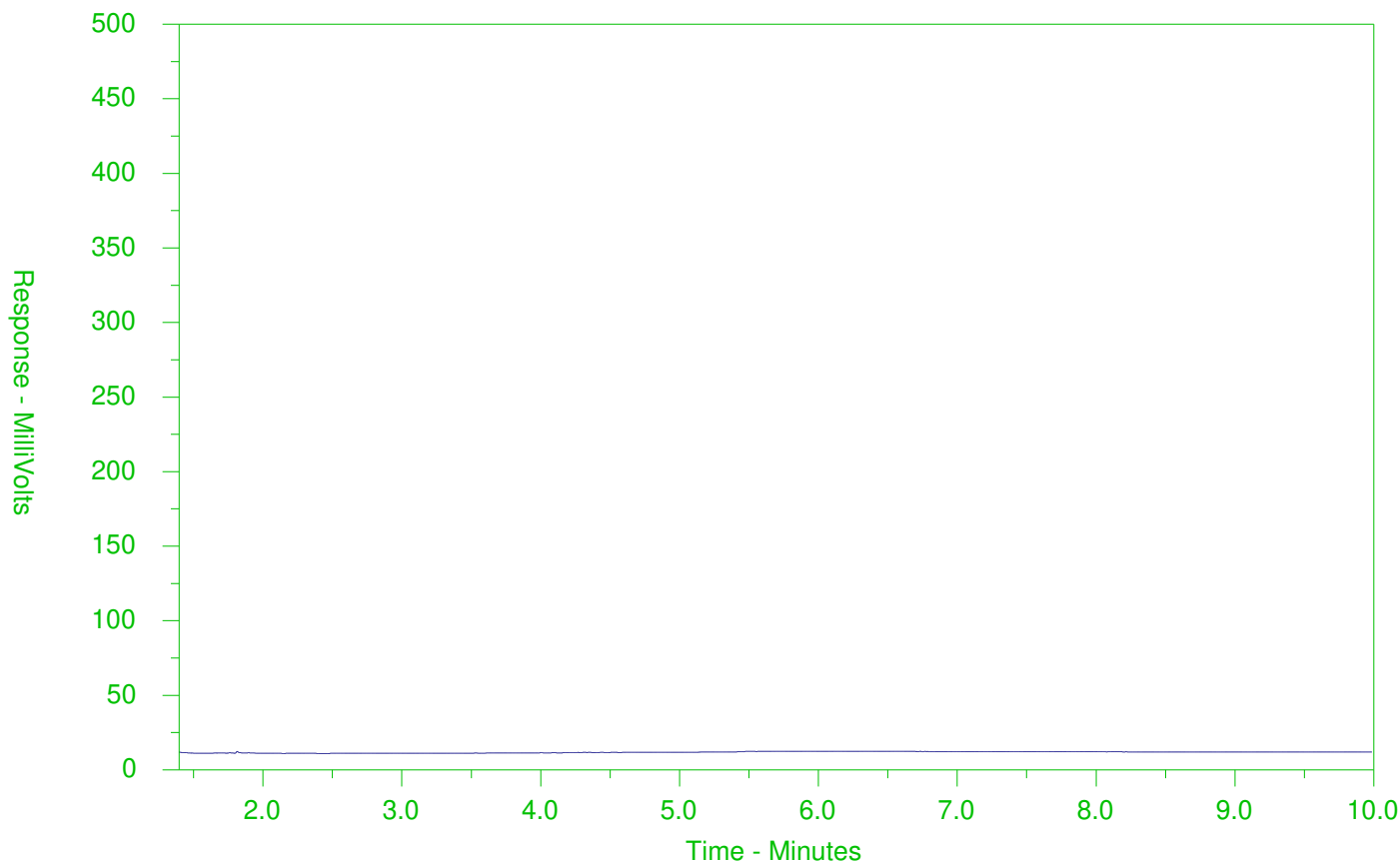
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at [www.alsglobal.com](http://www.alsglobal.com).

# CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: L2183807-2  
 Client Sample ID: BS-1



← F2 →		← F3 →		← F4 →	
nC10	nC16	nC34	nC50		
174°C	287°C	481°C	575°C		
346°F	549°F	898°F	1067°F		
Gasoline →			← Motor Oils/Lube Oils/Grease		
← Diesel/Jet Fuels →					

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at [www.alsglobal.com](http://www.alsglobal.com).



www.alsglobal.com

<b>Report To</b> Contact and company name below will appear on the final report		<b>Report Format / Distribution</b>		<input type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL) Quality Control (QC) Report with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked Select Distribution: <input type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX		Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply 4 day [P4] <input type="checkbox"/> 3 day [P3] <input checked="" type="checkbox"/> 2 day [P2] <input type="checkbox"/> 1 Business day [E1] <input type="checkbox"/> Same Day, Weekend or Statutory holiday [E0] <input type="checkbox"/>	
Company: Morrison Hershfield (Ottawa) - 24800 Contact: Mitchell Dawley Phone: 613-739-2910 x1022235 Company address below will appear on the final report Street: 2440 Don Reid Drive City/Province: Ottawa, ON Postal Code: K1H 1E1		Email 1 or Fax MDawley@morrisonhershfield.com Email 2 CGroulx@morrisonhershfield.com Email 3		Date and Time Required for all E&P TATs:		All E&P TATs with your AM - surcharges will apply	
<b>Invoice To</b> Same as Report To <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO Copy of Invoice with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		<b>Invoice Distribution</b> Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX Email 1 or Fax MDawley@morrisonhershfield.com Email 2 CGroulx@morrisonhershfield.com		Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below		Analysis Request	
<b>Project Information</b> ALS Account # / Quote #: Q70413 Job #: 180564799 PO / AFE: LSD:		<b>Oil and Gas Required Fields (client use)</b> AFE/Cost Center: PO# Major/Minor Code: Routing Code: Requisitioner: Location:		F/P P Reg. 153 complete Metals VOC / F1-F4 PAH Metals and Inorganics TCLP - b(a)p TCLP - Metals and Inorganics TCLP - VOCs		Number of Containers	
ALS Lab Work Order # (lab use only) <b>L2183807</b>		ALS Contact: <b>Melanie Moshi</b>		Sampler:			
ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type			
-1	BS-3	Nov 17-10-18	4:30 pm	GW	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	7
-2	BS-1	"	6:00 pm	"	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	4
<b>Drinking Water (DW) Samples<sup>1</sup> (client use)</b> Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO Are samples for human drinking water use? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only) <b>NO ECC T1 RP ICC</b> <b>NO ECC T3 ICC</b> <b>NO ECC T2 RP ICC</b>		<b>SAMPLE CONDITION AS RECEIVED (lab use only)</b> Frozen <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/> Ice Packs <input checked="" type="checkbox"/> Ice Cubes <input type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/> Cooling Initiated <input type="checkbox"/> INITIAL COOLER TEMPERATURES °C: 4.7 FINAL COOLER TEMPERATURES °C: 1.9			
<b>SHIPMENT RELEASE (client use)</b> Released by: [Signature] Date: 10/17/18 Time: 6pm		<b>INITIAL SHIPMENT RECEPTION (lab use only)</b> Received by: [Signature] Date: 10/18/18 Time: 9:00		<b>FINAL SHIPMENT RECEPTION (lab use only)</b> Received by: [Signature] Date: 10/18/18 Time: 9:30			



Morrison Hershfield Limited (Ottawa)  
ATTN: Mitchell Dawley  
2440 Don Reid Drive  
Ottawa ON K1H 1E1

Date Received: 16- OCT- 18  
Report Date: 23- OCT- 18 11:07 (MT)  
Version: FINAL

Client Phone: 613- 739- 2910

## Certificate of Analysis

Lab Work Order #: L2182371  
Project P.O. #: NOT SUBMITTED  
Job Reference: 180564799  
C of C Numbers:  
Legal Site Desc:

Melanie Moshi  
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ADDRESS: 190 Colonnade Road, Unit 7, Ottawa, ON K2E 7J5 Canada | Phone: + 1 613 225 8279 | Fax: + 1 613 225 2801  
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## Summary of Guideline Exceedances

Guideline							
ALS ID	Client ID	Grouping	Analyte	Result	Guideline Limit	Unit	
<b>Ontario Regulation 153/04 - April 15, 2011 Standards - T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use</b> (No parameter exceedances)							
<b>Ontario Regulation 153/04 - April 15, 2011 Standards - T3-Soil-Ind/Com/Commu. Property Use (Fine)</b> (No parameter exceedances)							

Sample Preparation - WASTE


Lab ID L2182371-1  
Sample Date 15-OCT-18  
Sample ID BS-TCLP


Guide Limits  
#1 #2

Analyte	Unit	#1	#2	
Initial pH	pH units	-	-	9.35
Final pH	pH units	-	-	5.34

Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use

Guide Limit #2: T3-Soil-Ind/Com/Commu. Property Use (Fine)

 Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.

 Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

## TCLP Extractables - WASTE

**Lab ID** L2182371-1  
**Sample Date** 15-OCT-18  
**Sample ID** BS-TCLP

Analyte	Unit	Guide Limits		
		#1	#2	
Benzo(a)pyrene	mg/L	-	-	<0.0010
Cyanide, Weak Acid Diss	mg/L	-	-	<0.10
Fluoride (F)	mg/L	-	-	<10
Nitrate and Nitrite as N	mg/L	-	-	<4.0
Nitrate-N	mg/L	-	-	<2.0
Nitrite-N	mg/L	-	-	<2.0
Surrogate: d12-Chrysene	%	-	-	83.5

**Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use**

**Guide Limit #2: T3-Soil-Ind/Com/Commu. Property Use (Fine)**

- Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
- Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

**TCLP Metals - WASTE**

**Lab ID** L2182371-1  
**Sample Date** 15-OCT-18  
**Sample ID** BS-TCLP

Analyte	Unit	Guide Limits		
		#1	#2	
Arsenic (As)	mg/L	-	-	<0.050
Barium (Ba)	mg/L	-	-	0.83
Boron (B)	mg/L	-	-	<2.5
Cadmium (Cd)	mg/L	-	-	<0.0050
Chromium (Cr)	mg/L	-	-	<0.050
Lead (Pb)	mg/L	-	-	<0.050
Mercury (Hg)	mg/L	-	-	<0.00010
Selenium (Se)	mg/L	-	-	<0.025
Silver (Ag)	mg/L	-	-	<0.0050
Uranium (U)	mg/L	-	-	<0.25

**Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use**

**Guide Limit #2: T3-Soil-Ind/Com/Commu. Property Use (Fine)**

- Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
- Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

## TCLP VOCs - WASTE

**Lab ID** L2182371-1  
**Sample Date** 15-OCT-18  
**Sample ID** BS-TCLP

Analyte	Unit	Guide Limits		
		#1	#2	
1,1-Dichloroethylene	mg/L	-	-	<0.025
1,2-Dichlorobenzene	mg/L	-	-	<0.025
1,2-Dichloroethane	mg/L	-	-	<0.025
1,4-Dichlorobenzene	mg/L	-	-	<0.025
Benzene	mg/L	-	-	<0.025
Carbon tetrachloride	mg/L	-	-	<0.025
Chlorobenzene	mg/L	-	-	<0.025
Chloroform	mg/L	-	-	<0.10
Dichloromethane	mg/L	-	-	<0.50
Methyl Ethyl Ketone	mg/L	-	-	<1.0
Tetrachloroethylene	mg/L	-	-	<0.025
Trichloroethylene	mg/L	-	-	<0.025
Vinyl chloride	mg/L	-	-	<0.050
Surrogate: 4-Bromofluorobenzene	%	-	-	97.5

**Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use**

**Guide Limit #2: T3-Soil-Ind/Com/Commu. Property Use (Fine)**

- Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
- Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

## Volatile Organic Compounds - WASTE


**Lab ID** L2182371-1  
**Sample Date** 15-OCT-18  
**Sample ID** BS-TCLP


**Guide Limits**  
**Unit #1 #2**

Analyte	Unit	#1	#2	
Surrogate: 1,4-Difluorobenzene	%	-	-	98.8

**Guide Limit #1: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use**

**Guide Limit #2: T3-Soil-Ind/Com/Commu. Property Use (Fine)**

 Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.

 Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

# Reference Information

**Methods Listed (if applicable):**

ALS Test Code	Matrix	Test Description	Method Reference**
<b>BAP-ONT-TCLP-WT</b>	Waste	Benzo(a)pyrene for O. Reg 347	SW 846 8270-GC-MS on TCLP Leachate
<b>CN-TCLP-WT</b>	Waste	Cyanide for O. Reg 347	APHA 4500CN I
<b>F-TCLP-WT</b>	Waste	Fluoride (F) for O. Reg 347	APHA 4110 B-Ion Chromatography
<b>HG-TCLP-WT</b>	Waste	Mercury (CVAA) for O.Reg 347	SW846 7470A
<b>LEACH-TCLP-WT</b>	Waste	Leachate Procedure for Reg 347	EPA 1311
Inorganic and Semi-Volatile Organic contaminants are leached from waste samples in strict accordance with US EPA Method 1311, "Toxicity Characteristic Leaching Procedure" (TCLP). Test results are reported in leachate concentration units (normally mg/L).			
<b>MET-TCLP-WT</b>	Waste	O.Reg 347 TCLP Leachable Metals	EPA 200.8
<b>N2N3-TCLP-WT</b>	Waste	Nitrate/Nitrite-N for O. Reg 347	APHA 4110 B-Ion Chromatography
<b>VOC-TCLP-WT</b>	Waste	VOC for O. Reg 347	SW846 8260
A sample of waste is leached in a zero headspace extractor at 30–2 rpm for 18–2.0 hours with the appropriate leaching solution. After tumbling the leachate is analyzed directly by headspace technology, followed by GC/MS using internal standard quantitation.			

\*\*ALS test methods may incorporate modifications from specified reference methods to improve performance.

Chain of Custody Numbers:

*The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:*

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

**GLOSSARY OF REPORT TERMS**

*Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.*

*mg/kg - milligrams per kilogram based on dry weight of sample  
 mg/kg wwt - milligrams per kilogram based on wet weight of sample  
 mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight  
 mg/L - unit of concentration based on volume, parts per million.  
 < - Less than.*

*D.L. - The reporting limit.*

*N/A - Result not available. Refer to qualifier code and definition for explanation.*

*Test results reported relate only to the samples as received by the laboratory.*

*UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.*

*Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.*

*Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guideline limits are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.*



## Quality Control Report

Workorder: L2182371

Report Date: 23-OCT-18

Page 1 of 6

Client: Morrison Hershfield Limited (Ottawa)  
 2440 Don Reid Drive  
 Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BAP-ONT-TCLP-WT		Waste						
<b>Batch</b>	<b>R4294469</b>							
<b>WG2908712-4</b>	<b>DUP</b>	<b>WG2908712-6</b>						
Benzo(a)pyrene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	50	23-OCT-18
<b>WG2908712-2</b>	<b>LCS</b>							
Benzo(a)pyrene			100.4		%		50-150	23-OCT-18
<b>WG2908712-1</b>	<b>MB</b>							
Benzo(a)pyrene			<0.0010		mg/L		0.001	23-OCT-18
Surrogate: d12-Chrysene			100.8		%		60-140	23-OCT-18
<b>WG2908712-3</b>	<b>MB</b>							
Benzo(a)pyrene			<0.0010		mg/L		0.001	23-OCT-18
Surrogate: d12-Chrysene			92.1		%		60-140	23-OCT-18
<b>WG2908712-5</b>	<b>MS</b>	<b>WG2908712-6</b>						
Benzo(a)pyrene			94.7		%		50-150	23-OCT-18
CN-TCLP-WT		Waste						
<b>Batch</b>	<b>R4292628</b>							
<b>WG2908243-3</b>	<b>DUP</b>	<b>L2182371-1</b>						
Cyanide, Weak Acid Diss		<0.10	<0.10	RPD-NA	mg/L	N/A	50	19-OCT-18
<b>WG2908243-2</b>	<b>LCS</b>							
Cyanide, Weak Acid Diss			98.6		%		70-130	19-OCT-18
<b>WG2908243-1</b>	<b>MB</b>							
Cyanide, Weak Acid Diss			<0.10		mg/L		0.1	19-OCT-18
<b>WG2908243-4</b>	<b>MS</b>	<b>L2182371-1</b>						
Cyanide, Weak Acid Diss			95.2		%		50-140	19-OCT-18
F-TCLP-WT		Waste						
<b>Batch</b>	<b>R4292413</b>							
<b>WG2908574-3</b>	<b>DUP</b>	<b>L2180628-1</b>						
Fluoride (F)		<10	<10	RPD-NA	mg/L	N/A	30	19-OCT-18
<b>WG2908574-2</b>	<b>LCS</b>							
Fluoride (F)			90.5		%		70-130	19-OCT-18
<b>WG2908574-1</b>	<b>MB</b>							
Fluoride (F)			<10		mg/L		10	19-OCT-18
<b>WG2908574-4</b>	<b>MS</b>	<b>L2180628-1</b>						
Fluoride (F)			90.7		%		50-150	19-OCT-18
HG-TCLP-WT		Waste						
<b>Batch</b>	<b>R4288447</b>							
<b>WG2908269-3</b>	<b>DUP</b>	<b>L2182359-2</b>						
Mercury (Hg)		<0.00010	<0.00010	RPD-NA	mg/L	N/A	50	19-OCT-18
<b>WG2908269-2</b>	<b>LCS</b>							



# Quality Control Report

Workorder: L2182371

Report Date: 23-OCT-18

Page 2 of 6

Client: Morrison Hershfield Limited (Ottawa)  
 2440 Don Reid Drive  
 Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-TCLP-WT		Waste						
<b>Batch</b>	<b>R4288447</b>							
<b>WG2908269-2</b>	<b>LCS</b>							
Mercury (Hg)			99.2		%		70-130	19-OCT-18
<b>WG2908269-1</b>	<b>MB</b>							
Mercury (Hg)			<0.00010		mg/L		0.0001	19-OCT-18
<b>WG2908269-4</b>	<b>MS</b>	<b>L2182359-2</b>						
Mercury (Hg)			93.7		%		50-140	19-OCT-18
MET-TCLP-WT		Waste						
<b>Batch</b>	<b>R4290097</b>							
<b>WG2908723-4</b>	<b>DUP</b>	<b>WG2908723-3</b>						
Silver (Ag)		<0.0050	<0.0050	RPD-NA	mg/L	N/A	40	19-OCT-18
Arsenic (As)		<0.050	<0.050	RPD-NA	mg/L	N/A	40	19-OCT-18
Boron (B)		<2.5	<2.5	RPD-NA	mg/L	N/A	40	19-OCT-18
Barium (Ba)		<0.50	<0.50	RPD-NA	mg/L	N/A	40	19-OCT-18
Cadmium (Cd)		<0.0050	<0.0050	RPD-NA	mg/L	N/A	40	19-OCT-18
Chromium (Cr)		<0.050	<0.050	RPD-NA	mg/L	N/A	40	19-OCT-18
Lead (Pb)		<0.050	<0.050	RPD-NA	mg/L	N/A	40	19-OCT-18
Selenium (Se)		<0.025	<0.025	RPD-NA	mg/L	N/A	40	19-OCT-18
Uranium (U)		<0.25	<0.25	RPD-NA	mg/L	N/A	40	19-OCT-18
<b>WG2908723-2</b>	<b>LCS</b>							
Silver (Ag)			95.8		%		70-130	19-OCT-18
Arsenic (As)			99.98		%		70-130	19-OCT-18
Boron (B)			95.6		%		70-130	19-OCT-18
Barium (Ba)			98.7		%		70-130	19-OCT-18
Cadmium (Cd)			97.2		%		70-130	19-OCT-18
Chromium (Cr)			98.1		%		70-130	19-OCT-18
Lead (Pb)			103.2		%		70-130	19-OCT-18
Selenium (Se)			97.8		%		70-130	19-OCT-18
Uranium (U)			99.3		%		70-130	19-OCT-18
<b>WG2908723-1</b>	<b>MB</b>							
Silver (Ag)			<0.0050		mg/L		0.005	19-OCT-18
Arsenic (As)			<0.050		mg/L		0.05	19-OCT-18
Boron (B)			<2.5		mg/L		2.5	19-OCT-18
Barium (Ba)			<0.50		mg/L		0.5	19-OCT-18
Cadmium (Cd)			<0.0050		mg/L		0.005	19-OCT-18
Chromium (Cr)			<0.050		mg/L		0.05	19-OCT-18



## Quality Control Report

Workorder: L2182371

Report Date: 23-OCT-18

Page 3 of 6

Client: Morrison Hershfield Limited (Ottawa)  
 2440 Don Reid Drive  
 Ottawa ON K1H 1E1

Contact: Mitchell Dawley

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-TCLP-WT		Waste						
<b>Batch</b>	<b>R4290097</b>							
<b>WG2908723-1</b>	<b>MB</b>							
Lead (Pb)			<0.050		mg/L		0.05	19-OCT-18
Selenium (Se)			<0.025		mg/L		0.025	19-OCT-18
Uranium (U)			<0.25		mg/L		0.25	19-OCT-18
<b>WG2908723-5</b>	<b>MS</b>	<b>WG2908723-3</b>						
Silver (Ag)			119.1		%		50-150	19-OCT-18
Arsenic (As)			103.8		%		50-150	19-OCT-18
Boron (B)			96.7		%		50-150	19-OCT-18
Barium (Ba)			102.8		%		50-150	19-OCT-18
Cadmium (Cd)			99.2		%		50-150	19-OCT-18
Chromium (Cr)			98.4		%		50-150	19-OCT-18
Lead (Pb)			102.3		%		50-150	19-OCT-18
Selenium (Se)			102.3		%		50-150	19-OCT-18
Uranium (U)			103.8		%		50-150	19-OCT-18
N2N3-TCLP-WT		Waste						
<b>Batch</b>	<b>R4292413</b>							
<b>WG2908574-3</b>	<b>DUP</b>	<b>L2180628-1</b>						
Nitrate-N		<2.0	<2.0	RPD-NA	mg/L	N/A	30	19-OCT-18
Nitrite-N		<2.0	<2.0	RPD-NA	mg/L	N/A	30	19-OCT-18
<b>WG2908574-2</b>	<b>LCS</b>							
Nitrate-N			100.1		%		70-130	19-OCT-18
Nitrite-N			98.0		%		70-130	19-OCT-18
<b>WG2908574-1</b>	<b>MB</b>							
Nitrate-N			<2.0		mg/L		2	19-OCT-18
Nitrite-N			<2.0		mg/L		2	19-OCT-18
<b>WG2908574-4</b>	<b>MS</b>	<b>L2180628-1</b>						
Nitrate-N			101.8		%		50-150	19-OCT-18
Nitrite-N			98.3		%		50-150	19-OCT-18
VOC-TCLP-WT		Waste						
<b>Batch</b>	<b>R4287942</b>							
<b>WG2906856-1</b>	<b>LCS</b>							
1,1-Dichloroethylene			103.0		%		70-130	19-OCT-18
1,2-Dichlorobenzene			106.7		%		70-130	19-OCT-18
1,2-Dichloroethane			114.9		%		70-130	19-OCT-18
1,4-Dichlorobenzene			104.9		%		70-130	19-OCT-18
Benzene			108.5				70-130	



## Quality Control Report

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Client: Morrison Hershfield Limited (Ottawa)  
 2440 Don Reid Drive  
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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-TCLP-WT	Waste							
<b>Batch</b>	<b>R4287942</b>							
<b>WG2906856-1</b>	<b>LCS</b>							
Benzene			108.5		%		70-130	19-OCT-18
Carbon tetrachloride			104.0		%		60-140	19-OCT-18
Chlorobenzene			108.5		%		70-130	19-OCT-18
Chloroform			110.7		%		70-130	19-OCT-18
Dichloromethane			112.2		%		70-130	19-OCT-18
Methyl Ethyl Ketone			122.0		%		50-150	19-OCT-18
Tetrachloroethylene			114.7		%		70-130	19-OCT-18
Trichloroethylene			111.0		%		70-130	19-OCT-18
Vinyl chloride			113.2		%		60-130	19-OCT-18
<b>WG2906856-2</b>	<b>MB</b>							
1,1-Dichloroethylene			<0.025		mg/L		0.025	19-OCT-18
1,2-Dichlorobenzene			<0.025		mg/L		0.025	19-OCT-18
1,2-Dichloroethane			<0.025		mg/L		0.025	19-OCT-18
1,4-Dichlorobenzene			<0.025		mg/L		0.025	19-OCT-18
Benzene			<0.025		mg/L		0.025	19-OCT-18
Carbon tetrachloride			<0.025		mg/L		0.025	19-OCT-18
Chlorobenzene			<0.025		mg/L		0.025	19-OCT-18
Chloroform			<0.10		mg/L		0.1	19-OCT-18
Dichloromethane			<0.50		mg/L		0.5	19-OCT-18
Methyl Ethyl Ketone			<1.0		mg/L		1	19-OCT-18
Tetrachloroethylene			<0.025		mg/L		0.025	19-OCT-18
Trichloroethylene			<0.025		mg/L		0.025	19-OCT-18
Vinyl chloride			<0.050		mg/L		0.05	19-OCT-18
Surrogate: 1,4-Difluorobenzene			100.2		%		70-130	19-OCT-18
Surrogate: 4-Bromofluorobenzene			99.8		%		70-130	19-OCT-18
<b>WG2906856-6</b>	<b>MB</b>							
1,1-Dichloroethylene			<0.025		mg/L		0.025	20-OCT-18
1,2-Dichlorobenzene			<0.025		mg/L		0.025	20-OCT-18
1,2-Dichloroethane			<0.025		mg/L		0.025	20-OCT-18
1,4-Dichlorobenzene			<0.025		mg/L		0.025	20-OCT-18
Benzene			<0.025		mg/L		0.025	20-OCT-18
Carbon tetrachloride			<0.025		mg/L		0.025	20-OCT-18
Chlorobenzene			<0.025		mg/L		0.025	20-OCT-18
Chloroform			<0.10		mg/L		0.1	20-OCT-18



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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-TCLP-WT	Waste							
<b>Batch</b>	<b>R4287942</b>							
<b>WG2906856-6 MB</b>								
Dichloromethane			<0.50		mg/L		0.5	20-OCT-18
Methyl Ethyl Ketone			<1.0		mg/L		1	20-OCT-18
Tetrachloroethylene			<0.025		mg/L		0.025	20-OCT-18
Trichloroethylene			<0.025		mg/L		0.025	20-OCT-18
Vinyl chloride			<0.050		mg/L		0.05	20-OCT-18
Surrogate: 1,4-Difluorobenzene			99.3		%		70-130	20-OCT-18
Surrogate: 4-Bromofluorobenzene			101.1		%		70-130	20-OCT-18
<b>WG2906856-5 MS</b>		<b>WG2906856-3</b>						
1,1-Dichloroethylene			100.3		%		50-140	19-OCT-18
1,2-Dichlorobenzene			108.0		%		50-140	19-OCT-18
1,2-Dichloroethane			96.1		%		50-140	19-OCT-18
1,4-Dichlorobenzene			109.7		%		50-140	19-OCT-18
Benzene			106.3		%		50-140	19-OCT-18
Carbon tetrachloride			110.9		%		50-140	19-OCT-18
Chlorobenzene			108.0		%		50-140	19-OCT-18
Chloroform			107.6		%		50-140	19-OCT-18
Dichloromethane			101.4		%		50-140	19-OCT-18
Methyl Ethyl Ketone			96.3		%		50-140	19-OCT-18
Tetrachloroethylene			115.4		%		50-140	19-OCT-18
Trichloroethylene			115.1		%		50-140	19-OCT-18
Vinyl chloride			94.5		%		50-140	19-OCT-18

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## Legend:

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Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

## Sample Parameter Qualifier Definitions:

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Qualifier	Description
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

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## Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

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The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

