APPENDIX

F

Contamination Overview Report

Final
Environmental Contamination Overview

Ojibway Parkway Wildlife Overpass
Ojibway Parkway, Windsor, Ontario
Project # IM20104013.2003.9

Prepared for:

The Corporation of the City of Windsor
400 City Hall Square East, Windsor, Ontario, N9A 7K6

April 29, 2021

Executive Summary

Wood Environment & Infrastructure Solutions (Wood) was retained by The Corporation of the City of Windsor (Client) to conduct an environmental contamination overview to support future environmental excess soil sampling and testing associated with the proposed Ojibway Parkway Wildlife Overpass along Ojibway Parkway in the City of Windsor, Ontario (the "Project Area").

Based on the Environment Contamination Overview conducted by Wood, the following Areas of Potential Environmental Concerns (APECs) were identified resulting from Potentially Contaminating Activities (PCAs) associated with known contaminants located adjacent to the Project Area,

Area of Potential Environmental Concern	Location of APEC on Project Area	Potentially Contaminating Activity*	Location of PCA	Contaminants of Potential Concern	Media Potentially Impacted
APEC-1: Ojibway Parkway (on-site, at least 1930s-present)	Central portion of Project Area	Other. Salt applied to roadway surface (current)	On-Project Area	EC, SAR	Soil
APEC-2: ETR tracks (west adjacent property, at least 1930s-present)	Western portion of Project Area	46. Rail Yards, Tracks and Spurs	On-Project Area	PAHs, BTEX, PHCs, ICP Metals	Soil

*Potentially Contaminating Activity (PCA) described specifically for the Phase One Property with reference to the applicable item number in the Table of Potentially Contaminating Activities provided in Schedule D of *O. Reg. 153/04* as amended, where applicable.

PHCs – Petroleum Hydrocarbons
PAHS – Polycyclic Aromatic Hydrocarbons
BTEX – Benzene, Toluene, Ethylbenzene, Xylenes
SAR – Sodium Adsorption Ratio
EC – Electrical Conductivity

Based on these APECs, soil sampling and analysis will be required to address any excess soil generated by the construction of the proposed Ojibway Park Wildlife Overpass. Reporting, sampling and analysis requirements as per O.Reg. 406/19 should be assessed during the detailed design phase of the Project.

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1.0 Introduction

Wood Environment & Infrastructure Solutions (Wood) was retained by The Corporation of the City of Windsor (Client) to conduct an environmental contamination overview to support future environmental excess soil sampling and testing associated with the proposed Ojibway Parkway Wildlife Overpass along Ojibway Parkway in the City of Windsor, Ontario (the "Project Area").

1.1 Project Area Description

The Study Area is generally located between Broadway Boulevard to the north, Weaver Street to the south, Ojibway Park to the east and Essex Terminal Railway and Black Oak Heritage Park to the west. The Project Area comprises a 180 m by 120 m area starting approximately 20 m south of Broadway Boulevard in the City of Windsor, Ontario.

The Project Area lies in an urban setting in an area that is primarily parkland with some industrial land use. The Project Area has no buildings. The layout of the Project Area is provided on Figure 1.

General information concerning the Project Area is provided below.

Municipal Address	Ojibway Parkway (Broadway Boulevard to the north, Weaver Street to the south)	
Current Project Area Use	Active roadway with green space adjacent to roadway	
Proposed Project Area Use	Ojibway Parkway Wildlife Overpass	
Municipal Zoning	Roadway	
Project Area Dimensions	Length:	Approximately 180 metres along the roadway
	Width:	Approximately 120 metres

1.2 Scope of the Investigation

The scope of work for the environmental contamination overview included the following tasks:

- Reviewing the historical occupancy of the Project Area and surrounding properties within the Study Area through the use of available archived and relevant (in Wood's opinion) municipal and business directories, fire insurance plans (FIP), chain of title; historical plans (if applicable), and aerial photographs to identify past or present uses and/or PCAs and/or land uses that may have impacted its environmental condition and to document the history of the Project Area to its first development or 1875, whichever is earlier;
- Completing a preliminary reconnaissance visit to take photographs of the Project Area and surrounding properties (from publicly accessible areas) and assess current on-site conditions;

- Evaluating the findings obtained through the tasks identified to determine if APECs that may be impacting the quality of soil exist at the Project Area through observations about current and past uses and PCAs on, in or under the Project Area and, as practicable, current and past uses and activities and PCAs in the APU Study Area; and,
- Preparing this environmental contamination overview to support future Environmental Excess Soil Sampling and Testing required by Ontario Regulation 406/19 (O.Reg. 406/19).

2.0 Records Review

2.1 Assessment of Past Uses Study Area Determination

The Study Area means the area that includes the Project Area, any other property that is located, wholly or partly, within 100 metres from the nearest point on a boundary of the Project Area and any property that the Qualified Person determines should be included as a part of the Study Area. The Qualified Person determined the default 100 m radius around the Project Area was sufficient to identify PCAs and/or past or present uses that could potentially result in APECs on, in or under the Project Area based on the geology, the historical development and land use on the Project Area and surrounding area. No additional properties outside the 100 m radius were included in the Study Area.

2.2 Historical Review of Available Information

2.2.1 First Developed Use Determination

According to historical records obtained by Wood, including street directories, FIPs and aerial photography, and from discussions from the Project Area representative, the Project Area was developed by the 1930s (earliest available records) with a roadway. The Ojibway Parkway roadway is present today, with eastern woodlot designated as Ojibway Park in the 1950s. The adjacent ETR tracks have been present since (at least) the 1930s, which would infer that the western portion of the Project Area was either gravel or grass covered since the 1930s. There is potential that the western portion of the Project Area could have been historically used by the railway for staging and/or storage.

2.2.2 Fire Insurance Plans

Wood reviewed the 1953 FIP in Wood's in-house library of FIPs. Due to COVID-19 closures of libraries and museums, additional FIPs were not available for review as part of this assessment. The following significant information was inferred from the FIPs reviewed concerning the Project Area and its surrounding properties:

Year	Description of Structures and Other Improvements	
	Project Area	Surrounding Properties
1953	The Project Area was not shown as developed in the 1953 FIP, but proposed roadways were shown.	No development around the Project Area with the exception of roadways (Sandwich St West, Broadway St) and some residential houses to the north along Sandwich St West. The Essex Terminal Railway (ETR) tracks were present west of the Project Area. Ojibway Park was not constructed as of 1953.

PCAs identified on the aerials within 100 m of the Project Area include:

- 46. Rail Yards, Tracks and Spurs

2.2.3 Aerial Photographs

Aerial photographs of the Study Area were obtained from the City of Windsor Public Works Department for the years 1954 and 1987 and from the City's local GIS website for the years 2000 and 2019. An interval of approximately 10 years between each aerial, subject to aerial availability and scale, was deemed sufficient to characterise changes in the Study Area during its history.

The following significant information was inferred from the aerial photographs reviewed:

Date	Project Area	Surrounding Properties
1954	The Project Area appeared to be a roadway with green space to the west and a woodlot to the east.	Ojibway Parkway was present (as Highway No. 18). Broadway Street was present to the north and the Essex Terminal Railway (ETR) tracks were present to the west. No buildings were present in the vicinity of the Project Area.
1987	The Project Area was not covered by the 1987 aerial photograph (located just south of the aerial extent.	Properties to the north, northwest and northeast were visible on the 1987 aerial photograph. Dainty Rice was present northwest of the Site, and the curved portion of Broadway was constructed between 1954 and 1987. A woodlot was present to the northeast and greenspace was present between Ojibway Parkway and the ETR tracks.
2000	No significant changes observed since the 1954 aerial.	No significant changes observed since the 1987 aerial photograph for properties north of the Project Area. Properties south of the property area included a woodlot (east, southeast), roadway (south) and greenspace, ETR tracks and woodlot (west, southwest).
2019	No significant changes observed.	No significant changes observed.

Aerial photographs are included in Appendix B.

PCAs identified on the aerials within 100 m of the Project Area include:

- 46. Rail Yards, Tracks and Spurs

2.2.4 City Directories

City directories are reviewed to determine historic businesses and activities at the Site and adjacent and surrounding properties. The directories are not conclusive as they only suggest potential activities and operations through business names and occasional brief descriptions.

City directories are available through Opta or public libraries; however, due to COVID-19, availability of city directories is limited. Wood was able to access the online city directories from the University of Windsor's Leddy Library; however the online directories are limited to pre-1969.

The only developed property within 100 m of the Project Area was Dainty Rice (725 Broadway Street, 90 m northwest). Dainty Rice was not developed in the 1953 FIP, or present in the 1954 aerial photograph, but was present by the 1987 aerial photograph.

Wood reviewed the online city directories from 1965 and 1969. Dainty Rice was present in the 1969 city directory, but Broadway was not built on in 1965. As such, Dainty Rice was developed in the mid-1960s. The operations at Dainty Rice is not considered a PCA for the Project Area.

2.2.5 Property Underwriters' Reports and Plans

Property Underwriter Reports and Plans searches were not completed as the Project Area has no municipal address to search for, and there has not been any historical development on the property.

2.2.6 Previous Environmental Reports

The following previous investigation reports were provided to Wood by the Client:

Title:	Geotechnical Investigation, Proposed Sanitary Sewer Replacement, Ojibway Parkway, City of Windsor, Ontario
Author:	Golder Associates Ltd. (Golder)
Date:	March 30, 2007
Summary:	The geotechnical investigation included six boreholes along Ojibway Parkway to depths between 1.2 and 5.0 m using a truck-mounted drill rig. The boreholes encountered surficial asphalt over granular subbase, followed by a brown to black sand with brick fragments (fill) and native deposits of and, silt and silty clay. Boreholes BH2 and BH3 were inferred to be located within the Project Area and were advanced on the east side of Ojibway Parkway.

Title:	Summary of Environmental Sampling Results, Ojibway Parkway Sewer Reconstruction Project Between Broadway Street and Weaver Road, Windsor, Ontario
Author:	Golder
Date:	July 2011
Summary:	The investigation included the advancement of eight boreholes with two temporary monitoring wells to a maximum depth of 4.6 m using a GeoProbe drill rig. Select soil and ground water samples were analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX), petroleum hydrocarbons (PHCs), polycyclic aromatic hydrocarbon (PAH) metals and inorganics. In addition, two waste characterization composite soil samples were analyzed for toxicity characteristic leaching procedure (TCLP) analysis. Analytical results were compared to Table 3 Site Condition Standards for industrial/commercial/ community land use and coarse textured soil (Table 3 SCS) and Table 1 SCS (background conditions). The Golder report identified exceedances of Table 3 SCS for industrial/commercial/community land use in soil on the west side of Ojibway Parkway, at BH106, BH106 and BH108 as follows: - BH105: electrical conductivity (EC) and sodium adsorption ratio (SAR) at sample 3B (3.2-3.66 m) - BH106: lead at sample 1C (0.18-0.3 m) - BH108: cadmium, lead and seven PAH parameters at sample 1C (0.24-0.46 m) Borehole BH103 was inferred to be located within the Project Area and were advanced on the west side of Ojibway Parkway, adjacent to the roadway (shoulder).

The previous reports are included in Appendix A.

No additional PCAs were identified by the review of the historical reports. It should be noted that the PAH and metal exceedances from the 2011 Golder report were located at least 425 m south of the Project Area; however, the ETR tracks run adjacent to the Project Area and study area of the 2011 report.

2.2.7 Historical On-line Information

The following information was obtained from on-line searches,

- Ojibway Park – purchased by the City of Windsor in 1957 from the Canadian Salt Company and by 1958 was preserved as a natural park and woodland area (formally declared in 1961).
- Black Oak Heritage Park – a natural area of land and public park area that is part of the Ojibway Prairie Complex and supports of the finest stands of black oak in southwestern Ontario.
- Dainty Rice (725 Broadway St) – construction of the rice mill was completed in 1967. Still in operation as of April 2021.
- Essex Region Conservation Authority (ERCA) website included a 1937 aerial photograph that shows railway spurs running to properties along the Detroit River, which are inferred to be from the ETR tracks adjacent to the Project Area.

There were no PCAs identified from the review of historical on-line information other than the adjacent ETR tracks.

2.2.8 Zoning

The Project Area and surrounding properties are shown on the City of Windsor zoning maps with the following zoning,

- GD1.4 (east portion of Project Area, Ojibway Park) – Natural Heritage Area
- GD1.1 (grassed area on west side of Project Area and Ojibway Parkway) – Public Park
- MD2.1 (Dainty Rice, northwest of Project Area) – Manufacturing District 2.1
- MD1.3 (ETR Yard, west of Project Area) – Transportation/Shipping
- GD1.4 (west of ETR Yard) - Natural Heritage Area

PCAs identified by the zoning within 100 m of the Project Area include:

- 46. Rail Yards, Tracks and Spurs

It should be noted that the manufacturing zoning for Dainty Rice is not specified as a PCA; however, some of the operations on the property could be considered PCAs. Based on its downgradient location from the Project Area, distance and low permeability of the native silty clay soils in the area, the operations at Dainty Rice are not anticipated to impact on-site soil and ground water.

2.3 Physical Setting Sources

2.3.1 Topography, Hydrology, Geology

The Project Area lies at an approximate elevation of 178 metres above sea level (mASL). The UTM coordinates are Zone 17, 4681569 Northing and 328265 Easting. The topography across the Project Area is noted to be relatively flat and at a similar elevation than the surrounding properties. Shallow drainage ditches were present on both sides of Ojibway Parkway to address precipitation drainage for the roadway.

The surficial geology within the Study Area is interpreted to consist of lacustrine beach, bar and near shore deposits of sand with minor gravel ("Quaternary Geology: Essex county Area (West Half)", preliminary map P.3253, Ministry of Northern Development and Mines, 1994. Glaciolacustrine silty clay deposits are known to present within the general vicinity of the Project Area.

Bedrock is anticipated be of the Middle Devonian age, consisting of limestone, shale and dolostone of the Dundee Formation ("Bedrock Geology of Ontario", Ontario Geological Survey, 1991). Bedrock is anticipated to be encountered at approximately 30 to 34 metres below ground surface (mbgs) ("Drift Thickness: Essex County Area (West Half)", preliminary map P.3255, Ministry of Northern Development and Mines, 1994).

The regional ground water flow direction based on topographic features is expected to be to the west to southwest towards the Detroit River. Locally, the shallow ground water flow may be influenced by underground utility trenches, conduits, and structures, variations in soil type, and minor fluctuations in topography.

2.3.2 Water Bodies and Areas of Natural Significance

The Detroit River is located approximately 1.5 kilometre (km) west of the Project Area. The Titcombe Road Drain is located approximately 225 m south of Broadway Street, and flows southeast to Turkey Creek then southwest to the Detroit River. Ojibway Parkway is the separation of two watersheds, the Windsor Area drainage (west side of Ojibway Parkway) and Turkey Creek watershed (east side of Ojibway Parkway). The Project Area does not include land that is within 30 m of a "water body".

2.3.3 Fill Materials

Based on observations made at the time of the Site reconnaissance, significant fill placements beyond that required for construction and development purposes are not inferred to be present at the Site. The Site is generally graded even with the surrounding properties. There was no evidence from the historical review to suggest that significant in-filling beyond that typically required for typical construction and Site grading purposes had occurred on Site. Previous Environmental reports indicate that fill impacted with PAHs and ICP metals were encountered during drilling activities along Ojibway Parkway from Broadway Street to Weaver Street.

2.3.4 Areas of Natural Significance

An area of natural significance means any of the following:

- An area reserved or set apart as a provincial park or conservation reserve under the Provincial Parks and Conservation Reserves Act, 2006;
- An area of natural and scientific interest (life science or earth science) identified by the Ministry of Natural Resources as having provincial significance;
- A wetland identified by the Ministry of Natural Resources as having provincial significance;

- An area designated by a municipality in its official plan as environmentally significant, however expressed, including designations of areas as environmentally sensitive, as being of environmental concern and as being ecologically significant;
- An area designated as an escarpment natural area or an escarpment protection area by the Niagara Escarpment Plan under the Niagara Escarpment Planning and Development Act;
- An area identified by the Ministry of Natural Resources as significant habitat of a threatened or endangered species;
- An area which is habitat of a species that is classified under section 7 of the Endangered Species Act, 2007 as a threatened or endangered species;
- Property within an area designated as a natural core area or natural linkage area within the area to which the Oak Ridges Moraine Conservation Plan under the Oak Ridges Moraine Conservation Act, 2001 applies; and,
- An area set apart as a wilderness area under the Wilderness Areas Act.

According to ERCA, the Study Area includes both woodlands and wetlands deemed to be areas of natural significance (Provincially Significant Wetlands have been mapped in Black Oak Heritage Park). The Ojibway Parkway and Black Oak Heritage Park are designated as Environmentally Significant Areas and comprise two of the five sites designated as the Ojibway Prairie Remnant Life Science Area of Natural and Scientific Interest (ANSI).

Based on a review of the available information sources concerning the above, the Project Area is within an "Area of Natural Significance" and therefore would be considered a sensitive site under O. Reg. 153/04.

2.3.5 Well Records

MECP Well Records identified the following wells within the Study Area: eleven observation/monitoring wells were installed to the north of the Project Area between 2009 and 2015. MECP Well Records indicated no domestic wells were present within the Study Area.

2.4 Environmental Source Information

Provincial and Federal environmental source information was evaluated through a review of available documents published by the MECP; requests for information submitted to the MECP and Technical Standards and Safety Authority (TSSA) made under the Freedom of Information (FOI) Act; and searches of provincial on-line registries and databases. The findings of the provincial and federal records review are summarized in the table below.

Information Source	Findings
TSSA Information concerning presence of petroleum storage tanks, fuel spill records, accidents or fuel-related incidents which may be registered for Project Area or surrounding properties. TSSA contacted by email on March 31, 2021.	There are no fuel storage tanks listed on the Project Area, or at addresses for Dainty Rice (725 Broadway St), Black Oak Heritage Park (599 Broadway St) or Ojibway Park (5200 Matchette Rd). No other municipal addresses were listed in proximity to the Project Area.
Inventory of Coal Gasification Plant Waste Project Areas in Ontario, (Intera, 1987).	No coal tar or coal gasification plant waste Project Areas were listed as being present within 1 km of the Project Area.
Inventory of Industrial Project Areas Producing or Using Coal Tar and Related Project Areas in Ontario, (Intera, 1988).	No industrial areas producing or using coal tar were listed as being present within 1 km of the Project Area.
Waste Disposal Project Area Inventory, prepared Waste Management Branch, Ontario Ministry of the Environment, June 1991.	No active or closed waste disposal Project Areas were listed as being present within one kilometre (km) of the Project Area.
MECP on-line Brownfields Environmental Project Area Registry accessed on March 30, 2021. (https://www.ontario.ca/page/brownfields-redevelopment#section-9)	A search of the registry indicated that no RSCs have been filed for the Project Area and Study Area.

2.5 Project Area Operating Records

At the time of preparation of this report, the Project Area was an asphalt roadway with no existing buildings. No Project Area operating records were available.

3.0 SITE RECONNAISANCE

3.1 General

Cindy McKee P.Geo., Qualified Person (QP), of Wood conducted a reconnaissance of the Project Area on March 31, 2021 to identify and evaluate current and past uses and PCAs on, in or under the Project Area and, to the extent practicable, current and past uses and PCAs in the APU Study Area that may have and/or are currently impacting the environmental condition of the Project Area.

Ground cover conditions at the time of the Site reconnaissance were clear and dry. No interviews were conducted as part of this assessment and no Site representative accompanied Wood during the Site reconnaissance.

At the time of the reconnaissance, the Project Area was an active asphalt roadway and adjacent greenspace or parkland. No PCAs associated with the Project Area.

3.2 Specific Observations at Project Area

3.2.1 Structures and Other Improvements

There are currently no permanent buildings at the Project Area, nor were there any historically. Selected photographs of the Project Area are presented in Appendix C.

3.2.2 Below Grade Structures

No below grade structures were observed to be present at the Project Area; however, sewers and other utilities are present below grade within the roadway (see Section 3.2.5).

3.2.3 Storage Tanks

Wood did not observe any ASTs, USTs, or any fill or vent pipes that would suggest the presence of USTs at the Project Area during the site reconnaissance. There was no information from the historical review completed to indicate the former presence of ASTs or USTs at the Project Area.

3.2.4 Potable and Non-Potable Water Supplies

Potable water is supplied to the City of Windsor and LaSalle via the municipal water distribution system with water obtained from the Detroit River. No buildings are currently present on the Project Area.

3.2.5 Underground Utilities and Service Corridors

The Project Area is an active roadway with sanitary and storm sewers, Bell communications and natural gas pipelines located along the roadway.

3.2.6 Drains, Pits and Sumps

No sumps, pits or drains, with the exception of sanitary and storm sewers, were observed at the Project Area.

3.2.7 Stains or Corrosion on Floors Near Discharge Location

No discharge locations were observed at the Project Area.

3.2.8 Water Wells

3.2.8.1 Project Area

No water wells were observed at the Project Area.

3.2.8.2 Study Area

Although the Project Area is not serviced by a municipal drinking water system, properties within the Study Area are connected to the municipal drinking water system. A drive-by reconnaissance was completed throughout the Study Area to identifying any wells that are used to supply water for human consumption or an agricultural use.

No water wells were observed in the Study Area.

3.2.9 Other Wells

No other wells, defined under the Oil, Gas and Salt Resources Act were observed at the Project Area by Wood during the reconnaissance.

3.2.10 Sewage Works

The Project Area has municipal sanitary sewer easements in the east and west bound lanes.

3.2.11 Ground Surface Cover

The Project Area is surfaced by asphalt, concrete curbs and a grass covered boulevard.

3.2.12 Former Railway Lines or Spurs

There were no active railway lines or spurs at the Project Area. The ETR railway corridor is located on the west adjacent property, running north to south.

3.2.13 Stained Soil, Vegetation or Pavement

Wood conducted a walkover of the Project Area to identify any areas of stained soil, vegetation or pavement or any other potential indicators of surface spills or leaks. No areas of surface staining or stressed vegetation were observed at the Project Area at the time of the reconnaissance.

3.2.14 Fill and/or Debris Placements

Based on observations made at the time of the reconnaissance, significant fill placements beyond that required for construction and development purposes are not inferred to be present at the Project Area. The Project Area is generally graded even with the surrounding properties. There was no evidence from the historical review to suggest that significant in-filling beyond that typically required for typical construction and Site grading purposes had occurred on the Project Area.

3.2.15 Unidentified Substances

No unidentified substances of determined to be of potential environmental concern were observed at the Project Area during the reconnaissance.

3.3 Enhanced Investigation Project Area

Clause 32(1)(b) of O. Reg. 153/04, as amended, defines an *enhanced investigation project* area as a property: (i) that has or is being used for industrial purposes; or (ii) that is being used or has been used, in whole or in part as: a) a garage, b) as a bulk liquid dispensing facility, including a gasoline outlet, or c) for the operation of dry cleaning equipment, unless either of the following two circumstances apply:

- an RSC has been filed for the Project Area, (ii) the current report did not identify a PCA at the Project Area other than PCAs identified in the Phase One ESA used in support of the RSC, and (iii) the current QP determines that there are no APECs at the Project Area; or
- the Project Area is currently used for an agricultural or other use, or a community use, an institutional use, a parkland use or a residential use; and (ii) since the latest date on which the Project Area ceased being used for a purpose that would otherwise qualify it as an enhanced investigation project area, an RSC has been filed for the Project Area.

The Project Area is not considered to be an enhanced investigation project area.

3.3.1 Site Operations, Processing and Manufacturing

The Project Area is currently an active asphalt roadway.

3.3.2 Hazardous Materials Used / Stored at the Project Area

No hazardous materials were observed in use or being stored at the Project Area.

3.3.3 Products Manufactured at the Project Area

No product manufacturing was observed at the Project Area.

3.3.4 By Products and Waste Produced at the Project Area

No by-products or waste products were observed being generated or stored at the Project Area.

3.3.5 Raw Materials Storage and Handling

No storage or handling or raw materials was observed at the Project Area.

3.3.6 Drum, Tote and Bin Storage Areas

No drum, tote or bin storage area were observed at the Project Area.

3.3.7 Oil Water Separators

No oil water separators were observed at the Project Area.

3.3.8 Vehicle Storage and Maintenance Areas

No vehicle storage or maintenance areas were observed at the Project Area; however, the roadway is currently open for vehicular traffic.

3.3.9 Spills

No spills or evidence of spills were observed at the Project Area.

3.3.10 Details of Operations at the Property, Including Processing or Manufacturing and Equipment Used in Processing or Manufacturing

No processing or manufacturing was observed at the Project Area.

3.3.11 Hydraulic Lift Equipment

No hydraulic lift equipment was observed at the Project Area.

3.4 Other Items

3.4.1 Polychlorinated Biphenyls

Polychlorinated biphenyls (PCB) are a group of synthetic organic chemicals with high stability, fire-resistance, and heat-transfer properties that were commercially manufactured between the late 1920s and 1977. Most PCBs were used as dielectric fluids (insulating liquids) in electrical transformers and capacitors. PCBs were also used in circuit breakers, switch gears, lamp ballasts and large electrical cables as synthetic cooling and insulating materials. PCBs were also used in heat transfer fluids, dye carriers in carbonless copy paper, adhesives, and caulking compounds and as waterproofing, anti-fouling, and fire retardant additives in paints, coatings and sealants for uses. PCBs were also used in some hydraulic oils, particularly those used in high temperature applications such as casting shop presses.

In Canada, PCBs were prohibited from being used in products, equipment, machinery, electrical transformers and capacitors that were manufactured or imported into the country after July 1980. However, older equipment in use after this date may still contain PCBs if the equipment's fluid has not been changed, or if there was sufficient inventory of such equipment.

3.4.2 Electrical Transformers

Electrical service is not supplied to the Project Area; however, overhead cables are located along the west side of Ojibway Parkway. No suspect PCB-containing equipment was observed at the Project Area.

3.4.3 PCB Storage Sites

No evidence of PCB storage was observed at the Project Area.

3.4.4 Radioactive Materials

The Canadian Nuclear Safety Commission (CNSC), under the Nuclear Safety and Control Act, is responsible for the management and licensing of radioactive materials, to ensure that the use of nuclear energy does not pose undue risk to health, safety, security and the environment. The CNSC achieves regulatory control of nuclear facilities and nuclear materials through a comprehensive licensing system, which is administered through the cooperation of federal and provincial government departments such as health, environment, transport and labour. Industrial equipment such as X-ray imagers, metal detection devices and measuring devices may contain radioactive materials and may be a hazard if used or stored improperly.

Radioactive materials or equipment (labelled as such) were not observed at the Project Area.

3.5 Surrounding Land Uses

Wood reviewed the current land uses of neighbouring properties from publicly accessible locations to assess possible environmental impacts to the Project Area that may arise from operations within the Study Area. Properties surrounding the Project Area are summarized as follows:

North of the Project Area

Adjacent to the north is the northern portion of Ojibway Parkway, with Broadway Steet intersecting approximately 20 m to the north (east side) and approximately 385 m to the north (west side). Ojibway Park is located to the northeast. ETR tracks and Dainty Rice (725 Broadway St., 85 m) are located to the northwest. No obvious significant environmental concerns were observed pertaining to the land use adjacent to the north of the Project Area other than the ETR tracks.

East of the Project Area

Ojibway Park is located to the east. No obvious significant environmental concerns were observed pertaining to the land use to the east of the Project Area.

South of the Project Area

Adjacent to the south of the Project Area is the southern portion of Ojibway Parkway with Ojibway Park to the east. No obvious significant environmental concerns were observed pertaining to the land use to the south of the Project Area other than the ETR tracks.

West of the Project Area

Adjacent to the west are the ETR tracks followed by the Black Oak Heritage Park. No obvious significant environmental concerns were observed pertaining to the land uses to the west of the Project Area other than the ETR tracks.

3.6 Potentially Contaminating Activities and Areas of Potential Environmental Concern

The following PCAs in the Study Area that resulted in APECs on the Project Area were identified as follows,

Area of Potential Environmental Concern	Location of APEC on Project Area	Potentially Contaminating Activity*	Location of PCA	Contaminants of Potential Concern	Media Potentially Impacted
APEC-1: Ojibway Parkway (on-site, at least 1930s-present)	Central portion of Project Area	Other. Salt applied to roadway surface (current)	On-Project Area	EC, SAR	Soil

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APEC-2: ETR tracks (west adjacent property, at least 1930s-present)	Western portion of Project Area	46. Rail Yards, Tracks and Spurs	On-Project Area	PAHs, BTEX, PHCs, ICP Metals	Soil

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PHCs – Petroleum Hydrocarbons
PAHS – Polycyclic Aromatic Hydrocarbons
BTEX – Benzene, Toluene, Ethylbenzene, Xylenes
SAR – Sodium Adsorption Ratio
EC – Electrical Conductivity

4.0 Sampling and Analysis Plan

A Sampling and Analysis Plan (SAP) is required to support Ontario Regulation 406/19 (O.Reg. 406/19) as of January 1, 2022. It should be noted that O.Reg. 406/19 includes a small volume exemption. Reporting, sampling and analysis requirements as per O.Reg. 406/19 should be assessed during the detailed design phase of the Project.

5.0 Findings & Conclusions

Based on the Environment Contamination Overview conducted by Wood, the following APECs were identified resulting from PCAs associated with known contaminants located adjacent to the Project Area,

Area of Potential Environmental Concern	Location of APEC on Project Area	Potentially Contaminating Activity*	Location of PCA	Contaminants of Potential Concern	Media Potentially Impacted
APEC-1: Ojibway Parkway (on-site, at least 1930s-present)	Central portion of Project Area	Other. Salt applied to roadway surface (current)	On-Project Area	EC, SAR	Soil
APEC-2: ETR tracks (west adjacent property, at least 1930s-present)	Western portion of Project Area	46. Rail Yards, Tracks and Spurs	On-Project Area	PAHs, BTEX, PHCs, ICP Metals	Soil

*Potentially Contaminating Activity (PCA) described specifically for the Phase One Property with reference to the applicable item number in the Table of Potentially Contaminating Activities provided in Schedule D of *O. Reg. 153/04* as amended, where applicable.

PHCs – Petroleum Hydrocarbons
PAHS – Polycyclic Aromatic Hydrocarbons
BTEX – Benzene, Toluene, Ethylbenzene, Xylenes
SAR – Sodium Adsorption Ratio
EC – Electrical Conductivity

Based on these APECs, soil sampling and analysis will be required to address any excess soil generated by the construction of the proposed Ojibway Park Wildlife Overpass. Reporting, sampling and analysis requirements as per O.Reg. 406/19 should be assessed during the detailed design phase of the Project.

6.0 Limitations

This report was prepared for the exclusive use of The Corporation of the City of Windsor and is intended to provide an Environmental Contamination Overview for the proposed Ojibway Parkway Wildlife Overpass along Ojibway Parkway in Windsor, Ontario at the time of the Project Area reconnaissance. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of the third party. Should additional parties require reliance on this report, written authorization from Wood will be required. With respect to third parties, Wood has no liability or responsibility for losses of any kind whatsoever, including direct or consequential financial effects on transactions or property values, or requirements for follow-up actions and costs.

The investigation undertaken by Wood with respect to this report and any conclusions or recommendations made in this report reflect Wood's judgment based on the Project Area conditions observed at the time of the Project Area inspection on the date(s) set out in this report and on information available at the time of preparation of this report. This report has been prepared for specific application to this Project Area and it is based, in part, upon visual observation of the Project Area, subsurface investigation at discrete locations and depths, and specific analysis of specific chemical parameters and materials during a specific time interval, all as described in this report. Unless otherwise stated, the findings cannot be extended to previous or future Project Area conditions, portions of the Project Area, which were unavailable for direct investigation, subsurface locations, which were not investigated directly, or chemical parameters, materials or analysis which were not addressed. Wood has used its professional judgment in analysing this information and formulating these conclusions.

Wood makes no other representations whatsoever, including those concerning the legal significance of its findings, or as to other legal matters touched on in this report, including, but not limited to, ownership of any property, or the application of any law to the facts set forth herein. With respect to regulatory compliance issues, regulatory statutes are subject to interpretation and change. Such interpretations and regulatory changes should be reviewed with legal counsel.

This Report is also subject to the further Standard Limitations contained in Appendix E.

7.0 Closure

The undersigned carried out the Environmental Contamination Overview documented herein, including developed the Sampling and Analysis Plan, supervising all field activities, reviewing the resulting data and preparing this report, including the findings and conclusions presented herein, acting either as a Qualified Person or under the supervision of a Qualified Person. Any practice of geoscience documented within this report was undertaken by or under the supervision of a Professional Engineer or Professional Geoscientist licensed in the Province of Ontario.

We trust that the information presented in this report meets your current requirements. Should you have any questions, or concerns, please do not hesitate to contact the undersigned.

Yours truly,

Wood Environment & Infrastructure Solutions
a division of Wood Canada Limited

Prepared by:

Cindy McKee, B.Sc., P.Geo., QP_{ESA}
Senior Environmental Geoscientist

Reviewed by:

Claudia Naas, M.Sc.
Senior Environmental Scientist

Figure

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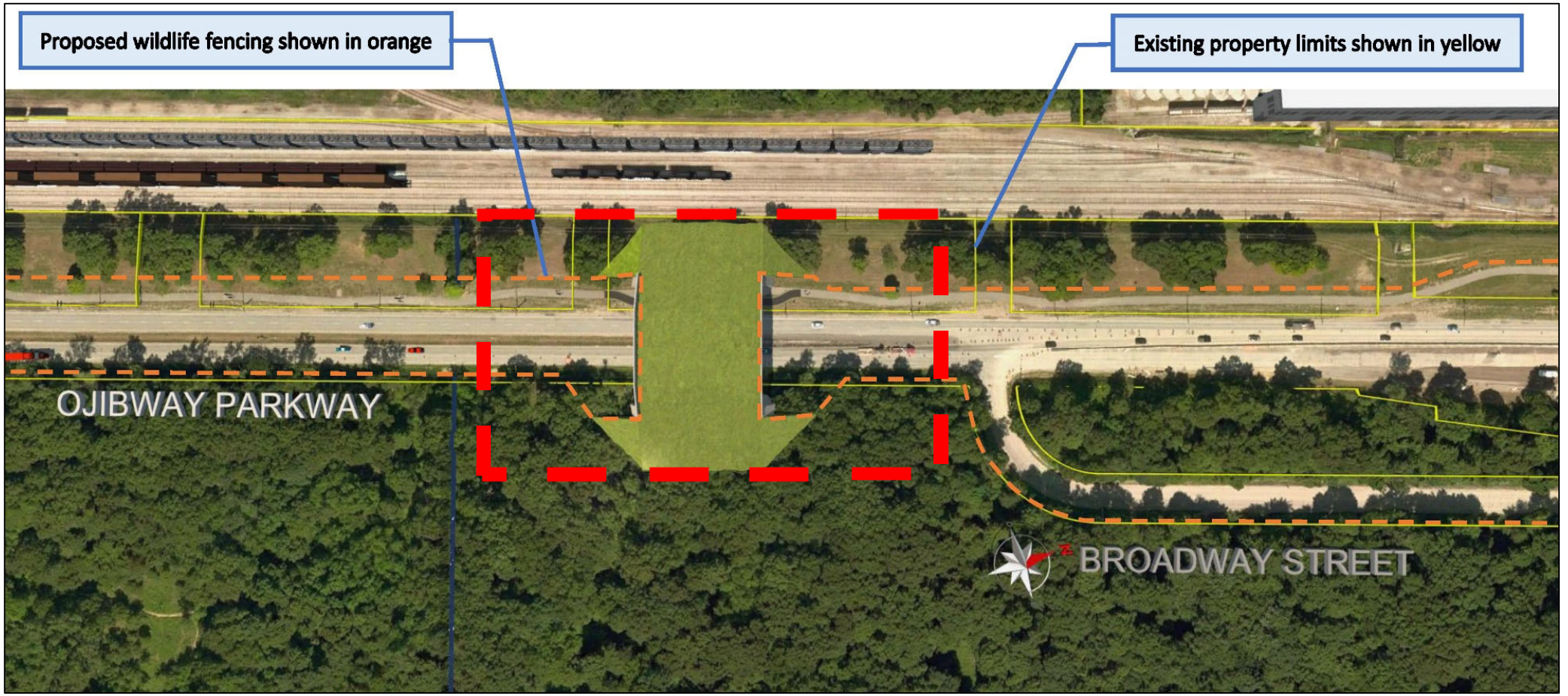

Courtesy: ROW 2020

wood.	**Figure 1**	**Project Area - Plan View**	**Project:**	**Ojibway Parkway Wildlife Overpass Ojibway Parkway, Windsor, Ontario**	
Environment & Infrastructure 11865 County Road 42 Windsor, Ontario N8N 0H1	**Client:**	**Corporation of the City of Windsor**	**Drawn by:**	**CM**	**Scale:** **NTS**
	Report Number:	**IM20104013**	**Reviewed by:**	**CN**	**Date:** **April 2021**

Appendix A

Previous Environmental Reports

REPORT ON

GEOTECHNICAL INVESTIGATION
PROPOSED SANITARY SEWER REPLACEMENT
OJIBWAY PARKWAY
CITY OF WINDSOR, ONTARIO

Submitted to:

Corporation of the City of Windsor
Engineering and Corporate Projects
Public Works Department
350 City Hall Square West
Windsor, Ontario
N9A 6S1

DISTRIBUTION:

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2 Copies - Golder Associates Ltd.

March 30, 2007

07-1140-0023

March 30, 2007 07-1140-0023

Corporation of the City of Windsor
Engineering and Corporate Projects
Public Works Department
350 City Hall Square West
Windsor, Ontario
N9A 6S1

Attention: Mr. Wade Bondy, P. Eng.

RE: GEOTECHNICAL INVESTIGATION
PROPOSED SANITARY SEWER REPLACEMENT
OJIBWAY PARKWAY
CITY OF WINDSOR, ONTARIO

Dear Sir:

This report presents the results of a geotechnical investigation carried out for the proposed sanitary sewer replacement below the southbound traveled portion of Ojibway Parkway in the City of Windsor, Ontario. The approximate location of the site is shown on the Key Plan, Figure 1.

1.0 TERMS OF REFERENCE

The purpose of the investigation was to determine the subsurface soil and groundwater conditions at the site, and to provide geotechnical engineering recommendations for the design of the works.

The investigation was carried out, and this report prepared in general accordance with Golder Associates Ltd. proposal letter P14-4038, dated February 13, 2007.

Authorization to proceed with the investigation was received from Mr. Thomas Murray, P. Eng. of the City of Windsor on February 15, 2007.

2.0 PROJECT DESCRIPTION

It is understood that this project comprises the construction of some 1.1 kilometres of sanitary sewers along Ojibway Parkway from north of Broadway to south of Weaver Road in the west end of the City of Windsor, Ontario. It is understood that the new 675 millimetre diameter sewer will be installed below the existing traveled portion of the road generally in the left lane of the southbound direction, at depths of between about 2.5 and 4.5 metres below the road surface.

It is understood that the portion of the roadway disturbed by sewer construction will be reconstructed using a flexible pavement structure.

3.0 INVESTIGATION PROCEDURE

To supplement the current investigation, the soils information obtained in relevant boreholes drilled during earlier investigations in the study area, was reviewed and, wherever applicable, used in the preparation of this report. A listing of some of the key earlier investigations is presented as follows:

- Golder Associates Ltd. Report Number 841-4125 entitled "Geotechnical Investigation, Ojibway Parkway Study, Morton Drive to Broadway Street, Windsor, Ontario", dated December 1984.

- Golder Associates Report Number 764112 entitled "Geotechnical Investigation, Preliminary Geotechnical Investigation, Ojibway Trunk Sanitary Sewer, Windsor, Ontario", dated November 1976.

- Golder Associates Report Number 75-4139-8 entitled "Geotechnical Investigation, Contract No. 2 Proposed Provincial Sewage Works Programme, Township of Sandwich West, County of Essex, Ontario", dated February 2001.

- Golder Associates Report Number 70461 entitled "Subsurface Investigation, Benkelman Beam Survey, Main Street, Windsor, Ontario", dated January 1971.

The field work for the current investigation was carried out on February 28, 2007, on which date, six (6) boreholes were advanced at the site. The approximate locations of the boreholes are shown on the Location Plans, Figures 2 and 3. The boreholes were advanced to depths of between about 1.2 and 5.0 metres below the existing road surface using a truck mounted drilling machine, supplied and operated by a specialist drilling contractor.

During the drilling, standard penetration testing and soil sampling was carried out at selected intervals of depth in the boreholes using conventional 35 millimetre, inside diameter, split spoon sampling equipment. Following field identification, the soil samples obtained were placed in individually labelled containers and brought to our Windsor office for further examination and laboratory testing.

The soil stratigraphy and groundwater conditions encountered in the boreholes, as well as the results of field and laboratory testing, are shown in detail in the Record of Borehole sheets following the text of this report.

An experienced member of our geotechnical engineering staff located the boreholes in the field, cleared the locations of active buried utilities, supervised the drilling operations, logged the boreholes and cared for the soil samples obtained.

4.0 SUBSURFACE CONDITIONS

For a detailed description of the subsurface soil and groundwater conditions encountered in the boreholes advanced for this investigation, reference should be made to the Record of Borehole sheets following the text of this report. Lists of Abbreviations and Symbols are provided to assist in the interpretation of the records. The soil boundaries indicated typically represent transitions from one soil type to another and are not intended to define exact planes of geological change. The subsurface conditions are established only at the borehole locations and may vary between and beyond the boreholes.

The subsurface conditions encountered in the boreholes generally consisted of the existing pavement structure overlying fill materials and/or native sands, underlain by grey silt to silty clay.

4.1 Pavement Structure, Fill Materials and Topsoil

From the pavement surface in boreholes 1, 3, 4 and 5, a composite pavement structure was encountered. The thickness of the asphalt ranged from 200 to 250 millimetres, overlying concrete ranging from 180 to 360 millimetres. Boreholes 2 and 6 consisted of 280 to 300 millimetres of asphalt, overlying 160 to 230 millimetres of granular base material.

Beneath the granular base material in boreholes 2 and 6, and the concrete in borehole 5, brown sand fill ranging in thickness from about 25 to 250 millimetres was encountered. Underlying the sand fill in borehole 6, a brown to black sand containing brick fragments was encountered to a depth of about 910 millimetres. The water content of the samples of the fill materials obtained varied from about 6 to 13 per cent.

Beneath the brown sand fill in borehole 5, about 690 millimetres of black sandy topsoil was encountered. The water content of the sample of topsoil obtained was about 20 per cent.

4.2 Sand and Silt

Underlying the concrete in boreholes 1, 3 and 4, the sand fill in boreholes 2 and 6, and the topsoil in borehole 5, brown fine sand was encountered. The thickness of the fine sand ranged from about 1.4 to 1.8 metres at the location of boreholes 1, 2 and 4. Measured 'N' values obtained from standard penetration testing carried out in the brown sand ranged from 7 to 25 blows per 0.3 metres. The water content of the samples of brown sand obtained varied from about 8 to 22 per cent. The results of a grain size distribution analysis carried out on a sample of the sand is presented in Figure 6.

Underlying the brown sand in boreholes 1, 2 and 4, grey, silty sand to sand was encountered. The thickness of the grey sand ranged from about 540 to 920 millimetres at the borehole locations. Measured 'N' values obtained in the grey sands ranged from 8 to 14 blows per 0.3 metres. The water content of the samples of the grey sand varied from about 18 to 25 per cent.

The grey sand was underlain by loose to compact grey silt in boreholes 1, 2 and 4, varying in thickness from 0.6 to 1.5 metres at the borehole locations. Measured 'N' values in the grey silt varied from 6 to 13 blows per 0.3 metres with corresponding water contents of typically about 25 per cent.

4.3 Silty Clay

Beneath the grey sands and silts in boreholes 1, 2 and 4, firm grey silty clay containing numerous silt seams or partings was encountered to the borehole termination depths. Measured 'N' values obtained in the grey silty clay ranged from 4 to 8 blows per 0.3 metres, with water contents varying from about 25 to 30 per cent.

4.4 Groundwater Observations

Water seepage into boreholes 1, 2 and 4 was observed during drilling at depths ranging from about 1.8 to 2.1 metres below the ground surface. Groundwater levels were observed in boreholes 2 and 4 at a depth of about 1.4 metres following drilling. Upon completion of drilling, caving was encountered, and boreholes 2 and 4 were partially blocked just below the water level.

A static water level was not observed in borehole 1, however, caving was encountered near the same depth as observed in boreholes 2 and 4.

5.0 DISCUSSION

5.1 General

The following section of the report presents our interpretation of factual information obtained from this investigation and is intended only for the use by the design engineer. Where comments are made on construction, they are provided only in order to highlight aspects of construction, which could potentially affect the design of the project. Contractors bidding on or undertaking any work at the site should make their own interpretation of the factual results of the investigation as it affects their construction methods, equipment capabilities, costs, sequencing and the like.

Our professional services for this assignment address only the geotechnical (physical) aspects of the subsurface conditions at the site. The geo-environmental (chemical) aspects, including the consequences of possible surface and/or subsurface contamination resulting from previous activities or uses of the site and/or resulting from the introduction onto the site of materials from off-site sources, are outside the terms of reference of this report and have not been investigated or addressed.

For the purpose of this report, it is assumed that the roadway will be constructed using a flexible pavement structure.

5.2 Sewer Trench Excavation

It is understood that the sanitary sewer is to be installed in the left lane of the southbound direction of Ojibway Parkway. The depth of the invert for the new sanitary sewer is understood to range from about 2.5 to 4.5 metres below grade. Based on the preceding and the results of this investigation, it appears that the founding soil at the base of the sewer excavations will generally be variable (sands, silts and silty clay). All excavations should be carried out in accordance with the Occupational Health and Safety Act and Regulations for Construction Projects.

As indicated, the subsurface soil conditions at the site generally consist of sands and silts overlying grey silty clay at depth.

The presence of groundwater will have a major impact on the successful completion of the sewer installations at the site.

Uncontrolled excavation below the ground level in the surficial granular soils will likely result in substantial loss of ground due to running or ravelling of the materials.

Based on the grain size distribution characteristics of the surficial granular materials, it is anticipated that the surficial sands may be unwatered using a conventional well point system or

properly spaced deep sumps. However, the cohesionless water bearing soils may terminate above the bottom of the excavation thereby precluding complete dewatering of these deposits. Between well points or sumps, there would continue to be substantial seepage into the excavation. Therefore, in addition to the installation of well points, it will probably be necessary to blanket the cut slopes with a free draining granular material and pump from properly filtered sumps located within the excavation in order to minimize loss of ground.

If the well point tips extend below the base of the surficial soils and into the cohesive soils, it will be necessary to provide a granular filter for the well point tips to prevent blocking of the well points by the fine grained soils. The size and spacing of the well points should be determined by a specialist dewatering contractor.

If adequate groundwater control is provided, open cut excavations without laterally supported trench walls are possible. If a dewatering system is utilized at the site, the surficial granular soils may be classified as "Type 3" soils under the act as indicated above. As such, slopes in unsupported cuts in the surficial granular materials may be cut at an inclination of 1 horizontal to 1 vertical or flatter.

Alternatively, the sides of the excavation could be supported by an engineered support system designed for the works or a prefabricated support system (trench liner box).

The support system should be certified as being designed in accordance with the Ontario Occupational Health and Safety Act and Regulations for Construction Projects. The support system should be designed, installed and removed in such a manner that it not only provides protection for the workers, but also provides adequate support for the sides of the excavation. A recommended earth pressure diagram for the design of the support system is shown on Figure 4.

Adequate provision should be made for the control of surface water runoff adjacent to the open excavations.

It is recommended that a public dig be carried out at the tender stage to enable contractors to view the soil and groundwater conditions at the site and to assess their specific requirements for dewatering.

5.3 Protection of Existing Structures

Adjacent to a vertically sided supported excavation, there are several zones in which movements of the surrounding soil may take place, as indicated on Figure 5. Within a zone defined by a line sloped at 2 vertical to 1 horizontal from about 0.6 metres below the base of the excavation, substantial movements may be anticipated. Structures within this zone should be protected by

underpinning. Within a zone bounded by lines sloping at 1 vertical to 1 horizontal and 2 vertical to 1 horizontal, upward and outward from a point located 0.6 metres below the base of the excavation, some settlements may be expected, and within a zone bounded by 1 vertical to 2 horizontal and 1 vertical to 1 horizontal, slight movements may be anticipated.

It is recommended that the alignment and depths of existing utilities be checked relative to the proposed sewer trench(s). In general, if movement of existing utilities and other settlement sensitive elements is to be minimized, it will be necessary to carry out sewer construction in properly sheeted and braced excavations. If, however, some movement of the adjacent utilities can be tolerated, sewer installation within a prefabricated support system (trench liner box) is probably acceptable.

Longitudinal open sections of the trench(s) should be kept to a minimum and backfilling of the trench(s) should be carried out immediately behind the support system. Any utilities along the proposed route of the sewers that fall within Zones I and II should be continuously monitored during construction so that corrective action can be taken if significant ground movement is observed.

A number of existing utility lines will cross the proposed alignment. Where existing services are exposed during the excavation, suitable temporary or permanent support of these services should be provided consistent with the requirements of the respective utility company.

Consideration should be given to providing suitable protective measures against vibrations generated by the compaction equipment during construction and to minimizing its impact on the adjacent utilities, and structures. A study could be undertaken to monitor the ground vibrations induced by the construction equipment at various distances from the source. This information could be used to determine appropriate compaction protocols and equipment to be used without adversely impacting the structural integrity of settlement sensitive elements located nearby.

5.4 Pipe Bedding

The bedding material for the new sanitary sewer should consist of an approved granular material, consistent with the type and class of pipe to be used. Granular 'A' material is considered to be an appropriate bedding material for the site. The bedding should extend from about 150 millimetres below the pipe to at least 300 millimetres above the pipe. The pipe bedding should be uniformly compacted to 95 per cent of the standard Proctor maximum dry density. Hand tamping around the pipe may be required to ensure that no voids are present below the spring line of the pipe. It is also important to provide a well compacted granular bedding within the approach zone of the sewer pipe(s) at the manholes.

5.5 General Trench Backfill

Ultimate suitability of the backfill materials will be determined in part by the method of excavation. This factor should be recognized when considering the following comments.

The native fine grained granular soils are considered suitable for use as general trench backfill provided their water content can be adjusted to close to the optimum water content for mechanical compaction purposes. The silty clay soils are not expected to be acceptable for general trench backfill as their water content is higher than the optimum water content for mechanical compaction purposes.

Where the water content of the material varies from the optimum water content to 5 per cent wet of the optimum water content, the material may be placed in maximum 300 millimetre thick loose lifts, compacted to 95 per cent of standard Proctor maximum dry density. Should the in situ water content of the material vary between 5 and 10 per cent wet of the optimum water content, the material may be compacted to 90 per cent of standard Proctor maximum dry density.

The material should not be used as general trench backfill in settlement sensitive areas where the material is wet of the optimum water content by more than 10 per cent, or is dry of the optimum water content. Regardless of the water content and material type, the upper one metre of the backfill within pavement areas should be compacted to 98 per cent of standard Proctor maximum dry density.

The use of granular backfill such as OPSS Granular 'B' Type I could also be considered up to the new pavement structure to reduce the amount of post construction settlement. Full depth granular backfill may be placed in maximum 300 millimetre thick loose lifts uniformly compacted to 98 per cent of standard Proctor maximum dry density.

With the backfill recommendations outlined above and the maximum anticipated excavation depths, it is estimated that the long term settlement of the trench backfill will be in the order of about 40 millimetres. If lesser degrees of compaction are achieved, increased settlements will result. Further, if non-uniform compaction of the backfill is achieved, non-uniform settlement of the trench backfill material will result.

In order to provide a more uniform transition of the subgrade soil from the undisturbed native material to the trench backfill, it is recommended that the sides of the excavation be sloped at an inclination of 2 horizontal to 1 vertical, outwards and upwards from a point approximately 1 metre below the elevation of the finished roadway subgrade.

5.6 Pavements

Following completion of the sanitary sewer installation, reconstruction of the road pavement may be commenced. Prior to constructing any pavement structures at the site, loosened and/or deleterious materials should be removed from within the limits of the roadway. The exposed subgrade should then be heavily proofrolled with a non-vibratory steel wheel roller under the direction of the geotechnical engineer. Any excessively softened areas identified during this operation should be subexcavated and backfilled with approved granular material, placed in maximum 300 millimetre thick loose lifts and uniformly compacted to 98 per cent of standard Proctor maximum dry density.

It is understood that a flexible pavement structure is being considered for the site. For the purpose of this report, Ojibway Parkway may be classified as a 'minor arterial' roadway. It is recommended that the pavement structure for this classification of roadway consist of 140 millimetres of asphalt and 710 millimetres of Granular 'A' base.

The Granular 'A' base material for the roadway should be placed in lifts of 300 millimetres or less and should be uniformly compacted to 100 per cent of standard Proctor maximum dry density. The asphaltic materials should comprise both binder and surface course layers and be produced and placed in accordance with OPSS requirements. It is considered that a HL1 surface course and HL8 binder course asphaltic concretes would be acceptable for this work.

Drainage of the pavement structure is a prime factor influencing the life expectancy of the new pavement. In this regard, it is recommended that perforated continuous subdrains be installed along both sides of the roadway. The subdrains should be placed just below the subgrade level, bedded in properly graded granular material and connected to a free discharge outlet. The pavement subgrade should be properly shaped and graded to provide adequate cross falls. Any water which finds its way into the granular base would then be directed to the subdrains. It should be noted that a well drained road base material will extend the life and enhance the performance of the completed pavement structure.

6.0 CLOSURE

This office should be given an opportunity to review the final design drawings to ensure that they are consistent with the recommendations contained within this report.

To ensure that construction is carried out in a manner consistent with the intent of the recommendations set forth in this report, a program of geotechnical inspection and testing should be developed and implemented throughout the construction phase. In addition, related laboratory testing should be carried out in conjunction with the field work to monitor compliance with the various material and project specifications.

The factual data, interpretation and recommendations contained in this report pertain to a specific project as described in the report and are not applicable to any other project or site location. If the project is modified in concept, location or elevation, or if the project is not initiated within twelve months of the date of the report, Golder Associates Ltd. should be given an opportunity to confirm that the recommendations are still valid.

Please refer to the "Important Information and Limitations of This Report" which follows the text, but forms an integral part of this document.

We trust that this report is sufficient for your present requirements. Should there be any questions or if we may be of further assistance during the construction phase, kindly contact our office at your convenience.

GOLDER ASSOCIATES LTD.

Brent Gusba, P. Eng.

James D. Rodger, P. Eng.
Principal

Attachments

Important Information and Limitations of This Report
List of Abbreviations and Symbols
Records of Boreholes 1 to 6 (Current Investigation)
Record of Borehole 2 (Report No. 764112)
Records of Boreholes 756, 757, 758 (Report No. 75-4139-8)
Record of Borehole 1 (Report No. 754002)
Records of Boreholes 2 and 3 (Report No. 70461)
Figures 1 to 6

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IMPORTANT INFORMATION AND LIMITATIONS OF THIS REPORT

Standard of Care: Golder Associates Ltd. (Golder) has prepared this report in a manner consistent with that level of care and skill ordinarily exercised by members of the engineering and science professions currently practising under similar conditions in the jurisdiction in which the services are provided, subject to the time limits and physical constraints applicable to this report. No other warranty, expressed or implied is made.

Basis and Use of the Report: This report has been prepared for the specific site, design objective, development and purpose described to Golder by the Client. The factual data, interpretations and recommendations pertain to a specific project as described in this report and are not applicable to any other project or site location. Any change of site conditions, purpose, development plans or if the project is not initiated within eighteen months of the date of the report may alter the validity of the report. Golder can not be responsible for use of this report, or portions thereof, unless Golder is requested to review and, if necessary, revise the report.

The information, recommendations and opinions expressed in this report are for the sole benefit of the Client. No other party may use or rely on this report or any portion thereof without Golder's express written consent. If the report was prepared to be included for a specific permit application process, then upon the reasonable request of the client, Golder may authorize in writing the use of this report by the regulatory agency as an Approved User for the specific and identified purpose of the applicable permit review process. Any other use of this report by others is prohibited and is without responsibility to Golder. The report, all plans, data, drawings and other documents as well as all electronic media prepared by Golder are considered its professional work product and shall remain the copyright property of Golder, who authorizes only the Client and Approved Users to make copies of the report, but only in such quantities as are reasonably necessary for the use of the report by those parties. The Client and Approved Users may not give, lend, sell, or otherwise make available the report or any portion thereof to any other party without the express written permission of Golder. The Client acknowledges that electronic media is susceptible to unauthorized modification, deterioration and incompatibility and therefore the Client can not rely upon the electronic media versions of Golder's report or other work products.

The report is of a summary nature and is not intended to stand alone without reference to the instructions given to Golder by the Client, communications between Golder and the Client, and to any other reports prepared by Golder for the Client relative to the specific site described in the report. In order to properly understand the suggestions, recommendations and opinions expressed in this report, reference must be made to the whole of the report. Golder can not be responsible for use of portions of the report without reference to the entire report.

Unless otherwise stated, the suggestions, recommendations and opinions given in this report are intended only for the guidance of the Client in the design of the specific project. The extent and detail of investigations, including the number of test holes, necessary to determine all of the relevant conditions which may affect construction costs would normally be greater than has been carried out for design purposes. Contractors bidding on, or undertaking the work, should rely on their own investigations, as well as their own interpretations of the factual data presented in the report, as to how subsurface conditions may affect their work, including but not limited to proposed construction techniques, schedule, safety and equipment capabilities.

Soil, Rock and Groundwater Conditions: Classification and identification of soils, rocks, and geologic units have been based on commonly accepted methods employed in the practice of geotechnical engineering and related disciplines. Classification and identification of the type and condition of these materials or units involves judgment, and boundaries between different soil, rock or geologic types or units may be transitional rather than abrupt. Accordingly, Golder does not warrant or guarantee the exactness of the descriptions.

IMPORTANT INFORMATION AND LIMITATIONS OF THIS REPORT (cont'd)

Special risks occur whenever engineering or related disciplines are applied to identify subsurface conditions and even a comprehensive investigation, sampling and testing program may fail to detect all or certain subsurface conditions. The environmental, geologic, geotechnical, geochemical and hydrogeologic conditions that Golder interprets to exist between and beyond sampling points may differ from those that actually exist. In addition to soil variability, fill of variable physical and chemical composition can be present over portions of the site or on adjacent properties. **The professional services retained for this project include only the geotechnical aspects of the subsurface conditions at the site, unless otherwise specifically stated and identified in the report.** The presence or implication(s) of possible surface and/or subsurface contamination resulting from previous activities or uses of the site and/or resulting from the introduction onto the site of materials from off-site sources are outside the terms of reference for this project and have not been investigated or addressed.

Soil and groundwater conditions shown in the factual data and described in the report are the observed conditions at the time of their determination or measurement. Unless otherwise noted, those conditions form the basis of the recommendations in the report. Groundwater conditions may vary between and beyond reported locations and can be affected by annual, seasonal and meteorological conditions. The condition of the soil, rock and groundwater may be significantly altered by construction activities (traffic, excavation, groundwater level lowering, pile driving, blasting, etc.) on the site or on adjacent sites. Excavation may expose the soils to changes due to wetting, drying or frost. Unless otherwise indicated the soil must be protected from these changes during construction.

Sample Disposal: Golder will dispose of all uncontaminated soil and/or rock samples 90 days following issue of this report or, upon written request of the Client, will store uncontaminated samples and materials at the Client's expense. In the event that actual contaminated soils, fills or groundwater are encountered or are inferred to be present, all contaminated samples shall remain the property and responsibility of the Client for proper disposal.

Follow-Up and Construction Services: All details of the design were not known at the time of submission of Golder's report. Golder should be retained to review the final design, project plans and documents prior to construction, to confirm that they are consistent with the intent of Golder's report.

During construction, Golder should be retained to perform sufficient and timely observations of encountered conditions to confirm and document that the subsurface conditions do not materially differ from those interpreted conditions considered in the preparation of Golder's report and to confirm and document that construction activities do not adversely affect the suggestions, recommendations and opinions contained in Golder's report. Adequate field review, observation and testing during construction are necessary for Golder to be able to provide letters of assurance, in accordance with the requirements of many regulatory authorities. In cases where this recommendation is not followed, Golder's responsibility is limited to interpreting accurately the information encountered at the borehole locations, at the time of their initial determination or measurement during the preparation of the Report.

Changed Conditions and Drainage: Where conditions encountered at the site differ significantly from those anticipated in this report, either due to natural variability of subsurface conditions or construction activities, it is a condition of this report that Golder be notified of any changes and be provided with an opportunity to review or revise the recommendations within this report. Recognition of changed soil and rock conditions requires experience and it is recommended that Golder be employed to visit the site with sufficient frequency to detect if conditions have changed significantly.

Drainage of subsurface water is commonly required either for temporary or permanent installations for the project. Improper design or construction of drainage or dewatering can have serious consequences. Golder takes no responsibility for the effects of drainage unless specifically involved in the detailed design and construction monitoring of the system.

LIST OF ABBREVIATIONS

The abbreviations commonly employed on Records of Boreholes, on figures and in the text of the report are as follows:

I. SAMPLE TYPE

AS	Auger sample
BS	Block sample
CS	Chunk sample
SS	Split-spoon
DS	Denison type sample
FS	Foil sample
RC	Rock core
SC	Soil core
ST	Slotted tube
TO	Thin-walled, open
TP	Thin-walled, piston
WS	Wash sample

II. PENETRATION RESISTANCE

Standard Penetration Resistance (SPT), N:

The number of blows by a 63.5 kg. (140 lb.) hammer dropped 760 mm (30 in.) required to drive a 50 mm (2 in.) split spoon sampler for a distance of 300 mm (12 in.)

Dynamic Cone Penetration Resistance; N_d:

The number of blows by a 63.5 kg (140 lb.) hammer dropped 760 mm (30 in.) to drive uncased a 50 mm (2 in.) diameter, 60° cone attached to "A" size drill rods for a distance of 300 mm (12 in.).

PH: Sampler advanced by hydraulic pressure
PM: Sampler advanced by manual pressure
WH: Sampler advanced by static weight of hammer
WR: Sampler advanced by weight of sampler and rod

Piezo-Cone Penetration Test (CPT)

A electronic cone penetrometer with a 60° conical tip and a project end area of 10 cm^2 pushed through ground at a penetration rate of 2 cm/s. Measurements of tip resistance (Q_t), porewater pressure (PWP) and friction along a sleeve are recorded electronically at 25 mm penetration intervals.

III. SOIL DESCRIPTION

(a) Cohesionless Soils

Density Index (Relative Density)	N Blows/300 mm or Blows/ft.
Very loose	0 to 4
Loose	4 to 10
Compact	10 to 30
Dense	30 to 50
Very dense	over 50

(b) Cohesive Soils

Consistency	c_u, s_u kPa	c_u, s_u psf
Very soft	0 to 12	0 to 250
Soft	12 to 25	250 to 500
Firm	25 to 50	500 to 1,000
Stiff	50 to 100	1,000 to 2,000
Very stiff	100 to 200	2,000 to 4,000
Hard	over 200	over 4,000

IV. SOIL TESTS

w	water content
w_p	plastic limit
w_l	liquid limit
C	consolidation (oedometer) test
CHEM	chemical analysis (refer to text)
CID	consolidated isotropically drained triaxial test[1]
CIU	consolidated isotropically undrained triaxial test with porewater pressure measurement[1]
D_R	relative density (specific gravity, G_s)
DS	direct shear test
M	sieve analysis for particle size
MH	combined sieve and hydrometer (H) analysis
MPC	Modified Proctor compaction test
SPC	Standard Proctor compaction test
OC	organic content test
SO_4	concentration of water-soluble sulphates
UC	unconfined compression test
UU	unconsolidated undrained triaxial test
V	field vane (LV-laboratory vane test)
γ	unit weight

Note: 1 Tests which are anisotropically consolidated prior to shear are shown as CAD, CAU.

LIST OF SYMBOLS

Unless otherwise stated, the symbols employed in the report are as follows:

I. General

π	3.1416
in x,	natural logarithm of x
$\log_{10}$	x or log x, logarithm of x to base 10
g	acceleration due to gravity
t	time
F	factor of safety
V	volume
W	weight

II. STRESS AND STRAIN

γ	shear strain
Δ	change in, e.g. in stress: $\Delta \sigma$
ε	linear strain
ε_v	volumetric strain
η	coefficient of viscosity
ν	poisson's ratio
σ	total stress
σ'	effective stress ($\sigma' = \sigma - u$)
σ'_{vo}	initial effective overburden stress
$\sigma_1, \sigma_2, \sigma_3$	principal stress (major, intermediate, minor)
σ_{oct}	mean stress or octahedral stress $= (\sigma_1+\sigma_2+\sigma_3)/3$
τ	shear stress
u	porewater pressure
E	modulus of deformation
G	shear modulus of deformation
K	bulk modulus of compressibility

III. SOIL PROPERTIES

(a) Index Properties

$\rho(\gamma)$	bulk density (bulk unit weight*)
$\rho_d(\gamma_d)$	dry density (dry unit weight)
$\rho_w(\gamma_w)$	density (unit weight) of water
$\rho_s(\gamma_s)$	density (unit weight) of solid particles
γ'	unit weight of submerged soil ($\gamma' = \gamma - \gamma_w$)
D_R	relative density (specific gravity) of solid particles ($D_R = \rho_s / \rho_w$) (formerly G_s)
e	void ratio
n	porosity
S	degree of saturation

(a) Index Properties (continued)

w	water content
w_l	liquid limit
w_p	plastic limit
I_p	plasticity index = $(w_l - w_p)$
w_s	shrinkage limit
I_L	liquidity index = $(w - w_p)/I_p$
I_C	consistency index = $(w_l - w) / I_p$
e_{max}	void ratio in loosest state
e_{min}	void ratio in densest state
I_D	density index = $(e_{max} - e) / (e_{max} - e_{min})$ (formerly relative density)

(b) Hydraulic Properties

h	hydraulic head or potential
q	rate of flow
v	velocity of flow
i	hydraulic gradient
k	hydraulic conductivity (coefficient of permeability)
j	seepage force per unit volume

(c) Consolidation (one-dimensional)

C_c	compression index (normally consolidated range)
C_r	recompression index (over-consolidated range)
C_s	swelling index
C_a	coefficient of secondary consolidation
m_v	coefficient of volume change
c_v	coefficient of consolidation
T_v	time factor (vertical direction)
U	degree of consolidation
σ'_p	pre-consolidation pressure
OCR	over-consolidation ratio = σ'_p/σ'_{vo}

(d) Shear Strength

τ_p, τ_r	peak and residual shear strength
ϕ'	effective angle of internal friction
δ	angle of interface friction
μ	coefficient of friction = tan δ
c'	effective cohesion
c_u, s_u	undrained shear strength ($\phi = 0$ analysis)
p	mean total stress $(\sigma_1 + \sigma_3)/2$
p'	mean effective stress $(\sigma'_1 + \sigma'_3)/2$
q	$(\sigma_1 + \sigma_3)/2$ or $(\sigma'_1 + \sigma'_3)/2$
q_u	compressive strength $(\sigma_1 + \sigma_3)$
S_t	sensitivity

Notes: 1 $\tau = c' + \sigma' \tan \phi'$

2 shear strength = (compressive strength)/2

* density symbol is ρ. Unit weight symbol is γ where $\gamma = \rho g$ (i.e. mass density x acceleration due to gravity)

PROJECT: 07-1140-0023

LOCATION: SEE LOCATION PLAN

SAMPLER HAMMER, 63.5kg; DROP, 760mm

RECORD OF BOREHOLE 1

BORING DATE: FEBRUARY 28, 2007

SHEET 1 OF 1

DATUM:

PENETRATION TEST HAMMER, 63.5kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	ELEVATION	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ●, rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	INSTALLATION AND GROUNDWATER OBSERVATIONS
0	POWER AUGER HOLLOW STEM	PAVEMENT SURFACE		179.10				179				
		0.00										
		ASPHALT		178.90								
		CONCRETE		0.20	1	AS						
				0.38								
1		Compact, brown, **FINE SAND**, some silt			2	SS	21	178				
					3	SS	22					
2				176.97				177				▽ water seepage
		Loose, grey, **FINE SAND**, some silt		2.13	4	SS	8					
				176.43								
				2.67								
3		Loose, grey, **SILT**, some clay, trace sand			5	SS	6	176				
				175.44								
				3.66								
4		Firm, grey, **SILTY CLAY**, trace sand, numerous silt seams/partings			6	SS	4	175				
					7	SS	5					
				174.07								
5		END OF BOREHOLE		5.03								
6												
7												
8												
9												
10												

Water seepage into borehole encountered at about elevation 176.97m during drilling on February 28, 2007.

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: B.G.

CHECKED: BG

LDN_BHS 07-1140-0023.GPJ GLDR_CAN.GDT 27/3/07 DATA INPUT: Brent Gusba

PROJECT: 07-1140-0023

LOCATION: SEE LOCATION PLAN

SAMPLER HAMMER, 63.5kg; DROP, 760mm

RECORD OF BOREHOLE 2

BORING DATE: FEBRUARY 28, 2007

SHEET 1 OF 1

DATUM:

PENETRATION TEST HAMMER, 63.5kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	ELEVATION	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ●, rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	INSTALLATION AND GROUNDWATER OBSERVATIONS
0	POWER AUGER HOLLOW STEM	PAVEMENT SURFACE		179.10 / 0.00				179				
		ASPHALT		178.82 / 0.28								
		Crushed, granular road base (**FILL**)		178.59 / 0.51								
		Brown, sand, some gravel (**FILL**)		178.34 / 0.76	1	AS						
1		Compact, brown, **FINE SAND**, some silt			2	SS	15	178			MH	▽ water level
					3	SS	25					▽ water seepage
2				176.97 / 2.13				177				
		Compact, grey, **SILTY SAND** to **SANDY SILT**			4	SS	13					Water level in borehole encountered at about elevation 177.73m upon completion of drilling on February 28, 2007.
				176.20 / 2.90								
3		Compact to loose, grey, **SILT**, layered with clayey silt seams			5	SS	13	176				
4					6	SS	6	175				Water seepage into borehole encountered at about elevation 177.19m during drilling on February 28, 2007.
				174.68 / 4.42								
		Firm, grey, **SILTY CLAY**, trace sand, occ. silt seams/partings			7	SS	8					
5				174.07 / 5.03								
		END OF BOREHOLE										
6												
7												
8												
9												
10												

LDN_BHS 07-1140-0023.GPJ GLDR_CAN.GDT 27/3/07 DATA INPUT: Brent Gusba

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: B.G.

CHECKED: BG

RECORD OF BOREHOLE 3

PROJECT: 07-1140-0023

LOCATION: SEE LOCATION PLAN

SAMPLER HAMMER, 63.5kg; DROP, 760mm

BORING DATE: FEBRUARY 28, 2007

SHEET 1 OF 1

DATUM:

PENETRATION TEST HAMMER, 63.5kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	ELEVATION	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	INSTALLATION AND GROUNDWATER OBSERVATIONS
0		PAVEMENT SURFACE		179.00								
		0.00										
		ASPHALT		178.77								
		CONCRETE		0.23								
	POWER AUGER HOLLOW STEM			0.41								
1		Brown, **FINE SAND**, trace silt			1	AS	-	178				Borehole dry during drilling on February 28, 2007
				177.48								
		END OF BOREHOLE		1.52								
2												
3												
4												
5												
6												
7												
8												
9												
10												

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: B.G.

CHECKED: BG

LDN_BHS 07-1140-0023.GPJ GLDR_CAN.GDT 27/3/07 DATA INPUT: Brent Gusba

PROJECT: 07-1140-0023

LOCATION: SEE LOCATION PLAN

SAMPLER HAMMER, 63.5kg; DROP, 760mm

RECORD OF BOREHOLE 4

BORING DATE: FEBRUARY 28, 2007

SHEET 1 OF 1

DATUM:

PENETRATION TEST HAMMER, 63.5kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	ELEVATION	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80); SHEAR STRENGTH Cu, kPa (nat V. + Q - ●, rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}); WATER CONTENT PERCENT (Wp, W, Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	INSTALLATION AND GROUNDWATER OBSERVATIONS
0	POWER AUGER HOLLOW STEM	PAVEMENT SURFACE		178.80 / 0.00								
		ASPHALT		178.55 / 0.25								
		CONCRETE		178.19 / 0.61								
1		Compact to loose, brown, **FINE SAND**, some silt, trace clay			1	SS	12	178				
					2	SS	7	177				water level; water seepage
2				176.67 / 2.13								
		Compact, brown to grey, fine to medium, **SAND**			3	SS	14	176				Water level in borehole encountered at about elevation 177.43m upon completion of drilling on February 28, 2007.
3				175.75 / 3.05								
		Loose, grey, **SILT**, trace sand, trace clay			4	SS	9					Water seepage into borehole encountered at about elevation 176.97m during drilling on February 28, 2007.
				175.14 / 3.66				175				
4		Firm, grey, **SILTY CLAY**, trace sand, occ. to numerous silt seams/partings			5	SS	6					
					6	SS	5	174				
5				173.77 / 5.03								
		END OF BOREHOLE										
6												
7												
8												
9												
10												

LDN_BHS 07-1140-0023.GPJ GLDR_CAN.GDT 27/3/07 DATA INPUT: Brent Gusba

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: B.G.

CHECKED: BG

PROJECT: 07-1140-0023

RECORD OF BOREHOLE 5

SHEET 1 OF 1

LOCATION: SEE LOCATION PLAN

BORING DATE: FEBRUARY 28, 2007

DATUM:

SAMPLER HAMMER, 63.5kg; DROP, 760mm

PENETRATION TEST HAMMER, 63.5kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	ELEVATION	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ●, rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	INSTALLATION AND GROUNDWATER OBSERVATIONS
0	POWER AUGER HOLLOW STEM	PAVEMENT SURFACE		178.80								
		ASPHALT		0.00 178.57								
		CONCRETE		0.23								
		Brown, sand (**FILL**)		0.41 0.43								
1		Black, sandy **TOPSOIL**		177.68	1	AS	-	178				Borehole dry during drilling on February 28, 2007
		Brown, **FINE SAND**, some silt, trace clay		1.12 177.28	2	AS	-					
		END OF BOREHOLE		1.52								
2												
3												
4												
5												
6												
7												
8												
9												
10												

LDN_BHS 07-1140-0023.GPJ GLDR_CAN.GDT 27/3/07 DATA INPUT: Brent Gusba

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: B.G.

CHECKED: BG

PROJECT: 07-1140-0023

LOCATION: SEE LOCATION PLAN

SAMPLER HAMMER, 63.5kg; DROP, 760mm

RECORD OF BOREHOLE 6

BORING DATE: FEBRUARY 28, 2007

SHEET 1 OF 1

DATUM:

PENETRATION TEST HAMMER, 63.5kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	ELEVATION	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ●, rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	INSTALLATION AND GROUNDWATER OBSERVATIONS
0		PAVEMENT SURFACE		178.90 / 0.00								
	POWER AUGER HOLLOW STEM	**ASPHALT**		178.60 / 0.30								
		Crushed, granular road base (**FILL**)		0.46	1	AS	-					
		Brown, sand, some gravel (**FILL**)		0.61	2	AS	-					
		Brown to black, sand, trace gravel, clay brick fragments (**FILL**)		177.99 / 0.91	3	AS	-	178				Borehole dry during drilling on February 28, 2007
1		Brown, silty, **FINE SAND**		177.68 / 1.22	4	AS	-					
		END OF BOREHOLE										
2												
3												
4												
5												
6												
7												
8												
9												
10												

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: B.G.

CHECKED: BG

LDN_BHS 07-1140-0023.GPJ GLDR_CAN.GDT 27/3/07 DATA INPUT: Brent Gusba

Form G.A.-D-1. Project No. 764112

RECORD OF BOREHOLE 2

LOCATION See Figure 1 BORING DATE OCT. 4 & 5, 1976 DATUM GEODETIC

SAMPLER HAMMER WEIGHT 140 LB., DROP 30 IN. PENETRATION TEST HAMMER WEIGHT 140 LB., DROP 30 IN.

BORING METHOD	ELEV'N. / DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/FT.
POWER AUGER 7.5" DIA. HOLLOW STEM	586.8 / 0.0	GROUND SURFACE				
		BLACK TOPSOIL		1	2" D.O.	7
	584.3 / 2.5	COMPACT BROWN FINE TO MEDIUM GRAINED SAND TRACE SILT		2	"	26
	581.0 / 5.8	COMPACT GREY WELL GRADED SAND AND FINE GRAVEL		3	"	24
	578.1 / 8.7	COMPACT GREY SANDY SILT		4	"	21
	576.8 / 10.0	STIFF TO VERY STIFF GREY PARTIALLY LAMINATED SILTY CLAY TRACE SAND WITH OCC. THIN SILT SEAMS		5	"	8
				6	"	5
	566.8 / 20.0			7	"	3
		FIRM TO STIFF GREY SILTY CLAY TRACE SAND		8	3" T.O. P.H.	
				9	2" D.O.	5
	551.8 / 35.0			10	"	W.H.
		STIFF GREY WITH RED FLECKS SILTY CLAY TRACE SAND		11	"	W.H.
				12	3" T.O.	P.H.
	536.8 / 50.0	END OF HOLE				

ELEVATION SCALE: 590, 585, 580, 575, 570, 565, 560, 555, 550, 545, 540, 535

DYNAMIC PENETRATION RESISTANCE, BLOWS/FT. (20, 40, 60, 80)

SHEAR STRENGTH Cu., LB./SQ.FT. (500, 1000, 1500, 2000) NAT. V. - + Q. - ● REM.V. - ⊕ U. - ○

3000+ 3000+

COEFFICIENT OF PERMEABILITY, k, CM./SEC. (1x10, 1x10, 1x10, 1x10)

WATER CONTENT, PERCENT (Wp, W, WL) (10, 20, 30, 40)

ADDITIONAL LAB. TESTING: BULK DENSITY P.C.F.

MH MH 124 MH MH

PIEZOMETER OR STANDPIPE INSTALLATION:

GROUND SURFACE

CLAYEY BACKFILL

PLASTIC TUBING

GRANULAR MATERIAL

PERFORATED STANDPIPE

MEDIUM TO FAST SEEPAGE AT ABOUT 6.0' BELOW GROUND SURFACE OCT. 5, 1976

STANDPIPE DRY OCT. 23, 1976

15 ◆ 5 Percent axial strain at failure

VERTICAL SCALE 1 IN. TO 5 FT.

Golder Associates

DRAWN A.K.D. CHECKED

G.A. 1

Project No. 754139

RECORD OF BOREHOLE 756

LOCATION See Figure 2 BORING DATE MAY 16, 1979 DATUM GEODETIC

SAMPLER HAMMER WEIGHT 140 LB., DROP 30 IN. PENETRATION TEST HAMMER WEIGHT 140 LB., DROP 30 IN.

BORING METHOD	SOIL PROFILE ELEV'N. / DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	TYPE	BLOWS/FT.	ELEVATION SCALE	DYNAMIC PENETRATION RESISTANCE, BLOWS/FT. (20 40 60 80) / SHEAR STRENGTH Cu., LB./SQ.FT. (NAT. V.- + Q.-● REM.V.- ⊕ U.-○)	COEFFICIENT OF PERMEABILITY, K., CM./SEC. (1x10 1x10 1x10 1x10) / WATER CONTENT, PERCENT (Wp W WL; 10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
POWER AUGER 4.5" DIA. (UNCASED)	587.8	SURFACE TREATMENT ROAD SURFACE					590				PROTECTIVE PIPE & CAP ROAD SURFACE
	0.2 / 586.3	GRANULAR ROADBASE		1	DO.	40					PLASTIC TUBING
	1.5	LOOSE TO COMPACT BROWN (BECOMING GREY AT ELEVATION 583.8) FINE TO MEDIUM SAND SOME SILT		2		10	585			MH.	GRAVEL FILTER
	5.0 / 580.8			3		28					STANDPIPE
	7.0	STIFF TO FIRM GREY TO MEDIUM SILTY CLAY NUMEROUS ELEVATION CLAYEY SILT SEAMS SILT PARTINGS TRACE SAND		4		12	580				
				5		6	575				CAVED MATERIAL
	13.8 / 573.8	ROAD SURFACE		6	A.S.	5					
	14.0	END OF BOREHOLE					570				BOREHOLE CAVED IN TO ELEVATION 583.8 DURING DRILLING MAY 16, 1979.
											▽1 WATER LEVEL IN STANDPIPE AT ELEVATION 582.8 DEC. 5, 1979
											▽2 WATER LEVEL IN STANDPIPE AT ELEVATION 582.6 JAN. 23, 1980.

Percent axial strain at failure

VERTICAL SCALE 1 IN. TO 5 FT.

Golder Associates

DRAWN L.B.

CHECKED

Project No. 754139

RECORD OF BOREHOLE 757

LOCATION See Figure 2 BORING DATE MAY 16, 1979 DATUM GEODETIC

SAMPLER HAMMER WEIGHT 140 LB., DROP 30 IN. PENETRATION TEST HAMMER WEIGHT 140 LB., DROP 30 IN.

BORING METHOD	ELEV'N. / DEPTH	SOIL PROFILE DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/FT.	ELEVATION SCALE
POWER AUGER (4.5" DIA. CUNCASED)	587.5 / 0.0	GROUND SURFACE					590
		LOOSE TO COMPACT BROWN SAND TRACE TOPSOIL (FILL)		1	DO	4	
				2	"	11	585
	583.0 / 4.5	COMPACT BROWN FINE SAND SOME SILT		3	"	18	
	580.5 / 7.0	COMPACT TO LOOSE GREY SILT TRACE TO SOME SAND		4	"	11	580
				5	"	7	
	576.0 / 11.5	FIRM GREY SILTY CLAY NUMEROUS SILT PARTINGS		6	"	6	575
	573.5 / 14.0	END OF BOREHOLE					570

DYNAMIC PENETRATION RESISTANCE, BLOWS/FT. (20, 40, 60, 80)

SHEAR STRENGTH Cu., LB./SQ.FT. NAT. V.- + Q.-● REM.V.- ⊕ U.-○

COEFFICIENT OF PERMEABILITY, K., CM./SEC. (1x10, 1x10, 1x10, 1x10)

WATER CONTENT, PERCENT Wp W WL (10, 20, 30, 40)

ADDITIONAL LAB. TESTING

PIEZOMETER OR STANDPIPE INSTALLATION

SEEPAGE INTO BOREHOLE AT ELEVATION 582.0 DURING DRILLING MAY 16, 1979

BOREHOLE CAVED IN TO ELEVATION 584.5 DURING DRILLING MAY 16, 1979.

15 0 5 10 Percent axial strain at failure

VERTICAL SCALE 1 IN. TO 5 FT.

Golder Associates

DRAWN L.B.

CHECKED

Form G.A.-D.-1

Project No. 541[illegible]

RECORD OF BOREHOLE 758

LOCATION See Figure 2 BORING DATE MAY 16, 1979 DATUM GEODETIC

SAMPLER HAMMER WEIGHT 140 LB., DROP 30 IN. PENETRATION TEST HAMMER WEIGHT 140 LB., DROP 30 IN.

BORING METHOD	ELEV'N / DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES: NUMBER	TYPE	BLOWS/FT.	ELEVATION SCALE
POWER AUGER 4.5" DIA. (UNCASED)	587.1 / 0.0	GROUND SURFACE					590
	585.1 / 2.0	LOOSE BLACK SAND (FILL)		1	2" DO.	6	
	583.1 / 4.0	LOOSE BROWN SAND TRACE CLAY		2	"	4	585
		COMPACT GREY SAND TRACE SILT		3	"	11	
				4	"	20	580
	575.1 / 12.0			5	"	12	
	573.1 / 14.0	FIRM GREY SILTY CLAY END OF BOREHOLE		6	"	4	575
							570

DYNAMIC PENETRATION RESISTANCE, BLOWS/FT. (20 40 60 80)

SHEAR STRENGTH Cu., LB./SQ.FT. NAT. V.- + Q.-● REM.V.- ⊕ U.-○

COEFFICIENT OF PERMEABILITY, K., CM./SEC. (1x10 1x10 1x10 1x10)

WATER CONTENT, PERCENT Wp W WL (10 20 30 40)

ADDITIONAL LAB. TESTING

PIEZOMETER OR STANDPIPE INSTALLATION

MH

WATER LEVEL IN BOREHOLE AT ELEVATION 583.1 AFTER DRILLING MAY 16, 1979.

BOREHOLE CAVED IN TO ELEVATION 582.1 DURING DRILLING MAY 16, 1979.

0 15 10 5 Percent axial strain at failure

VERTICAL SCALE 1 IN. TO 5 FT.

Golder Associates

DRAWN L.B.

CHECKED

Form G.A. - D - 1

Project No. 754002

RECORD OF BOREHOLE 1

LOCATION See Figure 1 BORING DATE JANUARY 16, 1975 DATUM GEODETIC

SAMPLER HAMMER WEIGHT 140 LB., DROP 30 IN. PENETRATION TEST HAMMER WEIGHT 140 LB., DROP 30 IN.

BORING METHOD	ELEV'N. / DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES: NUMBER	TYPE	BLOWS/FT.	ELEVATION SCALE
HOLLOW STEM AUGERS 7.5" DIA.	586.4 / 0.0	GROUND SURFACE					590
	585.2 / 1.2	DARK BROWN BLACK TOPSOIL		1 A	2" DIA.	16	
		LOOSE DAMP BROWN SLIGHTLY SILTY FINE TO MEDIUM GRAINED SAND		1 B			585
	581.9 / 4.5	(A)		2 A	"	4	
				2 B			
	579.8 / 6.6	COMPACT SATURATED GREY COARSE SAND AND FINE GRAVEL		3 A	"	22	580
				3 B			
				4	"	10	575
	574.0 / 12.8	SOFT TO FIRM GREY SILTY CLAY, SOME SAND, TRACE GRAVEL		5	"	4	
	570.4 / 16.0	(B)					570
	567.9 / 18.5	END OF HOLE					
		(B) STIFF GREY SILTY CLAY, SOME SAND, TRACE GRAVEL (TILL-LIKE)					565

DYNAMIC PENETRATION RESISTANCE, BLOWS/FT. (20, 40, 60, 80)

SHEAR STRENGTH Cu., LB./SQ.FT. (500, 1000, 1500, 2000) NAT. V. - + Q. - ● REM.V. - ● U. - ○

(A) COMPACT SATURATED BROWN PREDOMINANTLY MEDIUM TO COARSE GRAINED SAND SOME GRAVEL

COEFFICIENT OF PERMEABILITY, K., CM./SEC. (1x10, 1x10, 1x10, 1x10)

WATER CONTENT, PERCENT (Wp, W, WL) (10, 20, 30, 40)

ADDITIONAL LAB. TESTING: MH

PIEZOMETER OR STANDPIPE INSTALLATION

GROUND SURFACE

SAND BACKFILL

JAN. 22/75 JAN. 16/75

PLASTIC TUBING

SAND FILTER

PERFORATED STANDPIPE

WATER LEVEL IN OPEN BOREHOLE AT ELEV. 581.9 JAN. 16, 1975

WATER LEVEL IN STANDPIPE AT ELEV. 582.4 JAN. 22, 1975

RAPID WATER SEEPAGE AT ELEV. 581.9 JAN. 16, 1975

SEEPAGE SEALED BY ADVANCING AUGERS AT APPROXIMATE ELEV. 574.0

15 0 5 10 Percent axial strain at failure

VERTICAL SCALE 1 IN. TO 5 FT.

Golder Associates

DRAWN A.V.D.

CHECKED

Project No.

RECORD OF BOREHOLES 2 & 3

LOCATION See Figure 1 BORING DATE OCT. 1, 1970 DATUM

SAMPLER HAMMER WEIGHT 140 LB., DROP 30 IN. PENETRATION TEST HAMMER WEIGHT 140 LB., DROP 30 IN.

BORING METHOD	ELEV'N. DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/FT.	ELEVATION SCALE
	-	ROAD LEVEL					
POWER AUGER 4.5" DIA (UNCASED)	0.0	ASPHALT					
	0.7	BROWN SAND AND GRAVEL (FILL)					
	2.0	COMPACT BROWN SILTY SAND TRACE FINE GRAVEL		1	2" OD	20	
	4.0	STIFF GREY CLAYEY SILT TO SILTY CLAY (LAYERED)		3	"	11	
	5.0	END OF HOLE					
	-	ASPHALT					
POWER AUGER 4.5" DIA (UNCASED)	-	ROAD LEVEL					
	0.3	BROWN SAND AND GRAVEL (FILL)					
	1.5	LOOSE BROWN SAND TRACE SILT (FILL)		1	2" OD	6	
	4.5	COMPACT GREY BROWN SAND		2	"	19	
	5.8	COMPACT GREY FINE TO MEDIUM SAND TRACE TO SOME SILT		3	"	14	
	5.5	END OF HOLE					

DYNAMIC PENETRATION RESISTANCE, BLOWS/FT. 20 40 60 80

SHEAR STRENGTH Cu., LB./SQ.FT. NAT. V. - + C - ● REM. V. - ⊕ U - ○

COEFFICIENT OF PERMEABILITY, k cm/sec 1x10 1x10 1x10 1x10

WATER CONTENT PERCENT w_s 10 20 30 40

PIEZOMETER OR STANDPIPE INSTALLATION

BH-2

STAND PIPE INSTALLED APPROX. 6' FROM BH-2

PLASTIC TUBING

SAND BACKFILL

STANDPIPE

WATER IN STANDPIPE AT 5.5 FEET BELOW GROUND SURFACE NOV. 26, 1970

BH-3

BOREHOLE DRY DURING DURING OCT. 1970

0 5 10 15 Percent axial strain at failure

VERTICAL SCALE 1 IN. TO 5 FT.

Golder Associates

DRAWN

CHECKED

PROJECT THE CORPORATION OF THE CITY OF WINDSOR
OJIBWAY PARKWAY SANITARY SEWER
REHABILITATION - PHASE 4, WINDSOR, ONTARIO

TITLE

KEY PLAN

Golder Associates
Windsor, Ontario

PROJECT No. 07-1140-0023			FILE No. 07114000230001.dwg
DESIGN			SCALE N.T.S. REV. 0
CADD	T.M.	MAR/13/07	FIGURE 1
CHECK	BG		
REVIEW			

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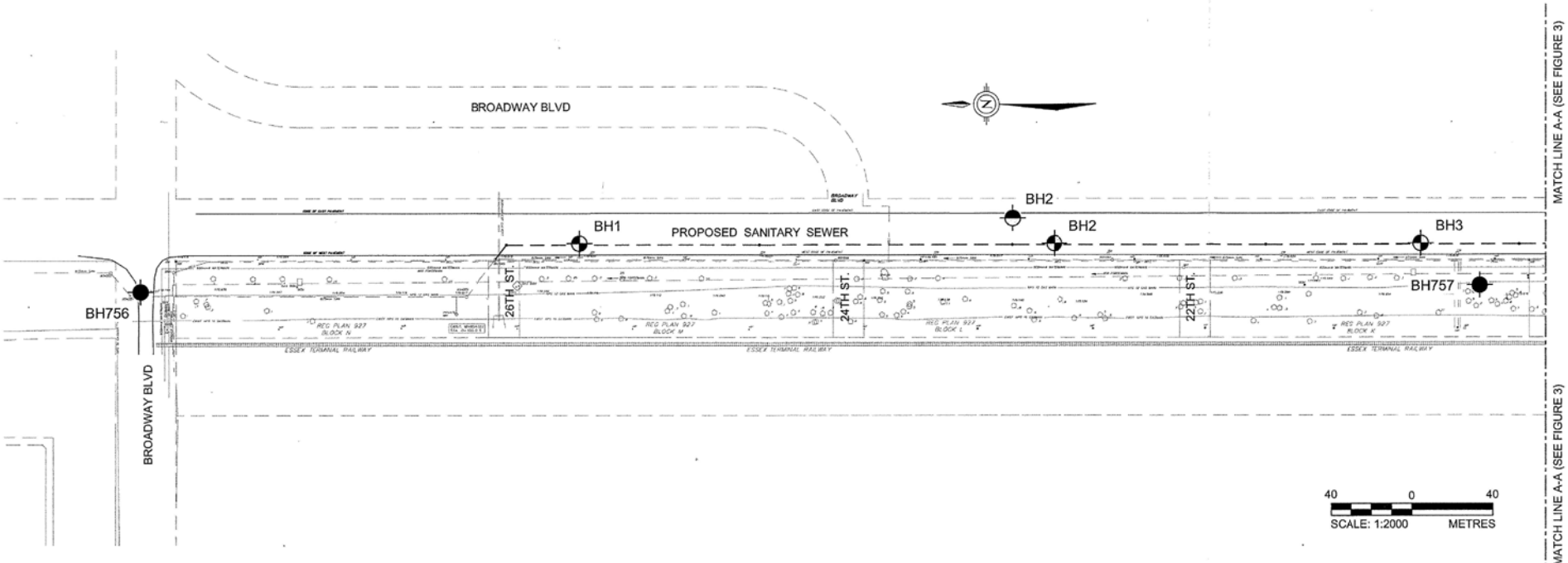


LEGEND

- BOREHOLE LOCATION (Current Investigation)
- BOREHOLE LOCATION (Previous Investigation) Report Number 764112
- BOREHOLE LOCATION (Previous Investigation) Report Number 754139
- BOREHOLE LOCATION (Previous Investigation) Report Number 754002
- BOREHOLE LOCATION (Previous Investigation) Report Number 70461

NOTES

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT.

ALL LOCATIONS APPROXIMATE.

REFERENCES

CAD PLAN SUPPLIED BY:
THE CORPORATION OF THE CITY OF WINDSOR
ENGINEERING & CORPORATE PROJECTS
GEOMATICS DIVISION
RECEIVED; Fri 09/03/2007 2:39 PM

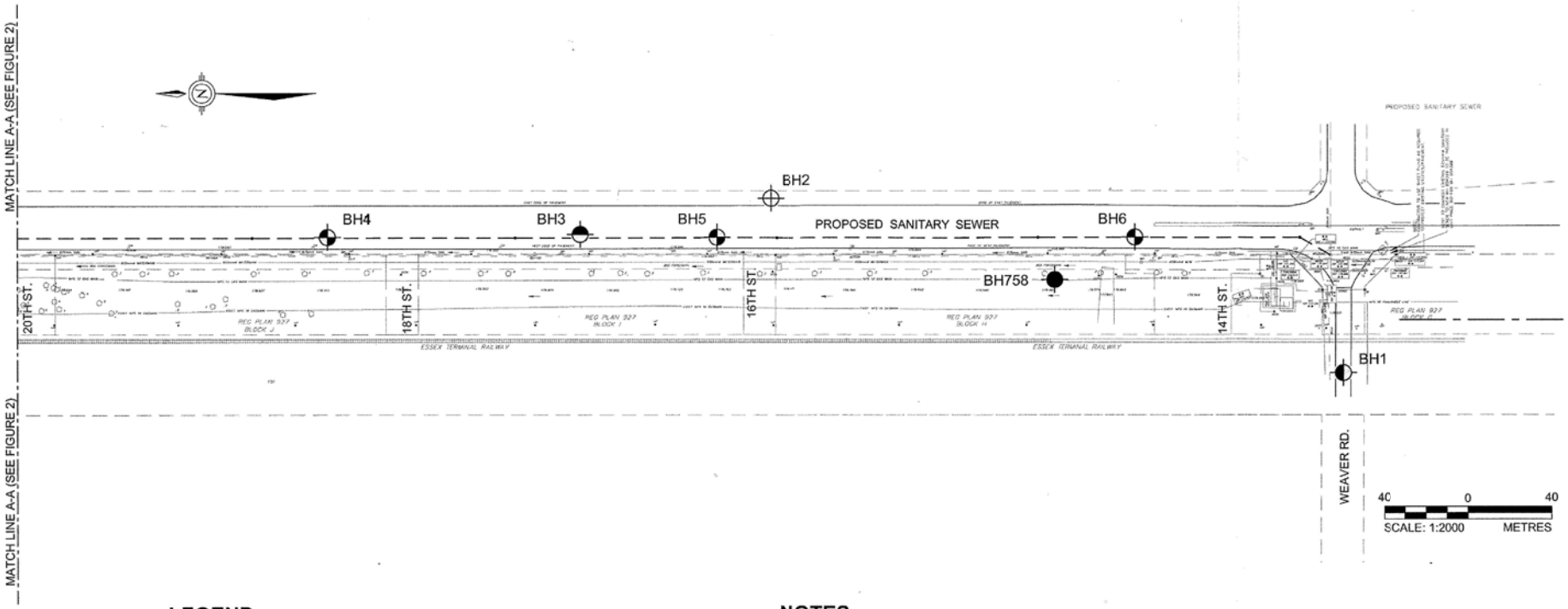
PROJECT: THE CORPORATION OF THE CITY OF WINDSOR
OJIBWAY PARKWAY SANITARY SEWER
REHABILITATION - PHASE 4, WINDSOR, ONTARIO

TITLE: **LOCATION PLAN**

Golder Associates
Windsor, Ontario

PROJECT No. 07-1140-0023			FILE No. 07114000230001.dwg
DESIGN			SCALE AS SHOWN REV. 0
CADD	T.M.	MAR/13/07	**FIGURE 2**
CHECK	BG		
REVIEW			

Drawing file: 07114000230001.dwg Mar 15, 2007 - 10:45am



LEGEND

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PROJECT: THE CORPORATION OF THE CITY OF WINDSOR
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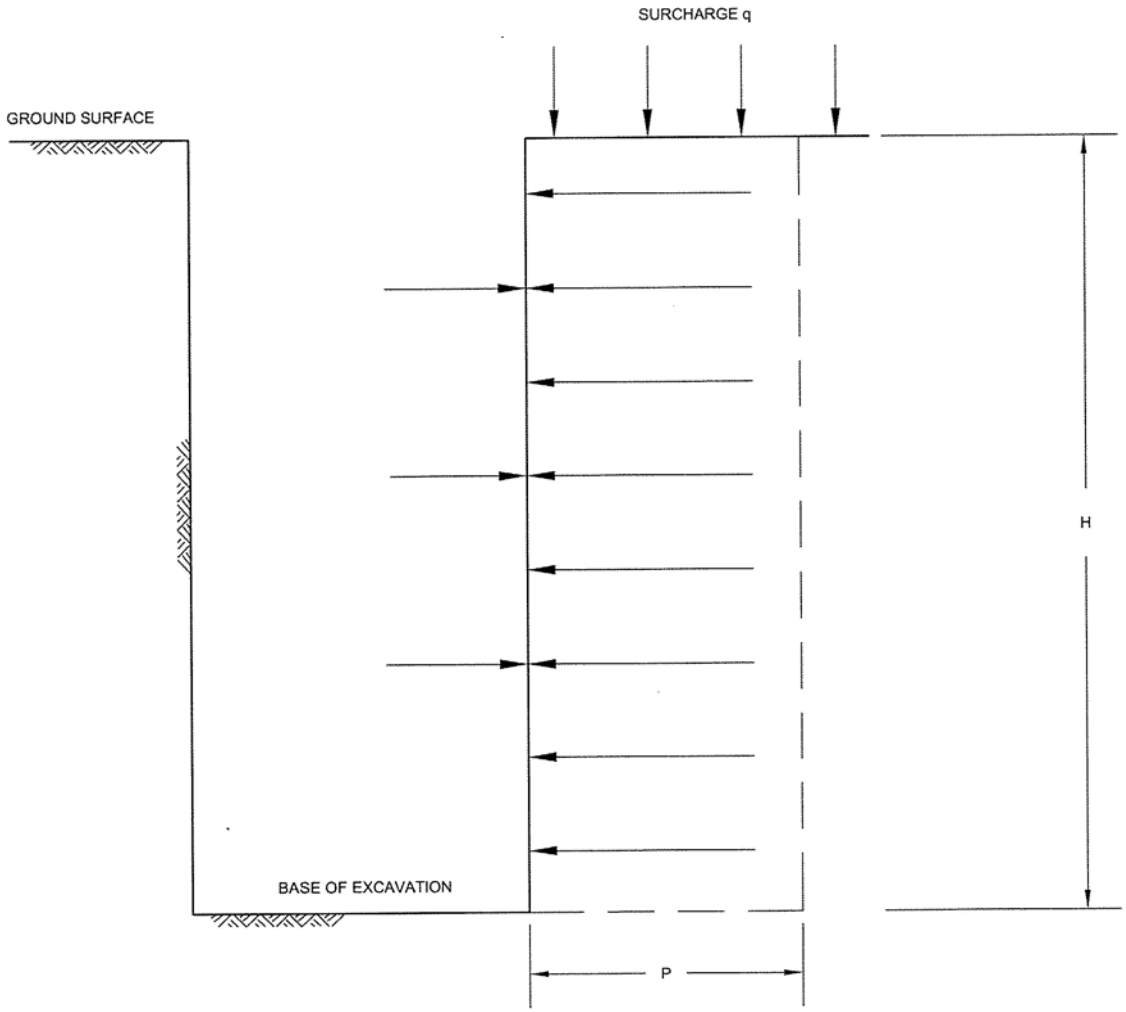
REHABILITATION - PHASE 4, WINDSOR, ONTARIO

TITLE: **LOCATION PLAN**

Golder Associates
Windsor, Ontario

PROJECT No. 07-1140-0023			FILE No. 07114000230001.dwg
DESIGN			SCALE AS SHOWN REV. 0
CADD	T.M.	MAR/13/07	
CHECK	TG		**FIGURE 3**
REVIEW			

Drawing file: 07114000230001.dwg Mar 15, 2007 - 10:09am



$P = 0.65K_A(\gamma H+q)$

WHERE :

K_A= Earth Pressure Coefficient = 0.33

γ= Unit Weight of soil = 18 kN/m³

H= Depth in metres

q= Surcharge = 15 kPa

NOTES

-THIS DRAWING IS BASED ON SUFFICIENT DE-WATERING OF THE SUBSURFACE SOIL.
-NUMBER & LOCATION OF STRUTS & WALES DEPENDENT ON DEPTH OF EXCAVATION.
-EARTH PRESSURE DIAGRAM BASED ON GENERALIZED SOIL STRATIGRAPHY.
-THIS DRAWING IS SCHEMATIC ONLY AND IS TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT.

PROJECT: THE CORPORATION OF THE CITY OF WINDSOR
OJIBWAY PARKWAY SANITARY SEWER
REHABILITATION - PHASE 4, WINDSOR, ONTARIO

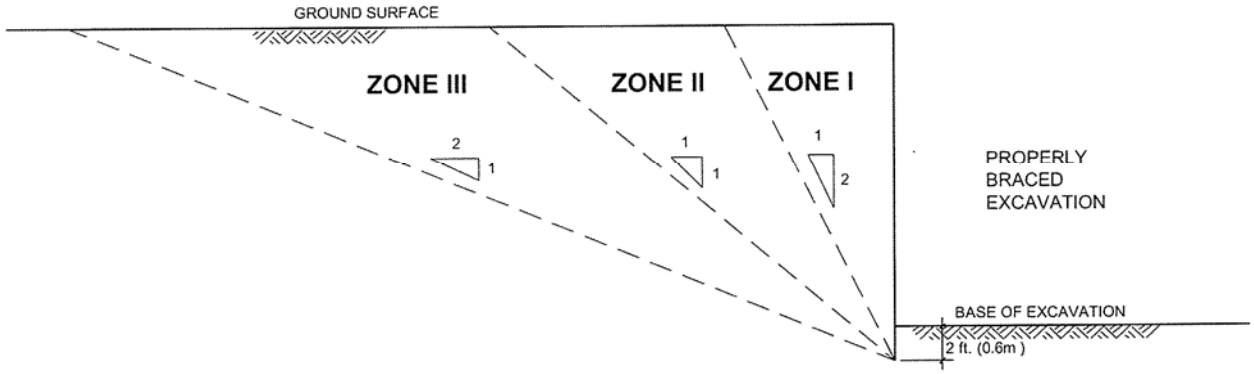
TITLE

EARTH PRESSURE DIAGRAM FOR BRACED EXCAVATION

Golder Associates
Windsor, Ontario

PROJECT No. 07-1140-0023			FILE No. 0711400023D004.dwg
DESIGN			SCALE N.T.S. REV. 0
CADD	T.M.	MAR/13/07	FIGURE 4
CHECK	BG		
REVIEW			

N:\ADMIN\ACAD FILES\TYPICAL DRAWINGS\EPD-BE3.DWG



ZONE I
SUBSTANTIAL SETTLEMENT IN THIS ZONE SHOULD BE ANTICIPATED. STRUCTURES WITHIN THIS ZONE SHOULD BE PROTECTED OR UNDERPINNED.

ZONE II
SOME SETTLEMENT WITHIN THIS ZONE SHOULD BE ANTICIPATED.

ZONE III
SLIGHT MOVEMENTS WITHIN THIS ZONE MAY BE ANTICIPATED.

NOTES

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PROJECT THE CORPORATION OF THE CITY OF WINDSOR
OJIBWAY PARKWAY SANITARY SEWER
REHABILITATION - PHASE 4, WINDSOR, ONTARIO

TITLE
ZONES OF POTENTIAL MOVEMENT (SUPPORTED EXCAVATION)

Golder Associates
Windsor, Ontario

PROJECT No. 07-1140-0023			FILE No. 0711400023D005.dwg
DESIGN			SCALE N.T.S. REV. 0
CADD	T.M.	MAR/13/07	
CHECK	BG		**FIGURE 5**
REVIEW			

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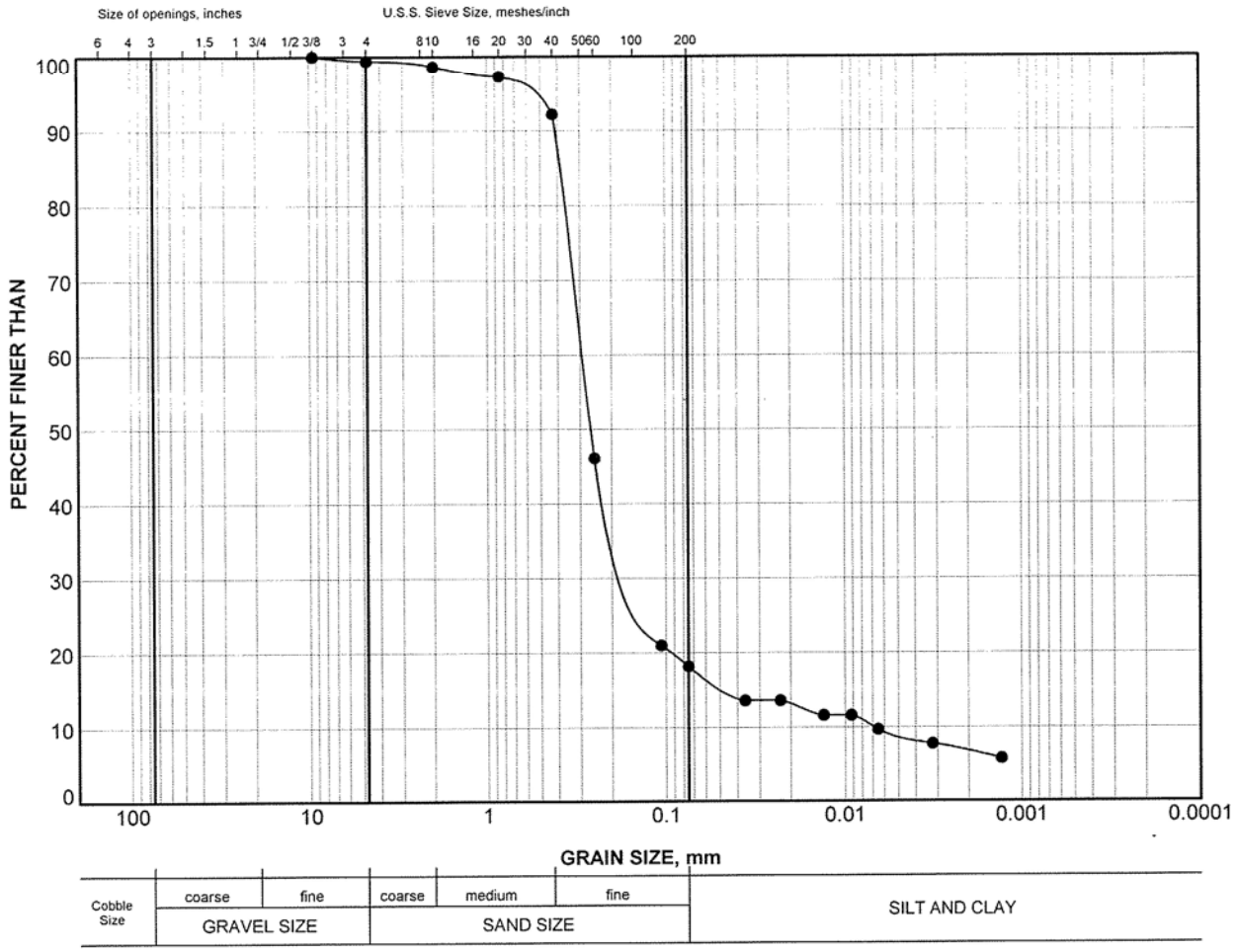

LEGEND

SYMBOL	BOREHOLE	SAMPLE	ELEV (m)
●	2	2	178.1

PROJECT
THE CORPORATION OF THE CITY OF WINDSOR
OJIBWAY PARKWAY SANITARY SEWER
REHABILITATION - PHASE 4, WINDSOR, ONTARIO

TITLE
GRAIN SIZE DISTRIBUTION
FINE SAND, some silt

Golder Associates
WINDSOR, ONTARIO

PROJECT No.	07-1140-0023		FILE No.	07-1140-0023.GPJ	
			SCALE	N/A	REV.
DRAWN	T.M.	27/3/07	FIGURE	6	
CHECK	BC	27/3/07			

LDN_GSD_NEW GLDR_LDN.GDT

July 2011

SUMMARY OF ENVIRONMENTAL SAMPLING RESULTS

Ojibway Parkway Sewer Reconstruction Project Between Broadway Street and Weaver Road Windsor, Ontario

Submitted to:

Mr. Fahd Mikhael, M.Sc., P.Eng., P.E.
Project Administrator
The Corporation of the City of Windsor
400 City Hall Square Street
Windsor, Ontario
N9A 7K6

REPORT

A world of capabilities delivered locally

Report Number: 10-1134-0170-R01

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Table of Contents

TABLES

FIGURES

APPENDICES

1.0 INTRODUCTION

Golder Associates Ltd. (Golder) is pleased to submit this report to the Corporation of the City of Windsor (City) to summarize the environmental results of the soil and groundwater sampling and analytical testing activities completed at the proposed Ojibway Parkway sewer reconstruction project between Broadway Street and Weaver Road in the City of Windsor, Ontario (the Site). The work was performed in general accordance with the scope of work outlined in Golder's proposal No. P0-1134-0170-L01 dated May 12, 2011 and subsequently approved by the City. The general location of the Site and the sample locations are presented on Figure 1, Location Plan.

1.1 Background

Golder understands that the project will include the reconstruction of the existing sanitary sewer line using the pipe bursting method and the installation of up to eight access shafts/manholes. We also understand that the location of the proposed sewer line will generally be underneath the westerly road shoulder. The limits of the work are from Broadway Street to the north to Weaver Road to the south. The sanitary sewer will range in depth from approximately 2.5 metres below ground surface (mbgs) at the south end to 4.5 mbgs at the north sewer tie-in. The Site is adjacent to an existing active railway, as well as the current Dainty Foods plant, and is located in a former industrial area of the former Town of Ojibway. Open cut excavation is only anticipated at the location of the proposed access shafts/manholes.

1.2 Objectives and Scope of Work

The City has elected to conduct this assessment to assist in the evaluation of off-Site management and disposal alternatives for excess soil generated during the anticipated soil excavation and sewer line reconstruction activities. The number of boreholes and samples and analytical parameters were selected and discussed with the City for general screening of the subsurface materials prior to the start of the construction work. At the request of the City, the boreholes locations were selected to be within close proximity of the eight existing manholes. It is Golder's understanding that the completed soil sampling activities will not be required for preparation of a Record of Site Condition (RSC) as described in Ontario Regulation 153/04, as amended.

The assessment activities included:

- Drilling of eight boreholes and installation of two temporary monitoring wells to facilitate the collection of soil and grab groundwater samples at the selected locations of the Site;

- Chemical analysis of selected soil and groundwater samples for selected parameters, which included benzene, toluene, ethylbenzene and xylenes (BTEX), petroleum hydrocarbons (PHC F1-F4) fractions, polynuclear aromatic hydrocarbons (PAHs), metals and inorganics. In addition, two waste characterization composite samples were collected from the upper fill materials and lower native soil for chemical analysis of BTEX and metals using the *Toxicity Characteristic Leaching Procedure* (*TCLP*); and
- Data interpretation, evaluation and reporting.

The above-noted work activities are discussed in additional detail as follows, and are based on the limited information provided by the City.

2.0 INVESTIGATION METHOD

Prior to any drilling at the Site, Golder contacted Ontario-One-Call (One-Call) and other public utility companies to provide service locates. In addition, Golder retained a private utility locator, Kent Locating Service of Kent Bridge, Ontario, to scan the proposed borehole locations for buried services prior to drilling to reduce, but not eliminate, the potential for encountering buried services. Golder also prepared a Site-specific Health and Safety Plan (HASP) to address safety issues associated with the proposed field activities.

The following sections describe the field investigation procedures utilized at the Site. The field work was carried out by a member of Golder's staff from June 10, 2011.

2.1 Borehole Drilling

A total of eight boreholes (BH-101 through BH-108) were drilled and sampled at the selected locations of the proposed sewer reconstruction Site. The boreholes were advanced within close proximity of the eight existing manholes. The boreholes were extended to depths ranging from 3.91 to 4.57 mbgs. The borehole locations, as approximately shown on Figure 1, were placed to assess the subsurface soil and groundwater conditions at the selected locations.

To carry out the drilling program, Golder retained the services of Strata Soil Sampling Inc. of Richmond Hill, Ontario (Strata), who advanced the boreholes using a Geoprobe® 6610DT track-mounted drill rig fitted with a hydraulic percussion hammer to facilitate the continuous sampling of subsurface materials from surface to the point of borehole termination. Strata worked under the direct supervision of an experienced Golder staff member. The drill rig advanced a dual-tube sampler that was comprised of two nested casings, an outer 83 millimetre (3.25-inch) outside diameter (OD) steel casing, and an inner 60 mm (2.375 inch) diameter sample sheath. The inner sample sheath was lined with a disposable PVC (lexan) liner to contain the sample and minimize cross contamination between samples. Using the Geoprobe® sampling system, soil samples were collected in the 1.2-metre (4-foot) long, lexan sampling tubes at continuous intervals over the depth of each borehole.

The soil stratigraphy encountered in the boreholes is summarized on the Record of Borehole sheets that are included in Appendix A. As described in Section 2.3, *Temporary Monitoring Well Installation and Groundwater Sampling*, two of the boreholes, BH-101 and BH-107 (MW-101 and MW-107), were completed as temporary groundwater monitoring wells and installed at approximate depths of 3.91 and 4.57 mbgs, respectively. The sampling equipment was decontaminated between sample locations and boreholes.

Borehole drilling and decommissioning are legislated under Ontario Regulation 903 (O.Reg.), as amended by O.Reg. 128/03 and O.Reg. 372/07, of the Ontario Water Resources Act. Upon completing the sampling activities, the boreholes were properly abandoned by the drilling contractor in general accordance with the applicable regulations.

2.2 Soil Sampling

Soil samples were collected continuously from the boreholes and logged in the field for observations of chemical impacts (e.g. odours and staining). Samples were subsequently placed in 1-litre sealable plastic bags for headspace combustible vapour testing using an RKI Eagle Type 101, calibrated to hexane. Concentrations were recorded as parts per million (ppm) by volume. Measured concentrations are recorded on the respective Record of Borehole sheets (Appendix A). Separate sub-samples were retained in glass jars, supplied by the analytical laboratory, for chemical analysis.

The soil samples obtained were placed in appropriate containers supplied by the analytical laboratory and stored in a cooler containing ice for preservation prior to submittal to the analytical laboratory following standard chain-of-custody procedures and using normal turn-around-time (TAT) schedule. Two soil samples were collected from each borehole for a total of 16 soil samples were collected and submitted to AGAT Laboratories (AGAT) in Mississauga, Ontario. The soil samples were analyzed for BTEX/PHC, PAHs and/or metals/inorganics. Four selected soil samples were also analyzed for volatile organic compounds (VOCs). In addition, two waste characterization composite samples were collected from the upper fill materials and lower native soil and submitted for chemical analysis of BTEX and metals using TCLP to characterize the materials for potential off-Site disposal.

The soil samples submitted for laboratory analysis were selected based on visual and/or olfactory evidence of chemical impact, headspace combustible vapour concentrations, borehole location and/or sample depth.

2.3 Temporary Monitoring Well Installation and Groundwater Sampling

To facilitate grab sampling of groundwater, two of the boreholes were completed as temporary monitoring wells (designated MW-101 and MW-107) and installed at approximate depths of 3.91 and 4.57 mbgs with 3.05-metre (10-feet) long, 51-mm (2-inch) diameter, Schedule 40, number 10 slot, threaded PVC screen. The annulus surrounding the screened portion of the well and an appropriate length of the riser pipe above the screen was backfilled with silica filter sand.

The temporary wells were purged then allowed to recharge and samples were collected on June 10, 2011 using new dedicated Waterra Model D-25 inertial pumps and 13-millimetre inside diameter polyethylene tubing. The recovered groundwater samples were inspected in the field for indications of petroleum hydrocarbon and signs of other chemical contamination (e.g., odour, sheen). Samples for metals analysis were filtered in the field using 0.45 micrometre, disposable, in-line filters.

The groundwater samples were collected in appropriate containers, as supplied by AGAT, and placed in a cooler with ice for delivery to AGAT under chain-of-custody procedures. A total of two grab groundwater samples were submitted for chemical analysis of BTEX/PHC, PAHs and/or metals/inorganics. One of the samples was also analyzed for VOCs.

3.0 EVALUATION OF FIELD INVESTIGATION RESULTS

3.1 Subsurface Soil Conditions

The subsurface soil conditions encountered in the boreholes are detailed on the Record of Borehole sheets in Appendix A. The following description of the subsurface conditions has been simplified in terms of major soil types for the purpose of environmental and hydrogeological discussion. The boundaries between soil types indicated on the borehole logs typically represent a transition between soil types and should not be interpreted to represent exact planes of geological change. Furthermore, soil conditions may vary between and beyond the locations of the boreholes and sampling locations. Approximate borehole locations are shown on Figure 1.

From the ground surface, sand, gravel and topsoil were encountered depending on the borehole location. Below the sand/grave and topsoil, a layer of brown and grey sand and gravel with some silty clay, clayey silt and silty sand fill materials extending to depths ranging from 2.31 to 3.53 mbgs. The fill materials extended to the maximum drilled depth of 3.91 mbgs in BH-101. Underlying the fill materials, grey silty clay was encountered and extended to the maximum drilled depths of 3.91 and 4.57 mbgs. A thin layer of grey sandy silt was encountered above the gery silty clay in boreholes BH-104, BH-105, BH-106 and BH-108. The thickness of the sandy silt ranged from 0.1 to 0.58 metre. It should be noted that not all boreholes were advance to native soils.

No evidence of chemical impact (odour or staining) was noted in the collected soil samples. In addition, the measured headspace combustible vapour concentrations of these samples ranged were below detection. The field observations are noted on the Record of Borehole sheets (Appendix A).

3.2 Groundwater Conditions

Two of the boreholes were completed as temporary monitoring wells (MW-101 and MW-107) and installed at approximate depths of 3.91 and 4.57 mbgs. Groundwater level was recorded in the boreholes at depths ranging from 1.16 to 1.7 mbgs upon completion of the drilling and sampling activities. The groundwater levels encountered during the drilling activities, if encountered, are listed on the relevant Record of Borehole sheets and included in Appendix A.

No evidence of contamination (sheen, odour or free-phase product) was observed during the purging and sampling of the two temporary monitoring wells (MW-101 and MW-107).

Shallow groundwater flow characteristics on Site and in the vicinity of the Site may be influenced locally by features such as building foundations, buried utilities (including sewers), local drainage features, and local soil properties or fill materials. The shallow groundwater encountered at the Site may be considered as a perched condition.

4.0 EVALUATION OF CHEMICAL ANALYSIS

4.1 Discussion of Environmental Criteria

For discussion purposes only, soil and groundwater concentrations were compared to local agency standards. Current environmental standards for soil and groundwater are identified in the MOE document: “Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act” (April 2011) (MOE Standards). The MOE Standards identify two sets of generic standards: one set for a potable groundwater condition (Table 2 in the MOE Standards) and a less stringent set for a non-potable groundwater condition (Table 3). The generic standards considered to be consistent with the use and location of the Site considering that the area of the Site is served by a municipal drinking water supply that does not rely on local groundwater, are the standards for industrial/commercial/community property use for a non-potable groundwater condition (Table 3 of the MOE Standards). Considering the presence of shallow coarse grained soils at the Site (i.e. sand, gravel and silty sand), the coarse grained soil criteria were also considered appropriate for the Site. The 2011 Table 3 standards for residential/parkland/institutional property use and the Table 1 standards for residential/parkland property use are also presented in the summary tables for comparison purposes. The analytical results of the two waste characterization samples were compared with the MOE Leachate Quality Criteria presented in Schedule 4 of O. Reg. 347.

4.2 Analytical Results for Soil Samples

A total of 18 soil samples were collected and analyzed for BTEX/PHC, PAHs and/or metals/inorganics. Four selected soil samples were also analyzed for VOCs. Based on the analytical results, PAHs were detected at concentrations above the applicable Table 3 Standards in one borehole (BH-108 close to Waver Road). Metals and inorganics were also detected at concentrations above the applicable Table 3 Standards in three locations (BH-105, BH-106 and BH-108). The concentrations of the other parameters were below the reported method detection limits or the applicable Table 3 Standards.

In addition, the TCLP analytical results for the two waste characterization samples composite soil samples were compared to O. Reg. 347/90 Schedule 4 Leachate Quality Criteria. Based on the analytical results, the reported TCLP results were below the reported method detection limits or the applicable MOE Leachate Quality Criteria presented in Schedule 4 of O. Reg. 347. Therefore, the soils represented by these two samples would not be characterised as hazardous (characteristic) waste as defined in O. Reg. 347 and could be disposed of at a licensed non-hazardous waste landfill.

The laboratory results for the selected soil samples and the applicable Table 3 Standards are summarized in Tables I through V. Copies of the laboratory certificates of analysis are provided in Appendix B.

4.3 Analytical Results for Groundwater Samples

A total of two grab groundwater samples were collected and analyzed for BTEX/PHC, PAHs and/or metals/inorganics. Four selected soil samples were also analyzed for VOCs. Based on the analytical results, the reported concentrations were below the method detection limits or the applicable standards.

The laboratory results for the groundwater samples and the applicable Table 3 Standards are summarized in Tables VI through IX. Copies of the laboratory certificates of analysis are also provided in Appendix B.

5.0 CONCLUSIONS

Based on the findings of the environmental sampling activities, the following can be concluded from the completed investigation at the Site:

Based on the soil sample analytical results, PAHs were detected at concentrations above the applicable Table 3 Standards in one borehole (BH-108 close to Waver Road). Metals and inorganics were also detected in three borehole locations (BH-105, BH-106 and BH-108) at concentrations above the applicable Table 3 Standards for industrial/commercial/community property use for a non-potable groundwater condition. Based on the groundwater sample analytical results, the reported concentrations were below the method detection limits or the applicable standards.

Soil materials with parameter concentrations exceeding the MOE Table 3 Standards and/or indicating evidence of impact (odour and staining) are interpreted to not be suitable for reuse on Site and require management and off-Site disposal as waste. Consequently, the excess materials that will be excavated from the general locations of the proposed access shafts/manholes (BH-105, BH-106 and BH-108) during the anticipated sewer line construction activities will require proper handling and off-Site disposal.

Based on the analytical results and field observations, the soil materials encountered in these three borehole locations would not be considered inert fill under the provisions of Reg. 347, as amended, and therefore is characterized as materials with chemicals of concern (impact) for management and off-Site disposal purposes. However based on the TCLP analytical results, it is interpreted that the soils represented by the two composite samples would not be characterized as hazardous (characteristic) waste as defined in Reg. 347 and could be disposed of at a non-hazardous solid waste landfill licensed or certified (whichever is applicable) by the responsible regulatory authority in the Province of Ontario. Additional sampling and analysis may be requested by the selected disposal facility for profiling and approval purposes. Proper documentation of off-Site disposal work will be required. Field monitoring of excavation activities is also recommended.

Soil materials with parameter concentrations below the MOE Table 3 standards and without evidence of impact (odour and staining) are interpreted to be suitable for reuse on Site. However, these materials would not be considered inert fill under the provisions of Reg. 347, as amended.

6.0 LIMITATIONS

This report was prepared for the exclusive use of The Corporation of The City of Windsor. It is intended to provide an assessment of subsurface soil and groundwater conditions at specific locations of the at the proposed Ojibway Parkway sewer reconstruction project between Broadway Street and Weaver Road in the City of Windsor, Ontario. Golder will not be responsible for any use of this report by any other party.

There is no warranty, expressed or implied, by Golder that this assessment has identified all potential contaminants at the Site or that the Site is free from any and all contamination from past or current practices other than that noted, nor that all issues of environmental compliance have been addressed. The assessment of environmental conditions and potential hazards at the Site has been made using the information provided by Stantec and Landmark as well as the results of chemical analysis of samples collected on the dates identified and within the specified period of investigation. No assurance is made regarding changes in conditions subsequent to the time of investigation.

The Site conditions in the area of investigation have been inferred based on conditions observed at a limited number of sampling locations in accessible areas; however, it should be noted that conditions between and beyond sampling locations may vary. In addition, the assessment is dependent upon the accuracy of the analytical data generated through sample analysis and is limited to determining the presence of contaminants for which analyses have been conducted.

In evaluating the Site, Golder has relied in good faith on information provided by individuals and companies noted in this report. We assume that the information provided is factual and accurate. We accept 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.

Where references have been made to regulatory guidelines and documents, it should be noted that regulatory statutes and guidelines are subject to interpretation and these guidelines and documents and their interpretations may be subject to change over time.

Golder accepts no responsibility for the consequential effects of this factual report on the real or perceived property value of the Site, on its saleability, or on the ability to gain financing. It is Golder's understanding that the completed soil sampling activities will not be required for preparation of a Record of Site Condition (RSC) as described in Ontario Regulation 153/04, as amended.

7.0 CLOSURE

We trust that this information is sufficient for your present purposes. If you have any questions regarding this report or if we can be of further assistance, please feel free to contact the undersigned directly.

GOLDER ASSOCIATES LTD.

ORIGINAL SIGNED

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Senior Environmental Engineer

ORIGINAL SIGNED

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TABLE I

ANALYTICAL RESULTS FOR PETROLEUM HYDROCARBONS AND BTEX COMPOUNDS IN SOIL

Ojibway Parkway Sewer Reconstruction Project
Ojibway Parkway, Windsor, Ontario

	Location:	BH101-1B	BH101-2B[11]	BH102-1B	BH102-3A	BH103-1D[11]	BH103-2C	2011 MOE TABLE 3	2011 MOE TABLE 3	2011 MOE TABLE 1
	Depth (mbgs):	0.12 - 0.58	2.29 - 2.74	0.61 - 1.01	3.05 - 3.81	0.37 - 0.76	2.35 - 2.71	Residential / Parkland / Institutional	Industrial / Commercial / Community	Residential / Parkland
	Soil Type:	Silty Sand	Silty Sand	Sand	Silty Clay	Sand	Sand			
	Sample Date:	10-Jun-2011	10-Jun-2011	10-Jun-2011	10-Jun-2011	10-Jun-2011	10-Jun-2011	STANDARDS[1]	STANDARDS[2]	STANDARDS[3]
PARAMETER	UNITS									
Benzene	µg/g	<0.02	<0.002	<0.02	<0.02	<0.002	<0.02	(0.17) 0.21	(0.4) 0.32	0.02
Toluene	µg/g	<0.08	<0.002	<0.08	<0.08	<0.002	<0.08	(6) 2.3	(78) 68	0.2
Ethylbenzene	µg/g	<0.05	<0.002	<0.05	<0.05	<0.002	<0.05	(15) 2	(19) 9.5	0.05
Total Xylenes[4]	µg/g	<0.05	<0.002	<0.05	<0.05	<0.002	<0.05	(25) 3.1	(30) 26	0.05
PHC F1 (C_6 - C_{10})[5]	µg/g	<5	<5	<5	<5	<5	<5	(65) 55	(65) 55	25
PHC F2 (>C_{10} - C_{16})	µg/g	<10	<10	<10	<10	<10	<10	(150) 98	(250) 230	10
PHC F3 (>C_{16} - C_{34})	µg/g	<50	<50	<50	<50	<50	<50	(1300) 300	(2500) 1700	240
PHC F4 (>C_{34} - C_{50})	µg/g	<50	<50	<50	<50	<50	<50	(5600) 2800	(6600) 3300	120

	Location:	BH104-1D	BH104-3A	BH105-2A	BH105-3B[11]	BH106-1C	BH106-2C	2011 MOE TABLE 3	2011 MOE TABLE 3	2011 MOE TABLE 1
	Depth (mbgs):	0.34 - 0.86	3.05 - 3.29	1.52 - 2.04	3.20 - 3.66	0.18 - 0.30	2.47 - 2.80	Residential / Parkland / Institutional	Industrial / Commercial / Community	Residential / Parkland
	Soil Type:	Sand	Sandy Silt	Sand	Silty Clay	Sandy Silt	Sand			
	Sample Date:	10-Jun-2011	10-Jun-2011	10-Jun-2011	10-Jun-2011	10-Jun-2011	10-Jun-2011	STANDARDS[1]	STANDARDS[2]	STANDARDS[3]
Benzene	µg/g	<0.02	<0.02	<0.02	<0.002	<0.02	<0.02	(0.17) 0.21	(0.4) 0.32	0.02
Toluene	µg/g	<0.08	<0.08	<0.08	<0.002	<0.08	<0.08	(6) 2.3	(78) 68	0.2
Ethylbenzene	µg/g	<0.05	<0.05	<0.05	<0.002	<0.05	<0.05	(15) 2	(19) 9.5	0.05
Total Xylenes[4]	µg/g	<0.05	<0.05	<0.05	<0.002	<0.05	<0.05	(25) 3.1	(30) 26	0.05
PHC F1 (C_6 - C_{10})[5]	µg/g	<5	<5	<5	<5	<5	<5	(65) 55	(65) 55	25
PHC F2 (>C_{10} - C_{16})	µg/g	<10	<10	<10	<10	<10	<10	(150) 98	(250) 230	10
PHC F3 (>C_{16} - C_{34})	µg/g	<50	<50	<50	<50	<50	<50	(1300) 300	(2500) 1700	240
PHC F4 (>C_{34} - C_{50})	µg/g	<50	<50	<50	<50	<50	<50	(5600) 2800	(6600) 3300	120

ANALYTICAL RESULTS FOR PETROLEUM HYDROCARBONS AND BTEX COMPOUNDS IN SOIL

Location:	BH107-1D[11]	BH107-2B	BH107-3B	BH108-1C	BH108-2A	BH108-3B	2011 MOE TABLE 3	2011 MOE TABLE 3	2011 MOE TABLE 1
Depth (mbgs):	0.91 - 1.22	2.36 - 2.74	3.96 - 4.27	0.24 - 0.46	1.52 - 2.13	3.20 - 3.44			
Soil Type:	Sand	Sand	Silty Clay	Sandy Silt	Sand	Sandy Silt	Residential / Parkland / Institutional	Industrial / Commercial / Community	Residential / Parkland
Sampling Date:	10-Jun-2011	10-Jun-2011	10-Jun-2011	10-Jun-2011	10-Jun-2011	10-Jun-2011	STANDARDS[1]	STANDARDS[2]	STANDARDS[3]
PARAMETER UNITS									
Benzene µg/g	<0.002	<0.02	<0.02	<0.02	<0.02	<0.02	(0.17) 0.21	(0.4) 0.32	0.02
Toluene µg/g	<0.002	<0.08	<0.08	<0.08	<0.08	<0.08	(6) 2.3	(78) 68	0.2
Ethylbenzene µg/g	<0.002	<0.05	<0.05	<0.05	<0.05	<0.05	(15) 2	(19) 9.5	0.05
Total Xylenes[4] µg/g	<0.002	<0.05	<0.05	<0.05	<0.05	<0.05	(25) 3.1	(30) 26	0.05
PHC F1 (C_6 - C_{10})[5] µg/g	<5	<5	<5	<5	<5	<5	(65) 55	(65) 55	25
PHC F2 (>C_{10} - C_{16}) µg/g	<10	<10	<10	<10	<10	<10	(150) 98	(250) 230	10
PHC F3 (>C_{16} - C_{34}) µg/g	<50	<50	<50	<50	<50	<50	(1300) 300	(2500) 1700	240
PHC F4 (>C_{34} - C_{50}) µg/g	<50	<50	<50	<50	<50	<50	(5600) 2800	(6600) 3300	120

NOTES:
1. MOE 'Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the *Environmental Protection Act*' (April 2011). Table 3 Standard is for a non-potable groundwater situation for residential/parkland/institutional property use. Values in brackets apply to medium and fine textured soils; non-bracketed values apply to coarse textured soils.
2. MOE 'Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the *Environmental Protection Act*' (April 2011). Table 3 Standard is for a non-potable groundwater situation for industrial/commercial/community property use. Values in brackets apply to medium and fine textured soils; non-bracketed values apply to coarse textured soils.
3. MOE 'Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the *Environmental Protection Act*' (April 2011). Table 1 Standard is for background site condition standards for residential/parkland/institutional/industrial/commercial/community property use.
4. Total xylenes represents the sum of p+m- and o-xylenes.
5. Recorded concentrations for PHC F1 are measured values minus BTEX concentration.
6. "mbgs" Metres below ground surface.
7. "µg/g" Micrograms per gram.
8. "<" Below method reporting limit.
9. "--" No applicable standard or not analysed.
10. Values in **bold** indicate exceedance of applicable 2011 MOE Table 3 Standard for residential/parkland use ; values underlined indicate exceedance of applicable 2011 MOE Table 3 Standard for industrial commercial use; values in *italics* indicate exceedamce of applicable 2011 MOE Table 1 Standard for residential/parkland/institutional/industrial.commercial/community property use.
11. BTEX results derived from VOC analysis. Detection limits were lowered.
12. Table to be read in conjunction with accompanying report.

Prepared By: JM
Checked By: KB

TABLE II

ANALYTICAL RESULTS FOR VOLATILE ORGANIC COMPOUNDS IN SOIL

Ojibway Parkway Sewer Reconstruction Project
Ojibway Parkway, Windsor, Ontario

Location:	BH101-2B	BH103-1D	BH105-3B	BH107-1D	2011	2011	2011
Depth (mbgs):	2.29 - 2.74	0.37 - 0.76	3.20 - 3.66	0.91 - 1.22	MOE TABLE 3	MOE TABLE 3	MOE TABLE 1
Soil Type:	Silty Sand	Sand	Silty Clay	Sand	Residential / Parkland / Institutional	Industrial / Commercial / Community	Residential / Parkland
Sample Date:	10-Jun-2011	10-Jun-2011	10-Jun-2011	10-Jun-2011	STANDARDS(1)	STANDARDS(2)	STANDARDS(3)
PARAMETER	UNITS						
Acetone	µg/g	<0.130	<0.130	<0.130	<0.130	(28) 16	(28) 16	0.5
Benzene	µg/g	<0.002	<0.002	<0.002	<0.002	(0.17) 0.21	(0.4) 0.32	0.02
Bromodichloromethane	µg/g	<0.003	<0.003	<0.003	<0.003	13	18	0.05
Bromoform	µg/g	<0.002	<0.002	<0.002	<0.002	(0.26) 0.27	(1.7) 0.61	0.05
Bromomethane	µg/g	<0.002	<0.002	<0.002	<0.002	0.05	0.05	0.05
Carbon Tetrachloride	µg/g	<0.002	<0.002	<0.002	<0.002	(0.12) 0.05	(1.5) 0.21	0.05
Chlorobenzene	µg/g	<0.002	<0.002	<0.002	<0.002	(2.7) 2.4	(2.7) 2.4	0.05
Chloroethane (ethyl chloride)	µg/g	<0.005	<0.005	<0.005	<0.005	--	--	--
Chloroform	µg/g	<0.002	<0.002	<0.002	<0.002	(0.18) 0.05	(0.18) 0.47	0.05
Chloromethane (methyl chloride)	µg/g	<0.002	<0.002	<0.002	<0.002	--	--	--
Dibromochloromethane	µg/g	<0.003	<0.003	<0.003	<0.003	9.4	13	0.05
1,2-Dichlorobenzene	µg/g	<0.002	<0.002	<0.002	<0.002	(4.3) 3.4	(8.5) 6.8	0.05
1,3-Dichlorobenzene	µg/g	<0.002	<0.002	<0.002	<0.002	(6) 4.8	(12) 9.6	0.05
1,4-Dichlorobenzene	µg/g	<0.002	<0.002	<0.002	<0.002	(0.097) 0.083	(0.84) 0.2	0.05
Dichlorodifluoromethane	µg/g	<0.005	<0.005	<0.005	<0.005	(25) 16	(25) 16	0.05
1,1-Dichloroethane	µg/g	<0.002	<0.002	<0.002	<0.002	(11) 3.5	(21) 17	0.05
1,2-Dichloroethane	µg/g	<0.002	<0.002	<0.002	<0.002	0.05	0.05	0.05
1,1-Dichloroethylene	µg/g	<0.002	<0.002	<0.002	<0.002	0.05	(0.48) 0.064	0.05
cis-1,2-Dichloroethylene	µg/g	<0.002	<0.002	<0.002	<0.002	(30) 3.4	(37) 55	0.05
trans-1,2-Dichloroethylene	µg/g	<0.003	<0.003	<0.003	<0.003	(0.75) 0.084	(9.3) 1.3	0.05
1,2-Dichloropropane	µg/g	<0.002	<0.002	<0.002	<0.002	(0.085) 0.05	(0.68) 0.16	0.05
cis-1,3-Dichloropropene	µg/g	<0.002	<0.002	<0.002	<0.002	--	--	--
trans-1,3-Dichloropropene	µg/g	<0.003	<0.003	<0.003	<0.003	--	--	--
1,3-Dichloropropene (Total)	µg/g	<0.002	<0.002	<0.002	<0.002	(0.083) 0.05	(0.21) 0.18	0.05
Ethylbenzene	µg/g	<0.002	<0.002	<0.002	<0.002	(15) 2	(19) 9.5	0.05
Ethylene Dibromide	µg/g	<0.002	<0.002	<0.002	<0.002	0.05	0.05	0.05
Hexane	µg/g	<0.005	<0.005	<0.005	<0.005	(34) 2.8	(88) 46	0.05
2-Hexanone (methyl butyl ketone)	µg/g	<0.470	<0.470	<0.470	<0.470	--	--	--
Methylene Chloride	µg/g	<0.003	<0.003	<0.003	<0.003	(0.96) 0.1	(2) 1.6	0.05
Methyl Isobutyl Ketone	µg/g	<0.10	<0.10	<0.10	<0.10	(4.3) 1.7	(210) 31	0.5
Methyl Ethyl Ketone	µg/g	<0.10	<0.10	<0.10	<0.10	(44) 16	(88) 70	0.5
Methyl tert-butyl Ether	µg/g	<0.004	<0.004	<0.004	<0.004	(1.4) 0.75	(3.2) 11	0.05
Styrene	µg/g	<0.002	<0.002	<0.002	<0.002	(2.2) 0.7	(43) 34	0.05
1,2,4-Trichlorobenzene	µg/g	<0.007	<0.007	<0.007	<0.007	(1.4) 0.36	(16) 3.2	0.05
1,1,1,2-Tetrachloroethane	µg/g	<0.002	<0.002	<0.002	<0.002	(0.05) 0.058	(0.11) 0.087	0.05
1,1,2,2-Tetrachloroethane	µg/g	<0.004	<0.004	<0.004	<0.004	0.05	(0.094) 0.05	0.05
Tetrachloroethylene	µg/g	<0.002	<0.002	<0.002	<0.002	(2.3) 0.28	(21) 4.5	0.05
Toluene	µg/g	<0.002	<0.002	<0.002	<0.002	(6) 2.3	(78) 68	0.2
1,1,1-Trichloroethane	µg/g	<0.002	<0.002	<0.002	<0.002	(3.4) 0.38	(12) 6.1	0.05
1,1,2-Trichloroethane	µg/g	<0.002	<0.002	<0.002	<0.002	0.05	(0.11) 0.05	0.05
Trichloroethylene	µg/g	<0.004	<0.004	<0.004	<0.004	(0.52) 0.061	(0.61) 0.91	0.05
Vinyl Chloride	µg/g	<0.002	<0.002	<0.002	<0.002	(0.022) 0.02	(0.25) 0.032	0.02
p+m-Xylenes	µg/g	<0.002	<0.002	<0.002	<0.002	--	--	--
o-Xylene	µg/g	<0.002	<0.002	<0.002	<0.002	--	--	--
Xylenes (Total)(4)	µg/g	<0.002	<0.002	<0.002	<0.002	(25) 3.1	(30) 26	0.05
Trichlorofluoromethane	µg/g	<0.004	<0.004	<0.004	<0.004	(5.8) 4	(5.8) 4	0.25

NOTES:
1. MOE 'Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the *Environmental Protection Act*' (April 2011). Table 3 Standard is for a non-potable groundwater situation for residential/parkland/institutional property use. Values in brackets apply to medium and fine textured soils; non-bracketed values apply to coarse textured soils.
2. MOE 'Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the *Environmental Protection Act*' (April 2011). Table 3 Standard is for a non-potable groundwater situation for industrial/commercial/community property use. Values in brackets apply to medium and fine textured soils; non-bracketed values apply to coarse textured soils.
3. MOE 'Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the *Environmental Protection Act*' (April 2011). Table 1 Standard is for background site condition standards for residential/parkland/institutional/industrial/commercial/community property use.
4. Total xylenes represents the sum of p+m- and o-xylenes.
5. "mbgs" Metres below ground surface.
6. "µg/g" Micrograms per gram.
7. "<" Below method reporting limit.
8. "--" No applicable standard or not analysed.
9. Values in **bold** indicate exceedance of applicable 2011 MOE Table 3 Standard for residential/parkland use ; values underlined indicate exceedance of applicable 2011 MOE Table 3 Standard for industrial commercial use; values in *italics* indicate exceedamce of applicable 2011 MOE Table 1 Standard for residential/parkland/institutional/industrial.commercial/community property use.
10. Table to be read in conjunction with accompanying report.

Prepared By: JM
Checked By: KB

TABLE III

ANALYTICAL RESULTS FOR POLYCYCLIC AROMATIC HYDROCARBONS IN SOIL

Ojibway Parkway Sewer Reconstruction Project
Ojibway Parkway, Windsor, Ontario

Location:		BH101-1B	BH101-2B	BH102-1B	BH102-3A	BH103-1D	BH103-2C	2011 MOE TABLE 3	2011 MOE TABLE 3	2011 MOE TABLE 1
Sample Number:		0.12 - 0.58	2.29 - 2.74	0.61 - 1.01	3.05 - 3.81	0.37 - 0.76	2.35 - 2.71			
Soil Type:		Silty Sand	Silty Sand	Sand	Silty Clay	Sand	Sand	Residential / Parkland / Institutional	Industrial / Commercial / Community	Residential / Parkland
Sample Date:		10-Jun-2011	10-Jun-2011	10-Jun-2011	10-Jun-2011	10-Jun-2011	10-Jun-2011	STANDARDS[1]	STANDARDS[2]	STANDARDS[3]
PARAMETER	UNITS									
Acenaphthene	µg/g	0.03	0.05	<0.03	<0.03	<0.03	<0.03	(58) 7.9	96	0.072
Acenaphthylene	µg/g	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	(0.17) 0.15	(0.17) 0.15	0.093
Anthracene	µg/g	0.07	0.10	<0.02	<0.02	<0.02	<0.02	(0.74) 0.67	(0.74) 0.67	0.16
Benzo(a)anthracene	µg/g	0.21	0.27	<0.02	<0.02	<0.02	<0.02	(0.63) 0.5	0.96	0.36
Benzo(a)pyrene	µg/g	0.23	0.28	<0.02	<0.02	<0.02	<0.02	0.3	0.3	0.3
Benzo(b)fluoranthene	µg/g	0.28	0.32	<0.02	<0.02	<0.02	<0.02	0.78	0.96	0.47
Benzo(g,h,i)perylene	µg/g	0.14	0.17	<0.02	0.02	<0.02	<0.02	(7.8) 6.6	9.6	0.68
Benzo(k)fluoranthene	µg/g	0.13	0.14	<0.02	<0.02	<0.02	<0.02	0.78	0.96	0.48
Chrysene	µg/g	0.24	0.28	<0.02	<0.02	<0.02	<0.02	(7.8) 7	9.6	2.8
Dibenzo(a,h)anthracene	µg/g	0.04	0.05	<0.02	<0.02	<0.02	<0.02	0.1	0.1	0.1
Fluoranthene	µg/g	0.49	*0.65*	0.02	<0.02	<0.02	<0.02	0.69	9.6	0.56
Fluorene	µg/g	0.04	0.06	<0.02	<0.02	<0.02	<0.02	(69) 62	(69) 62	0.12
Indeno(1,2,3-cd)pyrene	µg/g	0.11	0.16	<0.02	<0.02	<0.02	<0.02	(0.48) 0.38	(0.95) 0.76	0.23
2 and 1-Methylnaphthalene [4]	µg/g	0.07	0.07	<0.05	0.05	<0.05	<0.05	(3.4) 0.99	(85) 76	0.59
Naphthalene	µg/g	0.08	0.06	<0.03	0.07	<0.03	<0.03	(0.75) 0.6	(28) 9.6	0.09
Phenanthrene	µg/g	0.34	0.53	<0.02	<0.02	<0.02	<0.02	(7.8) 6.2	(16) 12	0.69
Pyrene	µg/g	0.38	0.5	0.02	<0.02	<0.02	<0.02	78	96	1

Location:		BH104-1D	BH104-3A	BH105-2A	BH105-3B	BH106-1C	BH106-2C	2011 MOE TABLE 3	2011 MOE TABLE 3	2011 MOE TABLE 1
Sample Number:		0.34 - 0.86	3.05 - 3.29	1.52 - 2.04	3.20-3.66	0.18 - 0.30	2.47 - 2.80			
Soil Type:		Sand	Sandy Silt	Sand	Silty Clay	Sandy Silt	Sand	Residential / Parkland / Institutional	Industrial / Commercial / Community	Residential / Parkland
Sample Date:		10-Jun-2011	10-Jun-2011	10-Jun-2011	10-Jun-2011	10-Jun-2011	10-Jun-2011	STANDARDS[1]	STANDARDS[2]	STANDARDS[3]
Acenaphthene	µg/g	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	(58) 7.9	96	0.072
Acenaphthylene	µg/g	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	(0.17) 0.15	(0.17) 0.15	0.093
Anthracene	µg/g	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	(0.74) 0.67	(0.74) 0.67	0.16
Benzo(a)anthracene	µg/g	<0.02	<0.02	<0.02	<0.02	0.14	<0.02	(0.63) 0.5	0.96	0.36
Benzo(a)pyrene	µg/g	<0.02	<0.02	<0.02	<0.02	0.19	0.02	0.3	0.3	0.3
Benzo(b)fluoranthene	µg/g	<0.02	<0.02	<0.02	<0.02	0.29	<0.02	0.78	0.96	0.47
Benzo(g,h,i)perylene	µg/g	<0.02	<0.02	<0.02	<0.02	0.22	0.02	(7.8) 6.6	9.6	0.68
Benzo(k)fluoranthene	µg/g	<0.02	<0.02	<0.02	<0.02	0.12	<0.02	0.78	0.96	0.48
Chrysene	µg/g	<0.02	<0.02	<0.02	<0.02	0.20	0.03	(7.8) 7	9.6	2.8
Dibenzo(a,h)anthracene	µg/g	<0.02	<0.02	<0.02	<0.02	0.05	<0.02	0.1	0.1	0.1
Fluoranthene	µg/g	<0.02	<0.02	<0.02	<0.02	0.13	0.04	0.69	9.6	0.56
Fluorene	µg/g	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	(69) 62	(69) 62	0.12
Indeno(1,2,3-cd)pyrene	µg/g	<0.02	<0.02	<0.02	<0.02	0.18	<0.02	(0.48) 0.38	(0.95) 0.76	0.23
2 and 1-Methylnaphthalene [4]	µg/g	<0.05	<0.05	<0.05	<0.05	0.15	<0.05	(3.4) 0.99	(85) 76	0.59
Naphthalene	µg/g	<0.03	0.03	<0.03	<0.03	0.07	<0.03	(0.75) 0.6	(28) 9.6	0.09
Phenanthrene	µg/g	<0.02	<0.02	<0.02	<0.02	0.06	0.03	(7.8) 6.2	(16) 12	0.69
Pyrene	µg/g	<0.02	<0.02	<0.02	<0.02	0.13	0.03	78	96	1

ANALYTICAL RESULTS FOR POLYCYCLIC AROMATIC HYDROCARBONS IN SOIL

	Location:	BH107-1D	BH107-2B	BH107-3B	BH108-1C	BH108-2A	BH108-3B	2011 MOE TABLE 3	2011 MOE TABLE 3	2011 MOE TABLE 1
	Sample Number:	0.91 - 1.22	2.36 - 2.74	3.96 - 4.27	0.24 - 0.46	1.52 - 2.13	3.20 - 3.44	Residential / Parkland / Institutional	Industrial / Commercial / Community	Residential / Parkland
	Soil Type:	Sand	Sand	Silty Clay	Sandy Silt	Sand	Sandy Silt			
	Sample Date:	10-Jun-2011	10-Jun-2011	10-Jun-2011	10-Jun-2011	10-Jun-2011	10-Jun-2011	STANDARDS[1]	STANDARDS[2]	STANDARDS[3]
Acenaphthene	µg/g	<0.03	<0.03	<0.03	*0.70*	<0.03	<0.03	(58) 7.9	96	0.072
Acenaphthylene	µg/g	<0.02	<0.02	<0.02	*<0.20*	<0.02	<0.02	(0.17) 0.15	(0.17) 0.15	0.093
Anthracene	µg/g	<0.02	<0.02	<0.02	***1.80***	<0.02	<0.02	(0.74) 0.67	(0.74) 0.67	0.16
Benzo(a)anthracene	µg/g	<0.02	<0.02	<0.02	***5.3***	<0.02	<0.02	(0.63) 0.5	0.96	0.36
Benzo(a)pyrene	µg/g	<0.02	<0.02	<0.02	***4.6***	<0.02	<0.02	0.3	0.3	0.3
Benzo(b)fluoranthene	µg/g	<0.02	<0.02	<0.02	***4.2***	<0.02	<0.02	0.78	0.96	0.47
Benzo(g,h,i)perylene	µg/g	<0.02	<0.02	<0.02	*2.8*	<0.02	0.02	(7.8) 6.6	9.6	0.68
Benzo(k)fluoranthene	µg/g	<0.02	<0.02	<0.02	***2.0***	<0.02	<0.02	0.78	0.96	0.48
Chrysene	µg/g	<0.02	<0.02	0.02	*5.3*	<0.02	<0.02	(7.8) 7	9.6	2.8
Dibenzo(a,h)anthracene	µg/g	<0.02	<0.02	<0.02	***0.83***	<0.02	<0.02	0.1	0.1	0.1
Fluoranthene	µg/g	<0.02	<0.02	<0.02	***11***	<0.02	<0.02	0.69	9.6	0.56
Fluorene	µg/g	<0.02	<0.02	<0.02	*0.80*	<0.02	<0.02	(69) 62	(69) 62	0.12
Indeno(1,2,3-cd)pyrene	µg/g	<0.02	<0.02	<0.02	***2.6***	<0.02	<0.02	(0.48) 0.38	(0.95) 0.76	0.23
2 and 1-Methylnaphthalene [4]	µg/g	<0.05	<0.05	<0.05	*0.91*	<0.05	<0.05	(3.4) 0.99	(85) 76	0.59
Naphthalene	µg/g	<0.03	<0.03	<0.03	*0.43*	<0.03	<0.03	(0.75) 0.6	(28) 9.6	0.09
Phenanthrene	µg/g	<0.02	<0.02	<0.02	***8.0***	<0.02	<0.02	(7.8) 6.2	(16) 12	0.69
Pyrene	µg/g	<0.02	<0.02	<0.02	*8.6*	<0.02	<0.02	78	96	1

NOTES:
1. MOE 'Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the *Environmental Protection Act*' (April 2011). Table 3 Standard is for a non-potable groundwater situation for residential/parkland/institutional property use. Values in brackets apply to medium and fine textured soils; non-bracketed values apply to coarse textured soils.
2. MOE 'Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the *Environmental Protection Act*' (April 2011). Table 3 Standard is for a non-potable groundwater situation for industrial/commercial/community property use. Values in brackets apply to medium and fine textured soils; non-bracketed values apply to coarse textured soils.
3. MOE 'Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the *Environmental Protection Act*' (April 2011). Table 1 Standard is for background site condition standards for residential/parkland/institutional/industrial/commercial/community property use.
4. If both methylnaphthalenes are detected, then the sum of the two must not exceed the standard.
5. "mbgs" Metres below ground surface.
6. "µg/g" Micrograms per gram.
7. "<" Below method reporting limit.
8. "--" No applicable standard or not analysed.
9. Values in **bold** indicate exceedance of applicable 2011 MOE Table 3 Standard for residential/parkland use ; values underlined indicate exceedance of applicable 2011 MOE Table 3 Standard for industrial commercial use; values in *italics* indicate exceedamce of applicable 2011 MOE Table 1 Standard for residential/parkland/institutional/industrial.commercial/community property use.
10. Table to be read in conjunction with accompanying report.

Prepared By: JM
Checked By: KB

TABLE IV

ANALYTICAL RESULTS FOR METALS AND INORGANICS IN SOIL

Ojibway Parkway Sewer Reconstruction Project
Ojibway Parkway, Windsor, Ontario

	Location:	BH101-1B	BH101-2B	BH102-1B	BH102-3A	BH103-1D	BH103-2C	2011	2011	2011
	Depth (mbgs):	0.12 - 0.58	2.29 - 2.74	0.61 - 1.01	3.05 - 3.81	0.37 - 0.76	2.35 - 2.71	MOE TABLE 3	MOE TABLE 3	MOE TABLE 1
	Soil Type:	Silty Sand	Silty Sand	Sand	Silty Clay	Sand	Sand	Residential / Parkland / Institutional	Industrial / Commercial / Community	Residential / Parkland
	Sample Date:	10-Jun-2011	10-Jun-2011	10-Jun-2011	10-Jun-2011	10-Jun-2011	10-Jun-2011	STANDARDS[1]	STANDARDS[2]	STANDARDS[3]
PARAMETER	UNITS									
Antimony	µg/g	0.8	<0.8	<0.8	<0.8	<0.8	<0.8	7.5	(50) 40	1.3
Arsenic	µg/g	6	3	4	6	3	3	18	18	18
Barium	µg/g	59	31	25	75	22	15	390	670	220
Beryllium	µg/g	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	(5) 4	(10) 8	2.5
Boron (Total)	µg/g	8	<5	<5	5	<5	<5	120	120	36
Boron[4]	µg/g	0.45	0.25	0.10	0.31	0.11	0.10	1.5	2	NA
Cadmium	µg/g	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	1.9	1.2
Chromium (Total)	µg/g	14	11	10	13	9	6	160	160	70
Chromium (VI)	µg/g	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	(10) 8	(10) 8	0.66
Cobalt	µg/g	5.9	3.2	4.6	7.4	3.4	3.6	22	(100) 80	21
Copper	µg/g	16	12	10	18	10	7	(180) 140	(300) 230	92
Lead	µg/g	27	22	11	9	7	5	120	120	120
Mercury	µg/g	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	(1.8) 0.27	(20) 3.9	0.27
Molybdenum	µg/g	2.0	0.9	0.8	1.0	0.5	<0.5	6.9	40	2
Nickel	µg/g	15	9	9	19	9	7	(130) 100	(340) 270	82
Selenium	µg/g	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	2.4	5.5	1.5
Silver	µg/g	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	(25) 20	(50) 40	0.5
Thallium	µg/g	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	1	3.3	1
Uranium	µg/g	0.8	0.6	0.5	1.0	<0.5	<0.5	23	33	2.5
Vanadium	µg/g	20	14	15	16	12	9	86	86	86
Zinc	µg/g	55	47	35	42	31	22	340	340	290
pH	unitless	8.01	7.48	7.76	7.92	7.77	7.61	--	--	--
Conductivity (EC)	mS/cm	*0.647*	0.301	0.189	*0.608*	0.339	0.310	0.7	1.4	0.57
Sodium Adsorption Ratio	µg/g	***8.39***	*2.57*	1.93	***6.60***	***5.68***	*3,75*	5	12	2.4
cyanide (free)	µg/g	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.051	0.051	0.051

ANALYTICAL RESULTS FOR METALS AND INORGANICS IN SOIL

	Location:	BH104-1D	BH104-3A	BH105-2A	BH105-3B	BH106-1C	BH106-2C	2011	2011	2011
	Depth (mbgs):	0.34 - 0.86	3.05 - 3.29	1.52 - 2.04	3.20-3.66	0.18 - 0.30	2.47 - 2.80	MOE TABLE 3	MOE TABLE 3	MOE TABLE 1
	Soil Type:	Sand	Sandy Silt	Sand	Silty Clay	Sandy Silt	Sand	Residential / Parkland / Institutional	Industrial / Commercial / Community	Residential / Parkland
	Sample Date:	10-Jun-2011	10-Jun-2011	10-Jun-2011	10-Jun-2011	10-Jun-2011	10-Jun-2011	STANDARDS[1]	STANDARDS[2]	STANDARDS[3]
PARAMETER	UNITS									
Antimony	µg/g	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	7.5	(50) 40	1.3
Arsenic	µg/g	3	3	4	7	6	5	18	18	18
Barium	µg/g	16	14	36	118	53	26	390	670	220
Beryllium	µg/g	<0.5	<0.5	<0.5	0.6	<0.5	<0.5	(5) 4	(10) 8	2.5
Boron (Total)	µg/g	<5	<5	<5	6	<5	6	120	120	36
Boron[4]	µg/g	<0.10	0.15	0.17	0.68	0.32	0.14	1.5	2	NA
Cadmium	µg/g	<0.5	<0.5	<0.5	<0.5	0.9	<0.5	1.2	1.9	1.2
Chromium (Total)	µg/g	6	6	10	19	18	12	160	160	70
Chromium (VI)	µg/g	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	(10) 8	(10) 8	0.66
Cobalt	µg/g	2.6	3.4	3.6	10.3	4.1	4.5	22	(100) 80	21
Copper	µg/g	9	10	10	23	30	12	(180) 140	(300) 230	92
Lead	µg/g	6	6	7	12	***133***	7	120	120	120
Mercury	µg/g	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	(1.8) 0.27	(20) 3.9	0.27
Molybdenum	µg/g	<0.5	0.6	<0.5	0.6	1.1	1.6	6.9	40	2
Nickel	µg/g	7	8	10	25	48	12	(130) 100	(340) 270	82
Selenium	µg/g	<0.4	<0.4	<0.4	<0.4	<0.4	0.5	2.4	5.5	1.5
Silver	µg/g	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	(25) 20	(50) 40	0.5
Thallium	µg/g	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	1	3.3	1
Uranium	µg/g	<0.5	<0.5	0.6	0.9	0.6	0.8	23	33	2.5
Vanadium	µg/g	10	10	13	21	18	17	86	86	86
Zinc	µg/g	27	28	32	56	134	36	340	340	290
pH	unitless	7.68	7.92	7.52	8.26	7.62	7.72	--	--	--
Conductivity (EC)	mS/cm	0.241	*0.621*	***0.752***	***1.91***	0.195	0.486	0.7	1.4	0.57
Sodium Adsorption Ratio	µg/g	*4.52*	***7.18***	***5.32***	***14.4***	*3.16*	***7.05***	5	12	2.4
cyanide (free)	µg/g	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.051	0.051	0.051

ANALYTICAL RESULTS FOR METALS AND INORGANICS IN SOIL

Location:	BH107-1D	BH107-2B	BH107-3B	BH108-1C	BH108-2A	BH108-3B	2011	2011	2011
Depth (mbgs):	0.91 - 1.22	2.36 - 2.74	3.96 - 4.27	0.24 - 0.46	1.52 - 2.13	3.20 - 4.44	MOE TABLE 3	MOE TABLE 3	MOE TABLE 1
Soil Type:	Sand	Sand	Silty Clay	Sandy Silt	Sand	Sandy Silt	Residential / Parkland / Institutional	Industrial / Commercial / Community	Residential / Parkland
Sample Date:	10-Jun-2011	10-Jun-2011	10-Jun-2011	10-Jun-2011	10-Jun-2011	10-Jun-2011	STANDARDS[1]	STANDARDS[2]	STANDARDS[3]
PARAMETER	UNITS								
Antimony	µg/g	<0.8	<0.8	<0.8	1.7	<0.8	<0.8	7.5	(50) 40	1.3
Arsenic	µg/g	3	4	7	10	5	6	18	18	18
Barium	µg/g	20	14	77	97	38	46	390	670	220
Beryllium	µg/g	<0.5	<0.5	0.6	0.6	<0.5	<0.5	(5) 4	(10) 8	2.5
Boron (Total)	µg/g	<5	<5	13	7	7	10	120	120	36
Boron[4]	µg/g	<0.10	0.13	0.70	0.42	**1.62**	0.26	1.5	2	NA
Cadmium	µg/g	<0.5	<0.5	<0.5	**2.3**	<0.5	<0.5	1.2	1.9	1.2
Chromium (Total)	µg/g	8	7	18	27	12	13	160	160	70
Chromium (VI)	µg/g	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	(10) 8	(10) 8	0.66
Cobalt	µg/g	2.5	2.6	8.6	5.1	3.4	6.3	22	(100) 80	21
Copper	µg/g	10	8	20	80	11	16	(180) 140	(300) 230	92
Lead	µg/g	6	5	10	***503***	9	9	120	120	120
Mercury	µg/g	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	(1.8) 0.27	(20) 3.9	0.27
Molybdenum	µg/g	0.5	0.8	1.9	2.5	0.9	1.7	6.9	40	2
Nickel	µg/g	7	7	22	23	9	16	(130) 100	(340) 270	82
Selenium	µg/g	<0.4	<0.4	<0.4	0.6	0.5	<0.4	2.4	5.5	1.5
Silver	µg/g	<0.2	<0.2	<0.2	0.2	<0.2	<0.2	(25) 20	(50) 40	0.5
Thallium	µg/g	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	1	3.3	1
Uranium	µg/g	<0.5	0.6	1.2	0.8	0.7	1.0	23	33	2.5
Vanadium	µg/g	13	13	27	22	19	19	86	86	86
Zinc	µg/g	27	25	50	*299*	37	43	340	340	290
pH	unitless	7.79	7.75	7.74	7.84	7.7	7.77	--	--	--
Conductivity (EC)	mS/cm	0.080	0.170	***0.957***	0.272	***0.952***	***0.779***	0.7	1.4	0.57
Sodium Adsorption Ratio	µg/g	0.526	1.69	1.76	***5.30***	***8.13***	*3.74*	5	12	2.4
cyanide (free)	µg/g	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.051	0.051	0.051

NOTES:

1. MOE 'Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the *Environmental Protection Act*' (April 2011). Table 3 Standard is for a non-potable groundwater situation for residential/parkland/institutional property use. Values in brackets apply to medium and fine textured soils; non-bracketed values apply to coarse textured soils.
2. MOE 'Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the *Environmental Protection Act*' (April 2011). Table 3 Standard is for a non-potable groundwater situation for industrial/commercial/community property use. Values in brackets apply to medium and fine textured soils; non-bracketed values apply to coarse textured soils.
3. MOE 'Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the *Environmental Protection Act*' (April 2011). Table 1 Standard is for background site condition standards for residential/parkland/institutional/industrial/commercial/community property use.
4. Boron 2011 soil standard based on hot water extract in surface soils (to 1.5 metres depth) and total boron for subsurface soils.
5. "mbgs" Metres below ground surface.
6. "µg/g" Micrograms per gram.
7. "<" Below method reporting limit.
8. "--" No applicable standard or not analysed; NV = No value derived; NA = Not applicable.
9. Values in **bold** indicate exceedance of applicable 2011 MOE Table 3 Standard for residential/parkland use ; values underlined indicate exceedance of applicable 2011 MOE Table 3 Standard for industrial commercial use; values in *italics* indicate exceedamce of applicable 2011 MOE Table 1 Standard for residential/parkland/institutional/industrial.commercial/community property use.
10. Table to be read in conjunction with accompanying report.

Prepared By: JM
Checked By: KB

TABLE V

ANALYTICAL RESULTS FOR TOXICITY CHARACTERISTIC LEACHING PROCEDURE (TCLP)

Ojibway Parkway Sewer Reconstruction Project
Ojibway Parkway, Windsor, Ontario

	Location:	Fill Comp	Native Comp	
	Depth (mbgs):	0 - 2.29	3.05 - 4.57	O.Reg 558
	Soil Type:	Soil Composite	Soil Composite	EPA Schedule 4
	Sample Date:	10-Jun-2011	10-Jun-2011	Leachate Quality Criteria[1]
PARAMETER	UNITS			
METALS				
Mecury	mg/L	<0.005	<0.005	0.1
Silver	mg/L	<0.010	<0.010	5
Arsenic	mg/L	<0.010	0.011	2.5
Boron	mg/L	<0.050	0.103	500
Barium	mg/L	0.397	1.96	100
Cadmium	mg/L	<0.010	<0.010	0.5
Chromium (Total)	mg/L	<0.010	0.015	5.0
Lead	mg/L	<0.010	0.067	5.0
Selenium	mg/L	<0.010	<0.010	1.0
Uranium	mg/L	<0.050	<0.050	10.0
BTEX				
Benzene	mg/L	<0.020	<0.020	0.5
Toluene	mg/L	<0.020	<0.020	--
Ethylbenzene	mg/L	<0.010	<0.010	--
m & p-Xylene	mg/L	<0.020	<0.020	--
o-Xylene	mg/L	<0.010	<0.010	--

NOTES:
1. Ontario Regulation 558/00 General – Waste Management (Amending Reg. 347 of R.R.O 1990).
2. "mbgs" Metres below ground surface.
3. "mg/L" Milligrams per litre.
4. "<" Below reportable detection limit.
5. "--" No applicable standard.
6. Values in **bold** indicate exceedance of O.Reg 558/00 schedule 4 leachate quality criteria.
7. Table to be read in conjunction with accompanying report.

Prepared By: JM
Checked By: KB

TABLE VI

ANALYTICAL RESULTS FOR PETROLEUM HYDROCARBONS AND BTEX COMPOUNDS IN GROUNDWATER

Ojibway Parkway Sewer Reconstruction Project
Ojibway Parkway, Windsor, Ontario

Location:		MW-101-1[9]	MW-107-1	2011 MOE TABLE 3 All Types of Property Use STANDARDS[1]	2011 MOE TABLE 1 All Types of Property Use STANDARDS[2]
Sample Date:		10-Jun-2011	10-Jun-2011		
PARAMETER	UNITS				
Benzene	µg/L	<0.20	<0.2	(430) 44	0.5
Toluene	µg/L	<0.20	<0.2	18000	0.8
Ethylbenzene	µg/L	<0.10	<0.1	2300	0.5
Total Xylenes[3]	µg/L	<0.20	<0.2	4200	72
PHC F1 (C_6 - C_{10})[4]	µg/L	<25	<25	750	420
PHC F2 (>C_{10} - C_{16})	µg/L	<100	<100	150	150
PHC F3 (>C_{16} - C_{34})	µg/L	<100	<100	500	500
PHC F4 (>C_{34} - C_{50})	µg/L	<100	<100	500	500

NOTES:
1. MOE 'Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the *Environmental Protection Act*' (April 2011). Table 3 Standard is for a non-potable groundwater situation for all types of property use. Values in brackets apply to medium and fine textured soils; non-bracketed values apply to coarse textured soils.
2. MOE 'Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the *Environmental Protection Act*' (April 2011). Table 1 Standard is for background site condition standards for all types of property use.
3. Total xylenes represents the sum of p+m- and o-xylenes.
4. Recorded concentrations for PHC F1 are measured values minus BTEX concentration.
5. "µg/L" Micrograms per litre.
6. "<" Below method reporting limit.
7. "--" No applicable standard or not analysed; NV = No value derived.
8. Values in **bold** indicate exceedance of applicable 2011 MOE Table 3 Standard for all types of property use ; values in italics indicate exceedamce of applicable 2011 MOE Table 1 Standard for all types of property use.
9. BTEX results derived from VOC analysis. Detection limits were lowered.
10. Table to be read in conjunction with accompanying report.

Prepared By: JM
Checked By: KB

TABLE VII

ANALYTICAL RESULTS FOR VOLATILE ORGANIC COMPOUNDS IN GROUNDWATER

Ojibway Parkway Sewer Reconstruction Project
Ojibway Parkway, Windsor, Ontario

	Location:	MW-101-1	2011 MOE TABLE 3 All Types of Property Use STANDARDS[1]	2011 MOE TABLE 1 All Types of Property Use STANDARDS[2]
	Sample Date:	10-Jun-2011		
PARAMETER	UNITS			
Acetone	µg/L	<1.0	130000	2700
Benzene	µg/L	<0.20	(430) 44	0.5
Bromodichloromethane	µg/L	<0.20	85000	2
Bromoform	µg/L	<0.10	(770) 380	5
Bromomethane	µg/L	<0.20	(56) 5.6	0.89
Carbon Tetrachloride	µg/L	<0.20	(8.4) 0.79	0.2
Chlorobenzene	µg/L	<0.10	630	0.5
Chloroethane (ethyl chloride)	µg/L	<0.20	--	--
Chloroform	µg/L	<0.20	(22) 2.4	2
Chloromethane (methyl chloride)	µg/L	<0.40	--	--
Dibromochloromethane	µg/L	<0.10	82000	2
1,2-Dichlorobenzene	µg/L	<0.10	(9600) 4600	0.5
1,3-Dichlorobenzene	µg/L	<0.10	9600	0.5
1,4-Dichlorobenzene	µg/L	<0.10	(67) 8	0.5
Dichlorodifluoromethane	µg/L	2.2	4400	590
1,1-Dichloroethane	µg/L	<0.30	(3100) 320	0.5
1,2-Dichloroethane	µg/L	<0.20	(12) 1.6	0.5
1,1-Dichloroethylene	µg/L	<0.30	(17) 1.6	0.5
cis-1,2-Dichloroethylene	µg/L	<0.20	(17) 1.6	1.6
trans-1,2-Dichloroethylene	µg/L	<0.20	(17) 1.6	1.6
1,2-Dichloropropane	µg/L	<0.20	(140) 16	0.5
cis-1,3-Dichloropropene	µg/L	<0.20	--	--
trans-1,3-Dichloropropene	µg/L	<0.30	--	--
1,3-Dichloropropene (Total)	µg/L	<0.30	(45) 5.2	0.5
Ethylbenzene	µg/L	<0.10	2300	0.5
Ethylene Dibromide	µg/L	<0.20	(0.83) 0.25	0.2
Hexane	µg/L	<0.20	(520) 51	5
2-Hexanone (methyl butyl ketone)	µg/L	<0.30	--	--
Methylene Chloride	µg/L	<0.30	(5500) 610	5
Methyl Isobutyl Ketone	µg/L	<1.0	(580000) 140000	640
Methyl Ethyl Ketone	µg/L	<1.0	(1500000) 470000	400
Methyl tert-butyl Ether	µg/L	<0.20	(1400) 190	15
Styrene	µg/L	<0.10	(9100) 1300	0.5
1,2,4-Trichlorobenzene	µg/L	<0.30	(850) 180	0.5
1,1,1,2-Tetrachloroethane	µg/L	<0.10	(28) 3.3	1.1
1,1,2,2-Tetrachloroethane	µg/L	<0.10	(15) 3.2	0.5
Tetrachloroethylene	µg/L	<0.20	(17) 1.6	0.5
Toluene	µg/L	<0.20	18000	0.8
1,1,1-Trichloroethane	µg/L	<0.30	(6700) 640	0.5
1,1,2-Trichloroethane	µg/L	<0.20	(30) 4.7	0.5
Trichloroethylene	µg/L	<0.20	(17) 1.6	0.5
Vinyl Chloride	µg/L	<0.17	(1.7) 0.5	0.5
p+m-Xylenes	µg/L	<0.20	--	--
o-Xylene	µg/L	<0.10	--	--
Xylenes (Total)[3]	µg/L	<0.20	4200	72
Trichlorofluoromethane	µg/L	<0.40	2500	150

NOTES:
1. MOE 'Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the *Environmental Protection Act*' (April 2011). Table 3 Standard is for a non-potable groundwater situation for all types of property use. Values in brackets apply to medium and fine textured soils; non-bracketed values apply to coarse textured soils.
2. MOE 'Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the *Environmental Protection Act*' (April 2011). Table 1 Standard is for background site condition standards for all types of property use.
3. Total xylenes represents the sum of p+m- and o-xylenes.
4. "µg/L" Micrograms per litre.
5. "<" Below method reporting limit.
6. "--" No applicable standard or not analysed; NV = No value derived.
7. Values in **bold** indicate exceedance of applicable 2011 MOE Table 3 Standard for all types of property use; values in italics indicate exceedance of applicable 2011 MOE Table 1 Standard for all types of property use.
8. Table to be read in conjunction with accompanying report.

Prepared By: JM
Checked By: KB

TABLE VIII

ANALYTICAL RESULTS FOR POLYCYCLIC AROMATIC HYDROCARBONS (PAHs) IN GROUNDWATER

Ojibway Parkway Sewer Reconstruction Project
Ojibway Parkway, Windsor, Ontario

Location:		MW-101-1	MW-107-1	2011 MOE TABLE 3 All Types of Property Use STANDARDS[1]	2011 MOE TABLE 1 All Types of Property Use STANDARDS[2]
Sample Date:		10-Jun-2011	10-Jun-2011		
PARAMETER	UNITS				
Acenaphthene	µg/L	<0.10	<0.10	(1700) 600	4.1
Acenaphthylene	µg/L	<0.11	<0.11	1.8	1
Anthracene	µg/L	<0.05	<0.05	2.4	0.1
Benzo(a)anthracene	µg/L	<0.08	<0.08	4.7	0.2
Benzo(a)pyrene	µg/L	<0.01	<0.01	0.81	0.01
Benzo(b)fluoranthene	µg/L	<0.05	<0.05	0.75	0.1
Benzo(g,h,i)perylene	µg/L	<0.06	<0.06	0.2	0.2
Benzo(k)fluoranthene	µg/L	<0.05	<0.05	0.4	0.1
Chrysene	µg/L	<0.05	<0.05	1.0	0.1
Dibenzo(a,h)anthracene	µg/L	<0.09	<0.09	0.52	0.2
Fluoranthene	µg/L	<0.12	<0.12	130	0.4
Fluorene	µg/L	<0.09	<0.09	400	120
Indeno(1,2,3-cd)pyrene	µg/L	<0.06	<0.06	0.2	0.2
2 and 1-Methylnaphthalene [4]	µg/L	<0.20	<0.20	1800	2
Naphthalene	µg/L	<0.12	<0.12	(6400) 1400	7
Phenanthrene	µg/L	<0.10	<0.10	580	0.1
Pyrene	µg/L	<0.05	<0.05	68	0.2

NOTES:
1. MOE 'Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the *Environmental Protection Act*' (April 2011). Table 3 Standard is for a non-potable groundwater situation for all types of property use. Values in brackets apply to medium and fine textured soils; non-bracketed values apply to coarse textured soils.
2. MOE 'Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the *Environmental Protection Act*' (April 2011). Table 1 Standard is for background site condition standards for all types of property use.
3. "µg/L" Micrograms per litre.
4. If both methylnaphthalenes are detected, then the sum of the two must not exceed the standard.
5. "<" Below method reporting limit.
6. "--" No applicable standard or not analysed; NV = No value derived.
7. Values in **bold** indicate exceedance of applicable 2011 MOE Table 3 Standard for all types of property use; values in italics indicate exceedance of applicable 2011 MOE Table 1 Standard for all types of property use.
8. Table to be read in conjunction with accompanying report.

Prepared By: JM
Checked By: CS

TABLE IX

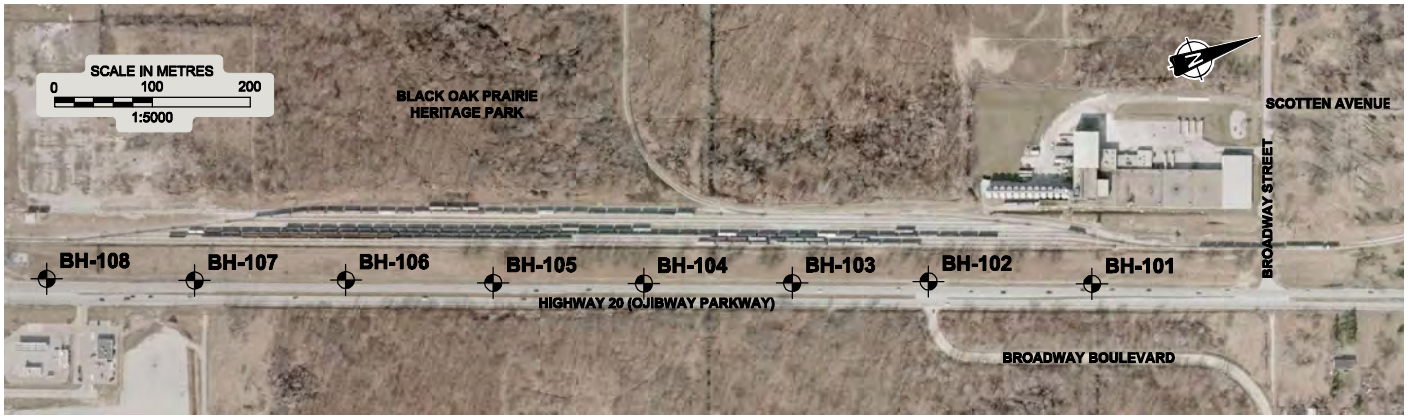
ANALYTICAL RESULTS FOR METALS AND INORGANICS IN GROUNDWATER

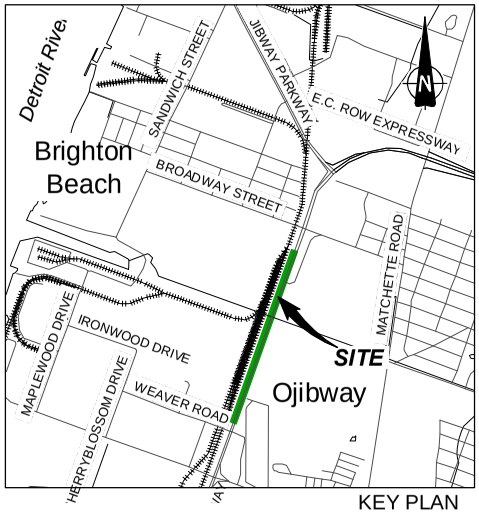
Ojibway Parkway Sewer Reconstruction Project
Ojibway Parkway, Windsor, Ontario

Location:		MW-101-1	MW-107-1	2011 MOE TABLE 3 All Types of Property Use STANDARDS[1]	2011 MOE TABLE 1 All Types of Property Use STANDARDS[2]
Sample Date:		10-Jun-2011	10-Jun-2011		
PARAMETER	UNITS				
Antimony	µg/L	*1.6*	0.6	20000	1.5
Arsenic	µg/L	3.9	5.3	1900	13
Barium	µg/L	139	96.2	29000	610
Beryllium	µg/L	<0.5	<0.5	67	0.5
Boron (Total)	µg/L	87.9	62.8	45000	1700
Cadmium	µg/L	<0.2	<0.2	2.7	0.5
Chromium (Total)	µg/L	6.9	8.6	810	11
Chromium (VI)	µg/L	<5	<5	140	25
Cobalt	µg/L	<0.5	1.2	66	3.8
Copper	µg/L	1.4	1.0	87	5
Lead	µg/L	<0.5	<0.5	25	1.9
Mercury	µg/L	<0.02	<0.02	(2.8) 029	0.1
Molybdenum	µg/L	*24.7*	*31.9*	9200	23
Nickel	µg/L	5.1	7.1	490	14
Selenium	µg/L	2.1	<1.0	63	5
Silver	µg/L	<0.2	<0.2	1.5	0.3
Thallium	µg/L	<0.3	<0.3	510	0.5
Uranium	µg/L	3.7	1.3	420	8.9
Vanadium	µg/L	*8.5*	3.6	250	3.9
Zinc	µg/L	<5.0	7.7	1100	160
Sodium	µg/L	350000	380000	2300000	490000
Chloride	µg/L	603000	677000	2300000	790000
Nitrate as N	µg/L	805	<50	--	--
Nitrite as N	µg/L	<50	<50	--	--
pH	unitless	8.12	8.15	--	--
Conductivity (EC)	mS/cm	2330	2460	NA	NA
cyanide (free)	µg/L	<2	<2	66	5

NOTES:
1. MOE 'Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the *Environmental Protection Act*' (April 2011). Table 3 Standard is for a non-potable groundwater situation for all types of property use. Values in brackets apply to medium and fine textured soils; non-bracketed values apply to coarse textured soi
2. MOE 'Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the *Environmental Protection Act*' (April 2011). Table 1 Standard is for background site condition standards for all types of property use.
3. "µg/L" Micrograms per litre.
4. "<" Below method reporting limit.
5. "--" No applicable standard or not analysed; NV = No value derived; NA = Not applicable.
6. Values in **bold** indicate exceedance of applicable 2011 MOE Table 3 Standard for all types of property use; values in italics indicate exceedance of applicable 2011 MOE Table 1 Standard for all types of property use.
7. Table to be read in conjunction with accompanying report.

Prepared By: JM
Checked By: KB





LEGEND

BOREHOLE

REFERENCE

DRAWING BASED ON 2008 AERIAL PHOTOGRAPHS PROVIDED BY THE COUNTY OF ESSEX (the digital map layers have been used with the express permission of The Corporation of the County of Essex); CANMAP STREETFILES V2008.4

NOTES

THIS DRAWING IS SCHEMATIC ONLY AND IS TO BE READ IN CONJUNCTION WITH ACCOMPANYING TEXT. ALL LOCATIONS ARE APPROXIMATE.

PROJECT

ENVIRONMENTAL SAMPLING AND ANALYSIS
OJIBWAY PARKWAY SEWER RECONSTRUCTION PROJECT
BETWEEN BROADWAY STREET AND WEAVER ROAD
WINDSOR, ONTARIO

TITLE

LOCATION PLAN

Golder Associates
WINDSOR, ONTARIO

PROJECT No. 10-1134-0170			FILE No. 1011340170-R01001
			SCALE AS SHOWN REV.
CADD	SJL	JUNE 30/11	FIGURE 1
CHECK			

Drawing file: 1011340170-R01001.dwg Jul 05, 2011 - 12:42pm

APPENDIX A

Borehole Logs

PROJECT: 10-1134-0170

RECORD OF BOREHOLE 101

SHEET 1 OF 1

LOCATION: SEE LOCATION PLAN

BORING DATE: June 10, 2011

DATUM: GEODETIC

CONTINUOUS SAMPLING EQUIPMENT

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: RUN No.	NUMBER	TYPE	ELEVATION	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ (ND = Not Detected; 100 200 300 400) / HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [%LEL] □ (ND = Not Detected; 20 40 60 80)	ADDITIONAL LAB. TESTING	INSTALLATION AND GROUNDWATER OBSERVATIONS
0	GEOPROBE DT SAMPLING SYSTEM	GROUND SURFACE		179.02							
		Brownish grey sand and gravel **(FILL)**		0.00		1A	SC	179	ND		
		Brown silty sand, trace gravel and clay **(FILL)**		0.13		1B	SC		ND		
				178.44		1C	SC		ND		
		Brown clayey silt, trace topsoil **(FILL)**		0.63	1	1D	SC		ND		
1		Brown sand and gravel, trace red brick **(FILL)**		177.83				178			
				1.19							WL Water level in borehole at about elevation 177.7m upon completion of drilling on June 10, 2011.
2		Brown clayey silt and sand, trace gravel **(FILL)**		176.73	2	2A	SC	177	ND		
		Brown silty sand, trace clay and gravel **(FILL)**		2.29		2B	SC		ND		
				176.12							
3		Grey crushed gravel, trace sand **(FILL)**		2.90		3A	SC	176	ND		
				175.77							
		Brown sand and gravel **(FILL)**		3.25	3	3B	SC		ND		
				175.11		3C	SC		ND		
4		END OF BOREHOLE		3.91				175			
5											
6											
7											
8											
9											

DEPTH SCALE

1 : 50

LOGGED: CS

CHECKED:

Golder Associates

LDN_ENV_03 1011340170.GPJ GLDR_LON.GDT 07/07/11 DATA INPUT: SJL

PROJECT: 10-1134-0170

RECORD OF BOREHOLE 102

SHEET 1 OF 1

LOCATION: SEE LOCATION PLAN

BORING DATE: June 10, 2011

DATUM: GEODETIC

CONTINUOUS SAMPLING EQUIPMENT

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: RUN No.	NUMBER	TYPE	ELEVATION	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] *ND = Not Detected* / HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [%LEL] *ND = Not Detected*	ADDITIONAL LAB. TESTING	INSTALLATION AND GROUNDWATER OBSERVATIONS
0	GEOPROBE DT SAMPLING SYSTEM	GROUND SURFACE		178.80				179			
		Brownish grey sand and gravel **(FILL)**		0.00		1A	SC				
		Brown sand, trace gravel **(FILL)**		0.15	1	1B	SC		*ND*		
1				177.53				178			
		Brown sandy silt, trace clay and gravel **(FILL)**		1.27		2A	SC		*ND*		
				177.10							
		Brown sand, trace gravel and silt **(FILL)**		1.70		2B	SC	177	*ND*		Water level in borehole at about elevation 177.3m upon completion of drilling on June 10, 2011.
2				176.77							
		Grey silty clay, trace sand and gravel **(FILL)**		2.03		2C	SC		*ND*		
				2.16	2	2D	SC		*ND*		
		Brown sand, trace gravel **(FILL)**		2.31		2E	SC		*ND*		
		Grey **SILTY CLAY**, trace sand		176.03				176			
3				2.77		3A	SC		*ND*		
		Grey **SILTY CLAY**			3			175			
4						3B	SC		*ND*		
				174.23							
		END OF BOREHOLE		4.57				174			
5											
6											
7											
8											
9											

HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [%LEL] *ND = Not Detected*: 20 40 60 80

WL

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: CS

CHECKED:

LDN_ENV_03 1011340170.GPJ GLDR_LON.GDT 07/07/11 DATA INPUT: SJL

PROJECT: 10-1134-0170

RECORD OF BOREHOLE 103

SHEET 1 OF 1

LOCATION: SEE LOCATION PLAN

BORING DATE: June 10, 2011

DATUM: GEODETIC

CONTINUOUS SAMPLING EQUIPMENT

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: RUN No.	NUMBER	TYPE	ELEVATION	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ND = Not Detected (100 200 300 400)	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [%LEL] ND = Not Detected (20 40 60 80)	ADDITIONAL LAB. TESTING	INSTALLATION AND GROUNDWATER OBSERVATIONS
0	GEOPROBE, DT SAMPLING SYSTEM	GROUND SURFACE		178.70								
		Brown topsoil with rootlets **(FILL)**		0.05		1A	SC		ND			
		Brownish grey sand and gravel **(FILL)**		0.15		1B	SC		ND			
		Brown sand, trace clay **(FILL)**		178.34		1C	SC		ND			
				0.36		1D	SC					
		Brown sand **(FILL)**			1			178				
1				177.53								
				1.17								
		Brown sand, trace silt **(FILL)**				2A	SC	177	ND			WL
2				176.59								Water level in borehole at about elevation 177.0m upon completion of drilling on June 10, 2011.
		Brown clayey silt, some sand, trace gravel **(FILL)**		2.11 / 176.36	2	2B	SC		ND			
				2.34		2C	SC		ND			
		Brown sand **(FILL)**		175.98				176				
		Grey **SILTY CLAY**, some sand		2.72 / 175.75		2D	SC		ND			
3				2.95								
						3A	SC		ND			
		Grey **SILTY CLAY**			3			175				
4						3B	SC		ND			
				174.13								
		END OF BOREHOLE		4.57				174				
5												
6												
7												
8												
9												

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: CS

CHECKED:

LDN_ENV_03 1011340170.GPJ GLDR_LON.GDT 07/07/11 DATA INPUT: SJL

PROJECT: 10-1134-0170

RECORD OF BOREHOLE 104

SHEET 1 OF 1

LOCATION: SEE LOCATION PLAN

BORING DATE: June 10, 2011

DATUM: GEODETIC

CONTINUOUS SAMPLING EQUIPMENT

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: RUN No.	NUMBER	TYPE	ELEVATION	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ND = Not Detected (100, 200, 300, 400) ⊕ / HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [%LEL] ND = Not Detected (20, 40, 60, 80) □	ADDITIONAL LAB. TESTING	INSTALLATION AND GROUNDWATER OBSERVATIONS
0	GEOPROBE DT SAMPLING SYSTEM	GROUND SURFACE		178.70							
		Brown topsoil with roots and rootlets (FILL)		0.05	1	1A	SC		ND		
				0.15		1B	SC		ND		
		Browish grey sand and gravel (FILL)		178.37		1C	SC		ND		
		Brown sandy silt, trace gravel (FILL)		0.33		1D	SC		ND		
1		Brown sand (FILL)						178			
				177.51							
		Brown sand, trace clay (FILL)		1.19		2A	SC		ND		
				176.97				177			
2		Brown sand (FILL)		1.73	2	2B	SC		ND		
				176.57							
		Brown sand and gravel (FILL)		2.13		2C	SC				
				175.98				176			
3		Grey SANDY SILT		2.72		3A	SC		ND		
				175.40							
		Grey SILTY CLAY		3.30	3	3B	SC	175	ND		
4											
				174.13							
		END OF BOREHOLE		4.57				174			
5											
6											
7											
8											
9											

WL

Water level in borehole at about elevation 177.2m upon completion of drilling on June 10, 2011.

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: CS

CHECKED:

LDN_ENV_03 1011340170.GPJ GLDR_LON.GDT 07/07/11 DATA INPUT: SJL

PROJECT: 10-1134-0170

RECORD OF BOREHOLE 105

SHEET 1 OF 1

LOCATION: SEE LOCATION PLAN

BORING DATE: June 10, 2011

DATUM: GEODETIC

CONTINUOUS SAMPLING EQUIPMENT

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: RUN No.	NUMBER	TYPE	ELEVATION	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ND = Not Detected (100, 200, 300, 400) ⊕ / HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [%LEL] ND = Not Detected (20, 40, 60, 80) □	ADDITIONAL LAB. TESTING	INSTALLATION AND GROUNDWATER OBSERVATIONS
0	GEOPROBE DT SAMPLING SYSTEM	GROUND SURFACE		178.98				179			
		Brown topsoil with roots and rootlets (FILL)		0.05		1A	SC		ND		
						1B	SC		ND		
		Brownish grey sand and gravel (FILL)		0.15		1C	SC		ND		
		Brown sandy silt, trace gravel (FILL)		0.28							
		Brown sand (FILL)				1D	SC		ND		
				178.19	1						
		Brown organic topsoil (FILL)				1E	SC		ND		
						1F	SC		ND		
1		Brown clayey silt, trace sand (FILL)		0.91		1G	SC	178	ND		
						2A	SC		ND		WL
2		Brown sand (FILL)						177			Water level in borehole at about elevation 177.3m upon completion of drilling on June 10, 2011.
					2	2B	SC		ND		
						2C	SC		ND		
						2D	SC		ND		
				176.11							
3		Grey SANDY SILT		2.87				176			
				175.78		3A	SC		ND		
				3.20							
		Grey SILTY CLAY			3	3B	SC		ND		
4								175			
				174.41							
		END OF BOREHOLE		4.57							
5								174			
6											
7											
8											
9											

DEPTH SCALE

1 : 50

LOGGED: CS

CHECKED:

Golder Associates

LDN_ENV_03 1011340170.GPJ GLDR_LON.GDT 07/07/11 DATA INPUT: SJL

PROJECT: 10-1134-0170

RECORD OF BOREHOLE 106

SHEET 1 OF 1

LOCATION: SEE LOCATION PLAN

BORING DATE: June 10, 2011

DATUM: GEODETIC

CONTINUOUS SAMPLING EQUIPMENT

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: RUN No.	NUMBER	TYPE	ELEVATION	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ND = Not Detected (100, 200, 300, 400) ⊕ / HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [%LEL] ND = Not Detected (20, 40, 60, 80) □	ADDITIONAL LAB. TESTING	INSTALLATION AND GROUNDWATER OBSERVATIONS
0	GEOPROBE DT SAMPLING SYSTEM	GROUND SURFACE		179.00				179			
		Brown topsoil with roots and rootlets **(FILL)**		0.05		1A	SC		ND		
		Brownish grey sand and gravel **(FILL)**		0.18		1B	SC		ND		
		Brown sand and silt, trace gravel and black coal pieces **(FILL)**		0.30		1C	SC		ND		
		Brown sand **(FILL)**		178.34		1D	SC		ND		
		Brown clayey silt, trace sand **(FILL)**		0.66	1	1E	SC		ND		
1				177.83				178			
		Brown sand, trace silt and gravel **(FILL)**		1.17							
				177.22		2A	SC		ND		
2		Brownish grey sand, trace gravel and clay **(FILL)**		1.78	2	2B	SC	177	ND		WL Water level in borehole at about elevation 177.3m upon completion of drilling on June 10, 2011.
				176.54							
		Brown sand **(FILL)**		2.46		2C	SC		ND		
3				175.85		3A	SC	176			
		Grey **SANDY SILT**		3.15		3B	SC		ND		
				3.25	3						
4		Grey **SILTY CLAY**				3C	SC	175			
				174.43							
		END OF BOREHOLE		4.57							
5								174			
6											
7											
8											
9											

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: CS

CHECKED:

LDN_ENV_03 1011340170.GPJ GLDR_LON.GDT 07/07/11 DATA INPUT: SJL

PROJECT: 10-1134-0170

RECORD OF BOREHOLE 107

SHEET 1 OF 1

LOCATION: SEE LOCATION PLAN

BORING DATE: June 10, 2011

DATUM: GEODETIC

CONTINUOUS SAMPLING EQUIPMENT

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: RUN No.	NUMBER	TYPE	ELEVATION	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ND = Not Detected (100, 200, 300, 400)	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [%LEL] ND = Not Detected (20, 40, 60, 80)	ADDITIONAL LAB. TESTING	INSTALLATION AND GROUNDWATER OBSERVATIONS
0	GEOPROBE, DT SAMPLING SYSTEM	GROUND SURFACE		179.06								
		Brown topsoil with rootlets **(FILL)**		0.05		1A	SC	179	ND			
		Brownish grey sand and gravel **(FILL)**		0.20		1B	SC		ND			
		Brown sandy silt, trace gravel **(FILL)**		178.65		1C	SC		ND			
				0.41	1	1D	SC		ND			
1								178				
												WL Water level in borehole at about elevation 177.9m upon completion of drilling on June 10, 2011.
2		Brown sand, trace gravel **(FILL)**			2	2A	SC	177	ND			
						2B	SC		ND			
3								176				
				175.53		3A	SC		ND			
				3.53	3	3B	SC		ND			
4		Grey **SILTY CLAY**						175				
				174.49								
		END OF BOREHOLE		4.57								
5								174				
6												
7												
8												
9												

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: CS

CHECKED:

LDN_ENV_03 1011340170.GPJ GLDR_LON.GDT 07/07/11 DATA INPUT: SJL

PROJECT: 10-1134-0170

RECORD OF BOREHOLE 108

SHEET 1 OF 1

LOCATION: SEE LOCATION PLAN

BORING DATE: June 10, 2011

DATUM: GEODETIC

CONTINUOUS SAMPLING EQUIPMENT

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: RUN No.	NUMBER	TYPE	ELEVATION	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ND = Not Detected (100, 200, 300, 400) ⊕	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [%LEL] ND = Not Detected (20, 40, 60, 80) □	ADDITIONAL LAB. TESTING	INSTALLATION AND GROUNDWATER OBSERVATIONS
0	GEOPROBE DT SAMPLING SYSTEM	GROUND SURFACE		178.80				179				
		Brown topsoil and rootlets **(FILL)**		0.05	1	1A	SC		ND			
		Brownish grey sand and gravel **(FILL)**		178.55		1B	SC		ND			
		Brown sandy silt, trace gravel, some black coal pieces **(FILL)**		0.25 / 178.34		1C	SC					
				0.46		1D	SC		ND			
1						1E	SC	178	ND			
2		Brown to brownish grey sand, trace gravel **(FILL)**			2	2A	SC	177	ND			WL Water level in borehole at about elevation 177.4m upon completion of drilling on June 10, 2011.
						3C	SC		ND			
						2B	SC		ND			
3				175.60		3A	SC	176	ND			
		Grey **SANDY SILT**		3.20 / 175.35		3B	SC		ND			
				3.45	3			175				
4		Grey **SILTY CLAY**										
				174.23								
		END OF BOREHOLE		4.57				174				
5												
6												
7												
8												
9												

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: CS

CHECKED:

LDN_ENV_03 1011340170.GPJ GLDR_LON.GDT 07/07/11 DATA INPUT: SJL

APPENDIX B

Certificates of Analysis

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: GOLDER ASSOCIATES LTD.
1825 PROVINCIAL ROAD
WINDSOR, ON N8W5V7

ATTENTION TO: Radwan Tamr

PROJECT NO: 10-1134-0170

AGAT WORK ORDER: 11T501001

SOIL ANALYSIS REVIEWED BY: Anthony Dapaah, PhD (Chem), Inorganic Lab Manager

TRACE ORGANICS REVIEWED BY: Jacky Takeuchi, BScH (Chem Eng), BSc (Bio), C.Chem, Laboratory Manager

WATER ANALYSIS REVIEWED BY: Anthony Dapaah, PhD (Chem), Inorganic Lab Manager

DATE REPORTED: Jun 20, 2011

PAGES (INCLUDING COVER): 35

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712 5100, or at 1-800-856-6261

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 11T501001

PROJECT NO: 10-1134-0170

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Radwan Tamr

O. Reg. 153 Metals & Inorganics in Soil

DATE SAMPLED: Jun 10, 2011 | **DATE RECEIVED: Jun 11, 2011** | **DATE REPORTED: Jun 20, 2011** | **SAMPLE TYPE: Soil**

Parameter	Unit	G / S	RDL	BH101-1B 2468937	BH101-2B 2468938	BH102-1B 2468944	BH102-3A 2468947	BH103-1D 2468950	BH103-2C 2468953	BH104-1D 2468960	BH104-3A 2468970
Antimony	µg/g	13	0.8	0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Arsenic	µg/g	20	1	6	3	4	6	3	3	3	3
Barium	µg/g	750	2	59	31	25	75	22	15	16	14
Beryllium	µg/g	1.2	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Boron	µg/g		5	8	<5	<5	5	<5	<5	<5	<5
Boron (Hot Water Extractable)	µg/g	1.5	0.10	0.45	0.25	0.10	0.31	0.11	0.10	<0.10	0.15
Cadmium	µg/g	12	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	µg/g	750	2	14	11	10	13	9	6	6	6
Cobalt	µg/g	40	0.5	5.9	3.2	4.6	7.4	3.4	3.6	2.6	3.4
Copper	µg/g	225	1	16	12	10	18	10	7	9	10
Lead	µg/g	200	1	27	22	11	9	7	5	6	6
Molybdenum	µg/g	40	0.5	2.0	0.9	0.8	1.0	0.5	<0.5	<0.5	0.6
Nickel	µg/g	150	1	15	9	9	19	9	7	7	8
Selenium	µg/g	10	0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Silver	µg/g	20	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Thallium	µg/g	4.1	0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Uranium	ug/g		0.5	0.8	0.6	0.5	1.0	<0.5	<0.5	<0.5	<0.5
Vanadium	µg/g	200	1	20	14	15	16	12	9	10	10
Zinc	µg/g	600	5	55	47	35	42	31	22	27	28
Chromium, Hexavalent	µg/g	8	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Cyanide, Free	µg/g	100	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Mercury	µg/g	10	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Electrical Conductivity (2:1)	mS/cm	0.7	0.002	0.647	0.301	0.189	0.608	0.339	0.310	0.241	0.621
Sodium Adsorption Ratio (2:1)	N/A	5	N/A	**8.39**	2.57	1.93	**6.60**	**5.68**	3.75	4.52	**7.18**
pH, 2:1 CaCl2 Extraction	pH Units			8.01	7.48	7.76	7.92	7.77	7.61	7.68	7.92

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Certificate of Analysis

AGAT WORK ORDER: 11T501001

PROJECT NO: 10-1134-0170

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Radwan Tamr

O. Reg. 153 Metals & Inorganics in Soil

DATE SAMPLED: Jun 10, 2011 | **DATE RECEIVED: Jun 11, 2011** | **DATE REPORTED: Jun 20, 2011** | **SAMPLE TYPE: Soil**

Parameter	Unit	G / S	RDL	BH105-2A 2468977	BH105-3B 2468985	BH106-1C 2468989	BH106-2C 2468994	BH107-1D 2468997	BH107-2B 2469002	BH107-3B 2469005	BH108-1C 2469008
Antimony	µg/g	13	0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	1.7
Arsenic	µg/g	20	1	4	7	6	5	3	4	7	10
Barium	µg/g	750	2	36	118	53	26	20	14	77	97
Beryllium	µg/g	1.2	0.5	<0.5	0.6	<0.5	<0.5	<0.5	<0.5	0.6	0.6
Boron	µg/g		5	<5	6	<5	6	<5	<5	13	7
Boron (Hot Water Extractable)	µg/g	1.5	0.10	0.17	0.68	0.32	0.14	<0.10	0.13	0.70	0.42
Cadmium	µg/g	12	0.5	<0.5	<0.5	0.9	<0.5	<0.5	<0.5	<0.5	2.3
Chromium	µg/g	750	2	10	19	18	12	8	7	18	27
Cobalt	µg/g	40	0.5	3.6	10.3	4.1	4.5	2.5	2.6	8.6	5.1
Copper	µg/g	225	1	10	23	30	12	10	8	20	80
Lead	µg/g	200	1	7	12	133	7	6	5	10	**503**
Molybdenum	µg/g	40	0.5	<0.5	0.6	1.1	1.6	0.5	0.8	1.9	2.5
Nickel	µg/g	150	1	10	25	48	12	7	7	22	23
Selenium	µg/g	10	0.4	<0.4	<0.4	<0.4	0.5	<0.4	<0.4	<0.4	0.6
Silver	µg/g	20	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2
Thallium	µg/g	4.1	0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Uranium	ug/g		0.5	0.6	0.9	0.6	0.8	<0.5	0.6	1.2	0.8
Vanadium	µg/g	200	1	13	21	18	17	13	13	27	22
Zinc	µg/g	600	5	32	56	134	36	27	25	50	299
Chromium, Hexavalent	µg/g	8	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Cyanide, Free	µg/g	100	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Mercury	µg/g	10	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Electrical Conductivity (2:1)	mS/cm	0.7	0.002	**0.752**	**1.91**	0.195	0.486	0.080	0.170	**0.957**	0.272
Sodium Adsorption Ratio (2:1)	N/A	5	N/A	**5.32**	**14.4**	3.16	**7.05**	0.526	1.69	1.76	**5.30**
pH, 2:1 CaCl2 Extraction	pH Units			7.52	8.26	7.62	7.72	7.79	7.75	7.74	7.84

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AGAT WORK ORDER: 11T501001

PROJECT NO: 10-1134-0170

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Radwan Tamr

O. Reg. 153 Metals & Inorganics in Soil

DATE SAMPLED: Jun 10, 2011 | **DATE RECEIVED: Jun 11, 2011** | **DATE REPORTED: Jun 20, 2011** | **SAMPLE TYPE: Soil**

Parameter	Unit	G / S	RDL	BH108-2A 2469011	BH108-3B 2469017
Antimony	µg/g	13	0.8	<0.8	<0.8
Arsenic	µg/g	20	1	5	6
Barium	µg/g	750	2	38	46
Beryllium	µg/g	1.2	0.5	<0.5	<0.5
Boron	µg/g		5	7	10
Boron (Hot Water Extractable)	µg/g	1.5	0.10	**1.62**	0.26
Cadmium	µg/g	12	0.5	<0.5	<0.5
Chromium	µg/g	750	2	12	13
Cobalt	µg/g	40	0.5	3.4	6.3
Copper	µg/g	225	1	11	16
Lead	µg/g	200	1	9	9
Molybdenum	µg/g	40	0.5	0.9	1.7
Nickel	µg/g	150	1	9	16
Selenium	µg/g	10	0.4	0.5	<0.4
Silver	µg/g	20	0.2	<0.2	<0.2
Thallium	µg/g	4.1	0.4	<0.4	<0.4
Uranium	ug/g		0.5	0.7	1.0
Vanadium	µg/g	200	1	19	19
Zinc	µg/g	600	5	37	43
Chromium, Hexavalent	µg/g	8	0.2	<0.2	<0.2
Cyanide, Free	µg/g	100	0.05	<0.05	<0.05
Mercury	µg/g	10	0.01	<0.01	<0.01
Electrical Conductivity (2:1)	mS/cm	0.7	0.002	**0.952**	**0.779**
Sodium Adsorption Ratio (2:1)	N/A	5	N/A	**8.13**	3.74
pH, 2:1 CaCl2 Extraction	pH Units			7.66	7.77

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to T3(RPI)

2468937-2469017 EC & SAR were determined on the DI water extract obtained from the 2:1 leaching procedure (2 parts DI water:1 part soil). pH was determined on the 0.01M CaCl2 extract prepared at 2:1 ratio.

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AGAT WORK ORDER: 11T501001

PROJECT NO: 10-1134-0170

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Radwan Tamr

O. Reg. 558 Metals

DATE SAMPLED: Jun 10, 2011 | **DATE RECEIVED: Jun 11, 2011** | **DATE REPORTED: Jun 20, 2011** | **SAMPLE TYPE: Soil**

Parameter	Unit	G / S	RDL	Fill Comp 2469041	Native Comp 2469042
Arsenic Leachate	mg/L	2.5	0.010	<0.010	0.011
Barium Leachate	mg/L	100	0.100	0.397	1.96
Boron Leachate	mg/L	500	0.050	<0.050	0.103
Cadmium Leachate	mg/L	0.5	0.010	<0.010	<0.010
Chromium Leachate	mg/L	5.0	0.010	<0.010	0.015
Lead Leachate	mg/L	5.0	0.010	<0.010	0.067
Mercury Leachate	mg/L	0.1	0.005	<0.005	<0.005
Selenium Leachate	mg/L	1.0	0.010	<0.010	<0.010
Silver Leachate	mg/L	5.0	0.010	<0.010	<0.010
Uranium Leachate	mg/L	10.0	0.050	<0.050	<0.050

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Regulation 558

Certified By:

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AGAT WORK ORDER: 11T501001

PROJECT NO: 10-1134-0170

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Radwan Tamr

O. Reg 153 - Volatile Organic Compounds in Soil

DATE SAMPLED: Jun 10, 2011 | **DATE RECEIVED: Jun 11, 2011** | **DATE REPORTED: Jun 20, 2011** | **SAMPLE TYPE: Soil**

Parameter	Unit	G / S	RDL	BH101-2B 2468938	BH103-1D 2468950	BH105-3B 2468985	BH107-1D 2468997
Dichlorodifluoromethane	µg/g		0.005	<0.005	<0.005	<0.005	<0.005
Chloromethane	µg/g		0.002	<0.002	<0.002	<0.002	<0.002
Vinyl Chloride	µg/g	0.003	0.002	<0.002	<0.002	<0.002	<0.002
Bromomethane	µg/g	0.061	0.002	<0.002	<0.002	<0.002	<0.002
Chloroethane	µg/g		0.005	<0.005	<0.005	<0.005	<0.005
Trichlorofluoromethane	µg/g		0.004	<0.004	<0.004	<0.004	<0.004
Acetone	µg/g	3.8	0.130	<0.130	<0.130	<0.130	<0.130
1,1-Dichloroethylene	µg/g	0.0024	0.002	<0.002	<0.002	<0.002	<0.002
Methylene Chloride	µg/g	120	0.003	<0.003	<0.003	<0.003	<0.003
TRANS-1,2-Dichloroethylene	µg/g	4.1	0.003	<0.003	<0.003	<0.003	<0.003
Methyl tert-butyl Ether	µg/g	100	0.004	<0.004	<0.004	<0.004	<0.004
1,1-Dichloroethane	µg/g	22	0.002	<0.002	<0.002	<0.002	<0.002
Methyl Ethyl Ketone	µg/g	38	0.10	<0.10	<0.10	<0.10	<0.10
CIS 1,2-Dichloroethylene	µg/g	2.3	0.002	<0.002	<0.002	<0.002	<0.002
Chloroform	µg/g	0.79	0.002	<0.002	<0.002	<0.002	<0.002
1,2- Dichloroethane	µg/g	0.022	0.002	<0.002	<0.002	<0.002	<0.002
1,1,1-Trichloroethane	µg/g	26	0.002	<0.002	<0.002	<0.002	<0.002
Carbon Tetrachloride	µg/g	0.1	0.002	<0.002	<0.002	<0.002	<0.002
Benzene	µg/g	5.3	0.002	<0.002	<0.002	<0.002	<0.002
1,2-Dichloropropane	µg/g	0.019	0.002	<0.002	<0.002	<0.002	<0.002
Trichloroethylene	µg/g	1.1	0.004	<0.004	<0.004	<0.004	<0.004
Bromodichloromethane	µg/g	14	0.003	<0.003	<0.003	<0.003	<0.003
CIS-1,3-Dichloropropene	µg/g		0.002	<0.002	<0.002	<0.002	<0.002
Methyl Isobutyl Ketone	µg/g	58	0.10	<0.10	<0.10	<0.10	<0.10
TRANS-1,3-Dichloropropene	µg/g		0.003	<0.003	<0.003	<0.003	<0.003
1,1,2-Trichloroethane	µg/g	2.3	0.002	<0.002	<0.002	<0.002	<0.002
Toluene	µg/g	34	0.002	<0.002	<0.002	<0.002	<0.002
2-Hexanone	µg/g		0.470	<0.470	<0.470	<0.470	<0.470
Dibromochloromethane	µg/g	10	0.003	<0.003	<0.003	<0.003	<0.003
Ethylene Dibromide	µg/g	0.0056	0.002	<0.002	<0.002	<0.002	<0.002
Tetrachloroethylene	µg/g	0.45	0.002	<0.002	<0.002	<0.002	<0.002
1,1,1,2-Tetrachloroethane	µg/g	0.019	0.002	<0.002	<0.002	<0.002	<0.002
Chlorobenzene	µg/g	8	0.002	<0.002	<0.002	<0.002	<0.002

Certified By: Jordy Takewaki

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Certificate of Analysis

AGAT WORK ORDER: 11T501001

PROJECT NO: 10-1134-0170

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Radwan Tamr

O. Reg 153 - Volatile Organic Compounds in Soil

DATE SAMPLED: Jun 10, 2011 | **DATE RECEIVED: Jun 11, 2011** | **DATE REPORTED: Jun 20, 2011** | **SAMPLE TYPE: Soil**

Parameter	Unit	G / S	RDL	BH101-2B 2468938	BH103-1D 2468950	BH105-3B 2468985	BH107-1D 2468997
Ethylbenzene	µg/g	290	0.002	<0.002	<0.002	<0.002	<0.002
m & p-Xylene	µg/g		0.002	<0.002	<0.002	<0.002	<0.002
Bromoform	µg/g	2.3	0.002	<0.002	<0.002	<0.002	<0.002
Styrene	µg/g	1.2	0.002	<0.002	<0.002	<0.002	<0.002
1,1,2,2- Tetrachloroethane	µg/g	0.037	0.004	<0.004	<0.004	<0.004	<0.004
o-Xylene	µg/g		0.002	<0.002	<0.002	<0.002	<0.002
1,3-Dichlorobenzene	µg/g	30	0.002	<0.002	<0.002	<0.002	<0.002
1,4-Dichlorobenzene	µg/g	30	0.002	<0.002	<0.002	<0.002	<0.002
1,2-Dichlorobenzene	µg/g	30	0.002	<0.002	<0.002	<0.002	<0.002
1,2,4-Trichlorobenzene	µg/g	30	0.007	<0.007	<0.007	<0.007	<0.007
Xylene Mixture (Total)	µg/g	34	0.002	<0.002	<0.002	<0.002	<0.002
1,3-Dichloropropene (Cis + Trans)	µg/g	0.0066	0.002	<0.002	<0.002	<0.002	<0.002
n-Hexane	µg/g		0.005	<0.005	<0.005	<0.005	<0.005
Surrogate	**Unit**	**Acceptable Limits**					
Toluene-d8	% Recovery	60-130		102	102	104	104
4-Bromofluorobenzene	% Recovery	70-130		86	86	85	89

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to T3(RPI)

2468938-2468997 Results are based on the dry weight of the soil.

Certified By: Jordy Takewaki

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AGAT WORK ORDER: 11T501001

PROJECT NO: 10-1134-0170

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Radwan Tamr

O. Reg 153 Petroleum Hydrocarbon F1 - F4 in Water (With PAHs)

DATE SAMPLED: Jun 10, 2011 | **DATE RECEIVED: Jun 11, 2011** | **DATE REPORTED: Jun 20, 2011** | **SAMPLE TYPE: Water**

Parameter	Unit	G / S	RDL	MW107-1 2469022
Benzene	µg/L	1900	0.2	<0.2
Toluene	µg/L	5900	0.2	<0.2
Ethylbenzene	µg/L	28000	0.1	<0.1
Xylene Mixture (Total)	µg/L	5600	0.2	<0.2
C6 - C10 (F1)	µg/L		25	<25
C6 - C10 (F1 minus BTEX)	µg/L		25	<25
C>10 - C16 (F2)	µg/L		100	<100
C>10 - C16 (F2 minus Naphthalene)	µg/L		100	<100
C6 - C16 (F1 + F2)	µg/L		100	<100
C>16 - C34 (F3)	µg/L		100	<100
C>16 - C34 (F3 minus PAHs)	µg/L		100	<100
C>34 - C50 (F4)	µg/L		100	<100
C>16 - C50 (F3 + F4)	µg/L		100	<100
Gravimetric Heavy Hydrocarbons	µg/L		500	NA

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to T3(NPGW)

2469022

The C6-C10 fraction is calculated using Toluene response factor.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and nC34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16 - C50 and are only determined if the chromatogram of the C34 - C50 Hydrocarbons indicated that hydrocarbons >C50 are present.
Total C6-C50 results are corrected for BTEX and PAH contributions.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.

Certified By: Jordy Takewaki

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AGAT WORK ORDER: 11T501001

PROJECT NO: 10-1134-0170

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Radwan Tamr

O. Reg 153 Petroleum Hydrocarbon F1 - F4 in Water (With PAHs)(-BTEX)

DATE SAMPLED: Jun 10, 2011 | **DATE RECEIVED: Jun 11, 2011** | **DATE REPORTED: Jun 20, 2011** | **SAMPLE TYPE: Water**

Parameter	Unit	G / S	RDL	MW101-1 2469030
C6 - C10 (F1)	µg/L		25	<25
C6 - C10 (F1 minus BTEX)	µg/L		25	<25
C>10 - C16 (F2)	µg/L		100	<100
C>10 - C16 (F2 minus Naphthalene)	µg/L		100	<100
C6 - C16 (F1 + F2)	µg/L		100	<100
C>16 - C34 (F3)	µg/L		100	<100
C>16 - C34 (F3 minus PAHs)	µg/L		100	<100
C>34 - C50 (F4)	µg/L		100	<100
C>16 - C50 (F3 + F4)	µg/L		100	<100
Gravimetric Heavy Hydrocarbons	µg/L		500	NA

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to T3(NPGW)

2469030

The C6-C10 fraction is calculated using Toluene response factor.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and nC34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16 - C50 and are only determined if the chromatogram of the C34 - C50 Hydrocarbons indicated that hydrocarbons >C50 are present.
Total C6-C50 results are corrected for BTEX and PAH contributions.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.

Certified By: Jordy Takewaki

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AGAT WORK ORDER: 11T501001

PROJECT NO: 10-1134-0170

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Radwan Tamr

O. Reg. 153 - PAHs in Water

DATE SAMPLED: Jun 10, 2011 | **DATE RECEIVED: Jun 11, 2011** | **DATE REPORTED: Jun 20, 2011** | **SAMPLE TYPE: Water**

Parameter	Unit	G / S	RDL	MW107-1 2469022	MW101-1 2469030
Naphthalene	µg/L	5900	0.12	<0.12	<0.12
Acenaphthylene	µg/L	2000	0.11	<0.11	<0.11
Acenaphthene	µg/L	1700	0.10	<0.10	<0.10
Fluorene	µg/L	290	0.09	<0.09	<0.09
Phenanthrene	µg/L	63	0.10	<0.10	<0.10
Anthracene	µg/L	12	0.05	<0.05	<0.05
Fluoranthene	µg/L	130	0.12	<0.12	<0.12
Pyrene	µg/L	40	0.05	<0.05	<0.05
Benzo(a)anthracene	µg/L	5.0	0.08	<0.08	<0.08
Chrysene	µg/L	3.0	0.05	<0.05	<0.05
Benzo(b)fluoranthene	µg/L	7.0	0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/L	0.4	0.05	<0.05	<0.05
Benzo(a)pyrene	µg/L	1.9	0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	µg/L	0.27	0.06	<0.06	<0.06
Dibenzo(a,h)anthracene	µg/L	0.25	0.09	<0.09	<0.09
Benzo(g,h,i)perylene	µg/L	0.2	0.06	<0.06	<0.06
2-and 1-methyl Napthalene	µg/L	13000	0.20	<0.20	<0.20
Surrogate	**Unit**	**Acceptable Limits**			
Chrysene-d12	%	60-130		80	93

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to T3(NPGW)

Certified By: Jordy Takewaki

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AGAT WORK ORDER: 11T501001

PROJECT NO: 10-1134-0170

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Radwan Tamr

O. Reg. 153 - PAHs in Soil

DATE SAMPLED: Jun 10, 2011 | **DATE RECEIVED: Jun 11, 2011** | **DATE REPORTED: Jun 20, 2011** | **SAMPLE TYPE: Soil**

Parameter	Unit	G / S	RDL	BH101-1B 2468937	BH101-2B 2468938	BH102-1B 2468944	BH102-3A 2468947	BH103-1D 2468950	BH103-2C 2468953	BH104-1D 2468960	BH104-3A 2468970
Naphthalene	µg/g	40	0.03	0.08	0.06	<0.03	0.07	<0.03	<0.03	<0.03	0.03
Acenaphthylene	µg/g	100	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Acenaphthene	µg/g	1000	0.03	0.03	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Fluorene	µg/g	350	0.02	0.04	0.06	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Phenanthrene	µg/g	40	0.02	0.34	0.53	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Anthracene	µg/g	28	0.02	0.07	0.10	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Fluoranthene	µg/g	40	0.02	0.49	0.65	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Pyrene	µg/g	250	0.02	0.38	0.50	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Benzo(a)anthracene	µg/g	40	0.02	0.21	0.27	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Chrysene	µg/g	12	0.02	0.24	0.28	<0.02	0.02	<0.02	<0.02	<0.02	<0.02
Benzo(b)fluoranthene	µg/g	12	0.02	0.28	0.32	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Benzo(k)fluoranthene	µg/g	12	0.02	0.13	0.14	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Benzo(a)pyrene	µg/g	1.2	0.02	0.23	0.28	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Indeno(1,2,3-cd)pyrene	µg/g	12	0.02	0.11	0.16	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Dibenz(a,h)anthracene	µg/g	1.2	0.02	0.04	0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Benzo(g,h,i)perylene	µg/g	40	0.02	0.14	0.17	<0.02	0.02	<0.02	<0.02	<0.02	<0.02
2-and 1-methyl Naphthalene	µg/g	280	0.05	0.07	0.07	<0.05	0.05	<0.05	<0.05	<0.05	<0.05
Surrogate	**Unit**	**Acceptable Limits**									
Chrysene-d12	%	60-130		94	86	77	82	83	86	85	110

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AGAT WORK ORDER: 11T501001

PROJECT NO: 10-1134-0170

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Radwan Tamr

O. Reg. 153 - PAHs in Soil

DATE SAMPLED: Jun 10, 2011 | **DATE RECEIVED: Jun 11, 2011** | **DATE REPORTED: Jun 20, 2011** | **SAMPLE TYPE: Soil**

Parameter	Unit	G / S	RDL	BH105-2A 2468977	BH105-3B 2468985	BH106-1C 2468989	BH106-2C 2468994	BH107-1D 2468997	BH107-2B 2469002	BH107-3B 2469005
Naphthalene	µg/g	40	0.03	<0.03	<0.03	0.07	<0.03	<0.03	<0.03	<0.03
Acenaphthylene	µg/g	100	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Acenaphthene	µg/g	1000	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Fluorene	µg/g	350	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Phenanthrene	µg/g	40	0.02	<0.02	<0.02	0.06	0.03	<0.02	<0.02	<0.02
Anthracene	µg/g	28	0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.02	<0.02
Fluoranthene	µg/g	40	0.02	<0.02	<0.02	0.13	0.04	<0.02	<0.02	<0.02
Pyrene	µg/g	250	0.02	<0.02	<0.02	0.13	0.03	<0.02	<0.02	<0.02
Benzo(a)anthracene	µg/g	40	0.02	<0.02	<0.02	0.14	<0.02	<0.02	<0.02	<0.02
Chrysene	µg/g	12	0.02	<0.02	<0.02	0.20	0.03	<0.02	<0.02	0.02
Benzo(b)fluoranthene	µg/g	12	0.02	<0.02	<0.02	0.29	<0.02	<0.02	<0.02	<0.02
Benzo(k)fluoranthene	µg/g	12	0.02	<0.02	<0.02	0.12	<0.02	<0.02	<0.02	<0.02
Benzo(a)pyrene	µg/g	1.2	0.02	<0.02	<0.02	0.19	0.02	<0.02	<0.02	<0.02
Indeno(1,2,3-cd)pyrene	µg/g	12	0.02	<0.02	<0.02	0.18	<0.02	<0.02	<0.02	<0.02
Dibenz(a,h)anthracene	µg/g	1.2	0.02	<0.02	<0.02	0.05	<0.02	<0.02	<0.02	<0.02
Benzo(g,h,i)perylene	µg/g	40	0.02	<0.02	<0.02	0.22	0.02	<0.02	<0.02	<0.02
2-and 1-methyl Naphthalene	µg/g	280	0.05	<0.05	<0.05	0.15	<0.05	<0.05	<0.05	<0.05
Surrogate	**Unit**	**Acceptable Limits**								
Chrysene-d12	%	60-130		73	88	124	100	75	104	87

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AGAT WORK ORDER: 11T501001

PROJECT NO: 10-1134-0170

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Radwan Tamr

O. Reg. 153 - PAHs in Soil

DATE SAMPLED: Jun 10, 2011 | **DATE RECEIVED: Jun 11, 2011** | **DATE REPORTED: Jun 20, 2011** | **SAMPLE TYPE: Soil**

Parameter	Unit	G / S	RDL	BH108-1C 2469008	RDL	BH108-2A 2469011	BH108-3B 2469017
Naphthalene	µg/g	40	0.30	0.43	0.03	<0.03	<0.03
Acenaphthylene	µg/g	100	0.20	<0.20	0.02	<0.02	<0.02
Acenaphthene	µg/g	1000	0.30	0.70	0.03	<0.03	<0.03
Fluorene	µg/g	350	0.20	0.80	0.02	<0.02	<0.02
Phenanthrene	µg/g	40	0.20	8.0	0.02	<0.02	<0.02
Anthracene	µg/g	28	0.20	1.8	0.02	<0.02	<0.02
Fluoranthene	µg/g	40	0.20	11	0.02	<0.02	<0.02
Pyrene	µg/g	250	0.20	8.6	0.02	<0.02	<0.02
Benzo(a)anthracene	µg/g	40	0.20	5.3	0.02	<0.02	<0.02
Chrysene	µg/g	12	0.20	5.3	0.02	<0.02	<0.02
Benzo(b)fluoranthene	µg/g	12	0.20	4.2	0.02	<0.02	<0.02
Benzo(k)fluoranthene	µg/g	12	0.20	2.0	0.02	<0.02	<0.02
Benzo(a)pyrene	µg/g	1.2	0.20	**4.6**	0.02	<0.02	<0.02
Indeno(1,2,3-cd)pyrene	µg/g	12	0.20	2.6	0.02	<0.02	<0.02
Dibenz(a,h)anthracene	µg/g	1.2	0.20	0.83	0.02	<0.02	<0.02
Benzo(g,h,i)perylene	µg/g	40	0.20	2.8	0.02	<0.02	0.02
2-and 1-methyl Naphthalene	µg/g	280	0.50	0.91	0.05	<0.05	<0.05
Surrogate	**Unit**	**Acceptable Limits**					
Chrysene-d12	%	60-130		119		100	94

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to T3(RPI)

2468937-2469005 Results are based on the dry weight of the soil.

2469008 Results are based on the dry weight of the soil.
Dilution Factor=10
The sample was diluted because the sample contains high concentrations of organic compounds. The reporting detection limit was adjusted.

2469011-2469017 Results are based on the dry weight of the soil.

Certified By: Jordy Takewaki

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AGAT WORK ORDER: 11T501001

PROJECT NO: 10-1134-0170

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Radwan Tamr

O. Reg. 153 - Petroleum Hydrocarbons F1 - F4 (C6 - C50) in Soil (-BTEX)

DATE SAMPLED: Jun 10, 2011 | **DATE RECEIVED: Jun 11, 2011** | **DATE REPORTED: Jun 20, 2011** | **SAMPLE TYPE: Soil**

Parameter	Unit	G / S	RDL	BH101-2B 2468938	BH103-1D 2468950	BH105-3B 2468985	BH107-1D 2468997
C6 - C10 (F1)	µg/g		5	<5	<5	<5	<5
C6 - C10 (F1 minus BTEX)	µg/g	30	5	<5	<5	<5	<5
C>10 - C16 (F2)	µg/g	150	10	<10	<10	<10	<10
C>10 - C16 (F2 minus Naphthalene)	µg/g	150	10	<10	<10	<10	<10
C>16 - C34 (F3)	µg/g	400	50	<50	<50	<50	<50
C>16 - C34 (F3 minus PAHs)	µg/g	400	50	<50	<50	<50	<50
C>34 - C50 (F4)	µg/g	2800	50	<50	<50	<50	<50
Gravimetric Heavy Hydrocarbons	µg/g	2800	50	NA	NA	NA	NA
Moisture Content	%		0.1	17.0	13.9	21.2	11.9

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to T3(RPI)

2468938-2468997 Results are based on sample dry weight.
The C6-C10 fraction is calculated using toluene response factor.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
Total C6 - C50 results are corrected for BTEX and PAH contributions.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.

Certified By: Jordy Takewaki

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AGAT WORK ORDER: 11T501001

PROJECT NO: 10-1134-0170

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Radwan Tamr

O. Reg. 153 - Petroleum Hydrocarbons F1 - F4 (C6 - C50) in Soil (PAHs Incl.)

DATE SAMPLED: Jun 10, 2011 | **DATE RECEIVED: Jun 11, 2011** | **DATE REPORTED: Jun 20, 2011** | **SAMPLE TYPE: Soil**

Parameter	Unit	G / S	RDL	BH101-1B 2468937	BH102-1B 2468944	BH102-3A 2468947	BH103-2C 2468953	BH104-1D 2468960	BH104-3A 2468970	BH105-2A 2468977	BH106-1C 2468989
Benzene	µg/g	5.3	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene	µg/g	34	0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Ethylbenzene	µg/g	290	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylene Mixture(Total)	µg/g	34	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	µg/g		5	<5	<5	<5	<5	<5	<5	<5	<5
C6 - C10 (F1 minus BTEX)	µg/g	30	5	<5	<5	<5	<5	<5	<5	<5	<5
C>10 - C16 (F2)	µg/g	150	10	<10	<10	<10	<10	<10	<10	<10	<10
C>10 - C16 (F2 minus Naphthalene)	µg/g	150	10	<10	<10	<10	<10	<10	<10	<10	<10
C>16 - C34 (F3)	µg/g	400	50	<50	<50	<50	<50	<50	<50	<50	<50
C>16 - C34 (F3 minus PAHs)	µg/g	400	50	<50	<50	<50	<50	<50	<50	<50	<50
C>34 - C50 (F4)	µg/g	2800	50	<50	<50	<50	<50	<50	<50	<50	<50
Gravimetric Heavy Hydrocarbons	µg/g	2800	50	NA	NA	NA	NA	NA	NA	NA	NA
Moisture Content	%		0.1	14.1	13.7	19.1	16.3	16.2	16.9	14.8	20.9

Parameter	Unit	G / S	RDL	BH106-2C 2468994	BH107-2B 2469002	BH107-3B 2469005	BH108-1C 2469008	BH108-2A 2469011	BH108-3B 2469017
Benzene	µg/g	5.3	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene	µg/g	34	0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Ethylbenzene	µg/g	290	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylene Mixture(Total)	µg/g	34	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	µg/g		5	<5	<5	<5	<5	<5	<5
C6 - C10 (F1 minus BTEX)	µg/g	30	5	<5	<5	<5	<5	<5	<5
C>10 - C16 (F2)	µg/g	150	10	<10	<10	<10	<10	<10	<10
C>10 - C16 (F2 minus Naphthalene)	µg/g	150	10	<10	<10	<10	<10	<10	<10
C>16 - C34 (F3)	µg/g	400	50	<50	<50	<50	<50	<50	<50
C>16 - C34 (F3 minus PAHs)	µg/g	400	50	<50	<50	<50	<50	<50	<50
C>34 - C50 (F4)	µg/g	2800	50	<50	<50	<50	<50	<50	<50
Gravimetric Heavy Hydrocarbons	µg/g	2800	50	NA	NA	NA	NA	NA	NA
Moisture Content	%		0.1	14.4	15.2	21.9	7.9	16.7	17.6

Certified By:

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AGAT WORK ORDER: 11T501001

PROJECT NO: 10-1134-0170

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Radwan Tamr

O. Reg. 153 - Petroleum Hydrocarbons F1 - F4 (C6 - C50) in Soil (PAHs Incl.)

DATE SAMPLED: Jun 10, 2011	DATE RECEIVED: Jun 11, 2011	DATE REPORTED: Jun 20, 2011	SAMPLE TYPE: Soil

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to T3(RPI)

2468937-2469017 Results are based on sample dry weight.
The C6-C10 fraction is calculated using toluene response factor.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
Total C6 - C50 results are corrected for BTEX and PAH contributions.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.

Certified By: Jordy Takewaki

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AGAT WORK ORDER: 11T501001

PROJECT NO: 10-1134-0170

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Radwan Tamr

O. Regulation 153 - Volatile Organic Compounds in Water

DATE SAMPLED: Jun 10, 2011 | **DATE RECEIVED: Jun 11, 2011** | **DATE REPORTED: Jun 20, 2011** | **SAMPLE TYPE: Water**

Parameter	Unit	G / S	RDL	MW101-1 2469030
Dichlorodifluoromethane	µg/L		0.20	2.2
Chloromethane	µg/L		0.40	<0.40
Vinyl Chloride	µg/L	0.5	0.17	<0.17
Bromomethane	µg/L	3.7	0.20	<0.20
Chloroethane	µg/L		0.20	<0.20
Trichlorofluoromethane	µg/L		0.40	<0.40
Acetone	µg/L	3300	1.0	<1.0
1,1 Dichloroethylene	µg/L	0.66	0.30	<0.30
Methylene Chloride	µg/L	50000	0.30	<0.30
trans- 1,2-dichloroethylene	µg/L	100	0.20	<0.20
Methyl tert-butyl ether	µg/L	50000	0.20	<0.20
1,1-Dichloroethane	µg/L	9000	0.30	<0.30
Methyl Ethyl Ketone	µg/L	50000	1.0	<1.0
cis- 1,2-Dichloroethylene	µg/L	70	0.20	<0.20
Chloroform	µg/L	430	0.20	<0.20
1,2 - Dichloroethane	µg/L	17	0.20	<0.20
1,1,1-Trichloroethane	µg/L	200	0.30	<0.30
Carbon Tetrachloride	µg/L	17	0.20	<0.20
Benzene	µg/L	1900	0.20	<0.20
1,2-Dichloropropane	µg/L	9.3	0.20	<0.20
Trichloroethylene	µg/L	50	0.20	<0.20
Bromodichloromethane	µg/L	50000	0.20	<0.20
cis-1,3-Dichloropropene	ug/L		0.20	<0.20
Methyl Isobutyl Ketone	µg/L	50000	1.0	<1.0
trans-1,3-Dichloropropene	µg/L		0.30	<0.30
1,1,2-Trichloroethane	µg/L	16000	0.20	<0.20
Toluene	µg/L	5900	0.20	<0.20
2-Hexanone	µg/L		0.30	<0.30
Dibromochloromethane	µg/L	50000	0.10	<0.10
Ethylene Dibromide	µg/L	3.3	0.20	<0.20
Tetrachloroethylene	µg/L	5.0	0.20	<0.20
1,1,1,2-Tetrachloroethane	µg/L	6.0	0.10	<0.10
Chlorobenzene	µg/L	500	0.10	<0.10

Certified By: Jordy Takewaki

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AGAT WORK ORDER: 11T501001

PROJECT NO: 10-1134-0170

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Radwan Tamr

O. Regulation 153 - Volatile Organic Compounds in Water

DATE SAMPLED: Jun 10, 2011 | **DATE RECEIVED: Jun 11, 2011** | **DATE REPORTED: Jun 20, 2011** | **SAMPLE TYPE: Water**

Parameter	Unit	G / S	RDL	MW101-1 2469030
Ethylbenzene	µg/L	28000	0.10	<0.10
m & p-Xylene	µg/L		0.20	<0.20
Bromoform	µg/L	840	0.10	<0.10
Styrene	µg/L	940	0.10	<0.10
1,1,2,2-Tetrachloroethane	µg/L	22	0.10	<0.10
o-Xylene	µg/L		0.10	<0.10
1,3-Dichlorobenzene	µg/L	7600	0.10	<0.10
1,4-Dichlorobenzene	µg/L	7600	0.10	<0.10
1,2-Dichlorobenzene	µg/L	7600	0.10	<0.10
1,2,4-Trichlorobenzene	µg/L	500	0.30	<0.30
1,3-Dichloropropene (Cis + Trans)	µg/L	3.8	0.30	<0.30
Xylene Mixture (Total)	µg/L	5600	0.20	<0.20
n-Hexane	µg/L		0.20	<0.20
Surrogate	**Unit**	**Acceptable Limits**		
Toluene-d8	% Recovery	60-130		93
4-Bromofluorobenzene	% Recovery	70-130		80

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to T3(NPGW)

Certified By: Jordy Takewaki

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AGAT WORK ORDER: 11T501001

PROJECT NO: 10-1134-0170

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Radwan Tamr

ON Regulation 558 BTEX

DATE SAMPLED: Jun 10, 2011 | **DATE RECEIVED: Jun 11, 2011** | **DATE REPORTED: Jun 20, 2011** | **SAMPLE TYPE: Soil**

Parameter	Unit	G / S	RDL	Fill Comp 2469041	Native Comp 2469042
Benzene	mg/L	0.5	0.020	<0.020	<0.020
Toluene	mg/L		0.020	<0.020	<0.020
Ethylbenzene	mg/L		0.010	<0.010	<0.010
m & p-Xylene	mg/L		0.020	<0.020	<0.020
o-Xylene	mg/L		0.010	<0.010	<0.010

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Regulation 558

2469041-2469042 Surrogate Recovery for Toluene-d8: %
Surrogate recovery for 4-Bromofluorobenzene: %
Sample was prepared using Regulation 558 protocol and a zero headspace extractor.
Results relate only to the items tested.

Certified By: Jordy Takewaki

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AGAT WORK ORDER: 11T501001

PROJECT NO: 10-1134-0170

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Radwan Tamr

O. Reg. 153 - Metals & Inorganics in Water

DATE SAMPLED: Jun 10, 2011 | **DATE RECEIVED: Jun 11, 2011** | **DATE REPORTED: Jun 20, 2011** | **SAMPLE TYPE: Water**

Parameter	Unit	G / S	RDL	MW107-1 2469022	MW101-1 2469030
Antimony	µg/L	16000	0.5	0.6	1.6
Arsenic	µg/L	480	1.0	5.3	3.9
Barium	µg/L	23000	2.0	96.2	139
Beryllium	µg/L	53	0.5	<0.5	<0.5
Boron	µg/L	50000	10.0	62.8	87.9
Cadmium	µg/L	11	0.2	<0.2	<0.2
Chromium	µg/L	2000	2.0	8.6	6.9
Cobalt	µg/L	100	0.5	1.2	<0.5
Copper	µg/L	23	1.0	1.0	1.4
Lead	µg/L	32	0.5	<0.5	<0.5
Molybdenum	µg/L	7300	0.5	31.9	24.7
Nickel	µg/L	1600	1.0	7.1	5.1
Selenium	µg/L	50	1.0	<1.0	2.1
Silver	µg/L	1.2	0.2	<0.2	<0.2
Thallium	µg/L	400	0.3	<0.3	<0.3
Uranium	µg/L		0.5	1.3	3.7
Vanadium	µg/L	200	0.4	3.6	8.5
Zinc	µg/L	1100	5.0	7.7	<5.0
Mercury	µg/L	0.12	0.02	<0.02	<0.02
Chromium VI	µg/L	110	5	<5	<5
Cyanide, Free	µg/L	52	2	<2	<2
Sodium	µg/L		500	380000	350000
Chloride	µg/L		100	677000	603000
Nitrate as N	µg/L		50	<50	805
Nitrite as N	µg/L	2000	50	<50	<50
Electrical Conductivity	uS/cm		2	2460	2330
pH	pH Units		NA	8.15	8.12

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to T3(NPGW)

Certified By: Tony Nash

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Guideline Violation

AGAT WORK ORDER: 11T501001

PROJECT NO: 10-1134-0170

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Radwan Tamr

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	GUIDEVALUE	RESULT
2468937	BH101-1B	T3(RPI)	O. Reg. 153 Metals & Inorganics in Soil	Sodium Adsorption Ratio (2:1)	5	8.39
2468947	BH102-3A	T3(RPI)	O. Reg. 153 Metals & Inorganics in Soil	Sodium Adsorption Ratio (2:1)	5	6.60
2468950	BH103-1D	T3(RPI)	O. Reg. 153 Metals & Inorganics in Soil	Sodium Adsorption Ratio (2:1)	5	5.68
2468970	BH104-3A	T3(RPI)	O. Reg. 153 Metals & Inorganics in Soil	Sodium Adsorption Ratio (2:1)	5	7.18
2468977	BH105-2A	T3(RPI)	O. Reg. 153 Metals & Inorganics in Soil	Electrical Conductivity (2:1)	0.7	0.752
2468977	BH105-2A	T3(RPI)	O. Reg. 153 Metals & Inorganics in Soil	Sodium Adsorption Ratio (2:1)	5	5.32
2468985	BH105-3B	T3(RPI)	O. Reg. 153 Metals & Inorganics in Soil	Electrical Conductivity (2:1)	0.7	1.91
2468985	BH105-3B	T3(RPI)	O. Reg. 153 Metals & Inorganics in Soil	Sodium Adsorption Ratio (2:1)	5	14.4
2468994	BH106-2C	T3(RPI)	O. Reg. 153 Metals & Inorganics in Soil	Sodium Adsorption Ratio (2:1)	5	7.05
2469005	BH107-3B	T3(RPI)	O. Reg. 153 Metals & Inorganics in Soil	Electrical Conductivity (2:1)	0.7	0.957
2469008	BH108-1C	T3(RPI)	O. Reg. 153 - PAHs in Soil	Benzo(a)pyrene	1.2	4.6
2469008	BH108-1C	T3(RPI)	O. Reg. 153 Metals & Inorganics in Soil	Lead	200	503
2469008	BH108-1C	T3(RPI)	O. Reg. 153 Metals & Inorganics in Soil	Sodium Adsorption Ratio (2:1)	5	5.30
2469011	BH108-2A	T3(RPI)	O. Reg. 153 Metals & Inorganics in Soil	Boron (Hot Water Extractable)	1.5	1.62
2469011	BH108-2A	T3(RPI)	O. Reg. 153 Metals & Inorganics in Soil	Electrical Conductivity (2:1)	0.7	0.952
2469011	BH108-2A	T3(RPI)	O. Reg. 153 Metals & Inorganics in Soil	Sodium Adsorption Ratio (2:1)	5	8.13
2469017	BH108-3B	T3(RPI)	O. Reg. 153 Metals & Inorganics in Soil	Electrical Conductivity (2:1)	0.7	0.779

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Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD.

AGAT WORK ORDER: 11T501001

PROJECT NO: 10-1134-0170

ATTENTION TO: Radwan Tamr

Soil Analysis

RPT Date: Jun 20, 2011			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153 Metals & Inorganics in Soil															
Antimony	1	2468937	0.8	0.6	28.6%	< 0.8	103%	90%	110%	103%	90%	110%	98%	70%	130%
Arsenic	1	2468937	6	5	18.2%	< 1	102%	90%	110%	109%	90%	110%	106%	70%	130%
Barium	1	2468937	59	55	7.0%	< 2	99%	90%	110%	104%	90%	110%	110%	70%	130%
Beryllium	1	2468937	< 0.5	< 0.5	0.0%	< 0.5	115%	80%	120%	109%	90%	110%	104%	70%	130%
Boron	1	2468937	8	8	0.0%	< 5	85%	80%	120%	107%	90%	110%	102%	70%	130%
Boron (Hot Water Extractable)	1	2468937	0.45	0.46	2.2%	< 0.10	102%	80%	120%	108%	90%	110%	108%	70%	130%
Cadmium	1	2468937	< 0.5	< 0.5	0.0%	< 0.5	87%	80%	120%	95%	90%	110%	100%	70%	130%
Chromium	1	2468937	14	13	7.4%	< 2	97%	90%	110%	116%	80%	120%	107%	70%	130%
Cobalt	1	2468937	5.9	5.6	5.2%	< 0.5	97%	90%	110%	103%	90%	110%	96%	70%	130%
Copper	1	2468937	16	15	6.5%	< 1	102%	90%	110%	112%	80%	120%	103%	70%	130%
Lead	1	2468937	27	23	16.0%	< 1	108%	90%	110%	107%	90%	110%	98%	70%	130%
Molybdenum	1	2468937	2.0	1.5	28.6%	< 0.5	94%	90%	110%	97%	90%	110%	97%	70%	130%
Nickel	1	2468937	15	14	6.9%	< 1	99%	90%	110%	102%	90%	110%	95%	70%	130%
Selenium	1	2468937	< 0.4	< 0.4	0.0%	< 0.4	89%	80%	120%	101%	90%	110%	98%	70%	130%
Silver	1	2468937	< 0.2	< 0.2	0.0%	< 0.2	87%	80%	120%	92%	90%	110%	105%	70%	130%
Thallium	1	2468937	< 0.4	< 0.4	0.0%	< 0.4	100%	90%	110%	100%	90%	110%	97%	70%	130%
Uranium	1	2468937	0.8	0.7	13.3%	< 0.5	107%	90%	110%	107%	90%	110%	97%	70%	130%
Vanadium	1	2468937	20	19	5.1%	< 1	97%	90%	110%	103%	90%	110%	98%	70%	130%
Zinc	1	2468937	55	52	5.6%	< 5	102%	90%	110%	108%	90%	110%	111%	70%	130%
Chromium, Hexavalent	1	2468960	< 0.2	< 0.2	0.0%	< 0.2	102%	80%	120%	100%	90%	110%	107%	70%	130%
Cyanide, Free	1	2468938	< 0.05	< 0.05	0.0%	< 0.05	100%	80%	120%	110%	90%	110%	74%	70%	130%
Mercury	1	2468937	< 0.01	< 0.01	0.0%	< 0.01	103%	80%	120%	107%	90%	110%	113%	70%	130%
Electrical Conductivity (2:1)	1	2468937	0.647	0.643	0.6%	< 0.002	84%	80%	120%						
Sodium Adsorption Ratio (2:1)	1	2468937	8.39	9.32	10.5%	N/A									
pH, 2:1 CaCl2 Extraction	1	2468977	7.52	7.61	1.2%	<	98%	90%	110%						
O. Reg. 558 Metals															
Arsenic Leachate	1		< 0.010	< 0.010	0.0%	< 0.010	101%	90%	110%	106%	90%	110%	111%	70%	130%
Barium Leachate	1		0.639	0.629	1.6%	< 0.100	104%	90%	110%	104%	90%	110%	96%	70%	130%
Boron Leachate	1		0.123	0.122	0.8%	< 0.050	102%	90%	110%	101%	90%	110%	113%	70%	130%
Cadmium Leachate	1		< 0.010	< 0.010	0.0%	< 0.010	97%	90%	110%	95%	90%	110%	93%	70%	130%
Chromium Leachate	1		< 0.010	< 0.010	0.0%	< 0.010	102%	90%	110%	105%	90%	110%	104%	70%	130%
Lead Leachate	1		0.0185	0.0182	1.6%	< 0.010	100%	90%	110%	94%	90%	110%	92%	70%	130%
Mercury Leachate	1		< 0.005	< 0.005	0.0%	< 0.005	99%	90%	110%	93%	90%	110%	92%	70%	130%
Selenium Leachate	1		< 0.010	< 0.010	0.0%	< 0.010	103%	90%	110%	107%	90%	110%	98%	70%	130%
Silver Leachate	1		< 0.010	< 0.010	0.0%	< 0.010	96%	90%	110%	92%	90%	110%	96%	70%	130%
Uranium Leachate	1		< 0.050	< 0.050	0.0%	< 0.050	99%	90%	110%	99%	90%	110%	93%	70%	130%

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Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD.

AGAT WORK ORDER: 11T501001

PROJECT NO: 10-1134-0170

ATTENTION TO: Radwan Tamr

Soil Analysis (Continued)

RPT Date: Jun 20, 2011			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Certified By:

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Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD. **AGAT WORK ORDER: 11T501001**

PROJECT NO: 10-1134-0170 **ATTENTION TO: Radwan Tamr**

Trace Organics Analysis

RPT Date: Jun 20, 2011			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
ON Regulation 558 BTEX															
Benzene	1		< 0.020	< 0.020	0.0%	< 0.020	98%	60%	140%	96%	60%	140%	84%	60%	140%
Toluene	1		< 0.020	< 0.020	0.0%	< 0.020	109%	60%	130%	102%	60%	130%	92%	60%	130%
Ethylbenzene	1		< 0.010	< 0.010	0.0%	< 0.010	102%	60%	130%	99%	60%	130%	84%	60%	130%
m & p-Xylene	1		< 0.020	< 0.020	0.0%	< 0.020	105%	60%	130%	95%	60%	130%	87%	60%	130%
o-Xylene	1		< 0.010	< 0.010	0.0%	< 0.010	103%	60%	130%	97%	60%	130%	85%	60%	130%
O. Reg. 153 - Petroleum Hydrocarbons F1 - F4 (C6 - C50) in Soil (PAHs Incl.)															
Benzene	1	2468997	< 0.02	< 0.02	0.0%	< 0.02	104%	60%	130%	115%	60%	130%	111%	60%	130%
Toluene	1	2468997	< 0.08	< 0.08	0.0%	< 0.08	98%	60%	130%	105%	60%	130%	92%	60%	130%
Ethylbenzene	1	2468997	< 0.05	< 0.05	0.0%	< 0.05	90%	60%	130%	120%	60%	130%	90%	60%	130%
Xylene Mixture(Total)	1	2468997	< 0.05	< 0.05	0.0%	< 0.05	100%	60%	130%	103%	60%	130%	100%	60%	130%
C6 - C10 (F1)	1	2468997	< 5	< 5	0.0%	< 5	109%	60%	130%	80%	60%	130%	84%	60%	130%
C>10 - C16 (F2)	1	2468944	< 10	< 10	0.0%	< 10	108%	70%	130%	97%	70%	130%	82%	70%	130%
C>16 - C34 (F3)	1	2468944	< 50	< 50	0.0%	< 50	109%	70%	130%	97%	70%	130%	100%	70%	130%
C>34 - C50 (F4)	1	2468944	< 50	< 50	0.0%	< 50	118%	70%	130%	103%	70%	130%	85%	70%	130%
O. Reg. 153 - Petroleum Hydrocarbons F1 - F4 (C6 - C50) in Soil (-BTEX)															
C6 - C10 (F1)	1	2468017	< 5	< 5	0.0%	< 5	104%	60%	130%	77%	60%	130%	75%	60%	130%
O. Reg 153 Petroleum Hydrocarbon F1 - F4 in Water (With PAHs)															
Benzene	1		< 0.2	< 0.2	0.0%	< 0.2	105%	70%	130%	106%	70%	130%	102%	70%	130%
Toluene	1		< 0.2	< 0.2	0.0%	< 0.2	104%	70%	130%	101%	70%	130%	98%	70%	130%
Ethylbenzene	1		< 0.1	< 0.1	0.0%	< 0.1	118%	70%	130%	116%	70%	130%	112%	70%	130%
Xylene Mixture (Total)	1		< 0.2	< 0.2	0.0%	< 0.2	119%	70%	130%	118%	70%	130%	117%	70%	130%
C6 - C10 (F1)	1		< 25	< 25	0.0%	< 25	127%	60%	130%	110%	60%	130%	106%	60%	130%
O. Reg 153 Petroleum Hydrocarbon F1 - F4 in Water (With PAHs)(-BTEX)															
C>10 - C16 (F2)	1		< 100	< 100	0.0%	< 100	106%	70%	130%	104%	70%	130%		70%	130%
C>16 - C34 (F3)	1		< 100	< 100	0.0%	< 100	106%	70%	130%	101%	70%	130%		70%	130%
C>34 - C50 (F4)	1		< 100	< 100	0.0%	< 100	102%	70%	130%	108%	70%	130%		70%	130%
O. Regulation 153 - Volatile Organic Compounds in Water															
Dichlorodifluoromethane	1		< 0.20	< 0.20	0.0%	< 0.20	113%	60%	130%	99%	60%	130%	111%	60%	130%
Chloromethane	1		< 0.40	< 0.40	0.0%	< 0.40	115%	60%	130%	100%	60%	130%	96%	60%	130%
Vinyl Chloride	1		< 0.17	< 0.17	0.0%	< 0.17	108%	60%	130%	90%	60%	130%	86%	60%	130%
Bromomethane	1		< 0.20	< 0.20	0.0%	< 0.20	114%	60%	130%	104%	60%	130%	93%	60%	130%
Chloroethane	1		< 0.20	< 0.20	0.0%	< 0.20	118%	60%	130%	94%	60%	130%	94%	60%	130%
Trichlorofluoromethane	1		< 0.40	< 0.40	0.0%	< 0.40	114%	60%	130%	98%	60%	130%	99%	60%	130%
Acetone	1		< 1.0	< 1.0	0.0%	< 1.0	94%	60%	130%	98%	60%	130%	87%	60%	130%
1,1 Dichloroethylene	1		< 0.30	< 0.30	0.0%	< 0.30	103%	60%	130%	96%	60%	130%	95%	60%	130%
Methylene Chloride	1		< 0.30	< 0.30	0.0%	< 0.30	106%	60%	130%	106%	60%	130%	118%	60%	130%
trans- 1,2-dichloroethylene	1		< 0.20	< 0.20	0.0%	< 0.20	97%	60%	130%	102%	60%	130%	108%	60%	130%
Methyl tert-butyl ether	1		< 0.20	< 0.20	0.0%	< 0.20	94%	60%	130%	101%	60%	130%	90%	60%	130%

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Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD. **AGAT WORK ORDER: 11T501001**

PROJECT NO: 10-1134-0170 **ATTENTION TO: Radwan Tamr**

Trace Organics Analysis (Continued)

RPT Date: Jun 20, 2011			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
1,1-Dichloroethane	1		< 0.30	< 0.30	0.0%	< 0.30	98%	60%	130%	100%	60%	130%	89%	60%	130%
Methyl Ethyl Ketone	1		< 1.0	< 1.0	0.0%	< 1.0	72%	60%	130%	110%	60%	130%	86%	60%	130%
cis- 1,2-Dichloroethylene	1		< 0.20	< 0.20	0.0%	< 0.20	75%	60%	130%	99%	60%	130%	80%	60%	130%
Chloroform	1		< 0.20	< 0.20	0.0%	< 0.20	86%	60%	130%	100%	60%	130%	86%	60%	130%
1,2 - Dichloroethane	1		< 0.20	< 0.20	0.0%	< 0.20	85%	60%	130%	102%	60%	130%	92%	60%	130%
1,1,1-Trichloroethane	1		< 0.30	< 0.30	0.0%	< 0.30	94%	60%	130%	98%	60%	130%	91%	60%	130%
Carbon Tetrachloride	1		< 0.20	< 0.20	0.0%	< 0.20	94%	60%	130%	96%	60%	130%	96%	60%	130%
Benzene	1		< 0.20	< 0.20	0.0%	< 0.20	98%	60%	130%	96%	60%	130%	84%	60%	130%
1,2-Dichloropropane	1		< 0.20	< 0.20	0.0%	< 0.20	88%	60%	130%	101%	60%	130%	87%	60%	130%
Trichloroethylene	1		< 0.20	< 0.20	0.0%	< 0.20	92%	60%	130%	100%	60%	130%	119%	60%	130%
Bromodichloromethane	1		< 0.20	< 0.20	0.0%	< 0.20	81%	60%	130%	103%	60%	130%	83%	60%	130%
cis-1,3-Dichloropropene	1		< 0.20	< 0.20	0.0%	< 0.20	104%	60%	130%	106%	60%	130%	82%	60%	130%
Methyl Isobutyl Ketone	1		< 1.0	< 1.0	0.0%	< 1.0	113%	60%	130%	112%	60%	130%	77%	60%	130%
trans-1,3-Dichloropropene	1		< 0.30	< 0.30	0.0%	< 0.30	104%	60%	130%	108%	60%	130%	82%	60%	130%
1,1,2-Trichloroethane	1		< 0.20	< 0.20	0.0%	< 0.20	104%	60%	130%	103%	60%	130%	81%	60%	130%
Toluene	1		< 0.20	< 0.20	0.0%	< 0.20	109%	60%	130%	102%	60%	130%	92%	60%	130%
2-Hexanone	1		< 0.30	< 0.30	0.0%	< 0.30	114%	60%	130%	117%	60%	130%	88%	60%	130%
Dibromochloromethane	1		< 0.10	< 0.10	0.0%	< 0.10	103%	60%	130%	110%	60%	130%	84%	60%	130%
Ethylene Dibromide	1		< 0.20	< 0.20	0.0%	< 0.20	102%	60%	130%	103%	60%	130%	84%	60%	130%
Tetrachloroethylene	1		< 0.20	< 0.20	0.0%	< 0.20	106%	60%	130%	100%	60%	130%	92%	60%	130%
1,1,1,2-Tetrachloroethane	1		< 0.10	< 0.10	0.0%	< 0.10		60%	130%	104%	60%	130%	83%	60%	130%
Chlorobenzene	1		< 0.10	< 0.10	0.0%	< 0.10	98%	60%	130%	98%	60%	130%	85%	60%	130%
Ethylbenzene	1		< 0.10	< 0.10	0.0%	< 0.10	102%	60%	130%	99%	60%	130%	84%	60%	130%
m & p-Xylene	1		< 0.20	< 0.20	0.0%	< 0.20	105%	60%	130%	95%	60%	130%	87%	60%	130%
Bromoform	1		< 0.10	< 0.10	0.0%	< 0.10	99%	60%	130%	103%	60%	130%	84%	60%	130%
Styrene	1		< 0.10	< 0.10	0.0%	< 0.10	72%	60%	130%	97%	60%	130%	77%	60%	130%
1,1,2,2-Tetrachloroethane	1		< 0.10	< 0.10	0.0%	< 0.10		60%	130%	108%	60%	130%	89%	60%	130%
o-Xylene	1		< 0.10	< 0.10	0.0%	< 0.10	103%	60%	130%	97%	60%	130%	85%	60%	130%
1,3-Dichlorobenzene	1		< 0.10	< 0.10	0.0%	< 0.10	107%	60%	130%	99%	60%	130%	77%	60%	130%
1,4-Dichlorobenzene	1		< 0.10	< 0.10	0.0%	< 0.10	102%	60%	130%	100%	60%	130%	75%	60%	130%
1,2-Dichlorobenzene	1		< 0.10	< 0.10	0.0%	< 0.10	102%	60%	130%	98%	60%	130%	77%	60%	130%
1,2,4-Trichlorobenzene	1		< 0.30	< 0.30	0.0%	< 0.30	109%	60%	130%	95%	60%	130%	78%	60%	130%
1,3-Dichloropropene (Cis + Trans)	1		< 0.30	< 0.30	0.0%	< 0.30	104%	60%	130%	108%	60%	130%	82%	60%	130%
Xylene Mixture (Total)	1		< 0.20	< 0.20	0.0%	< 0.20	103%	60%	130%	97%	60%	130%	85%	60%	130%
n-Hexane	1		< 0.20	< 0.20	0.0%	< 0.20		60%	130%	110%	60%	130%	79%	60%	130%
O. Reg 153 - Volatile Organic Compounds in Soil															
Dichlorodifluoromethane	1	2468997	< 0.005	< 0.005	0.0%	< 0.005	98%	60%	130%	110%	60%	130%	98%	60%	130%
Chloromethane	1	2468997	< 0.002	< 0.002	0.0%	< 0.002	105%	60%	130%	107%	60%	130%	92%	60%	130%
Vinyl Chloride	1	2468997	< 0.002	< 0.002	0.0%	< 0.002	120%	60%	130%	108%	60%	130%	97%	60%	130%

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Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD. **AGAT WORK ORDER: 11T501001**

PROJECT NO: 10-1134-0170 **ATTENTION TO: Radwan Tamr**

Trace Organics Analysis (Continued)

RPT Date: Jun 20, 2011			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Bromomethane	1	2468997	< 0.002	< 0.002	0.0%	< 0.002	113%	60%	130%	110%	60%	130%	98%	60%	130%
Chloroethane	1	2468997	< 0.005	< 0.005	0.0%	< 0.005	118%	60%	130%	105%	60%	130%	93%	60%	130%
Trichlorofluoromethane	1	2468997	< 0.004	< 0.004	0.0%	< 0.004	115%	60%	130%	114%	60%	130%	98%	60%	130%
Acetone	1	2468997	< 0.130	< 0.130	0.0%	< 0.130	97%	60%	130%	101%	60%	130%	91%	60%	130%
1,1-Dichloroethylene	1	2468997	< 0.002	< 0.002	0.0%	< 0.002	107%	60%	130%	104%	60%	130%	94%	60%	130%
Methylene Chloride	1	2468997	< 0.003	< 0.003	0.0%	< 0.003	110%	60%	130%	103%	60%	130%	100%	60%	130%
TRANS-1,2-Dichloroethylene	1	2468997	< 0.003	< 0.003	0.0%	< 0.003	119%	60%	130%	118%	60%	130%	91%	60%	130%
Methyl tert-butyl Ether	1	2468997	< 0.004	< 0.004	0.0%	< 0.004	114%	60%	130%	112%	60%	130%	93%	60%	130%
1,1-Dichloroethane	1	2468997	< 0.002	< 0.002	0.0%	< 0.002	108%	60%	130%	114%	60%	130%	99%	60%	130%
Methyl Ethyl Ketone	1	2468997	< 0.10	< 0.10	0.0%	< 0.10	86%	60%	130%	106%	60%	130%	82%	60%	130%
CIS 1,2-Dichloroethylene	1	2468997	< 0.002	< 0.002	0.0%	< 0.002	118%	60%	130%	116%	60%	130%	92%	60%	130%
Chloroform	1	2468997	< 0.002	< 0.002	0.0%	< 0.002	109%	60%	130%	113%	60%	130%	105%	60%	130%
1,2- Dichloroethane	1	2468997	< 0.002	< 0.002	0.0%	< 0.002	106%	60%	130%	108%	60%	130%	101%	60%	130%
1,1,1-Trichloroethane	1	2468997	< 0.002	< 0.002	0.0%	< 0.002	119%	60%	130%	113%	60%	130%	101%	60%	130%
Carbon Tetrachloride	1	2468997	< 0.002	< 0.002	0.0%	< 0.002	93%	60%	130%	114%	60%	130%	99%	60%	130%
Benzene	1	2468997	< 0.002	< 0.002	0.0%	< 0.002	98%	60%	130%	117%	60%	130%	85%	60%	130%
1,2-Dichloropropane	1	2468997	< 0.002	< 0.002	0.0%	< 0.002	105%	60%	130%	109%	60%	130%	95%	60%	130%
Trichloroethylene	1	2468997	< 0.004	< 0.004	0.0%	< 0.004	113%	60%	130%	108%	60%	130%	82%	60%	130%
Bromodichloromethane	1	2468997	< 0.003	< 0.003	0.0%	< 0.003	120%	60%	130%	108%	60%	130%	96%	60%	130%
CIS-1,3-Dichloropropene	1	2468997	< 0.002	< 0.002	0.0%	< 0.002	104%	60%	130%	106%	60%	130%	81%	60%	130%
Methyl Isobutyl Ketone	1	2468997	< 0.10	< 0.10	0.0%	< 0.10	78%	60%	130%	102%	60%	130%	94%	60%	130%
TRANS-1,3-Dichloropropene	1	2468997	< 0.003	< 0.003	0.0%	< 0.003	113%	60%	130%	111%	60%	130%	99%	60%	130%
1,1,2-Trichloroethane	1	2468997	< 0.002	< 0.002	0.0%	< 0.002	109%	60%	130%	106%	60%	130%	103%	60%	130%
Toluene	1	2468997	< 0.002	< 0.002	0.0%	< 0.002	116%	60%	130%	113%	60%	130%	90%	60%	130%
2-Hexanone	1	2468997	< 0.470	< 0.470	0.0%	< 0.470	78%	60%	130%	102%	60%	130%	94%	60%	130%
Dibromochloromethane	1	2468997	< 0.003	< 0.003	0.0%	< 0.003	111%	60%	130%	108%	60%	130%	111%	60%	130%
Ethylene Dibromide	1	2468997	< 0.002	< 0.002	0.0%	< 0.002	100%	60%	130%	103%	60%	130%	111%	60%	130%
Tetrachloroethylene	1	2468997	< 0.002	< 0.002	0.0%	< 0.002	117%	60%	130%	112%	60%	130%	104%	60%	130%
1,1,1,2-Tetrachloroethane	1	2468997	< 0.002	< 0.002	0.0%	< 0.002		60%	130%	114%	60%	130%	108%	60%	130%
Chlorobenzene	1	2468997	< 0.002	< 0.002	0.0%	< 0.002	119%	60%	130%	118%	60%	130%	82%	60%	130%
Ethylbenzene	1	2468997	< 0.002	< 0.002	0.0%	< 0.002	102%	60%	130%	111%	60%	130%	83%	60%	130%
m & p-Xylene	1	2468997	< 0.002	< 0.002	0.0%	< 0.002	121%	60%	130%	118%	60%	130%	75%	60%	130%
Bromoform	1	2468997	< 0.002	< 0.002	0.0%	< 0.002	109%	60%	130%	109%	60%	130%	119%	60%	130%
Styrene	1	2468997	< 0.002	< 0.002	0.0%	< 0.002	103%	60%	130%	113%	60%	130%	106%	60%	130%
1,1,2,2- Tetrachloroethane	1	2468997	< 0.004	< 0.004	0.0%	< 0.004		60%	130%	109%	60%	130%	109%	60%	130%
o-Xylene	1	2468997	< 0.002	< 0.002	0.0%	< 0.002	114%	60%	130%	118%	60%	130%	78%	60%	130%
1,3-Dichlorobenzene	1	2468997	< 0.002	< 0.002	0.0%	< 0.002	118%	60%	130%	117%	60%	130%	76%	60%	130%
1,4-Dichlorobenzene	1	2468997	< 0.002	< 0.002	0.0%	< 0.002	111%	60%	130%	113%	60%	130%	75%	60%	130%
1,2-Dichlorobenzene	1	2468997	< 0.002	< 0.002	0.0%	< 0.002	114%	60%	130%	116%	60%	130%	95%	60%	130%

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Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD. **AGAT WORK ORDER: 11T501001**

PROJECT NO: 10-1134-0170 **ATTENTION TO: Radwan Tamr**

Trace Organics Analysis (Continued)

RPT Date: Jun 20, 2011			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
1,2,4-Trichlorobenzene	1	2468997	< 0.007	< 0.007	0.0%	< 0.007	112%	60%	130%	106%	60%	130%	119%	60%	130%
Xylene Mixture (Total)	1	2468997	< 0.002	< 0.002	0.0%	< 0.002	114%	60%	130%	118%	60%	130%	78%	60%	130%
1,3-Dichloropropene (Cis + Trans)	1	2468997	< 0.002	< 0.002	0.0%	< 0.002	113%	60%	130%	111%	60%	130%	99%	60%	130%
n-Hexane	1	2468997	< 0.005	< 0.005	0.0%	< 0.005		60%	130%	107%	60%	130%	81%	60%	130%
O. Reg. 153 - PAHs in Soil															
Naphthalene	1	2468950	< 0.03	< 0.03	0.0%	< 0.03	102%	60%	130%	77%	60%	130%	75%	60%	130%
Acenaphthylene	1	2468950	< 0.02	< 0.02	0.0%	< 0.02	94%	60%	130%	69%	60%	130%	71%	60%	130%
Acenaphthene	1	2468950	< 0.03	< 0.03	0.0%	< 0.03	102%	60%	130%	78%	60%	130%	71%	60%	130%
Fluorene	1	2468950	< 0.02	< 0.02	0.0%	< 0.02	99%	60%	130%	74%	60%	130%	70%	60%	130%
Phenanthrene	1	2468950	< 0.02	< 0.02	0.0%	< 0.02	100%	60%	130%	78%	60%	130%	78%	60%	130%
Anthracene	1	2468950	< 0.02	< 0.02	0.0%	< 0.02	96%	60%	130%	75%	60%	130%	72%	60%	130%
Fluoranthene	1	2468950	< 0.02	< 0.02	0.0%	< 0.02	101%	60%	130%	80%	60%	130%	87%	60%	130%
Pyrene	1	2468950	< 0.02	< 0.02	0.0%	< 0.02	103%	60%	130%	80%	60%	130%	86%	60%	130%
Benzo(a)anthracene	1	2468950	< 0.02	< 0.02	0.0%	< 0.02	92%	60%	130%	74%	60%	130%	81%	60%	130%
Chrysene	1	2468950	< 0.02	< 0.02	0.0%	< 0.02	107%	60%	130%	87%	60%	130%	90%	60%	130%
Benzo(b)fluoranthene	1	2468950	< 0.02	< 0.02	0.0%	< 0.02	106%	60%	130%	85%	60%	130%	85%	60%	130%
Benzo(k)fluoranthene	1	2468950	< 0.02	< 0.02	0.0%	< 0.02	121%	60%	130%	97%	60%	130%	92%	60%	130%
Benzo(a)pyrene	1	2468950	< 0.02	< 0.02	0.0%	< 0.02	120%	60%	130%	86%	60%	130%	88%	60%	130%
Indeno(1,2,3-cd)pyrene	1	2468950	< 0.02	< 0.02	0.0%	< 0.02	108%	60%	130%	88%	60%	130%	86%	60%	130%
Dibenz(a,h)anthracene	1	2468950	< 0.02	< 0.02	0.0%	< 0.02	97%	60%	130%	81%	60%	130%	80%	60%	130%
Benzo(g,h,i)perylene	1	2468950	< 0.02	< 0.02	0.0%	< 0.02	109%	60%	130%	90%	60%	130%	93%	60%	130%
2-and 1-methyl Naphthalene	1	2468950	< 0.05	< 0.05	0.0%	< 0.05	107%	60%	130%	80%	60%	130%	74%	60%	130%
O. Reg. 153 - PAHs in Water															
Naphthalene	1					< 0.12	102%	60%	140%	78%	60%	140%		60%	140%
Acenaphthylene	1					< 0.11	103%	60%	140%	79%	60%	140%		60%	140%
Acenaphthene	1					< 0.10	104%	60%	140%	78%	60%	140%		60%	140%
Fluorene	1					< 0.09	104%	60%	140%	83%	60%	140%		60%	140%
Phenanthrene	1					< 0.10	108%	60%	140%	88%	60%	140%		60%	140%
Anthracene	1					< 0.05	108%	60%	140%	88%	60%	140%		60%	140%
Fluoranthene	1					< 0.12	109%	60%	140%	91%	60%	140%		60%	140%
Pyrene	1					< 0.05	106%	60%	140%	96%	60%	140%		60%	140%
Benzo(a)anthracene	1					< 0.08	99%	60%	140%	94%	60%	140%		60%	140%
Chrysene	1					< 0.05	98%	60%	140%	94%	60%	140%		60%	140%
Benzo(b)fluoranthene	1					< 0.05	102%	60%	140%	89%	60%	140%		60%	140%
Benzo(k)fluoranthene	1					< 0.05	103%	60%	140%	88%	60%	140%		60%	140%
Benzo(a)pyrene	1					< 0.01	95%	60%	140%	95%	60%	140%		60%	140%
Indeno(1,2,3-cd)pyrene	1					< 0.06	102%	60%	140%	103%	60%	140%		60%	140%
Dibenzo(a,h)anthracene	1					< 0.09	94%	60%	140%	81%	60%	140%		60%	140%

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Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD.

AGAT WORK ORDER: 11T501001

PROJECT NO: 10-1134-0170

ATTENTION TO: Radwan Tamr

Trace Organics Analysis (Continued)

RPT Date: Jun 20, 2011			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Benzo(g,h,i)perylene	1					< 0.06	91%	60%	140%	90%	60%	140%		60%	140%
2-and 1-methyl Napthalene	1					< 0.20	106%	60%	140%	71%	70%	130%		60%	140%

Certified By: Jordy Takeuchi

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Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD.

AGAT WORK ORDER: 11T501001

PROJECT NO: 10-1134-0170

ATTENTION TO: Radwan Tamr

Water Analysis

RPT Date: Jun 20, 2011

PARAMETER	Batch	Sample Id	DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
			Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153 - Metals & Inorganics in Water															
Antimony	1		< 0.5	< 0.5	0.0%	< 0.5	99%	90%	110%	104%	90%	110%	104%	70%	130%
Arsenic	1		< 1.0	< 1.0	0.0%	< 1.0	99%	90%	110%	100%	90%	110%	106%	70%	130%
Barium	1		40.9	41.1	0.5%	< 2.0	107%	90%	110%	106%	90%	110%	97%	70%	130%
Beryllium	1		< 0.5	< 0.5	0.0%	< 0.5	93%	90%	110%	98%	90%	110%	99%	70%	130%
Boron	1		< 10.0	< 10.0	0.0%	< 10.0	105%	90%	110%	98%	90%	110%	103%	70%	130%
Cadmium	1		< 0.2	< 0.2	0.0%	< 0.2	97%	90%	110%	105%	80%	120%	106%	70%	130%
Chromium	1		2.05	1.96	4.5%	< 2.0	101%	90%	110%	100%	90%	110%	102%	70%	130%
Cobalt	1		< 0.5	< 0.5	0.0%	< 0.5	99%	90%	110%	99%	90%	110%	101%	70%	130%
Copper	1		< 1.0	< 1.0	0.0%	< 1.0	108%	90%	110%	105%	90%	110%	101%	70%	130%
Lead	1		< 0.5	< 0.5	0.0%	< 0.5	99%	90%	110%	100%	90%	110%	93%	70%	130%
Molybdenum	1		< 0.5	< 0.5	0.0%	< 0.5	101%	90%	110%	100%	90%	110%	102%	70%	130%
Nickel	1		2.2	2.1	4.7%	< 1.0	99%	90%	110%	99%	90%	110%	99%	70%	130%
Selenium	1		< 1.0	< 1.0	0.0%	< 1.0	99%	90%	110%	96%	90%	110%	106%	70%	130%
Silver	1		< 0.2	< 0.2	0.0%	< 0.2	98%	90%	110%	101%	80%	120%	103%	70%	130%
Thallium	1		< 0.3	< 0.3	0.0%	< 0.3	97%	90%	110%	96%	90%	110%	86%	70%	130%
Uranium	1		< 0.5	< 0.5	0.0%	< 0.5	97%	90%	110%	99%	90%	110%	99%	70%	130%
Vanadium	1		1.1	1.1	0.0%	< 0.4	101%	90%	110%	99%	90%	110%	104%	70%	130%
Zinc	1		< 5.0	< 5.0	0.0%	< 5.0	101%	90%	110%	114%	80%	120%	104%	70%	130%
Mercury	1		< 0.02	< 0.02	0.0%	< 0.02	99%	80%	120%	103%	90%	110%	103%	70%	130%
Chromium VI	1		< 5	< 5	0.0%	< 5	99%	80%	120%	97%	90%	110%	100%	70%	130%
Cyanide, Free	1		< 2	< 2	0.0%	< 2	100%	80%	120%	100%	90%	110%	90%	70%	130%
Sodium	1		332000	322000	3.1%	< 500	98%	80%	120%	99%	90%	110%	92%	70%	130%
Chloride	1		60800	60000	1.3%	< 100	96%	90%	110%	99%	90%	110%	99%	70%	130%
Nitrate as N	1		8300	8160	1.7%	< 50	92%	90%	110%	101%	90%	110%	102%	70%	130%
Nitrite as N	1		< 50	< 50	0.0%	< 50	NA	90%	110%	90%	90%	110%	106%	70%	130%
Electrical Conductivity	1		4140	4040	2.4%	< 2	102%	80%	120%						
pH	1		7.16	7.17	0.1%	N/A	100%	90%	110%						

Certified By:

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Method Summary

CLIENT NAME: GOLDER ASSOCIATES LTD. **AGAT WORK ORDER: 11T501001**

PROJECT NO: 10-1134-0170 **ATTENTION TO: Radwan Tamr**

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Antimony	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Arsenic	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Barium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Beryllium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Boron	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Boron (Hot Water Extractable)	MET-93-6104	EPA SW 846 6010C; MSA, Part 3, Ch.21	ICP/OES
Cadmium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Chromium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Cobalt	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Copper	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Lead	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Molybdenum	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Nickel	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Selenium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Silver	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Thallium	MET-93-1003	EPA SW 846 3050B & 6020A	ICP-MS
Uranium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Vanadium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Zinc	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Chromium, Hexavalent	INOR-93-6029	SM 3500 B; MSA Part 3, Ch. 25	SPECTROPHOTOMETER
Cyanide, Free	INOR-93-6052	MOE CN-3015 & E 3009 A;SM 4500 CN	TECHNICON AUTO ANALYZER
Mercury	MET-93-6101	EPA SW 846 7471A 245.5	CVAAS
Electrical Conductivity (2:1)	INOR-93-6036	McKeague 4.12, SM 2510 B	EC METER
Sodium Adsorption Ratio (2:1)	INOR-93-6007	McKeague 4.12 & 3.26 & EPA SW-846 6010C	ICP/OES
pH, 2:1 CaCl2 Extraction	INOR-93-6031	MSA part 3 & SM 4500-H+ B	PH METER
Arsenic Leachate	MET-93-6103	EPA SW-846 1311 & 3010A & 6020A	ICP-MS
Barium Leachate	MET-93-6103	EPA SW-846 1311 & 3010A & 6020A	ICP-MS
Boron Leachate	MET-93-6103	EPA SW-846 1311 & 3010A & 6020A	ICP-MS
Cadmium Leachate	MET-93-6103	EPA SW-846 1311 & 3010A & 6020A	ICP-MS
Chromium Leachate	MET-93-6103	EPA SW-846 1311 & 3010A & 6020A	ICP-MS
Lead Leachate	MET-93-6103	EPA SW-846 1311 & 3010A & 6020A	ICP-MS
Mercury Leachate	MET-93-6100	EPA SW-846 1311 & 7470, 245.1	CVAAS
Selenium Leachate	MET-93-6103	EPA SW-846 1311 & 3010A & 6020A	ICP-MS
Silver Leachate	MET-93-6103	EPA SW-846 1311 & 3010A & 6020A	ICP-MS
Uranium Leachate	MET-93-6103	EPA SW-846 1311 & 3010A & 6020A	ICP-MS

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Method Summary

CLIENT NAME: GOLDER ASSOCIATES LTD. **AGAT WORK ORDER: 11T501001**

PROJECT NO: 10-1134-0170 **ATTENTION TO: Radwan Tamr**

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Dichlorodifluoromethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Chloromethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Vinyl Chloride	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Bromomethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Chloroethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Trichlorofluoromethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Acetone	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,1-Dichloroethylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Methylene Chloride	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
TRANS-1,2-Dichloroethylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Methyl tert-butyl Ether	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,1-Dichloroethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Methyl Ethyl Ketone	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
CIS 1,2-Dichloroethylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Chloroform	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,2- Dichloroethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,1,1-Trichloroethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Carbon Tetrachloride	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Benzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,2-Dichloropropane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Trichloroethylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Bromodichloromethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
CIS-1,3-Dichloropropene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Methyl Isobutyl Ketone	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
TRANS-1,3-Dichloropropene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,1,2-Trichloroethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Toluene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
2-Hexanone	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Dibromochloromethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Ethylene Dibromide	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Tetrachloroethylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,1,1,2-Tetrachloroethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Chlorobenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Ethylbenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
m & p-Xylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Bromoform	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Styrene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,1,2,2- Tetrachloroethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
o-Xylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,3-Dichlorobenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,4-Dichlorobenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,2-Dichlorobenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,2,4-Trichlorobenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Xylene Mixture (Total)	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,3-Dichloropropene (Cis + Trans)	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
n-Hexane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Toluene-d8	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
4-Bromofluorobenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Benzene	VOL-91-5010	MOE PHC E3421	(P&T)GC/MS

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Method Summary

CLIENT NAME: GOLDER ASSOCIATES LTD. **AGAT WORK ORDER: 11T501001**

PROJECT NO: 10-1134-0170 **ATTENTION TO: Radwan Tamr**

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Toluene	VOL-91-5010	MOE PHC E3421	(P&T)GC/MS
Ethylbenzene	VOL-91-5010	MOE PHC E3421	(P&T)GC/MS
Xylene Mixture (Total)	VOL-91-5010	MOE PHC E3421	(P&T)GC/MS
C6 - C10 (F1)	VOL-91-5010	MOE PHC E3421	(P&T)GC/FID
C6 - C10 (F1 minus BTEX)	VOL-91-5010	MOE PHC E3421	(P&T)GC/FID
C>10 - C16 (F2)	VOL-91-5010	MOE PHC E3421	GC/FID
C>10 - C16 (F2 minus Naphthalene)	VOL-91-5010	MOE PHC E3421	GC/FID
C6 - C16 (F1 + F2)	VOL - 5010	MOE PHC E3421	(P&T)GC/FID & GC/FID
C>16 - C34 (F3)	VOL-91-5010	MOE PHC E3421	GC/FID
C>16 - C34 (F3 minus PAHs)	VOL-91-5010	MOE PHC E3421	GC/FID
C>34 - C50 (F4)	VOL -91- 5010	MOE PHC- E3421	GC/FID
C>16 - C50 (F3 + F4)	VOL-91-5010	MOE E3421	GC/FID
Gravimetric Heavy Hydrocarbons	VOL-91-5010	MOE PHC E3421	BALANCE
C6 - C10 (F1)	VOL-91-5010	MOE PHC E3421	(P&T)GC/FID
C6 - C10 (F1 minus BTEX)	VOL-91-5010	MOE PHC E3421	(P&T)GC/FID
C>10 - C16 (F2)	VOL-91-5010	MOE PHC E3421	GC/FID
C>10 - C16 (F2 minus Naphthalene)	VOL-91-5010	MOE PHC E3421	GC/FID
C6 - C16 (F1 + F2)	VOL - 5010	MOE PHC E3421	(P&T)GC/FID & GC/FID
C>16 - C34 (F3)	VOL-91-5010	MOE PHC E3421	GC/FID
C>16 - C34 (F3 minus PAHs)	VOL-91-5010	MOE PHC E3421	GC/FID
C>34 - C50 (F4)	VOL -91- 5010	MOE PHC- E3421	GC/FID
C>16 - C50 (F3 + F4)	VOL-91-5010	MOE E3421	GC/FID
Gravimetric Heavy Hydrocarbons	VOL-91-5010	MOE PHC E3421	BALANCE
Naphthalene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
Acenaphthylene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
Acenaphthene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
Fluorene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
Phenanthrene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
Anthracene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
Fluoranthene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
Pyrene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
Benzo(a)anthracene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
Chrysene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
Benzo(b)fluoranthene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
Benzo(k)fluoranthene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
Benzo(a)pyrene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
Indeno(1,2,3-cd)pyrene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
Dibenzo(a,h)anthracene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
Benzo(g,h,i)perylene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
2-and 1-methyl Napthalene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
Chrysene-d12	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
Naphthalene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Acenaphthylene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Acenaphthene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Fluorene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Phenanthrene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Anthracene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Fluoranthene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Pyrene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Benzo(a)anthracene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS

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Method Summary

CLIENT NAME: GOLDER ASSOCIATES LTD. **AGAT WORK ORDER: 11T501001**

PROJECT NO: 10-1134-0170 **ATTENTION TO: Radwan Tamr**

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Chrysene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Benzo(b)fluoranthene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Benzo(k)fluoranthene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Benzo(a)pyrene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Indeno(1,2,3-cd)pyrene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Dibenz(a,h)anthracene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Benzo(g,h,i)perylene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
2-and 1-methyl Naphthalene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Chrysene-d12	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
C6 - C10 (F1)	VOL-91-5009	CCME Tier 1 Method	GC / FID
C6 - C10 (F1 minus BTEX)	VOL-91-5009	CCME Tier 1 Method	GC / FID
C>10 - C16 (F2)	VOL-91-5009	CCME Tier 1 Method	GC / FID
C>10 - C16 (F2 minus Naphthalene)	VOL-91-5009	CCME Tier 1 Method	GC / FID
C>16 - C34 (F3)	VOL-91-5009	CCME Tier 1 Method	GC / FID
C>16 - C34 (F3 minus PAHs)	VOL-91-5009	CCME Tier 1 Method	GC / FID
C>34 - C50 (F4)	VOL-91-5009	CCME Tier 1 Method	GC / FID
Gravimetric Heavy Hydrocarbons	VOL-91-5009	CCME Tier 1 Method	GRAVIMETRIC ANALYSIS
Moisture Content	VOL-91-5009	CCME Tier 1 Method	GRAVIMETRIC
Benzene	VOL-91-5009	EPA SW-846 5035 & 8260	P & T GC/MS
Toluene	VOL-91-5009	EPA SW-846 5035 & 8260	P & T GC/MS
Ethylbenzene	VOL-91-5009	EPA SW-846 5035 & 8260	P & T GC/MS
Xylene Mixture(Total)	VOL-91-5009	EPA SW-846 5035 & 8260	P & T GC/MS
C6 - C10 (F1)	VOL-91-5009	CCME Tier 1 Method	GC / FID
C6 - C10 (F1 minus BTEX)	VOL-91-5009	CCME Tier 1 Method	GC / FID
C>10 - C16 (F2)	VOL-91-5009	CCME Tier 1 Method	GC / FID
C>10 - C16 (F2 minus Naphthalene)	VOL-91-5009	CCME Tier 1 Method	GC / FID
C>16 - C34 (F3)	VOL-91-5009	CCME Tier 1 Method	GC / FID
C>16 - C34 (F3 minus PAHs)	VOL-91-5009	CCME Tier 1 Method	GC / FID
C>34 - C50 (F4)	VOL-91-5009	CCME Tier 1 Method	GC / FID
Gravimetric Heavy Hydrocarbons	VOL-91-5009	CCME Tier 1 Method	GRAVIMETRIC ANALYSIS
Moisture Content	VOL-91-5009	CCME Tier 1 Method	GRAVIMETRIC
Dichlorodifluoromethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Chloromethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Vinyl Chloride	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Bromomethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Chloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Trichlorofluoromethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Acetone	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1 Dichloroethylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Methylene Chloride	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
trans- 1,2-dichloroethylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Methyl tert-butyl ether	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1-Dichloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Methyl Ethyl Ketone	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
cis- 1,2-Dichloroethylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Chloroform	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,2 - Dichloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1,1-Trichloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Carbon Tetrachloride	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Benzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
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FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: GOLDER ASSOCIATES LTD. **AGAT WORK ORDER: 11T501001**

PROJECT NO: 10-1134-0170 **ATTENTION TO: Radwan Tamr**

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
1,2-Dichloropropane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Trichloroethylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Bromodichloromethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
cis-1,3-Dichloropropene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Methyl Isobutyl Ketone	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
trans-1,3-Dichloropropene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1,2-Trichloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Toluene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
2-Hexanone	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Dibromochloromethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Ethylene Dibromide	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Tetrachloroethylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1,1,2-Tetrachloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Chlorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Ethylbenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
m & p-Xylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Bromoform	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Styrene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1,2,2-Tetrachloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
o-Xylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,3-Dichlorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,4-Dichlorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,2-Dichlorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,2,4-Trichlorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,3-Dichloropropene (Cis + Trans)	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Xylene Mixture (Total)	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
n-Hexane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Toluene-d8	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
4-Bromofluorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Benzene	VOL - 5001	EPA 1311, EPA 8260	(P&T)GC/MS
Toluene	VOL 5001	EPA SW-846 5230B & 8260	(P&T)GC/MS
Ethylbenzene	VOL 5001	EPA SW-846 5230B & 8260	(P&T)GC/MS
m & p-Xylene	VOL 5001	EPA SW-846 5230B & 8260	(P&T)GC/MS
o-Xylene	VOL 5001	EPA SW-846 5230B & 8260	(P&T)GC/MS

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FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: GOLDER ASSOCIATES LTD. **AGAT WORK ORDER: 11T501001**

PROJECT NO: 10-1134-0170 **ATTENTION TO: Radwan Tamr**

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Antimony	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Arsenic	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Barium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Beryllium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Boron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cadmium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Chromium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cobalt	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Copper	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Lead	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Molybdenum	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Nickel	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Selenium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Silver	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Thallium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Uranium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Vanadium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Zinc	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Mercury	MET-93-6100	EPA SW-846 7470 & 245.1	CVAAS
Chromium VI	INOR-93-6034	SM 3500-Cr B	SPECTROPHOTOMETER
Cyanide, Free	INOR-93-6052	MOE METHOD CN- 3015 & SM 4500 CN- I	TECHNICON AUTO ANALYZER
Sodium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Chloride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Electrical Conductivity	INOR-93-6000	SM 2510 B	PC TITRATE
pH	INOR-93-6000	SM 4500-H+ B	PC TITRATE

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CHAIN OF CUSTODY RECORD

LABORATORY USE ONLY
Arrival Condition: ☒ Good ☐ Poor (complete "notes")
Arrival Temperature: 8.7, 7.9 AGAT WO #: 11T501001
Notes:

Client Information
Company: Golder Associates
Contact: Radwan Tamr
Address: 1025 Provincial Road, Windsor, Ontario
Phone: 519-250-3753 Fax:
Project: 11-1134-0170 PO:
AGAT Quotation #:
Please note, if quotation number is not provided, client will be billed full price for analysis.

Invoice To Same as Above? Yes/No (circle)
Company:
Contact:
Address:
Phone: Fax:

Report Information - reports to be sent to:
1. Name: Radwan Tamr
Email: rtamr@golder.com
2. Name:
Email:

Regulatory Requirements
☒ Regulation 153 Table 3 (Indicate one) ☐ Ind/Com ☒ Res/Park ☐ Agriculture
Soil Texture (check one) ☐ Coarse ☐ Med/Fine
☐ Sewer Use Region (Indicate one) ☐ Sanitary ☐ Storm
☐ Regulation 558 ☐ CCME ☐ Other (Indicate)
☐ Prov. Water Quality Objectives (PWQO)
☐ Nutrient Management Act (NMA)

Is this a drinking water sample (potable water intended for human consumption)? ☐ Yes ☒ No (If "Yes" please use the Drinking Water Chain of Custody Record)

Report Format
☐ Single Sample per page
☒ Multiple Samples per page
☐ Results by fax

Turnaround Time (TAT) Required*
Regular TAT: ☒ 5 to 7 Working Days
Rush TAT: (please provide prior notification)
Rush Surcharges Apply
☐ 3 to 5 Working Days
☐ 2 Working Days
☐ 1 Working Day
OR
DATE REQUIRED (Rush surcharges may apply):
*TAT is exclusive of weekends and statutory holidays

Sample Identification	Date Sampled	Time Sampled	Sample Matrix	# of Containers	Comments Site/ Sample Information	Metals and Inorganics	Metal Scan (exclud. Hg, B, Cr6)	CCME Fractions 1 to 4	VOCs	PAHs	PCBs	TCLP Metals/Inorganics	TCLP	Storm Sewer Use	Sanitary Sewer Use	BTEX					LABORATORY USE ONLY LAB SAMPLE ID
BH101-1B	June 10, 2011			Soil		✓		✓		✓						✓					
BH101-2B						✓		✓		✓						✓					
BH102-1A						✓		✓		✓						✓					
BH102-1B						✓		✓		✓						✓					
BH102-3A						✓		✓		✓						✓					
BH103-1D						✓		✓		✓						✓					
BH103-2C						✓		✓		✓						✓					
BH103-3B						✓		✓		✓						✓					
BH104-1D						✓		✓		✓						✓					
BH104-2C						✓		✓		✓						✓					
BH104-3A						✓		✓		✓						✓					
BH105-1D						✓		✓		✓						✓					
BH105-2A						✓		✓		✓						✓					
BH105-3B						✓		✓		✓						✓					

Samples Relinquished By (print name & sign)	Date/Time	Samples Received By (print name & sign)	Date/Time
Clayton Severes	June 10, 2011		1:10
Samples Relinquished By (print name & sign)	Date/Time	Samples Received By (print name & sign)	Date/Time

Pink Copy - Client
Yellow + Golden Copy - AGAT
White Copy - AGAT

NO: 149906

AGAT Laboratories

CHAIN OF CUSTODY RECORD

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http://webearth.agatlabs.com

LABORATORY USE ONLY
Arrival Condition: ☒ Good ☐ Poor (complete "notes")
Arrival Temperature: 8.7, 7.9 AGAT WO #: _____
Notes: _____

Client Information
Company: Golder Associates
Contact: Radyan Tamr
Address: 1025 Provincial Road
Phone: 519-850-3733 Fax: _____
Project: 11-1134-0170 PO: _____
AGAT Quotation #: _____
Please note, if quotation number is not provided, client will be billed full price for analysis.

Invoice To Same as Above? Yes/No (circle)
Company: _____
Contact: _____
Address: _____
Phone: _____ Fax: _____

Report Information - reports to be sent to:
1. Name: Radyan Tamr
Email: RTamr@Golder.com
2. Name: _____
Email: _____

Regulatory Requirements
☑ Regulation ~~153~~ Table 3 (Indicate one) ☐ Ind/Com ☑ Res/Park ☐ Agriculture
Soil Texture (check one) ☐ Coarse ☐ Med/Fine
☐ Sewer Use Region _____ (Indicate one) ☐ Sanitary ☐ Storm
☐ Regulation 558 ☐ CCME ☐ Other (indicate) _____
☐ Prov. Water Quality Objectives (PWQO) ☐ Nutrient Management Act (NMA)

Is this a drinking water sample (potable water intended for human consumption)? ☐ Yes ☒ No (If "Yes" please use the Drinking Water Chain of Custody Record)

Report Format
☐ Single Sample per page
☑ Multiple Samples per page
☐ Results by fax

Turnaround Time (TAT) Required*
Regular TAT:
☑ 5 to 7 Working Days
Rush TAT: (please provide prior notification)
Rush Surcharges Apply
☐ 3 to 5 Working Days
☐ 2 Working Days
☐ 1 Working Day
OR
DATE REQUIRED (Rush surcharges may apply): _____
*TAT is exclusive of weekends and statutory holidays

Sample Identification	Date Sampled	Time Sampled	Sample Matrix	# of Containers	Comments Site/ Sample Information	Metals and Inorganics	Metal Scan (exclud. Hg, B, CrVI)	CCME Fractions 1 to 4	VOCs	PAHs	PCBs	TCLP Metals/Inorganics	TCLP BTEX	Storm Sewer Use	Sanitary Sewer Use	BTEX	LABORATORY USE ONLY LAB SAMPLE ID
BH 106 - 1C	June 10, 2011		Soil			✓		✓		✓						✓	
BH 106 - 2C						✓		✓		✓						✓	
BH 107 - 1D						✓		✓		✓						✓	
BH 107 - 2B						✓		✓		✓						✓	
BH 107 - 3B						✓		✓		✓						✓	
BH 108 - 1C						✓		✓		✓						✓	
BH 108 - 2A						✓		✓		✓						✓	
BH 108 - 3B						✓		✓		✓						✓	
MW 107 - 1			Water	10		✓		✓		✓						✓	
MW 101 - 1			Water	10		✓		✓		✓						✓	
Fill Comp.			Soil									✓	✓				
Native Comp			Soil									✓	✓				

Samples Relinquished By (print name & sign)	Date/Time	Samples Received By (print name & sign)	Date/Time
Clayton Seeves	June 10, 2011		June 11
Samples Relinquished By (print name & sign)	Date/Time	Samples Received By (print name & sign)	Date/Time
			1:10

Pink Copy - Client
Yellow + Golden Copy - AGAT
White Copy - AGAT

PAGE 2 of 2
NO: 149903

At Golder Associates we strive to be the most respected global group of companies specializing in ground engineering and environmental services. Employee owned since our formation in 1960, we have created a unique culture with pride in ownership, resulting in long-term organizational stability. Golder professionals take the time to build an understanding of client needs and of the specific environments in which they operate. We continue to expand our technical capabilities and have experienced steady growth with employees now operating from offices located throughout Africa, Asia, Australasia, Europe, North America and South America.

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Australasia	+ 61 3 8862 3500
Europe	+ 356 21 42 30 20
North America	+ 1 800 275 3281
South America	+ 55 21 3095 9500

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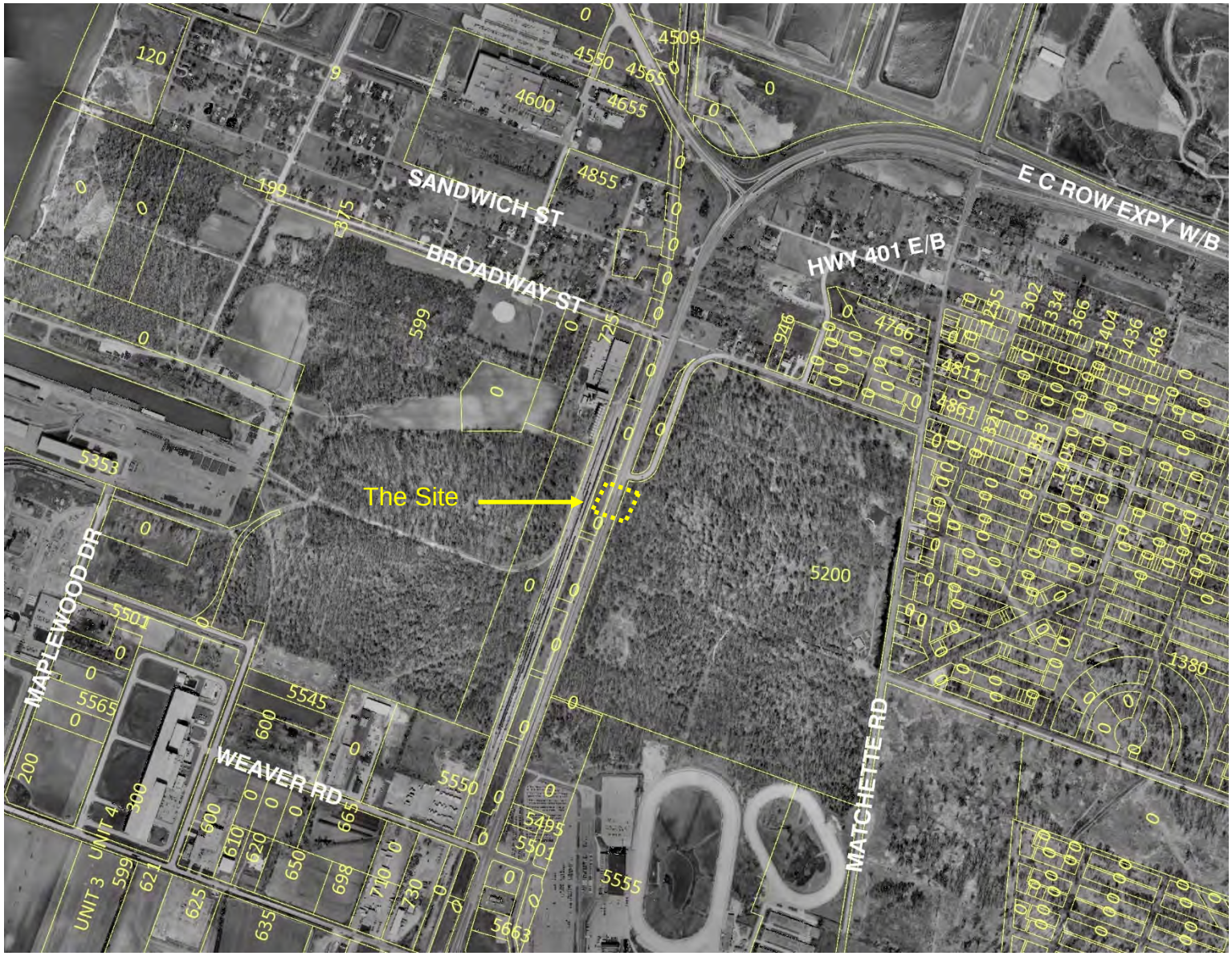
Golder Associates

Appendix B

Aerial Photographs

Aerial Photograph	wood.	N	Date: March 2021	Scale: Not to Scale	Project No.:
1954			Drawn by: CM	Approved by: CN	IM20104013

Aerial Photograph	wood.	N	Date: March 2021	Scale: Not to Scale	Project No.:
1987			Drawn by: CM	Approved by: CN	IM20104013.3000.9



Aerial Photograph	wood.	N	Date: March 2021	Scale: Not to Scale	Project No.: IM20104013.3000.9
2000			Drawn by: CM	Approved by: CN	

Aerial Photograph	wood.	N	Date: March 2021	Scale: Not to Scale	Project No.:
2019			Drawn by: CM	Approved by: CN	IM20104013.3000.9

Appendix C

Photographs

Photo 1:
View of the west side of the Project Area (grassed area west of Ojibway Parkway).

Date:
March 31, 2021

Direction:
Southwest

Photo 2:
View of the west side of the Project Area (asphalt walking trail and grassed area west of Ojibway Parkway).

Date:
March 31, 2021

Direction:
South

Photo 3:
View of the central and east side of the Project Area (Ojibway Parkway and Ojibway Park).

Date:
March 31, 2021

Direction:
Southeast

Photo 4:
View of the central and east side of the Project Area (Ojibway Parkway and Ojibway Park).

Date:
March 31, 2021

Direction:
Southeast

Photo 5:
View of the west-adjacent properties, ETR corridor and Black Oak Heritage Park.

Date:
March 31, 2021

Direction:
West

Photo 6:
View of Dainty Rice, located northwest of the Project Area (on west side of ETR corridor).

Date:
March 31, 2021

Direction:
Northwest

Appendix D

Qualifications of the Assessor

Qualifications of the Assessors

Cindy McKee, P.Geo.
Senior Environmental Geoscientist

Ms. McKee is a senior environmental geoscientist and qualified person (QPESA) with over twenty-two years' experience in the field of environmental consulting. She has been involved in a wide variety of environmental projects including Phase One ESAs, Phase Two ESAs, site remediation programs, Record of Site Condition (RSC) filings and underground storage tank (UST) removals. Ms. McKee has been the project management, technical report writer and field supervisor on a number of environmental projects including small to large residential, commercial and industrial facilities, including manufacturing and automotive plants, retail petroleum outlets, former railway properties, and numerous federal and provincial government facilities contaminated by petroleum hydrocarbons (PHCs), heavy metals, polycyclic aromatic hydrocarbons (PAHs) and polychlorinated biphenyls (PCBs). Throughout her career, Ms. McKee's activities have included proposal development, project management, training and supervision of junior field staff.

Claudia Naas, M.Sc.
Environmental Scientist

Ms. Naas is an environmental scientist with approximately 23 years of experience in environmental sector working as a researcher and a consultant. Her diverse experience includes ground water research, contaminant hydrogeology, fate and transport studies, feasibility studies and project management of environmental investigations. Ms. Naas's experience includes the use of passive in-situ technologies to promote aerobic/anaerobic degradation of contaminants. Key clients have included Defense Construction Canada, Ministry of Environment, Metrolinx, Toronto Transit Commission and various other public and private sector clients.

Appendix E

Report Limitations

Limitations

1. The work performed in the preparation of this report and the conclusions presented are subject to the following:
    a. The Standard Terms and Conditions which form a part of our Professional Services Contract;
    b. The Scope of Services;
    c. Time and Budgetary limitations as described in our Contract; and
    d. The Limitations stated herein.
2. No other warranties or representations, either expressed or implied, are made as to the professional services provided under the terms of our Contract, or the conclusions presented.
3. The conclusions presented in this report were based, in part, on visual observations of the Project Area and attendant structures. Our conclusions cannot and are not extended to include those portions of the Project Area or structures, which are not reasonably available, in Wood's opinion, for direct observation.
4. The environmental conditions at the Project Area were assessed, within the limitations set out above, having due regard for applicable environmental regulations as of the date of the inspection. A review of compliance by past owners or occupants of the Project Area with any applicable local, provincial or federal bylaws, orders-in-council, legislative enactments and regulations was not performed.
5. The Project Area history research included obtaining information from third parties and employees or agents of the owner. No attempt has been made to verify the accuracy of any information provided, unless specifically noted in our report.
6. Where testing was performed, it was carried out in accordance with the terms of our contract providing for testing. Other substances, or different quantities of substances testing for, may be present on-Project Area and may be revealed by different or other testing not provided for in our contract.
7. Because of the limitations referred to above, different environmental conditions from those stated in our report may exist. Should such different conditions be encountered, Wood must be notified in order that it may determine if modifications to the conclusions in the report are necessary.
8. The utilization of Wood's services during the implementation of any remedial measures will allow Wood to observe compliance with the conclusions and recommendations contained in the report. Wood's involvement will also allow for changes to be made as necessary to suit field conditions as they are encountered.
9. This report is for the sole use of the party to whom it is addressed unless expressly stated otherwise in the report or contract. Any use which any third party makes of the report, in whole or the part, or any reliance thereon or decisions made based on any information or conclusions in the report is the sole responsibility of such third party. Wood accepts no responsibility whatsoever for damages or loss of any nature or kind suffered by any such third party as a result of actions taken or not taken or decisions made in reliance on the report or anything set out therein.
10. This report is not to be given over to any third party for any purpose whatsoever without the written permission of Wood.
11. Provided that the report is still reliable, and less than 12 months old, Wood will issue a third-party reliance letter to parties that the client identifies in writing, upon payment of the then current fee for such letters. All third parties relying on Wood's report, by such reliance agree to be bound by our proposal and Wood's standard reliance letter. Wood's standard reliance letter indicates that in no event shall Wood be liable for any damages, howsoever arising, relating to third-party reliance on Wood's report. No reliance by any party is permitted without such agreement.