Phase Two Environmental Site Assessment
Burnside Site, NCC Property Asset 95979
Ottawa, Ontario

Revision: 0 (Final)

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APEC - Area of Potential Environmental Concern

AST – Aboveground Storage Tank

BTEX – Benzene, Toluene, Ethylbenzene, Xylenes

CCME – Canadian Council Ministers of the Environment

COC – Contaminant of Concern

COPC – Contaminant of Potential Concern

CSM – Conceptual Site Model

DEM – Digital Elevation Model

ESA – Environmental Site Assessment

FIGQG – Federal Interim Groundwater Quality Guidelines

GIS – Geographical Information System

LiDAR – Light Detection and Ranging

mASL – metres above sea level

mBGS – metres below ground surface

mBTOR – metres below top of riser

MOE – Ontario Ministry of the Environment (information prior to June 24, 2014)

MTM – Modified Transverse Mercator

MNR – Ontario Ministry of Natural Resources

MOECC - Ontario Ministry of the Environment and Climate Change (information after June 24, 2014)

MECP – Ontario Ministry of the Environment, Conservation and Parks (information after June 28, 2019)

NCC – National Capital Commission

ODWS – Ontario Drinking Water Standards

OGS – Ontario Geological Survey

PCA – Potentially Contaminating Activity

PCB – Polychlorinated Biphenyls

PAH – Polycyclic Aromatic Hydrocarbon

PHC – Petroleum Hydrocarbons

QP – Qualified Person

RSC – Record of Site Condition

SJMP – Sir John A. Macdonald Parkway

SSRA – Site Specific Risk Assessment

TPH – Total Petroleum Hydrocarbons

1 EXECUTIVE SUMMARY

Geofirma Engineering Ltd. was retained by the National Capital Commission (NCC), to conduct a Phase Two Environmental Site Assessment (ESA) for the Burnside property, in Ottawa, Ontario (the site). The site includes several smaller properties and municipal PIN numbers. The site is currently owned by the National Capital Commission.

The NCC intends on applying for a municipal zoning change for the Phase Two ESA property from parkland to diplomatic mission use (i.e., office space defined as commercial under O.Reg. 153/04) to facilitate development the site. The Phase Two ESA was completed in accordance with the general requirements of O. Reg. 153/04 as requested by the NCC for the planned City of Ottawa zoning application. The Phase Two ESA is a follow-up report to a Phase One ESA report prepared by Geofirma in accordance with O.Reg. 153/04 requirements. Neither the Phase One nor Phase Two ESA reports are intended to support filing for a Record of Site Condition.

The site has been subject to commercial, industrial and parkland uses since the mid to late 1800's. Historical use of the property included lumber yards, parkland, residential housing and the importation of large amounts of fill materials in the former area of Lazy Bay and over the remainder of the site. Although the Phase One ESA identifies several PCAs within the Phase One study area, historical and current soil and groundwater quality investigations on the site show that none of the identified PCA's surrounding the site have negatively impacted environmental conditions on the site. One APEC (APEC-1, PCA #30) due to importation of poor quality fill is identified for the entire site.

The site stratigraphy consists of a thin veneer of topsoil overlying generally one to three metres of granular fill overlying about two metres of native alluvial sand in the former Lazy Bay fill area and a discontinuous layer of native silty sandy glacial till found in an eroded bedrock fault depression. Fill materials in APEC-1 consist of a mixture of silt, sand, clay, cobbles and boulders with debris including asphalt, brick, concrete, plastics, glass, metal, cinders, ashes and wood pieces. These overburden deposits are underlain by horizontally and vertically fractured grey limestone of the Bobcaygeon Formation, with minor dark grey to black shale layers.

Approximate depth to bedrock ranges from 0 m to 6.0 m with a site average of about 1.5 m. The depth to bedrock is greatest in the centre of the site near the former Lazy Bay fill area and is a minimum in the western part of the site. The depth to bedrock in the eastern part of the site approximates 1.5 to 2 m. Given the site stratigraphy, MECP Table 7 shallow soil standards for coarse-textured soil, non-potable groundwater and parkland use are applicable to the site.

Groundwater flow occurs primarily within the bedrock as the groundwater table is typically found at or below the bedrock surface at the site. Groundwater flow at the site is focussed to the former Lazy Bay fill area and discharges to the Ottawa River located about 70 m north of the northern property line via permeable fill and alluvial deposits. Some groundwater flow will also be channelled via overburden infill of utility excavations into bedrock (i.e., storm and sanitary sewers and low-pressure forcemain) and via the bedrock depression created by eroded splays of the Gloucester Fault.

The results of historical and 2019 laboratory soil quality testing show that the imported fill across the entire site frequently contains metals (lead, barium, zinc, selenium, copper, vanadium, mercury, antimony, molybdenum and cadmium) and heavy molecular weight PAH exceedences of MECP Table

7 standards and that general inorganics, PHCs/BTEX, PCBs and VOCs are not significant COCs in site soil. The sporadic but widespread occurrence of the metal and PAH COCs in site soil is consistent with the site history. A reasonable and conservative assumption is that all fill at the site is contaminated by metals and PAHs. Soil quality testing also shows that the minor pockets of native soil at the site including sandy alluvium and glacial till are not contaminated. Consequently, the vertical limits of metal and PAH contaminated soil are defined by the bottom of the topsoil layer and top of either the native sandy alluvium, glacial till or bedrock.

The results of historical and 2012 and 2014 laboratory testing of groundwater quality show that groundwater at the site is not contaminated above MECP Table 7 standards. This conclusion is consistent with the observations that most of contaminated soil is found above the groundwater table and most of the identified soil COCs are low solubility and low mobility chemicals in groundwater systems.

The site does not meet applicable site condition standards, MECP Table 7 for soil.

2 INTRODUCTION

Geofirma Engineering Ltd. was retained by the National Capital Commission (NCC), to conduct a Phase Two Environmental Site Assessment (ESA) for the Burnside property, in Ottawa, Ontario (the site). The site includes several smaller properties and municipal PIN numbers and is currently parkland. The site location is provided in Figure 9.1 in Section 9. The site is currently owned by the National Capital Commission.

The Phase Two ESA was completed following a Phase One ESA (Geofirma Engineering Ltd., 2019) completed and submitted to the NCC under separate cover. Following the completion of the Phase One ESA and as defined in Section 32 of O.Reg 153/04, the site is mandated to a Phase Two ESA based on historic site usage and the known historical presence of contaminants exceeding current Ontario Ministry of Environment, Conservation and Parks (MECP) standards in site soil. Additionally, Phase Two ESA investigations may support future remediation or risk assessment, as deemed necessary to support site redevelopment.

The Phase Two ESA work was completed in accordance with the general requirements of Canadian Standards Association (CSA) Standard *"Z769-00 – Phase II Environmental Site Assessment - R2018*" (CSA, 2018) and, more importantly, the specific MECP mandatory requirements of Phase Two Environmental Site Assessments as defined in Part VIII and Schedule E of Ontario Regulation 153/04 (as amended). The Phase Two ESA was completed in accordance with the requirements of O. Reg. 153/04 following MOE (2011b) guidance, as the property owner intends on applying for a municipal zoning change for the Phase Two ESA property from parkland to diplomatic mission use (i.e., office space defined as commercial under O.Reg. 153/04), in hopes of developing the site. Property redevelopment does not require completion of a Record of Site Condition.

Main mandatory tables and figures are provided in Section 9 as per O.Reg. 153/04 requirements. Other supplementary tables and figures are provided in report sections where they are discussed.

2.1 Site Description

The Phase Two ESA property is bordered by parkland and the Sir John A. Macdonald Parkway (the parkway or SJMP) to the north; Slidell Street and the City of Ottawa Bayview Works Yard to the east; Burnside Avenue and residential uses to the south; and Hinchey Avenue and residential uses and Forward Avenue and the Embassy of Indonesia to the west.

The irregular-shaped site has an area of approximately 3 hectares and is vacant parklands with minor wooded areas. The northern boundary of the site is located about 70 m south of the Ottawa River. The current site layout is provided in Figure 9.2.

2.2 Property Ownership

The site is currently owned by the National Capital Commission. The main contact for the assessment of the site is Andrea McKenzie, Senior Environmental Advisor, National Capital Commission, 202-40 Elgin Street, Ottawa, ON, K1P 1C7.

2.3 Current and Proposed Future Uses

The site is currently vacant grassed parkland with minor treed areas with no municipal address. According to the City of Ottawa Zoning information provided on the geoOttawa website, the central and eastern portions of the site are currently zoned as O1 – Parks and Open Space Zone. The western portion of the site is currently zoned as R5 – Residential Fifth Density Zone.

Future re-development to diplomatic mission use (i.e., office space defined as commercial under O.Reg. 153/04) is contemplated for the property. The details of future property use are not known at this time. Based on this proposed change in land use to include diplomatic mission use, a Record of Site Condition would not be required for site redevelopment.

2.4 Applicable Site Condition Standards

In accordance with the regulation, the applicable site conditions standards for the NCC Burnside site, are MECP *Table 7 Shallow Soils in a Non-Potable Ground Water Condition, Coarse-Textured Soils* (MOE, 2011a).

The site is located in the developed part of Ottawa, and is serviced by municipal water supply; drinking water wells will not be established at the site, or within a 250 metre radius of the site. The City of Ottawa has not been notified of the intent to apply non-potable groundwater standards to the site. The overburden that exists on the site is generally medium- to coarse-grained fill material with an average thickness of less than 2 metres (see Figure 9.7). The nearest water body proximate to the site is the Ottawa River located greater than 30 m to the north of the site.

The site is not environmentally sensitive. It is not within, adjacent to or within 30 m of an area of natural significance. Soil pH, based on historical and current Phase Two ESA testing is within acceptable ranges (i.e., 5 to 9 pH units for surface soils). Although the site currently has parkland use, proposed future development may include commercial structures. Parkland and residential standards are applied in the Phase Two ESA.

3 BACKGROUND INFORMATION

3.1 Physical Setting

Information on site topography, hydrology and geology were obtained from review of surficial and bedrock geology mapping, topographical maps, information obtained from Google Earth website and information provided in the Phase One ESA (Geofirma Engineering Ltd., 2019) and historical reports.

Topographical relief at the site is governed by bedrock depths and fill areas on the site. The highest area of the site, with an elevation of approximately 63 metres above sea level (mASL) is at the corner of Burnside Avenue and Hinchey Street, along the southwestern boundary of the site. The site slopes to the northwest corner and to the eastern boundary, both with elevations of approximately 58 mASL according to Google Earth elevation information. The lowest point on the site appears to the approximately 55 mASL along the SJMP in the northcentral portion of the site.

Nearby permanent surface water bodies include the Ottawa River which is located approximately 70 m north of the site. The shallow groundwater table is located near the limestone bedrock surface of the site, at depths on the order of 3 to 5 metres below grade. Shallow groundwater from the site discharges to the Ottawa River.

Surface drainage at the site is directed north and east to catch basins at SJMP, the east end of Burnside Avenue and to Slidell Street.

The geological setting of the area is described as follows:

- Surficial Geology (Ontario Geological Survey, 2010): Paleozoic bedrock and a small sliver at the western boundary as stone-poor sandy silty to silty sand-textured till on Paleozoic terrain.

- Bedrock Geology (Armstrong and Dodge, 2007): Middle Ordovician Bobcaygeon Formation consisting of limestone with minor shales in the upper part. Williams et al., (1984) maps several northwest-striking splays of the regional Gloucester Fault as being present near the eastern site boundary.

In historical investigations (Duke Engineering & Services (Canada), DE&S, 2000; 2001; Intera Engineering Ltd., 2002a;, CH2MHILL, 2005; and EXP, 2018) the geology of the site and surrounding area was shown to be generally 1 to 5 m of granular fill with waste materials overlying aphanitic to fine grained, medium to thickly bedded, grey limestone presumably of the Bobcaygeon Formation. Some native materials in the form of a basal silty clayey sand glacial till may also be present on top of bedrock and within bedrock depressions caused by erosion along splays of the Gloucester Fault. Thickness of overburden material appears to greatest in the former Lazy Bay fill area located in the central and eastern parts of the property.

There are no areas of natural significance, as defined by O.Reg. 153/04 (as amended) located on or within 250 m of the site based on Ontario Ministry of Natural Resources (2012) data as provided in the MNR GIS database.

3.2 Past Investigations

Many historical environmental assessment reports have been prepared for the site and surrounding areas. The following list while not exhaustive, describes the pertinent information necessary for the purposes of this Phase Two ESA. Reports are listed in chronological order of completion date. Historical sampling locations are provided on Figure 9.3.

3.2.1 Mapping and Assessment of Former Industrial Sites – Intera Technologies Ltd. (1988)

This report entitled: *Mapping and Assessment of Former Industrial Sites, City of Ottawa – July 1988* was completed for the City of Ottawa to identify and inventory former industrial sites within the City from 1850 to 1984 that potentially handled or produced hazardous chemicals and therefore might create site contamination.

No former industrial sites were identified on the site.

The Bayview and Slidell Landfill was identified approximately 50 m east of the site and the Stonehurst and Bayview Landfill was identified approximately 200 m south of the site, however no additional information for these landfills was provided in the report.

The closest former industrial property was located approximately 100 m south of the site. Modern Containers Ltd. was reported at 20 Bayview Road and was in operation in the 1940's. This company was the manufacturer of metal toilet tube containers. No additional information was provided for the property.

No other industrial sites were identified within the 250 m radius site study area.

3.2.2 Phase I and II Environmental Site Assessment - DE&S (2000)

This report entitled: *Phase I and II Environmental Site Assessment, Burnside Vacant Land, Ottawa, Ontario – July 2000* was completed for the National Capital Commission on a small part of the current NCC Burnside site along Forward Avenue to identify any potential historical land uses of environmental concern and investigate potential soil contamination concerns based on landfilling and historical industrial activities in the surrounding area.

The Phase I ESA portion of the report did not identify any historical owners on the subject property of environmental concern, however it was noted that Lazy Bay was infilled in the 1960's.

As part of the Phase II ESA investigation, a total of ten test pits (TP1 to TP10) were excavated in the northern portion of the property as the southern portion was being used as a temporary gravel parking lot at the time of the work. Minimal overburden was encountered on the property and waste fill materials were found in 8 of the 10 test pits. Waste materials including wood, metals and concrete were identified at surface in the treed areas and concrete building foundations were also observed. Waste materials identified in the test pits, mainly along the western boundary and near the parking area included concrete, brick, plastic, polystyrene insulation, asphalt, asphalt singles, metal and glass. Three soil samples were submitted for metals and one for polycyclic aromatic hydrocarbons (PAH). There were no total petroleum hydrocarbon (TPH) soil samples submitted as there was no visual or olfactory evidence of potential contamination. Groundwater was not encountered and therefore not

sampled as part of this work.

Soil samples were compared to the 1997 *Ontario Ministry of the Environment, Guideline for Use at Contaminated Sites in Ontario* (MOE Guideline), Table F (background values). Table F values were used as the overburden encountered was less than 2 meters thick across the site, making it considered a sensitive site according to the regulation. Soil was also compared to the *1999 Canadian Council of Ministers of the Environment, Interim Canadian Environmental Quality Criteria for Contaminated Sites* (CCME Guideline) or *1997 Recommended Canadian Soil Quality Guidelines* for residential/parkland land use.

The soil sample from TP-3 exceeded both MOE Table F and CCME guidelines for lead, molybdenum and zinc. The soil sample from TP-1 and TP-6 exceeded MOE Table F guideline for molybdenum. The soil sample collected TP-7 exceeded all 16 PAH parameters when compared to MOE Table F guidelines and 8 PAH parameters when compared to CCME guidelines.

Additional investigations were recommended to further characterize the site.

It should be noted to avoid confusion with later sampling at the site these test pits are labelled as TP#A on figures in this report showing historical sampling locations.

3.2.3 Phase II Environmental Site Assessment – DE&S (2001)

This report entitled: *Phase II ESA, Burnside Site – April 2001* was completed for the National Capital Commission to investigate soil and groundwater conditions at the site to address the filling of Lazy Bay, the presence of surface and subsurface construction debris and elevated polycyclic aromatic hydrocarbons (PAH) historically identified in soils. The site was separated into three distinct areas, Area A, B and C. Area A is the part of the site previously investigated by DE&S in 2000.

A total of 49 test pits (TP1 to TP49) were excavated across the site to bedrock refusal or a maximum of 3 metres below ground surface (mBGS). It was reported that the majority of the site was covered in approximately 0.2 m of topsoil underlain by sand and gravel fill with metals, bricks, ash, glass and wood overlying the bedrock. Some of the test pits also included plastic, concrete and fabrics. Overburden ranged from 0.2 m to greater than 3 m with no native soils encountered on the site. Soil sample analyses included a total of 55 samples for metals, 22 samples for PAHs and 5 samples for benzene, ethylbenzene, toluene, xylenes (BTEX) and TPH. Groundwater was only encountered in one test pit TP6 and was sampled for metals and general chemistry parameters.

For the purposes of this report MOE Table F guidelines were not used, and instead the MOE Table B guidelines for surface soil and groundwater criteria in a residential/parkland land use for a non-potable groundwater condition was used in addition to the CCME guidelines used previously.

A total of 27 of the 55 metals soil samples showed exceedences of CCME and/or MOE Table B guidelines with these mainly distributed across areas A, B and C. Metals parameters exceeding guidelines included lead, copper, zinc, barium and total chromium. A total of 10 of the 21 PAH soil samples showed exceedences of CCME and/or MOE Table B guidelines with these distributed across areas A and B. Of the 5 BTEX/TPH soil samples, only one exceeded CCME guidelines. The groundwater sample showed no exceedences of applicable guidelines.

Although this ESA report provides the most extensive set of soil sampling and laboratory analyses, the analyte lists are incomplete with respect to current MOE (2011a) standard lists. Soil sampling did not include testing for boron, hot-water soluble boron, hexavalent chromium, mercury and uranium, as well as general inorganic parameters of cyanide, electrical conductivity and SAR. As this work predates development of CCME PHC-F1 to -F4, such analyses are lacking, and instead TPH_{gas}, TPH_{diesel} and $TPH_{heavy\ oil}$ results are reported.

It was recommended that a Site Specific Risk Assessment be completed for the site.

3.2.4 Risk Assessment and Risk Strategy Report - Intera Engineering Ltd. (2002a)

This report entitled: *Risk Assessment & Risk Strategy Report, Burnside Site, Ottawa, ON – March 2002* was completed for the National Capital Commission as recommended in the former Phase II ESA report.

Five groundwater monitoring wells (MW-1 to MW-5) were drilled as part of the site-specific risk assessment (SSRA) and sampled for general chemistry, metals and PAHs. Groundwater results were compared to 1997 MOE Table B guidelines for metals and PAHs, however because there were no guideline values for general chemistry parameters, these parameters were compared to 2001 *Ontario Drinking Water Quality Standards/Objectives* (ODWS). There were no exceedences of metals or PAH parameters when compared to applicable guidelines. Elevated levels of chloride in groundwater were reported which was attributed to road salting activities.

Submission of surficial soil samples from 2001 was also completed as part of this risk assessment for PAHs and metals. Once again all soil results (historical test pitting results and current surficial soil samples) were compared to MOE Table B guidelines. It was noted that none of the soil contaminants exceeding MOE Table B criteria had cleanup guidelines based on soil to groundwater leaching and metals and PAHs were not shown in groundwater concentrations above MOE non-potable groundwater guidelines, which was the reasoning for using the MOE Table B guidelines.

Deeper soil samples showed exceedences of MOE and CCME guidelines for copper, lead, zinc and total chromium, and PAH parameters. One sample marginally exceeded the benzene guideline in the former parking area on Area A. No exceedences of TPH were noted in deeper soils.

Marginal exceedences of beryllium, total chromium and selenium were noted in surficial soils when compared to applicable guidelines. Four marginal exceedences of PAH parameters were noted when compared to CCME guidelines, but these met MOE guidelines.

The results of the SSRA showed that the human exposure to metals and PAHs was limited by the 0.2 m of clean surficial soil covering the site. The SSRA also showed that risks to soil microorganisms, microbial processes and some terrestrial invertebrates were not considered significant.

Based on the above, it was recommended that residential or institutional uses that would involve human occupancy should be prohibited until an SSRA demonstrates that it does not pose undue risks. It was also recommended that growing food for human consumption should be prohibited.

Ongoing groundwater monitoring was recommended as well as continued annual inspections to ensure contaminated soils were not exposed at surface.

3.2.5 Inspection and Groundwater Monitoring - Intera Engineering Ltd. (2002b)

This report entitled: *Inspection and Groundwater Monitoring, Burnside Site, Ottawa – December 2002* was completed for the National Capital Commission to satisfy the recommendation in the above risk assessment report for the inspection of surficial soils and annual groundwater monitoring.

A site inspection showed that contaminated soils were not being exposed at surface and no stressed vegetation was observed.

The five monitoring wells located on the site were sampled and analysed for metals and PAHs. There were no exceedences of 1998 MOE Table B guidelines in any of the samples.

3.2.6 2003 Inspection and Groundwater Monitoring - Intera Engineering Ltd. (2003)

This report entitled: *2003 Inspection and Groundwater Monitoring, Burnside Site – November 2003* was completed for the National Capital Commission to as part of the annual surficial soils inspection and groundwater monitoring.

A site inspection showed that contaminated soils were not being exposed at surface and no stressed vegetation was observed.

The five monitoring wells located on the site were sampled and analysed for metals and PAHs. There were no exceedences of 1998 MOE Table B guidelines in any of the samples.

3.2.7 Lemieux Forcemain Easement Properties, Phase 2 ESA - CH2MHILL (2005)

This report entitled: *Lemieux Forcemain Easement Properties, Ottawa, Ontario, Phase 2 Environmental Site Assessment – November 2005 (DRAFT)* was completed for the City of Ottawa to assess soil and groundwater conditions within the easement lands for the proposed forcemain and to identify any health and safety issues that would need to be addressed during construction.

Soil and groundwater conditions were investigated by drilling two boreholes which were completed as monitoring wells (CH2M MW-1 and CH2M MW-2), as well as excavating three test pits (CH2M-TP3 to CH2M-TP5). Soils encountered at the site included fill materials consisting of sand and gravel with some brick, wood, and glass.

Soil and groundwater samples were submitted for selected parameters including metals, VOCs, PAH, petroleum hydrocarbons (PHC), polychlorinated biphenyls (PCBs) and pH.

MOE *Ontario Regulation 153/04 (O. Reg 153/04)* came into effect in 2004 and replaced the former 1998 MOE Guidelines. The *Soil, Ground Water and Sediment Standards for Use under Part XV.1 of the Environmental Protection Act (2004)* was used to assess groundwater and soil conditions at the site. MOE Table 1 values (background) were used as it was determined that soils along the easement were less than 2 m thick, therefore making the work area a sensitive site under the regulation.

Metals parameters in soil exceeded MOE Table 1 standards in all boreholes and test pits except CM2M MW-2. Soil BTEX parameters exceeded MOE Table 1 standards in all five samples submitted for analysis. PAH soil exceedences of MOE Table 1 standards were identified in CH2M-TP5. There

were no exceedences of PHC or PCB standards.

Groundwater exceedences of metals MOE Table 1 standards for cobalt and/or copper in all samples (except the duplicate). PAH exceedences were noted in all samples, except CH2M MW-2, however this sample had laboratory analytical detection limits above that of the applicable standards. There were no exceedences of BTEX, VOC, PHC or PCB standards.

3.2.8 Enhanced Phase I ESA - Trow Associates Inc. (2008)

This report entitled: *Enhanced Phase I Environmental Site Assessment, Ottawa River Parkway, Ottawa, Ontario, Property Asset #95979 – December 2008* was completed for the National Capital Commission to determine if land uses on and surrounding the site impacted environmental conditions at the site.

This Phase I ESA covered a much larger stretch of the Parkway and was divided into five separate sections (Section A to E). Only Section E covered the subject site, however Section E also covered a larger amount of land to the west and north.

The Burnside site was identified as an area of potential environmental concern (APEC) in the report with potential contaminants of potential concern (COPCs) included PAHs, PHCs, VOCs and metals. It was reported that soils on the site were shown to be contaminated with PAHs and metals. Even though the wells had previously shown no exceedences, it was recommended they be sampled once to confirm there were still no exceedences and then decommissioned.

It was also reported that the filling of Lazy Bay was an APEC for the site with COPCs including PAHs, PHCs, BTEX and metals. A Phase II ESA was recommended in this area with additional boreholes/monitoring wells being drilled north of the parkway to assess fill quality.

In addition, two landfills were reported in the area of the site. Bayview and Slidell Landfill and Stonehurst and Bayview Landfill were identified east and south of the site respectively.

Modern Containers – Metal Tube Manufacturers was also identified south of the site at 80 Bayview Road. The report included a plan showing the location of TCE contaminated groundwater on the property and adjacent Laroche Park.

3.2.9 Surface Soil and Groundwater Monitoring Program - Trow Associates Inc. (2010)

This report entitled: *Surface Soil and Groundwater Monitoring Program, Burnside Site, Ottawa, ON (Property Asset #95979) – January 2010* was completed for the National Capital Commission to inspect ground surface at the site to ensure contaminated soils were not exposed and to confirm surface soil and groundwater quality posed no risk to human health and the environment.

A total of ten surficial soil samples were collected across the site (SS1 to SS10) from a depth of 0-0.1 m. Groundwater sampling was also conducted from the six monitoring wells remaining on the site (MW-1 to MW-5 and a CH2MHILL well) for PHCs, VOCs, PAHs and metals. It was reported that CH2M MW-1 was sampled and CH2M MW-2 had been destroyed during the installation of a sewer line. It should be noted that when comparing this Trow report with the former CH2MHILL report, the CM2M well locations were switched on the plan and in the report, meaning the well destroyed was

actually CH2M MW-1, located at the northeast corner of the site and the well sampled was actually CH2M MW-2.

The primary guidelines for soil quality comparison were the 2008 CCME *Canadian Soil Quality Guidelines for the Protection of Environment and Human Health* for parkland/residential use. The 2008 CCME *Canada-Wide Standards for Petroleum Hydrocarbons in Soil* was used for PHC soil samples. The 2004 MOE Table 1 (background) and Table 3 (residential/parkland in a non-potable groundwater condition) standards was also used for comparison.

CCME did not have groundwater guidelines for a non-potable groundwater condition. For comparative purposes, the MOE Table 1 (background) and MOE Table 3 (non-potable groundwater) values were used. As these MOE guidelines did not include values for PHCs, Trow used the *Atlantic Partners in Risk Based Corrective Action (RBCA) Implementation (2003)* Tier 1 values (residential/parkland in a non-potable groundwater condition) for these values. It was also noted that based on the close proximity of the site to the Ottawa River, the CCME *Canadian Water Quality Guidelines for the Protection of Aquatic Life* (2007) was used for comparison purposes only and did not actually apply to groundwater, only to surface water.

No exceedences of PAHs were noted in any of the soil samples. Three of the soil samples (SS3, SS4, SS5) marginally exceeded CCME and MOE Table 1 guidelines and standards for chromium, and MOE Table 1 standards for barium.

All groundwater analyses were less than MOE Table 3 standards and PHC values were less than the Atlantic RBCA criteria.

It was noted that TCE was not detected in any of the groundwater samples suggesting the two TCE plumes identified in the area of the site (Bayview Works Yard) and south of the site (80 Bayview Road and Laroche Park) did not extend to the groundwater at the site.

Bi-yearly groundwater monitoring was recommended to ensure current conditions remain unchanged.

It should be noted to avoid confusion with later surficial soil sampling at the site, these soil samples are labelled as SST# on figures in this report showing historical sampling locations.

3.2.10 November 2012 Groundwater Monitoring and Sampling – SNC Lavalin Environment (2013)

This report entitled: *November 2012 Groundwater Monitoring and Sampling, Burnside Site, Ottawa, Ontario (NCC Property Asset Number 95979) – February 2013* was completed for the National Capital Commission to satisfy recommendations from the previous report and to ensure groundwater conditions remain unchanged.

The CH2M well confusion continues in this report. It was noted that MW-1 to MW-5 wells were found and used for groundwater sampling. SNC reported that CH2M MW-1 was found as a flush-mount well and was located in a wooded area. It was also reported that an unknown stick-up well was identified in the southeastern portion of the site near the roundabout. It is Geofirma's position that the unknown stick-up well found by SNC was actually CH2M MW-2. However, since CH2M MW-1 was destroyed historically during the construction of the forcemain, it is unknown what the flush-mount well found was. None of the documentation provided to Geofirma describes any flush-mount wells being drilled

on the site. SNC sampled groundwater from the flush-mount, but not the stick-up (CH2M MW-2). Six groundwater samples were submitted for VOCs, PAHs, PHCs and metals.

Groundwater results were compared against the 2012 *Guidance Document on Federal Interim Groundwater Quality Guidelines for Federal Contaminated Sites* (FIGQG) Table 2, Tier 2 for residential/parkland land use, and the MOE (2011a) Table 7 standards for shallow soil sites in a non-potable groundwater condition. All samples satisfied MOE and FIGQG for VOC parameters. There were no exceedences of PAHs, PHCs or metals for MOE Table 7 standards, however several PAH and metals parameters exceeded FIGQG values in a few of the wells. PAH exceedences were noted in MW-1, MW-2 and MW-5. Metals exceeded for selenium in MW-4, and chromium and copper in MW-5.

Recommendations for the site included continued biannual monitoring of groundwater at the site, as well as a few monitoring well repairs and resolving the monitoring well discrepancies identified.

3.2.11 Fall 2014 Groundwater Monitoring – Stantec Consulting Ltd. (2014)

This report entitled: *Fall 2014 Groundwater Monitoring, Burnside Site, Ottawa, ON, NCC Property Asset 95979 – November 2014* was completed for the National Capital Commission as part of the biannual monitoring of the site.

Groundwater samples were collected at the site for PHCs, metals, PAHs and VOCs. Assessment criteria used included the 2014 FIGQG Table 2, Tier 2 guidelines and the MOE (2011a) Table 7 standards as in the above report. All parameters measured in groundwater at the site were below applicable guidelines and standards with the exception of FIGQGs for iron in MW-1, iron and pyrene in MW-2, iron in MW-3 and cadmium in MW-5.

It was recommended that no further sampling be conducted at the site and the monitoring wells be decommissioned.

3.2.12 Preliminary Geotechnical Investigation – EXP Services Inc. (2018)

This report entitled: *Preliminary Geotechnical Investigation, Burnside OPA & ZBLA Supporting Studies, Burnside Avenue, City of Ottawa, Ontario – May 2018 (DRAFT)* was completed for the National Capital Commission in support of the proposed development at the site. The development plan included dividing the site into four separate buildable parcels in addition to green space. The usage of the parcels was unknown at the time of the report. A total of four boreholes were drilled and 13 test pits excavated on the site. No groundwater or soil sampling occurred as part of this report.

It was reported that fill materials were encountered from depths of 0.2 to 1.7 m occasionally underlain by glacial till veneer to the surface of shallow limestone bedrock. One of the boreholes (BH-4) on the site was drilled in the area of the Lazy Bay infilling. Fill materials were encountered in this hole to a depth of 7.4 m with glacial till to the bottom of the hole at 24.1 m. Bedrock was not encountered in this hole. In addition to the infilling area, this borehole was reportedly also drilled in the area of splays of the regionally extensive Gloucester Fault that runs through the site.

It was reported that building on Lots 1-3 was considered feasible however the fill from the infilling of Lazy Bay on Lot 4 made this area more problematic and challenging for development.

3.2.13 Phase Two ESA, West Portion of Bayview Yard – AMEC Earth and Environmental (2014)

This report entitled: *Phase Two Environmental Site Assessment, West Portion of Bayview Yard, 7 Bayview Road, Ottawa, ON - AMEC Earth and Environmental – June 2014,* describes a Phase Two ESA prepared in accordance with O.Reg. 153/04. This report was completed for just the western portion of the adjacent City of Ottawa Bayview Works Yard to address APECs identified in a Phase One ESA historically completed for the entire yard in 2013, as well as to provide a Phase Two ESA using the updated MOE O. Reg. 153/04 standards (MOE, 2011a) to support the potential future requirement for an RSC in the event of site redevelopment. This property is located immediately east off the site and is considered a potentially contaminating activity (PCA) with respect to the subject site.

A total of 37 APECs were identified for the entire yard in 2001. The City Works Yard included: storage, use and handling of chlorinated solvent by the former Regional Test Lab and the subsequent disposal of spent solvent into two dry wells located north of the building; a former Fleet Vehicle Refueling Facility; several former aboveground storage tanks (ASTs) and underground storage tanks (USTs) containing different petroleum hydrocarbon products; a former PCB storage site; a historical maintenance garage; and a former machine shop, just to name a few.

It was reported that MOE (2011a) Table 7 standards for both residential/parkland and commercial/industrial were used based on the results of the Phase II ESA drilling and overburden depths being generally less than 2 m across the property. However, it was also reported that bedrock was encountered during investigations at a depth of up to 6.7 mBGS at the northeast corner of the Phase II ESA site boundary.

Soil exceedences of MOE (2011a) Table 7 residential/parkland standards for PHCs, PAHs, and metals were found on the property.

Groundwater exceedences of MOE Table 7 residential/parkland standards for PHCs, VOCs, PAHs, sodium and chloride, were also found on the property. A known VOC (TCE and degradation products) plume extends to the north of the Works Yard property.

3.3 Data Quality

Historical ESA investigations at the site were conducted by various consultants, and although different analytical protocols and sampling methods were in effect at the time of historic investigations, the main contaminants of concern in soil and groundwater at the site are persistent, and historical information is therefore deemed useful in this Phase Two ESA.

Both historical and recent soil quality data for the site are presented, and compared to current standards. A comparison of soil quality data from 2000 to 2019 shows that metals and PAH concentrations have not changed noticeably over this 19 year period. This is not unexpected given the source of the soil contamination is the presence of impacted overburden material from on-site and possibly off-site historical land uses. Consequently, historical soil quality information can be used to augment current soil quality data to provide an overall picture of the nature and extent of contaminants at the site.

Groundwater elevations collected through historical ESA investigations at the site are presented for historical site monitoring wells MW-1 to MW-5 from December, 2001 to April, 2019, and for historical

site monitoring wells CH2M MW-1 and CH2M MW-2 from October, 2005 to April, 2019. Historical water levels were measured and reported relative to a local site datum. Based on geodetic elevation surveying completed as part of the current investigation, these historical water levels are reported relative to geodetic elevations in meters above sea level (mASL). Historical groundwater elevation data provides information on the long term trends in groundwater elevation at the site over the last 18 years, illustrating the relatively stable elevation of the water table at the site.

Groundwater quality data, collected in November, 2012 and October 2014 from monitoring wells MW-1 to MW-5 and CH2M MW-2 are presented for use in this report as they represent the two most recent rounds of historical groundwater sampling completed at the site. Review of the historical reports describing 2012 and 2014 groundwater sampling shows that these investigations were completed under appropriate quality assurance and quality control programs including use of certified analytical laboratories and methods, and blind replicate samples. Prior to 2012, groundwater sampling was undertaken at the site in 2001, 2002, 2003, 2005 and 2010 with results that are comparable to 2012 and 2014 data.

Recent groundwater elevation data (April 2019) presented for the site were collected by Geofirma staff, under the firm's ISO-certified Quality Management System, using the same protocols and procedures for data collection outlined under O.Reg 153/04 and those used in historical groundwater investigations.

Review of historical soil quality investigations completed at the site shows that these investigations were completed under appropriate quality assurance and quality control programs including use of soil field screening, quality control samples and qualified analytical laboratories and methods. Site soil data collected by Geofirma in 2019 were collected under an ISO-certified Quality Management System, using certified analytical laboratories, and were completed in accordance with O.Reg 153/04. For these reasons, soil and groundwater data are deemed to be of adequate quality, such that they can be relied upon for use in this Phase Two ESA.

4 SCOPE OF THE INVESTIGATION

4.1 Overview of the Site Investigation and Media Investigated

The intention of the Phase Two ESA for the NCC Burnside property is to address soil quality conditions existing today, as compared to current MECP standards, to support application for a municipal zoning change for the property from parkland to commercial to facilitate development the site. This proposed sampling and analysis plan given in Appendix A describes the proposed borehole drilling, soil sampling and analytical activities to achieve these Phase Two ESA goals.

As documented in the Phase One ESA Report (Geofirma Engineering Ltd., 2019), Phase Two ESA investigations need to include drilling boreholes and laboratory testing in areas of fill thickness greater than 3 m (e.g., in and near the Lazy Bay fill area). Additional testing of fill for metals and PAHs is recommended to improve spatial coverage and address O.Reg. 153/04 delineation requirements within APEC-1, unknown fill quality that covers the entire site. Testing of fill quality for PHC-F1 to -F4 and BTEX near the historical $TPH_{gas/diesel}$ and $TPH_{heavy\ oil}$ hotspot as well as similar testing at the benzene hotspot is also recommended to address O.Reg. 153/04 delineation requirements. All borehole soil samples should be field screened using a combustible gas detector and/or organic vapour meter.

The Phase Two ESA investigation included clearance of underground utilities, borehole drilling, soil field screening and sampling, groundwater elevation surveys and soil analyses for site contaminants of potential concern (COPCs). Based on historical investigations site COPCs include primarily PAHs and metals in soil and to a lesser extent PHCs and BTEX in soil. Proposed borehole and monitoring well locations were selected to provide areal coverage of the site and to obtain overburden and fill quality information in addition to further delineation of the horizontal and vertical extent of possible contamination in site overburden. The proposed drilling and soil sampling and testing program included 10 new boreholes at the site, as summarized in the following Table 4.1 and as shown in the appended Figure A.1.

Table 4.1 Summary of Borehole Drilling and Soil Sampling Location Rationale

Borehole ID	***Location Rationale***
BH19-01	Quality testing of soil for O.Reg. 153/04 listed metals, general inorganics (EC, SAR, CN, pH) and PAHs below depth of 3 m near EXP borehole BH4 in former Lazy Bay Fill Area
BH19-02	Quality testing of soil for O.Reg. 153/04 listed metals, general inorganics (EC, SAR, CN, pH) and PAHs below depth of 3 m near Intera well MW-5 in former Lazy Bay Fill Area
BH19-03	Quality testing of soil for O.Reg. 153/04 listed metals, general inorganics (EC, SAR, CN, pH) and PAHs below depth of 3 m near Intera well MW-2 in former Lazy Bay Fill Area
BH19-04	Quality testing of soil for O.Reg. 153/04 listed metals, general inorganics (EC, SAR, CN, pH) and PAHs below depth of 3 m near DE&S TP20 in near edge of former Lazy Bay Fill Area
BH19-05	Quality testing of soil for O.Reg. 153/04 listed metals, general inorganics (EC, SAR, CN, pH) and PAHs above of 2 m near DE&S TP34 to increase spatial coverage
BH19-06 & BH19-07	Quality testing of soil for O.Reg. 153/04 listed TPH and BTEX parameters to provide horizontal delineation above a depth of 2 m near TPH hotspot near DE&S TP29

Borehole ID	*Location Rationale*
BH19-08	Quality testing of soil for O.Reg.153/04 listed metals, general inorganics (EC, SAR, CN, pH) and PAHs above of 2 m near DE&S TP9A to increase spatial coverage
BH19-09 &BH19-10	Quality testing of soil for O.Reg. 153/04 listed TPH and BTEX parameters to provide horizontal delineation above a depth of 2 m near benzene hotspot near DE&S TP41

Drilling was completed to bedrock refusal, with soil screening and soil sampling at 10 locations with expected depth to bedrock ranging from <2 m to 6 m. Drilling and continuous soil sampling was completed using a track-mounted GM100GT GeoMachine using direct push drilling technology. Use of direct-push drilling technology and soil sample volume requirements did not generate excess soil requiring disposal.

During the drilling of each new borehole, continuous samples of fill were collected, logged for stratigraphy and screened in the field for visual, olfactory and instrument evidence of contamination. Instrument soil screening included measurement of total combustible vapours using a calibrated Combustible Gas Indicator and measurement of total organic vapours using a calibrated Photoionization Detector.

Representative samples of the fill layer in boreholes BH19-01 to BH19-05 and BH19-08 (typically one sample per borehole) were collected for laboratory analysis of MECP-listed metals and general inorganic parameters (electrical conductivity [EC], sodium absorption ratio [SAR], cyanide [CN] and pH) which were historically not analyzed at the site, and for PAHs. One blind QA/QC duplicate soil sample was collected and submitted for analysis of MECP-listed metals, general inorganics and PAHs.

Representative samples of the fill layer in boreholes BH19-06, BH19-07, BH19-09 and BH19-10 (typically one sample per borehole) were collected for laboratory analysis of PHCs and BTEX to assess extent of previously identified TPH and benzene hotspots.

An allowance was made in the sampling and analysis plan to complete additional PHC, BTEX and PCB analyses on soil if field conditions and screening information warrant such analyses. No such additional soil sampling and testing was undertaken.

The groundwater investigation program consisted of the collection of groundwater elevations from accessible monitoring wells on site, on one occasion and surveying of the existing monitoring well network to geodetic elevations. No groundwater samples were collected as part of the Phase Two ESA.

Collected soil samples were submitted to Paracel Laboratories Ltd, Ottawa in coolers with ice packs under chain of custody procedures for analysis of O.Reg. 153/04-listed metals, general inorganics, PAHs, PHCs and BTEX following O.Reg. 153/04 MECP-approved analytical methods.

4.2 Phase One Conceptual Site Model

Interpreting the probable environmental conditions of the site is undertaken by reference to a Phase One Conceptual Site Model (CSM). A Conceptual Site Model is an idealization of potential site contaminants and their interaction with the hydrogeologic system and surrounding properties, based

on the known conditions of a site. The Conceptual Site Model includes a description of the potentially contaminating activities at the Phase One ESA property and surrounding properties, identifying potential contaminants of concern and their source locations. The model also demonstrates the interaction of these contaminants with the natural environment (soil, groundwater, bedrock, water bodies) and the built environment (utilities, buildings), identifying potential receptors.

The Phase One ESA study area is located in a predominately residential and parkland area about 70 m south of the Ottawa River. The site has had former use as a lumber yard, parkland and residential housing and has been subject to importation of fill of poor quality. The site is currently parkland located between the Sir John A. MacDonald Parkway and residential neighbourhoods.

Figures 9.2, 9.3, 9.4, 9.5, 9.6, 9.7 and 9.8 illustrate the CSM for the site. Figure 9.4 identifies PCAs on the site and within the Phase One study area, as wells as the locations of waterbodies, former Lazy Bay, existing buildings, and roads (as applicable). Although Figure 9.4 identifies several PCAs within the Phase One study area, historical soil and groundwater quality investigations on the site, show that none of the identified PCA's surrounding the site have negatively impacted environmental conditions on the site.

Figure 9.2 identifies one APEC for the entire Phase One ESA site related to importation of fill of poor quality. The former infilling of Lazy Bay and the presence of fill across the site have the potential to contaminate the subsurface soils and groundwater beneath the site and is the only APEC identified for the site. Fill materials in this APEC consist of a mixture of silt, sand, clay, cobbles and boulders with debris including asphalt, brick, concrete, plastics, glass, metal, cinders, ash and wood pieces. Extensive historical testing of the overburden fill at the site shows that fill is contaminated by metals including in order of decreasing frequency of exceedence of MECP Table 7 standards: lead, barium, zinc, selenium, copper, vanadium, mercury, antimony, molybdenum and cadmium. PAHs including light to heavy molecular weight compounds are also present throughout the fill layer. PHCs and BTEX are occasional possible COPCs. Surficial fill is generally of better quality than deeper fill. Based on measured soil pH, the site is not environmentally sensitive as per Section 41 of O.Reg. 153/04. Several years of groundwater sampling completed at the site over a 13 year period (i.e., 2001 to 2014) show that these soil COPCs do not create groundwater contamination at the site. Figure 9.3 shows the location of historical soil and groundwater sampling locations, and Phase One CSM cross sections A-A' and B-B'.

Figures 9.5 and 9.6 demonstrate the interaction of the identified APEC with the surrounding natural and built environment through two cross sections (A-A' and B-B') constructed through the site. Figures 9.5 and 9.6 show the current understanding of former land uses of concern, COPCs in soil and groundwater, site stratigraphy, groundwater and bedrock conditions, and shallow utility corridors excavated into bedrock.

The overburden thickness at the site (see Figure 9.7) is generally less than 2 m identifying the property as a shallow soil site under O.Reg. 153/04. Overburden thickness is negligible in the northwestern and southeastern parts of the site where bedrock is exposed at ground surface. Overburden thickness is thicker in the former Lazy Bay fill area and greatest at 24.1 m in EXP (2018) BH-4 that is interpreted to intersect an eroded splay of the regionally significant northwest striking bedrock Gloucester Fault.

Groundwater flow occurs primarily within the bedrock as the groundwater table is typically found at or below the bedrock surface at the site. Groundwater flow at the site is focussed to the former Lazy Bay fill area and discharges to the Ottawa River located about 70 m north of the northern property line. Some groundwater flow will also be channelled via overburden infill of utility excavations into bedrock and via the bedrock depression created by splays of the Gloucester Fault.

4.3 Impediments and Deviations from Sampling and Analysis Plan

There were no impediments or deviations from the borehole drilling and soil sampling and analysis plan. One impediment to the groundwater level monitoring program was encountered. A water level could not be recorded at MW-1 on April 17, 2019 due to suspected infilling of the monitoring well with soil.

There were no other impediments or deviations from the sampling and analysis plan during the Phase Two ESA investigations.

5 INVESTIGATION METHOD

5.1 General

Prior to any intrusive investigations at the site, underground utility locates were completed. Underground Service Locaters (USL-1) of Ottawa, Ontario was contracted to identify the location of all underground buried utilities at the site in the vicinity of proposed drilling locations. Utilities including telephone, gas, hydro, municipal services and private utilities were cleared through these services. Proposed drilling locations were staked by Geofirma personnel to assist USL-1 in utility clearances.

Overburden borehole drilling and soil sampling was completed on May 24, 2019 using a track-mounted GM100GT GeoMachine using direct push drilling technology. Drilling services were by Strata Soil Sampling Inc., an MECP-licensed well contractor based out of Richmond Hill, Ontario under supervision by Geofirma field staff.

Boreholes were advanced through the shallow overburden to bedrock or refusal using 95 mm diameter direct push casing. Continuous soil samples were collected in 1.2 m length plastic sample sleeves. Soil samples were logged for stratigraphy, moisture and visual/olfactory evidence of contamination. In addition, soil samples were collected in air tight bags and screened in the field using a combustible gas indicator (CGI) and a photoionization detector (PID).

Soil samples selected for laboratory analysis of metals, inorganics, PAHs and PHCs/BTEX were containerized on site in laboratory supplied containers and delivered to Parcel Laboratories in Ottawa, Ontario, under chain-of-custody procedures.

5.2 Drilling and Soil Logging

Ten boreholes (BH19-01 to BH19-10), were advanced at the property on May 24, 2019, in accordance with the sampling plan described in Section 4.1 using a track-mounted GM100GT GeoMachine using direct push drilling technology. Soil samples were logged for stratigraphy, as well as visual and olfactory evidence of contamination.

5.3 Soil Sampling

Continuous soil samples were collected using 95 mm diameter direct push casing and 1.2 m length plastic sample sleeves. Samples were split, with a portion transferred immediately into laboratory supplied containers, and placed in a cooler with ice, and the remainder placed in a re-sealable plastic bag to allow for field screening.

Soil samples are identified as BHXX-YY-Z, where XX is the year, YY is the borehole identifier, and Z is the sequential sample interval. For example, BH19-02-1 indicates that it is the first sample collected from borehole two, in 2019.

Borehole stratigraphic and instrumentation logs are included in Appendix B, and borehole locations are shown on Figure 9.2.

5.4 Field Screening Measurements

Soil samples were collected, placed in re-sealable plastic bags and screened using a RKI Eagle 2 portable gas detector, which is a dual gas instrument capable of operating as a combustible gas indicator (CGI), methane elimination, and in photoionization detector (PID) mode. The RKI Eagle 2 was rented from Maxim Environmental and Safety Inc. Maxim provided an instrument specific calibration certificate for the RKI Eagle 2.

Generally, screened soils samples that produced the highest PID value or showed the highest degree of staining for each individual borehole were selected for laboratory analysis for PAHs.

5.5 Groundwater Elevation Monitoring

On April 17, 2019, groundwater elevations were recorded in all accessible groundwater monitoring wells. Groundwater levels were measured relative to the top of PVC riser (TOR) using an electronic water level tape that was decontaminated between wells with soapy water, methyl alcohol and deionised water and recorded to the nearest 0.01 m. Table 9.1 provides information on the location, screen length, stratigraphy intersecting the screen, total well depth and elevations of the ground surface, top of riser, and the screened interval for all groundwater monitoring wells accessible at the site.

Water levels could not be measured in MW-1 on April 17, 2019 due to presence of debris in the well above the water table.

5.6 Analytical Testing

All soil samples collected for metals/inorganics, PAHs and PHCs/BTEX analysis were collected directly into laboratory-supplied sampling containers. All samples were stored and shipped in coolers with ice packs. Samples were submitted to Paracel Laboratories of Ottawa, Ontario, a CALA-certified analytical laboratory, under standard chain-of-custody procedures and in accordance with Geofirma QA/QC procedures. Complete laboratory analytical reports for 2019 analyses are included in Appendix C.

5.7 Residue Management Procedures

No soil residual wastes were generated during drilling activities due to use of direct push drilling technology. No liquid residual wastes were generated as no groundwater sampling was undertaken.

5.8 Elevation Surveying

The locations of test pits, boreholes and monitoring wells, including historical locations, were surveyed for both horizontal and vertical elevation by Geofirma personnel as part of the Phase Two ESA. Horizontal locations of all 2019 drilling locations were determined using a hand-held GPS unit. Horizontal locations of all historical sampling locations were determined by overlaying sample location maps over the City of Ottawa georeferenced site plans. Vertical elevations of ground surface for all historical and 2019 sampling locations were determined from overlaying georeferenced sampling locations against a City of Ottawa LiDAR digital elevation model (DEM) survey flown in 2014.

Vertical elevations of top of casing and ground surface of all groundwater monitoring wells were determined by geodetic elevation surveying of the top of casing at well MW-5 and converting earlier ground surface and top of casing elevations that were surveyed to a local site datum to geodetic elevations as mASL. Geodetic elevation surveying was undertaken by Annis O'Sullivan Vollebekk Ltd. - Ontario Land Surveyors.

5.9 Quality Assurance and Quality Control Measures

Following amendments to O. Reg. 153/04, samples collected for BTEX/F1 petroleum hydrocarbons in soil were collected by preserving a 10 mL (approximately 6 g wet weight of soil) with methanol immediately following sample collection.

Soil samples collected for PAHs, other PHCs, metals and/or inorganic analyses were collected directly into laboratory supplied unpreserved clear class jars with Teflon-lined lids. All sample containers used for the collection and submission of soil samples for analytical results were supplied directly by the laboratory (Paracel Laboratories) and stored in coolers with ice packs. All samples selected for laboratory analysis were shipped in custody-sealed coolers to Paracel's Ottawa office via courier, under chain-of-custody procedures

Use of dedicated new plastic sampling sleeves for each direct push casing advance eliminated the need for cleaning of soil sampling equipment during drilling.

Field quality control measured used during the Phase Two ESA consisted of the collection of one blind field duplicate sample for metals, general inorganics and PAHs in soil. Historical soil quality investigations also included duplicate sample analyses for metals. Historical groundwater quality investigations included duplicate sample analyses for metals, PAHs, PHC/BTEX and VOCs. Relative percent difference (RPD) values for comparison of soil and groundwater samples to corresponding field duplicates were calculated and compared to MECP quality requirements for both historical and current soil and groundwater duplicate analyses. RPD values for comparison of samples to the corresponding field duplicates are discussed in Section 6.7.

Groundwater sampling also included analyses of field blanks and/or trip blanks for metals, PAH, PHC/BTEX and VOC analyses.

All Geofirma field and office work for the Phase Two ESA was completed in accordance with procedures established as part of Geofirma's ISO 9001-2015 certified Quality Management System.

6 REVIEW AND EVALUATION

6.1 Geology and Hydrogeology

Based on historical and 2019 investigations, the geology of the Burnside site can be described as generally one to three metres of granular fill overlying about two metres of alluvial sand in the former Lazy Bay fill area and a discontinuous layer of native silty sandy glacial till found in a bedrock fault depression, which are all underlain by horizontally and vertically fractured grey limestone of the Bobcaygeon Formation, with minor dark grey to black shale layers observed.

The site stratigraphy consists of a thin veneer of topsoil, underlain by fill and occasional discontinuous layers of native alluvium and glacial till. The native alluvium is intersected by borehole BH19-02. Total overburden thickness ranges from 0 to 6.0 m, as illustrated in Figure 9.7 and in cross sections of the site given in Figures 9.12 to 9.14, 9.22 to 9.24.

The eastern part of the site was subject to landfilling as part of the filling of Lazy Bay between 1958 and 1965. The western portion of the site was historically developed residential lands which were demolished between 1958 and 1965. Additional areas across the site have been used for parking areas and former roadways and filling in these areas is also likely. Historical investigations have shown that fill is located across the majority of the site with no native materials found above bedrock except in one location (near a splay of the bedrock Gloucester Fault). Fill materials at the site consisted of a mixture of silt, sand, clay, cobbles and boulders with debris including asphalt, brick, concrete, plastics, glass, metal, cinders, ash and wood pieces.

Natural bedrock elevations at the site are on the order of 51 to 63 mASL sloping towards the northeast and the erosional depression of the former Lazy Bay (see Figure 9.8) which is interpreted to be related to splays of the regionally significant, northwest-striking Gloucester Fault.

Bedrock fractures are expected to be primarily horizontal and associated with bedding. A secondary set of northwest striking, sub-vertical fractures are also expected to present given the presence of splays of the Gloucester Fault at and near the site. The following Table 6.1 below lists the thickness of each geologic unit where present and the corresponding elevations of the top and bottom of each unit at the Burnside site.

Table 6.1 Stratigraphic Units at Burnside Site, Ottawa

Unit	*Description*	*Average Thickness (m)*	*Top Elevation (mASL)*	*Bottom Elevation (mASL)*
Fill	Sand, gravel and various construction debris and waste	1.5	55.8-63.0	53.2-62.8
Alluvium	Sand to silty sand	2.0	53.2	51.2
Glacial Till*	Silty clay with trace gravel	<1.0	49.8	33.2
Bedrock	Grey limestone – Bobcaygeon Formation	> 40	51.2-63.0	< 33.2

*as found in EXP (2018) BH-4 within eroded splay of bedrock Gloucester Fault

Hydraulic testing of the overburden and bedrock at the property has not been completed in either historical investigations or the current 2019 Phase Two ESA investigations. Based on soil logging of existing and new boreholes the overburden fill and alluvium are estimated based on observed grain size (coarse sand) to be permeable with hydraulic conductivity of about 1 $x10^{-4}$ m/s or higher (Freeze and Cherry, 1979). Hydraulic testing of similar bedrock at the NCC's Bayview Landfill site (Golder Associates Ltd., 2011) indicates a range of hydraulic conductivity of 4.5 $x10^{-10}$ to 3.4 $x10^{-5}$ m/s for bedrock to depths of about 40-50 m.

The water table at the site is generally found at or below the bedrock surface, at depths between 2.6 and 5.5 metres below ground surface (see Table 9.2) with the exception of the former Lazy Bay fill area where the water table is within the overburden. Historical groundwater elevations at the site and data provided in historical reports summarized in Section 3.2 confirm that overburden is generally above the water table and that COPCs in site soils are not likely to occur in a saturated state.

6.2 Groundwater: Elevations and Flow Directions

Groundwater depths were measured directly from the top of each monitoring well riser using an electronic contact water level tape. Depth measurements were converted to groundwater elevations by subtracting the measured depth from the elevation of the top of each monitoring well riser. Elevations of the top of monitoring well risers were established following the geodetic elevation survey discussed in Section 5.8. Historical groundwater elevations recorded between 2001 and 2014 are presented in Table 9.2 for review, 2019 groundwater elevations collected as part of this Phase Two ESA investigation are also presented in Table 9.2.

Groundwater elevations in the vicinity of the site have remained relatively consistent historically, with elevations on the order of 52.9 to 59.6 mASL in monitoring wells on site, equivalent to water table depths of about 2.6 to 5.5 mBGS. Shallow groundwater at the site reflects topography and hydraulic properties of the saturated materials at the site. Water levels are highest in the southwest part of the site where topography is highest and where bedrock is the saturated material. Water levels are lowest in the former Lazy Bay fill area near the SJMP in the central and eastern parts of the site where topography is lowest and permeable saturated overburden occurs. Figure 9.8 illustrated the interpreted water level contours and flow directions of the shallow groundwater systems at the site.

Groundwater flow occurs primarily within the bedrock as the groundwater table is typically found at or below the bedrock surface at the site. Groundwater flow at the site is focussed to the former Lazy Bay fill area and discharges to the Ottawa River located about 70 m north of the northern property line via permeable fill and alluvial deposits. Some groundwater flow will also be channelled via overburden infill of utility excavations into bedrock (i.e., storm and sanitary sewers and low-pressure forcemain) and via the bedrock depression created by eroded splays of the Gloucester Fault.

Due to the site location in parkland/green space and with hydraulic connection to the nearby Ottawa River, there is opportunity for significant groundwater infiltration following seasonal precipitation trends and fluctuations in Ottawa River levels. Historical groundwater elevation data collected over several years from December, October, November and April presented in Table 9.2 confirm this statement with water level fluctuations of up to 3 m observed.

Consequently, shallow groundwater flow in the area of the site may be affected by the presence of underground structures such as utility trenches excavated into bedrock, channelling of flow along fractured and faulted parts of the bedrock due to proximity to the Gloucester Fault and water level fluctuations in the Ottawa River.

6.3 Groundwater: Hydraulic Gradients

Based on the interpreted water level contours presented for the shallow groundwater system in Figure 9.8, the horizontal hydraulic gradients in the shallow bedrock in the western and central parts of the site are approximately 0.06 m/m directed to the northeast. In the former Lazy Bay fill area in the central and eastern parts of the site horizontal hydraulic gradients in the more permeable overburden deposits are lower at 0.009 m/m directed to the north to the Ottawa River. These lower hydraulic gradients in more permeable saturated materials are consistent with hydrogeological principles and Darcy's Law.

There are no deep groundwater monitoring wells at the site with which to assess vertical hydraulic gradients. Lacking this information, data from the adjacent Bayview Landfill site are used to infer vertical hydraulic gradients. Data from multi-level bedrock monitoring wells at the adjacent Bayview Landfill site (Golder Associates Ltd., 2011) show that hydraulic gradients between deep bedrock at depths of 40-50 mBGS and shallow bedrock/overburden are upward. These data are transferable to the Burnside site given the similarity of hydrogeological settings and site proximities. They are also consistent with hydrogeological expectations given that the Ottawa River is a regional groundwater discharge feature.

6.4 Soil: Field Screening

Field screening of soils (as described in Section 5.4) prior to selection for laboratory testing, consisted of using a CGI and PID to detect combustible gases and volatile organic gas vapors. Each soil sample retrieved from the plastic sleeve of the direct push casing was screened with a CGI and PID value. In total 26 individual CGI and PID values were recorded during the 2019 borehole drilling program.

CGI and PID values for overburden materials collected from within the fill unit in 2019 were typically low. CGI values ranged from 0 to 15 ppm total combustible gases, and PID values ranged from 0 to 1 ppm total organic vapours. These CGI and PID readings are essentially background values and reflect variability in moisture content, and not contaminant levels.

Field screening results from 2019 and earlier investigations are summarized on the borehole stratigraphic logs in Appendix B.

6.5 Soil Quality

One of the primary focuses of this Phase Two ESA was the collection and analyses of soil samples to provide an assessment of soil quality at the site in accordance with O.Reg. 153/04. To this end, the following soil samples were collected in 2019:

- 9 samples (plus one QA/QC duplicate) were collected and submitted for metals analyses;
- 8 samples (plus one QA/QC duplicate) were collected and submitted for PAH analyses;

- 7 samples (plus one QA/QC duplicate) were collected and submitted for general inorganics analyses; and
- 4 samples were collected and submitted for PHC/BTEX analyses.

In total, 11 soil samples, including one blind field duplicate were collected and analysed for metals, general inorganics, PAHs and/or PHCs/BTEX in 2019. The following Table 6.2 contains the horizontal and vertical locations and depths of each soil sample collected during the 2019 borehole drilling and soil sampling program, while Table 9.3 includes further data on individual soil sample dates, analysis dates and corresponding laboratory analytical reports for all historical and current soil quality analyses. Table 6.2 and this report use the Modified transverse Mercator (MTM) coordinate system for specifying sampling locations, as both the NCC and City of Ottawa use this coordinate system.

Table 6.2 2019 Soil Sampling Locations at Burnside Site, Ottawa

Sample ID	*MTM Easting*	*MTM Northing*	*Depth (mBGS)*
BH19-01-1	365073	5030276	0.3-1.1
BH19-02-1	365127	5030264	0.2-1.5
BH19-02-3	365127	5030264	3.0-4.6
BH19-03-1	365016	5030302	0.7-0.8
BH19-04-1	365001	5030266	0.2-1.5
BH19-05-1	364942	5030203	0-0.8
BH19-06-1	364933	5030262	0-0.8
BH19-07-1	364939	5030273	0.5-1.4
BH19-08-1	364838	5030312	0.2-0.6
BH19-09-1	364848	5030259	0.1-0.6
BH19-10-1	364839	5030263	0.3-1.1

Soil quality analytical results are summarized in Tables 9.4 through 9.8, for metals, PAHs, PHCs/BTEX and PCBs, VOCs and general inorganics, respectively. Historical soil quality results for existing site surficial sampling and from testpits and boreholes are presented alongside 2019 data in Tables 9.4 through 9.8. Results are compared to MECP Table 7 soil quality standards for coarse-grained soils in a non-potable groundwater environment, residential or parkland property use.

Soil quality exceedences of MECP Table 7 standards are shown in plan and on the three cross sections in a series of figures generally based on contaminant group. Cross section locations are shown on Figures 9.3 and 9.4. Because of the large number of soil samples submitted for metals (103 samples including duplicates) and PAHs (64 samples including duplicates) plan figures of these soil quality results are presented on three separate figures covering west, central and east parts of the site. Because of the relatively small number of soil quality analyses captured on the three cross sections, all soil quality testing data are shown on each of the three cross sections.

As a result, Figures 9.9, 9.10 and 9.11 show the plan distribution of all metals and general inorganics testing in the west, centre and east parts of the site, respectively. Figures 9.12, 9.13 and 9.14 show

the vertical distribution of all soil quality testing along cross sections A-A', B-B' and C-C', respectively. Figures 9.15, 9.16 and 9.17 show the plan distribution of all PAH testing in the west, centre and east parts of the site, respectively. Figures 9.18 and 9.19 show the plan distribution of PHCs/BTEX and PCBs, and VOCs, respectively, for the entire site. Complete laboratory analytical reports for 2019 and historical soil quality results are included in Appendix C.

Historical soil quality results for metals, general inorganics, PAH and PCB parameters are deemed useful in the discussion of soil quality, as these parameters are generally persistent, are typically located above the water table, and not subject to significant chemical and biological transformations. Historical PHC/BTEX and VOC parameters are also presented as such historical analyses likely represent maximum concentrations.

Review of the combined 2019 and historical soil quality results indicates the following:

- Metal exceedences of MECP Table 7 standards occurred in 32 of 103 samples (31% of samples). Most common metals exceedences in order of decreasing frequency of exceedence of MECP Table 7 standards were lead, barium, zinc, selenium, copper, vanadium, mercury, antimony, molybdenum and cadmium. There were no exceedences of MECP Table 7 standards for new parameters added in 2019 testing (i.e., boron, boron (hot water soluble), hexavalent chromium, mercury, uranium) versus original 2000 soil quality testing.
- PAH exceedences of MECP Table 7 standards occurred in 30 of 64 samples (47% of samples). The most common PAH exceedences were with heavy molecular weight carcinogenic PAHs including benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, chrysene, dibenz(a,h)anthracene and indeno(1,2,3-cd)pyrene.
- PHC/BTEX exceedences of Table 7 MECP standards were very minor. Only one of 14 BTEX analyses exceeded applicable standards. This exceedence was for benzene at TP-41. Follow-up 2019 testing in the vicinity of TP-41 (at BH19-09 and BH19-10, see Figure 9.18) did not show detectable concentrations of BTEX, indicating that the historical benzene exceedence was an isolated occurrence. The historical moderately elevated $TPH_{gas+diesel}$ measured at TP-29 (360 µg/g) was investigated with two adjacent boreholes (BH19-06 and BH19-07, see Figure 9.18). Only trace levels of PHCs were detected in one borehole with no detections in the second borehole indicating that there are no PHC exceedences of MECP Table 7 standards in soil at the site.
- There were no VOC exceedences of MECP Table 7 standards in the five soil samples submitted for VOC analyses.
- There were no PCB exceedences of MECP Table 7 standards in the one soil sample submitted for PCB analyses.
- There were no MECP Table 7 exceedences for general organics (SAR, conductivity, free cyanide) in eight soil samples submitted for general inorganic analyses.
- All 19 soil samples submitted for pH analyses were within the MECP approved range of pH 5 to 9 for surface soil indicating the site is not environmental sensitive as per Section 41 of O.Reg. 153/04.

Based on the data presented in Tables 9.4 to 9.8 and the information summarized above, contaminants of concern (COCs) in soil at the site include:

***Metals*:** antimony, barium, cadmium, copper, lead, mercury, molybdenum, selenium, vanadium and

zinc;

PAHs: acenaphthylene, anthracene, benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[k]fluoranthene, chrysene, dibenzo[a,h]anthracene, indeno[1,2,3-cd]pyrene, fluoranthene, methylnaphthalene, naphthalene and phenanthrene.

BTEX: benzene

The maximum detected concentrations of each parameter analysed in the soil of the site are presented in Table 9.9. Exceedences of MECP Table 7 standards in soil (both historic and 2019) are provided in plan and cross sections in Figures 9.9 to 9.19.

6.6 Groundwater Quality

In addition to soil quality, groundwater quality was a focus of this Phase Two ESA. Most groundwater at the site occurs near or within the bedrock. The collection and analysis of groundwater samples provides an assessment of groundwater quality at the site in accordance with O.Reg 153/04. To this end, the following groundwater samples were collected in 2012 and 2014, which is the most recent groundwater sampling at the site following 2011 revisions to O.Reg. 153/04 (note, no groundwater sampling was completed in 2019):

- 12 samples (plus two QA/QC duplicates and one QA/QC field blank) were collected and submitted for metals analyses;
- 12 samples (plus two QA/QC duplicates and one QA/QC field blank) were collected and submitted for PAH analyses;
- 12 samples (plus two QA/QC duplicates, one field blank and one trip blank) were collected and submitted for PHC/BTEX analyses;
- 12 samples (plus two QA/QC duplicates, one field blank and one trip blank) were collected and submitted for analysis of VOCs.

Table 9.10 includes data on individual groundwater sample collection dates, analysis dates and corresponding laboratory analytical reports for the 2012 and 2014 groundwater quality analyses. The summary Table 9.2 provides a list of all bedrock groundwater monitoring wells sampled in 2012 and 2014, identifying their location, stratigraphic unit and screened interval lengths and elevations.

Groundwater quality analytical results are summarized in Tables 9.10 through 9.14, for metals, PAHs, PHCs/BTEX and VOCs, respectively. Results are compared to MECP Table 7 groundwater quality standards for coarse-grained soils in a non-potable groundwater environment, residential or parkland property use. Groundwater quality results assessed relative to MECP Table 7 standards are shown in plan in Figure 9.20. Complete laboratory analytical reports for 2012 and 2014 groundwater sampling results are included in Appendix C.

Based on the data presented in Tables 9.10 to 9.14 and on Figure 9.20 there are no contaminants of concern (COCs) in groundwater at the site. Although not given on tables or shown on figures in this report, the results of historical groundwater sampling completed in 2001, 2002, 2005 and 2010 confirm this conclusion. Consequently, there is no requirement for delineation in accordance with O.Reg. 153/04 and no need to present groundwater quality data on cross sections. The maximum detected

concentrations of each parameter analysed in the groundwater of the site are presented in Table 9.15.

6.7 Quality Assurance and Quality Control Results

A quality assurance/quality control (QA/QC) program was implemented during the 2019 Phase Two ESA field investigations as described in Section 5.9. Historical soil and groundwater sampling programs completed by other consultants also included QA/QC programs. These QA/QC programs consisted of the use of standard field protocols, and for Geofirma use in accordance with Geofirma's Quality Management System (QMS), which is certified and registered as ISO 9001:2015. All relevant Geofirma QMS Procedures, Work Instructions and Field Protocols were adhered to during the completion of the assignment. The QA/QC programs also included internal laboratory QC performed by all analytical laboratories.

The Geofirma and other consultant QA/QC programs consisted of standard sampling protocols and the collection and submission of blind field duplicate soil and groundwater samples and use of field and trip blanks. Blind duplicate samples were typically collected at a frequency of one in ten samples. Duplicate sample results are presented in the summary analytical tables in Section 9. A total of six duplicate samples were collected for analyses of metals, PAHs and/or inorganic analyses in soil, and two duplicate samples were collected for analysis of metals and PAHs in groundwater. Groundwater sampling also included analysis of metals, PAHs, PHCs/BTEX and/or VOCs in two field blanks and two trip blanks.

Historical laboratory analyses of soil and groundwater were completed by Accutest Laboratories, Paracel Laboratories and Maxxam Analytics, all CALA-certified laboratories. 2019 soil analytical work was completed by Paracel Laboratories. All laboratories completed all analyses in accordance with internal laboratory QC programs that include referenceable standardized analytical methods and procedures, in accordance with O.Reg 153/04. All samples were received by the laboratory within the accepted holding time, with the correct preservation method and container type (as provided by the laboratory).

Quality assurance reports were provided by analytical laboratories for all completed analyses. These certificates summarize the laboratory results for laboratory QA/QC samples including matrix spikes, spiked blanks, method blanks and relative percent difference (RPD). Complete laboratory analytical reports are provided in Appendix C. Laboratory quality assurance reports noted the following remarks or qualifications for soil analyses completed in 2000 to 2019 and for groundwater analyses in 2012 and 2014:

- There are no qualifications for 2000 soil quality analyses completed by Accutest Laboratories.
- There are no qualifications for 2000 soil quality analyses completed by Parcel Laboratories.
- There are no qualifications for 2001 soil quality analyses completed by Parcel Laboratories.
- There are no qualifications for 2005 soil quality analyses completed by Maxxam Analytics.
- There are no qualifications for 2009 soil quality analyses completed by Parcel Laboratories.
- Qualifications for 2012 groundwater quality analyses completed by Parcel Laboratories include:
  - QM-05: the spike recovery was outside acceptance limits for matrix spike due to matrix interference.

  - QR-01: Duplicate RPD is high, however, the sample result is less than 10x the MDL.
  - QS-02: Spike level outside of control limits. Analysis batch accepted based on other QC included in the batch.
- There are no qualifications for 2014 groundwater quality analyses completed by Maxxam Analytics.
- There are no qualifications for 2019 soil quality analyses completed by Parcel Laboratories.

Geofirma's review of all analytical laboratory certificates indicates that soil and groundwater analytical results noted above fell within acceptable QA/QC limits for constituent recovery as defined by the protocols for the analytical methods.

Precision for duplicate analysis was determined by the relative percent difference (RPD) between the set of duplicate samples and was calculated as follows:

$$RPD = \frac{|x_1 - x_2|}{\bar{x}} \times 100\%$$

Where: x_1 = concentration of original sample

x_2 = concentration of duplicate sample

$\bar{x}$ = average concentration of original and duplicate sample

RPD values for homogeneous samples are generally considered acceptable in laboratory QC if they are less than 30%. However, due to different conditions encountered in the field, acceptance limits for RPD in field QC are broader (MOE, 2004). As well, because the uncertainty associated with a value increases dramatically as the result approaches the MDL, the MOE recommends using a duplicate result in RPD calculations only if the average of the two duplicates is greater than five times the MDL (5x MDL) (MOE, 2004).

RPD values were calculated using the equation provided for all duplicate parameters sampled, following MOE (2004) guidance. The calculated average RPD values for soil were 24.5% to 57.1% for metals, 35.9% to 66.4% for PAHs and 26.9% for general inorganics, for individual duplicate samples. The calculated average RPD values for groundwater were 0% and 18.7% for metals and 6.5% and 48.9.% for PAHs, for individual duplicate samples. The slightly elevated RPD values for metals and PAHs in soils and for PAHs in groundwater are not unexpected given the heterogeneous nature of the fill at the site, and poor reproducibility of PAH analyses in groundwater samples where variable suspended sediment levels can results in wide ranges of PAH concentrations due to sorption of PAHs to suspended sediment.

Two field blanks and two trip blanks were submitted with groundwater samples analyzed for metals, PAHs/BTEX and/or VOCs. There were no detections of metals, PAHs, PHCs/BTEX or VOC parameters above MDLs in the field and trip blanks.

As the concentrations of duplicate samples were comparable to respective original samples, including RPD values within MOE guidelines, field and trip blanks were non-detect and confirmation that laboratory internal quality control results are acceptable, the laboratory data presented and summarized within this report are considered acceptable for use without qualification.

6.8 Phase Two Conceptual Site Model

6.8.1 Overview

A Conceptual Site Model (CSM) is an idealization of the site contaminants and their interaction with the hydrogeologic system and surrounding properties and human and ecological receptors, based on the known conditions of a site. The Phase Two CSMs described herein include a summary of the Phase One CSM, and a Phase Two CSM that describes potential contaminating activities, areas of potential environment concern, contaminants of concern, their source locations and release and contaminant transport pathways and mechanisms. CSMs also demonstrate the interaction of these contaminants with the natural environment (soil, groundwater, bedrock, water bodies) and the built environment (utilities, buildings), identifying potential receptors. The Phase Two ESA CSMs are illustrated in text, figures and tables herein, and in Section 9.

6.8.2 Proposed Future Site Use

The Burnside.site is currently vacant grassed parkland with minor treed areas with no municipal address. The site is located adjacent and south of the SJMP and about 70 m south of the Ottawa River in west-central Ottawa. According to the City of Ottawa Zoning information provided on the geoOttawa website, the central and eastern portions of the site are currently zoned as O1 – Parks and Open Space Zone. The western portion of the site is currently zones as R5 – Residential Fifth Density Zone.

Future re-development to diplomatic mission use (i.e., office space defined as commercial under O.Reg. 153/04) is contemplated for the property. The specific details of future property use are not known at this time. Based on this proposed change in land use to include diplomatic mission uses, a Record of Site Condition would not be required for site redevelopment.

6.8.3 PCAs, COPCs and APECs

Burnside site has been subject to commercial, industrial and parkland uses since the mid to late 1800's. Historical use of the property included lumber yards, parkland, residential housing and the importation of large amounts of fill materials in the former area of Lazy Bay and over the remainder of the site. Numerous potentially contaminating activities (PCAs) are located within the Phase One study area according to the historical review. The City of Ottawa Bayview Works Yard, Bayview and Slidell Landfill, Stonehurst and Bayview Landfill; Modern Containers Ltd., and gasoline service stations/garages are located within the Phase One study area. Although the Phase One ESA identifies several PCAs within the Phase One study area, historical and current soil and groundwater quality investigations on the site, show that none of the identified PCA's surrounding the site have negatively impacted environmental conditions on the site.

Table 6.3 summarizes the on-site and off-site PCAs determined from the Phase One ESA. Table 6.3 indicates only one on-site and several off-site Potential Contaminating Activities. Table 6.4 summarizes the one Area of Potential Environmental Concern (APEC-1) determined from the Phase One ESA. Fill materials in APEC-1 consist of a mixture of silt, sand, clay, cobbles and boulders with debris including asphalt, brick, concrete, plastics, glass, metal, cinders, ashes and wood pieces. The contaminants of potential environmental concern (COPCs) associated with APEC-1 include metals and PAHs and to a lesser degree PHCs/BTEX and general inorganics in soil and groundwater.

Table 6.3 Summary of Potential Contaminating Activities on and in the Vicinity of Burnside Site, Ottawa

Address	*Business Name*	*PCA #*	*Potential Issue*
	On-Site		
Entire site	National Capital Commission	30	Importation of fill material of unknown quality
	Off-Site		
Bayview and Slidell Street	Bayview and Slidell Landfill	58, 30	Waste Disposal, Importation of fill material of unknown quality
Stonehurst and Bayview Road	Stonehurst and Bayview Landfill	58, 30	Waste Disposal, Importation of fill material of unknown quality
7 Bayview Road	City of Ottawa Bayview Works Yard	28, 52	Gasoline and associated products stored in fixed tanks, Fuelling and repair of transportation vehicles
80 Bayview Road	Modern Containers Ltd. – Metal Tube Manufacturing	34	Metal Fabrication
80 Bayview Road	Keyes Supply Co. Ltd.	28	Gasoline and associated products stored in fixed tanks
55 Carruthers Avenue	Gordie's Hydraulic Service	28	Gasoline and associated products stored in fixed tanks
55 Carruthers Avenue	Ouimet's Garage	28	Gasoline and associated products stored in fixed tanks
55 Carruthers Avenue	Hank's Auto Service	28	Gasoline and associated products stored in fixed tanks
140 Hinchey Avenue	Crawford's Motors Garage	28	Gasoline and associated products stored in fixed tanks
140 Hinchey Avenue	Mario's Garage	28	Gasoline and associated products stored in fixed tanks
140 Hinchey Avenue	Rideau Pump Service	28	Gasoline and associated products stored in fixed tanks
154 Hinchey Avenue	Bastien Fuels Ltd.	28	Gasoline and associated products stored in fixed tanks

Table 6.4 Areas of Potential Environmental Concern, Burnside Site, Ottawa

Area of Potential Environmental Concern	*Location of Area of Potential Environmental Concern on Phase One Property*	*Potentially Contaminating Activity (PCA#)*	*Location of PCA (on-site or off-site)*	*Contaminants of Potential Concern*	*Media Potentially Impacted (Groundwater, soil and/or sediment)*
Fill Materials (APEC-1)	All of the site with the thickest areas in the former Lazy Bay fill area (central portion)	Importation of fill of unknown quality (PCA #30)	On-site	Metals, PAHs, PHCs, BTEX, Inorganics	Soil and groundwater

Figures 9.2, 9.4 and 9.21 summarize the location of the on-site and off-site PCAs and the one on-site APEC considered in the Phase 2 CSM. APEC-1 covers the entire property and is related to importation of fill of poor quality. Figure 9.2 shows the extent of APEC-1 and Phase Two ESA sampling locations.

6.8.4 Subsurface Structures and Utilities

There are underground utilities of low-pressure forcemain and storm and sanitary sewers transecting the property that may be excavated into shallow bedrock in parts of the site. The excavations into bedrock for these utility trenches likely occur in the western, central, and eastern parts of the site where the overburden thickness is less than 2 m (see Figure 9.7).

In the western part of the site there are sanitary sewers that extend from the ends of Emmerson Ave. and Hinchey Ave. onto the site. There are storm sewers along the western property line extending north from the end of Forward Ave. onto the site. In the central part of the site there is a sanitary sewer extending from the end of Carruthers Ave. onto the site. In the eastern part of the site there are storm sewers that traverse the site from south to north. A low-pressure forcemain is located in the eastern part of the site near Slidell St. Figures 9.22 to 9.24 show the location of these underground utilities on cross sections A-A', B-B' and C-C'.

Where these utility trenches are below the depth of the local groundwater table, there is some potential for interception and diversion of groundwater flow within these permeable backfilled utility trench excavations. As shown on Figures 9.22 to 9.24, most of these underground utilities appear to be above the groundwater table. However, in selected areas where bedrock is near surface and groundwater tables are shallow (e.g., southwest part and near Slidell St.) there is potential for channelling of groundwater flow along utility trenches excavated into bedrock.

6.8.5 Physical Setting of Property

6.8.5.1 Site Stratigraphy

The site stratigraphy consists of a thin veneer of topsoil overlying generally one to three metres of granular fill overlying about two metres of native alluvial sand in the former Lazy Bay fill area and a discontinuous layer of native silty sandy glacial till found in an eroded bedrock fault depression. These overburden deposits are underlain by horizontally and vertically fractured grey limestone of the Bobcaygeon Formation, with minor dark grey to black shale layers. There are bedrock exposures in the western part of the property and in north central and north east parts of the site in proximity to the SJMP.

Total overburden thickness ranges from 0 to 6.0 m, as illustrated in Figure 9.7 and in cross sections of the site given in Figures 9.22 to 9.24. Landfilling of the site was greatest in the former Lazy Bay fill area located in central to eastern part of the site. The filling of Lazy Bay occurred between 1958 and 1965. Table 6.1 of Section 6.1 summarizes the description, average thickness and ranges of top and bottom elevations of each stratigraphic unit present at the site. Fill materials at the site consisted of a mixture of silt, sand, clay, cobbles and boulders with debris including asphalt, brick, concrete, plastics, glass, metal, cinders, ash and wood pieces.

Given the site stratigraphy, MECP Table 7 shallow soil standards for coarse-textured soil are applicable to the site.

6.8.5.2 Depth to Water Table

The water table at the site is generally found at or below the bedrock surface, at depths between 2.6 and 5.5 metres below ground surface (see Table 9.2) with the exception of the former Lazy Bay fill area where the water table is within the overburden. Historical groundwater elevations at the site and data provided in historical reports summarized in Section 3.2 confirm that overburden is generally above the water table and that COPCs in site soils are not likely to occur in a saturated state.

6.8.5.3 Hydrogeological Characteristics

The shallow groundwater system at the Burnside site is conceptualized as unsaturated fill and shallow bedrock overlying a shallow bedrock aquifer extending to depth of at least 6 m. In the Lazy Bay fill area the shallow bedrock aquifer discharges to a shallow sandy alluvial aquifer that has hydraulic connection to the Ottawa River.

Groundwater flow occurs primarily within the bedrock as the groundwater table is typically found at or below the bedrock surface at the site. Groundwater flow at the site is focussed to the former Lazy Bay fill area and discharges to the Ottawa River located about 70 m north of the northern property line via permeable fill and alluvial deposits. Some groundwater flow will also be channelled via overburden infill of utility excavations into bedrock (i.e., storm and sanitary sewers and low-pressure forcemain) and via the bedrock depression created by eroded splays of the Gloucester Fault.

Shallow groundwater elevations at the site reflect topography and hydraulic properties of the saturated materials at the site. Water levels are highest in the southwest part of the site where topography is highest and where bedrock is the saturated material. Water levels are lowest in the former Lazy Bay fill area near the SJMP in the central and eastern parts of the site where topography is lowest and permeable saturated overburden occurs. Figure 9.8 illustrated the interpreted water level contours and flow directions of the shallow groundwater systems at the site.

Hydraulic testing of the overburden and bedrock at the property has not been completed in either historical investigations or the current 2019 Phase Two ESA investigations. Based on soil logging of existing and new boreholes the overburden fill and alluvium are estimated based on observed grain size (coarse sand) to be permeable with hydraulic conductivity of about 1 $x10^{-4}$ m/s or higher (Freeze and Cherry, 1979). Hydrualic testing of similar bedrock at the NCC's Bayview Landfill site (Golder Associates Ltd., 2011) indicates a range of hydraulic conductivity of 4.5 $x10^{-10}$ to 3.4 $x10^{-5}$ m/s for bedrock to depths of about 40-50 m.

Based on the interpreted water level contours presented for the shallow groundwater system in Figure 9.8, the horizontal hydraulic gradients in the shallow bedrock in the western and central parts of the site are approximately 0.06 m/m directed to the northeast. In the former Lazy Bay fill area in the central and eastern parts of the site horizontal hydraulic gradients in the more permeable overburden deposits are lower at 0.009 m/m directed to the north to the Ottawa River. These lower hydraulic gradients in more permeable saturated materials are consistent with hydrogeological principles and Darcy's Law.

6.8.5.4 Approximate Depth to Bedrock

Approximate depth to bedrock shown in Figure 9.7 ranges from 0 m to 6.0 m with a site average of about 1.5 m. The depth to bedrock is greatest in the centre of the site near the former Lazy Bay fill area and is the west a minimum in the western part of the site. The depth to bedrock in the eastern part of the site approximates 1.5 to 2 m.

6.8.5.5 Applicability of Sections 41 and 43.1

Section 41 of the Regulation does not apply to the property. The site is not environmentally sensitive. It is not within, adjacent to or within 30 m of an area of natural significance. All soil pH testing (see Table 9.8) shows values within the MECP defined acceptable range of 5 to 9 for surface soil.

Section 43.1 of the Regulations applies to the property. Although none of the site is adjacent to or within 30 m of a water body, one third or more of the area of the site consists of soil equal to or less than 2 m depth beneath the soil surface excluding any non-soil surface treatment such as asphalt. Hence the site is a shallow soil property.

6.8.5.6 Imported Fill

Imported fill as granular foundation material likely exists throughout the site based on former site use and presence of historical site building and structures. The majority of fill importation occurred in the 1960s. However, sources of such imported fill are unknown. Historical and 2019 soil quality testing of the fill shows it is of poor quality being contaminated primarily with metals and PAHs.

6.8.5.7 Proposed Buildings and Other Structures

Future re-development to diplomatic mission use (i.e., office space defined as commercial under O.Reg. 153/04) is contemplated for the property. The details of future property use are not known at this time. Based on this proposed change in land use to include diplomatic mission use, a Record of Site Condition would not be required for site redevelopment.

6.8.6 Environmental Conditions

Environmental conditions at the Burnside site as part of the Phase Two CSM are illustrated in plan (Figures 9.9 to 9.11, 9.15 to 9.19 and 9.20) and three cross sections A-A', B-B' and C-C' (Figures 9.12 to 9.14 and 9.22 to 9.24) constructed west-east, south-north and south-north through the site and surrounding lands, and are discussed below based on results of historical and 2019 Phase Two ESA work.

6.8.6.1 Soil Screening and Quality

Overburden material on the site is unsaturated, generally very shallow (typically less than 2 metres thickness), and generally consists of sand and gravel fill overlying limestone bedrock. Soil samples collected during historical and 2019 investigations were screened with a CGI and/or a PID. Soil CGI and PID values (see Appendix B) were typically less than 30 ppm and 1 ppm, respectively indicating that PHCs, BTEX and other VOCs were not widespread contaminants in site soil.

6.8.6.2 Areas Where Contaminants are Present

The results of historical and 2019 laboratory soil quality testing show that the imported fill across the entire site frequently contains metals (lead, barium, zinc, selenium, copper, vanadium, mercury, antimony, molybdenum and cadmium) and heavy molecular weight PAH exceedences of MECP Table 7 standards and that general inorganics, PHCs/BTEX and PCBs are not significant COCs in site soil. The sporadic but widespread occurrence of the metals and PAH COCs in site soil is consistent with the site history.

Soil quality testing also shows that the minor pockets of native soil at the site including sandy alluvium and glacial till are not contaminated.

The results of historical and 2012 and 2014 laboratory testing of groundwater quality show that groundwater at the site is not contaminated above MECP Table 7 standards. This conclusion is consistent with the observations that most of contaminated soil is found above the groundwater table and most of the identified soil COCs are low solubility and low mobility chemicals in groundwater systems.

6.8.6.3 Distribution of Contaminants

The horizontal and vertical distribution of contaminants in soil and groundwater at the Burnside site are shown in plan and in cross sections based on contaminant groups of metals and general inorganics, PAHs, PHCs/BTEX and PCBs and VOCs in Figures 9.9 to 9.19 for soil and Figures 9.20 for groundwater.

Soil

Figures 9.9 to 9.14 show that occurrences of metals exceedences of MECP standards in fill are sporadic but widespread across the site and that delineation of areas of individual metals exceedences cannot practically be achieved at the site. A reasonable and conservative assumption is that all fill at the site is contaminated by metals. There are no general inorganic exceedences of MECP standards. The vertical limits of metal contaminated fill are defined by the bottom of the topsoil layer and top of either native sandy alluvium, glacial till or bedrock.

Figures 9.12 to 9.17 similarly show that PAH exceedences of MECP standards in fill are also sporadic but widespread across the site and that delineation of areas of individual PAH exceedences cannot practically be achieved at the site. A reasonable and conservative assumption is that all fill at the site is contaminated by PAHs. The vertical limits of PAH contaminated fill are defined by the bottom of the topsoil layer and top of either native sandy alluvium, glacial till or bedrock.

Figures 9.12 to 9.14 and 9.18 show there are no PHC exceedences of MECP standards in soil at the site. The 2019 targeted investigations of the historically elevated $TPH_{gas+diesel}$ measured at TP-29 (360 µg/g) confirm there are no PHC exceedences of MECP Table 7 standards in soil at the site.

Figures 9.12 to 9.14 and 9.18 show that there is only one very minor BTEX exceedence of MECP standards in soil at the site. This BTEX exceedence is due to slightly elevated benzene historically measured at TP-41 (concentration of 0.56 µg/g vs standard of 0.21 µg/g). Follow-up 2019 testing in the vicinity of TP-41 (at BH19-09 and BH19-10, see Figure 9.18) did not show detectable

concentrations of BTEX, indicating that the historical benzene exceedence was a minor isolated occurrence.

Figures 9.12 to 9.14, 9.18 and 9.19 show there are no PCB or VOC exceedences of MECP standards in site soil.

Groundwater

There are no COCs in site groundwater as shown in Figure 9.20.

6.8.6.4 Discharge and Migration of Contaminants

Groundwater from the site is channelled to the former Lazy Bay fill area and discharges to the Ottawa via permeable fill and native alluvial deposits (see Figure 9.8). However, since there are no COCs in site groundwater there is no discharge and migration of contaminants by groundwater flow.

6.8.6.5 Climatic and Meteorological Conditions

Climatic and meteorological conditions have potential to affect the distribution and migration of contaminants. This can occur through changes in groundwater infiltration rates that affect the rate of leaching of contaminants present in the unsaturated zone into groundwater and through changes in directions and rates of groundwater flow that affect the migration of dissolved chemical plumes.

Due to the site location in parkland/green space and with hydraulic connection to the nearby Ottawa River, there is opportunity for significant groundwater infiltration following seasonal precipitation trends and fluctuations in Ottawa River levels. Historical groundwater elevation data collected over several years from December, October, November and April presented in Table 9.2 confirm this statement with water level fluctuations of up to 3 m observed.

6.8.6.6 Potential for Vapour Intrusion

The potential for vapour intrusion into future buildings and/or structures at the Burnside site is generically assessed based on results of soil vapour screening and soil quality results for volatile chemicals including light molecular weight PAHs (e.g., naphthalene and methylnaphthalenes) and PHCs (e.g., PHC-F1 and PHC-F2), BTEX and VOCs. Other than generic assessment is not possible as there are no specific building development plans for site.

The very low soil vapour screening levels, low concentrations or volatile COPCs in site soil and lack of volatile COCs in site groundwater indicate that the potential for vapour intrusion to future buildings and structures at the site in negligible.

6.8.6.7 Contaminant Transport and Exposure Diagrams

Figures 9.8 and 9.22 are the contaminant transport and exposure diagrams for the site that illustrate contaminant release mechanisms, contaminant transport pathways as well human and ecological receptors on and off site, receptor exposure points and routes of exposure.

As there are no COCs in site groundwater there are no release and transport mechanisms due to dissolution of soil COCs and migration in site groundwater. Since identified COCs in site soil (i.e.,

metals, PAHs and minor benzene) are strongly sorbed to site soil, the only identifiable contaminant release and transport mechanisms for COC in site soil are due to windblown or surface runoff dispersal of exposed COCs during excavation and construction activities. The presence of a grassed topsoil cover eliminates such windblown and surface runoff release and transport of soil COCs today. Diligent future excavation and construction measures would mitigate any potential for off-site release and transport of soil COCs by wind or surface runoff.

6.8.6.8 Human and Ecological Receptors, Exposure Points and Routes

As shown on Figure 9.22 on-site human receptors include park visitors, maintenance/utility or construction workers and future commercial site users. Assuming diligent excavation and construction activities, there are no exposed off-site human or ecological receptors. On-site ecological receptors include all terrestrial receptors including mammals, birds, soil invertebrates and plants. As there are no groundwater COCs, off-site aquatic receptors in the nearby Ottawa River are not at risk due to exposure to site soil COCs.

Given current and projected future site use (parkland and commercial), the primary route of on-site human exposure to soil COCs is via direct exposure including soil dust inhalation, soil ingestion and soil dermal absorption. The primary route of on-site terrestrial ecological exposure is also via direct contact. For terrestrial plants the exposure route includes contact and uptake from contaminated soil. For soil invertebrates the exposure route includes direct contact and soil ingestion. For terrestrial mammals and birds, the exposure route includes soil ingestion, and ingestion of plants, invertebrates and smaller animals as food sources contaminated by soil COCs via uptake.mechanisms.

7 CONCLUSIONS

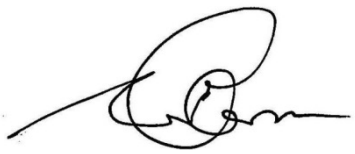
Based on a review of historical information, and completion of Phase Two ESA soil and groundwater investigations described herein, the following conclusions are made regarding the Burnside site, Ottawa, Ontario.

- The site is currently vacant grassed parkland with minor treed areas with no municipal address. The site is located adjacent and south of the SJMP and about 70 m south of the Ottawa River in west-central Ottawa. Future re-development to diplomatic mission use (i.e., office space defined as commercial under O.Reg. 153/04) is contemplated for the property. The specific details of future property use are not known at this time. Based on this proposed change in land use to include diplomatic mission uses, a Record of Site Condition would not be required for site redevelopment.
- The site has been subject to commercial, industrial and parkland uses since the mid to late 1800's. Historical use of the property included lumber yards, parkland, residential housing and the importation of large amounts of fill materials in the former area of Lazy Bay and over the remainder of the site. Although the Phase One ESA identifies several PCAs within the Phase One study area, historical and current soil and groundwater quality investigations on the site show that none of the identified PCA's surrounding the site have negatively impacted environmental conditions on the site. One APEC (APEC-1, PCA #30) due to importation of poor quality fill is identified for the entire site.
- The site stratigraphy consists of a thin veneer of topsoil overlying generally one to three metres of granular fill overlying about two metres of native alluvial sand in the former Lazy Bay fill area and a discontinuous layer of native silty sandy glacial till found in an eroded bedrock fault depression. Fill materials in APEC-1 consist of a mixture of silt, sand, clay, cobbles and boulders with debris including asphalt, brick, concrete, plastics, glass, metal, cinders, ashes and wood pieces. These overburden deposits are underlain by horizontally and vertically fractured grey limestone of the Bobcaygeon Formation, with minor dark grey to black shale layers.
- Approximate depth to bedrock ranges from 0 m to 6.0 m with a site average of about 1.5 m. The depth to bedrock is greatest in the centre of the site near the former Lazy Bay fill area and is a minimum in the western part of the site. The depth to bedrock in the eastern part of the site approximates 1.5 to 2 m. Given the site stratigraphy, MECP Table 7 shallow soil standards for coarse-textured soil, non-potable groundwater and parkland use are applicable to the site.
- Groundwater flow occurs primarily within the bedrock as the groundwater table is typically found at or below the bedrock surface at the site. Groundwater flow at the site is focussed to the former Lazy Bay fill area and discharges to the Ottawa River located about 70 m north of the northern property line via permeable fill and alluvial deposits. Some groundwater flow will also be channelled via overburden infill of utility excavations into bedrock (i.e., storm and sanitary sewers and low-pressure forcemain) and via the bedrock depression created by eroded splays of the bedrock Gloucester Fault.
- The results of historical and 2019 laboratory soil quality testing show that the imported fill across the entire site frequently contains metals (lead, barium, zinc, selenium, copper, vanadium, mercury, antimony, molybdenum and cadmium) and heavy molecular weight PAH exceedences of MECP Table 7 standards and that general inorganics, PHCs/BTEX, PCBs and VOCs are not significant COCs in site soil. The sporadic but widespread occurrence of the metal and PAH COCs in site soil is consistent with the site history. A reasonable and conservative assumption is that all fill at the site is contaminated by metals and PAHs. Soil quality testing also shows that the minor pockets of native soil at the site including sandy alluvium and glacial till are not contaminated. Consequently, the vertical limits of metal and PAH contaminated soil are defined by the bottom of the topsoil layer and top of either the native sandy alluvium, glacial till or bedrock.

- The results of historical and 2012 and 2014 laboratory testing of groundwater quality show that groundwater at the site is not contaminated above MECP Table 7 standards. This conclusion is consistent with the observations that most of contaminated soil is found above the groundwater table and most of the identified soil COCs are low solubility and low mobility chemicals in groundwater systems.
- The site does not meet applicable site condition standards, MECP Table 7 for soil.
- As there are no COCs in site groundwater there are no release and transport mechanisms due to dissolution of soil COCs and migration in site groundwater. Since identified COCs in site soil (i.e., metals, PAHs and minor benzene) are strongly sorbed to site soil, the only identifiable contaminant release and transport mechanisms for COC in site soil are due to windblown or surface runoff dispersal of exposed COCs during excavation and construction activities.
- On-site human receptors include park visitors, maintenance/utility or construction workers and future commercial site users. Assuming diligent excavation and construction activities, there are no exposed off-site human or ecological receptors. On-site ecological receptors include all terrestrial receptors including mammals, birds, soil invertebrates and plants. As there are no groundwater COCs, off-site aquatic receptors in the nearby Ottawa River are not at risk due to exposure to site soil COCs.
- Given current and projected future site use (parkland and commercial), the primary route of on-site human exposure to soil COCs is via direct exposure including soil dust inhalation, soil ingestion and soil dermal absorption. The primary route of on-site terrestrial ecological exposure is also via direct contact. For terrestrial plants the exposure route includes contact and uptake from contaminated soil. For soil invertebrates the exposure route includes direct contact and soil ingestion. For terrestrial mammals and birds, the exposure route includes soil ingestion, and ingestion of plants, invertebrates and smaller animals as food sources contaminated by soil COCs via uptake.mechanisms.

This Phase Two ESA was prepared by and under the supervision of Mr. Kenneth Raven a Qualified Person for environmental site assessment and risk assessment under O Reg. 153/04. Mr. Raven has reviewed all information included in this Phase Two ESA report, and confirms the findings and conclusions contained herein.

Respectfully submitted,



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Principal

Glen Briscoe, QP_{ESA} , P.Eng.
Project Manager

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9 MAIN FIGURES AND TABLES

LEGEND

Burnside Site Boundary

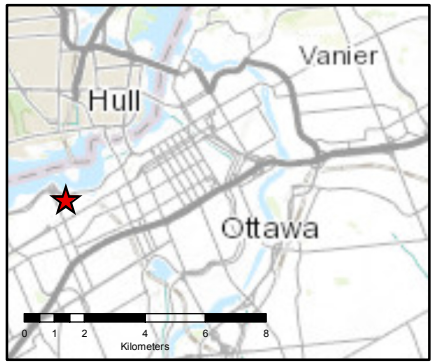

Figure 9.1
Site Location

Scale 1:15,000

0 50 100 200 300 400
Meters

N

Coordinate System: NAD 1983 MTM 9
Source: NCC property boundary
Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

PROJECT No. 18-262-1

Phase Two Environmental Site Assessment
Burnside Site, Ottawa, ON

DESIGN: ADG
CAD/GIS: ADG
CHECK: KGR
REV: 0

DATE: 12/06/2019

Geofirma Engineering Ltd

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LEGEND

- Burnside Site Boundary
- 2019 Geofirma Borehole

Area of Potential Environmental Concern

- APEC-1, Unknown Quality Fill

Figure 9.2
Site Layout, APEC-1 and Phase Two ESA Sampling Locations

Scale 1:2,500

0 10 20 40 60 80
Meters

N

Coordinate System: NAD 1983 MTM 9
Source: NCC property boundary
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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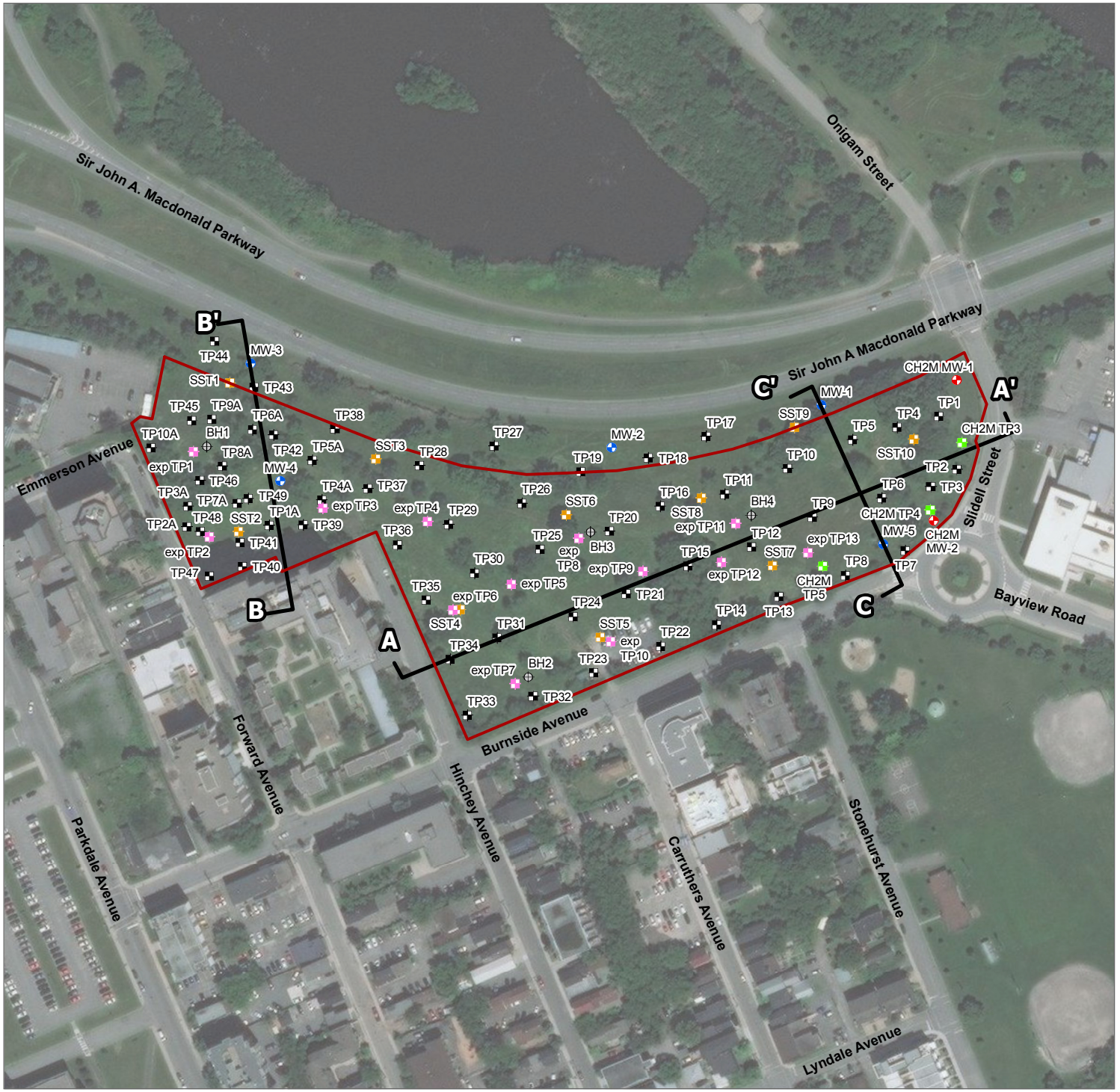

LEGEND

- Burnside Site Boundary
- Cross Section Lines
- Monitoring Well, Intera
- Monitoring Well, CH2MHILL
- Test Pit, DE&S
- Test Pit, CH2MHILL
- Test Pit, Trow
- Test Pit, EXP
- Borehole, EXP

Figure 9.3
Historical Sampling Locations and Cross Sections

Scale 1:2,500

0 10 20 40 60 80
Meters

N

Coordinate System: NAD 1983 MTM 9
Source: NCC property boundary
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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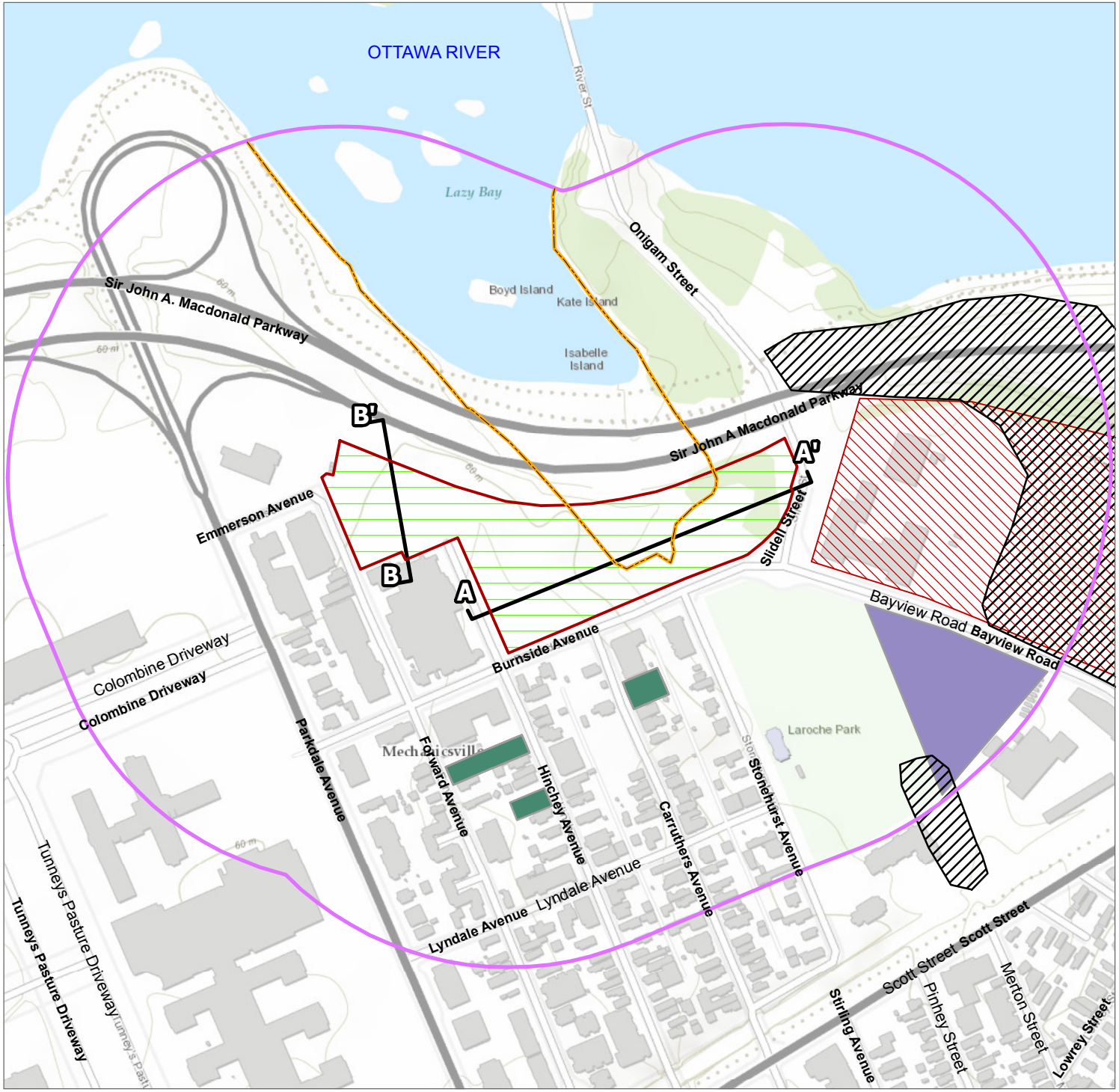

LEGEND

- Burnside Site Boundary
- Phase One Study Area
- 1928 Shoreline
- Cross Section Lines

Potentially Contaminating Activities

- Filled Area (PCA 30)
- Landfills (PCA 30, 58)
- Transportation Yard (PCA 28, 52)
- Metal Fabrication (PCA 34)
- Garages and Potential Petroleum Storage (PCA 28)

Figure 9.4
Phase One Conceptual Site Model - PCAs and Cross Sections

Scale 1:4,500

0 25 50 100 150 200
Meters

N

Coordinate System: NAD 1983 MTM 9
Source: NCC property boundary
Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

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REV: 0

DATE: 12/06/2019

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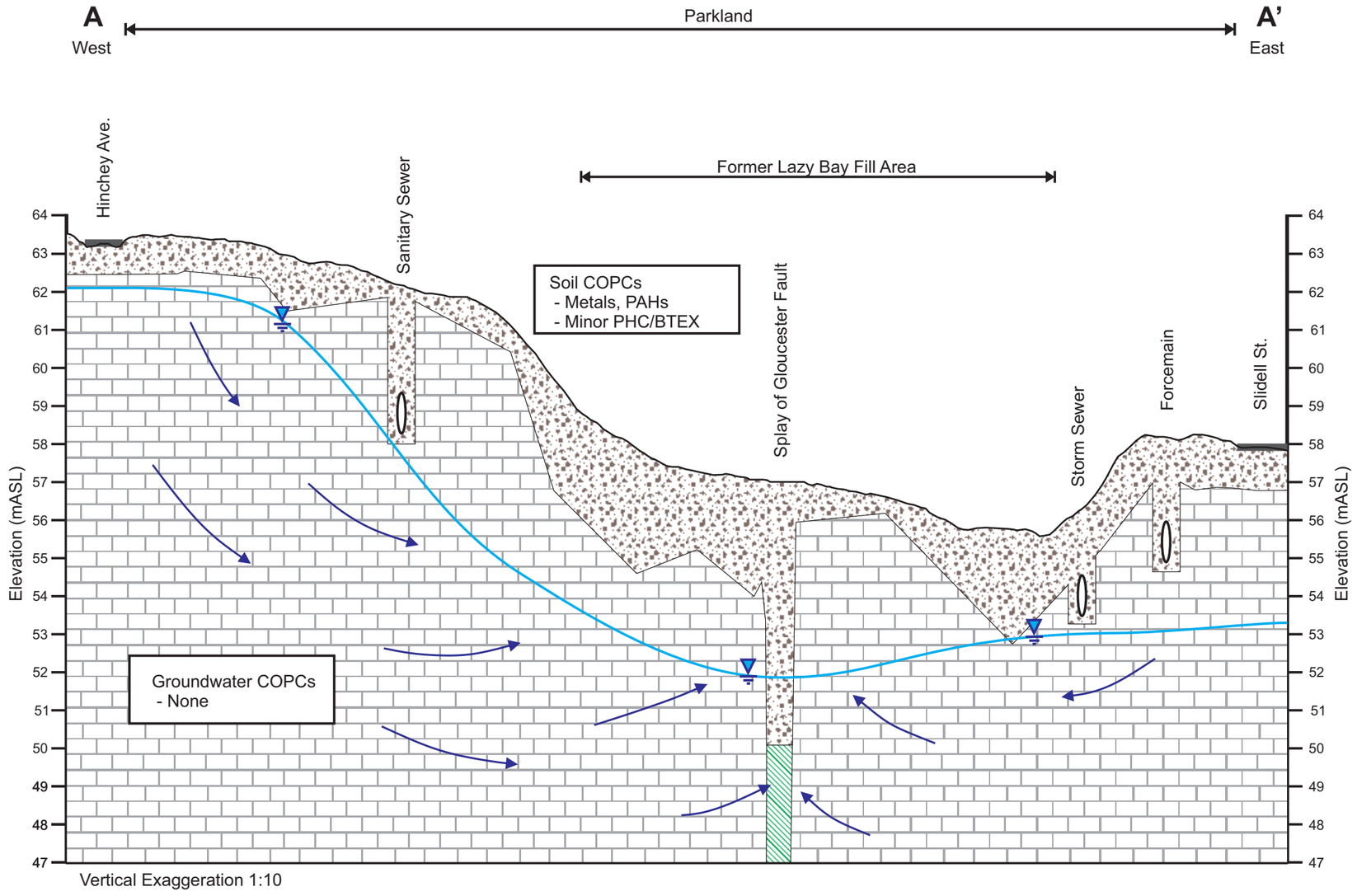

LEGEND

Fill | Glacial Till | Limestone Bedrock | Groundwater Table | Interpreted Groundwater Flow Direction

Phase One Conceptual Site Model, Cross Section A-A'
Phase Two ESA, Burnside Site, Ottawa, ON

FIGURE 9.5

Doc: 18-262-1_Burnside_P2_F9_5_CSM_AA.cdr"

Prepared by: NMP/ADG
Reviewed by: KGR
Doc. No.: 0
Date: 11 Jun 2019

0m 10m 20m 50m Horizontal Scale

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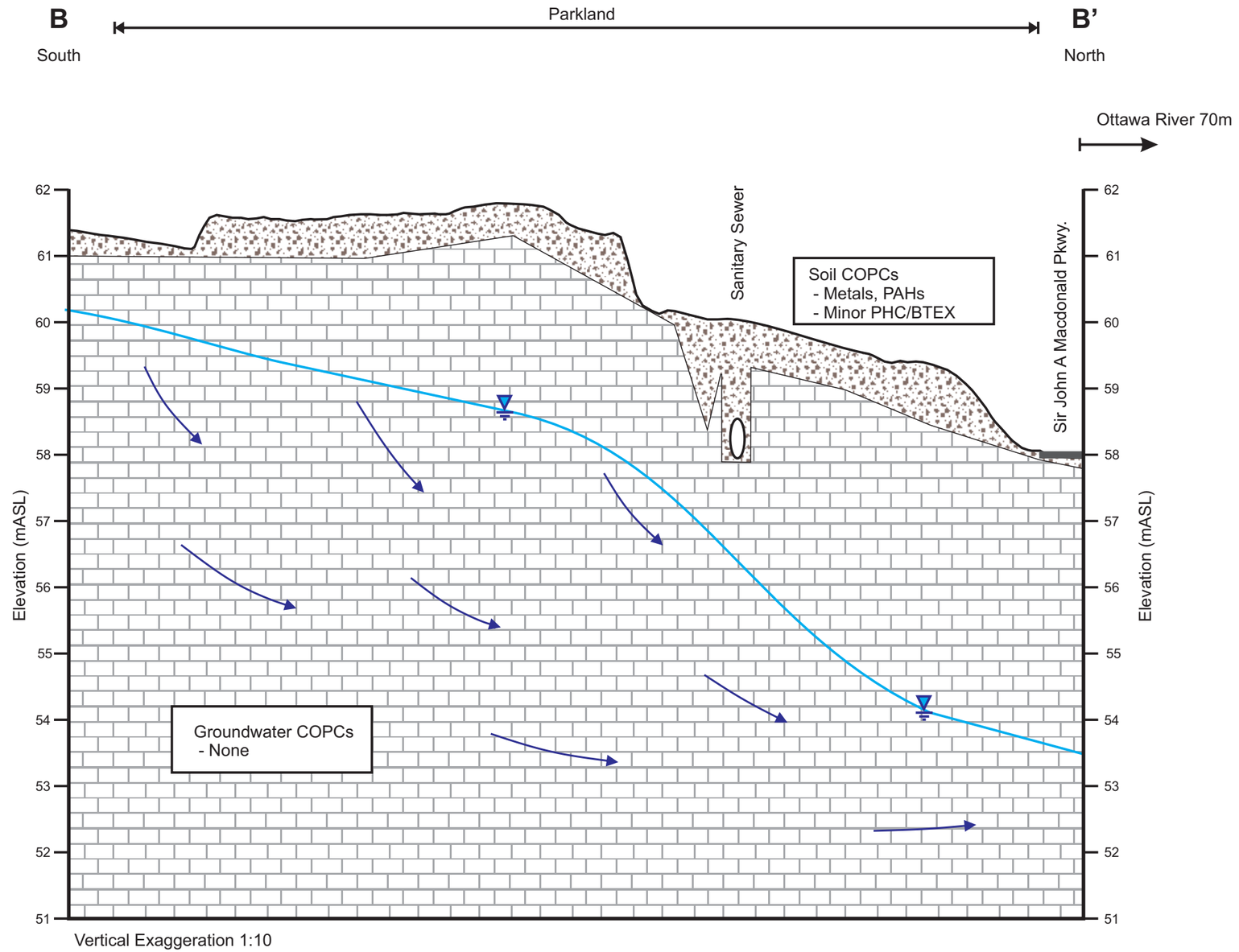


LEGEND

Fill | Limestone Bedrock | Groundwater Table | Interpreted Groundwater Flow Direction

Phase One Conceptual Site Model, Cross Section B-B'
Phase Two ESA, Burnside Site, Ottawa, ON

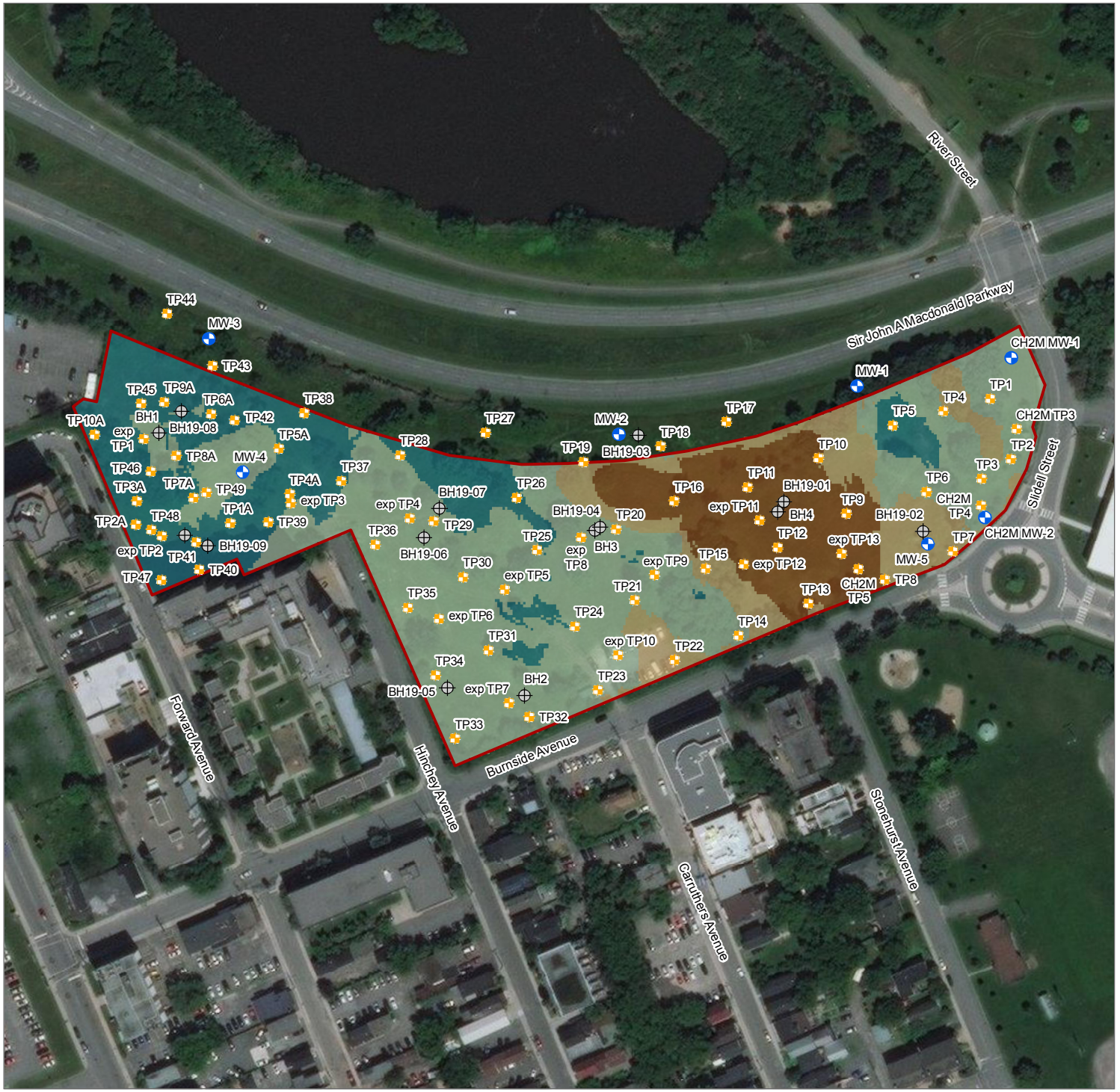
FIGURE 9.6

Doc: 18-262-1_Burnside_P2_F9_6_CSM_BB.cdr"

Prepared by: NMP/ADG
Reviewed by: KGR
Doc. No.: 0
Date: 11 Jun 2019

Horizontal Scale
0m 10m 20m 50m

Geofirma Engineering Ltd



LEGEND

- Burnside Site Boundary
- Borehole
- Monitoring Well
- Test Pit

Overburden Thickness (m)

- <1
- 1-2
- 2-3
- >3

Figure 9.7
Overburden Thickness

Scale 1:2,200

0 20 40 80

Meters

N

Coordinate System: NAD 1983 MTM 9
Source: NCC property boundary
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,

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Burnside Site, Ottawa, ON

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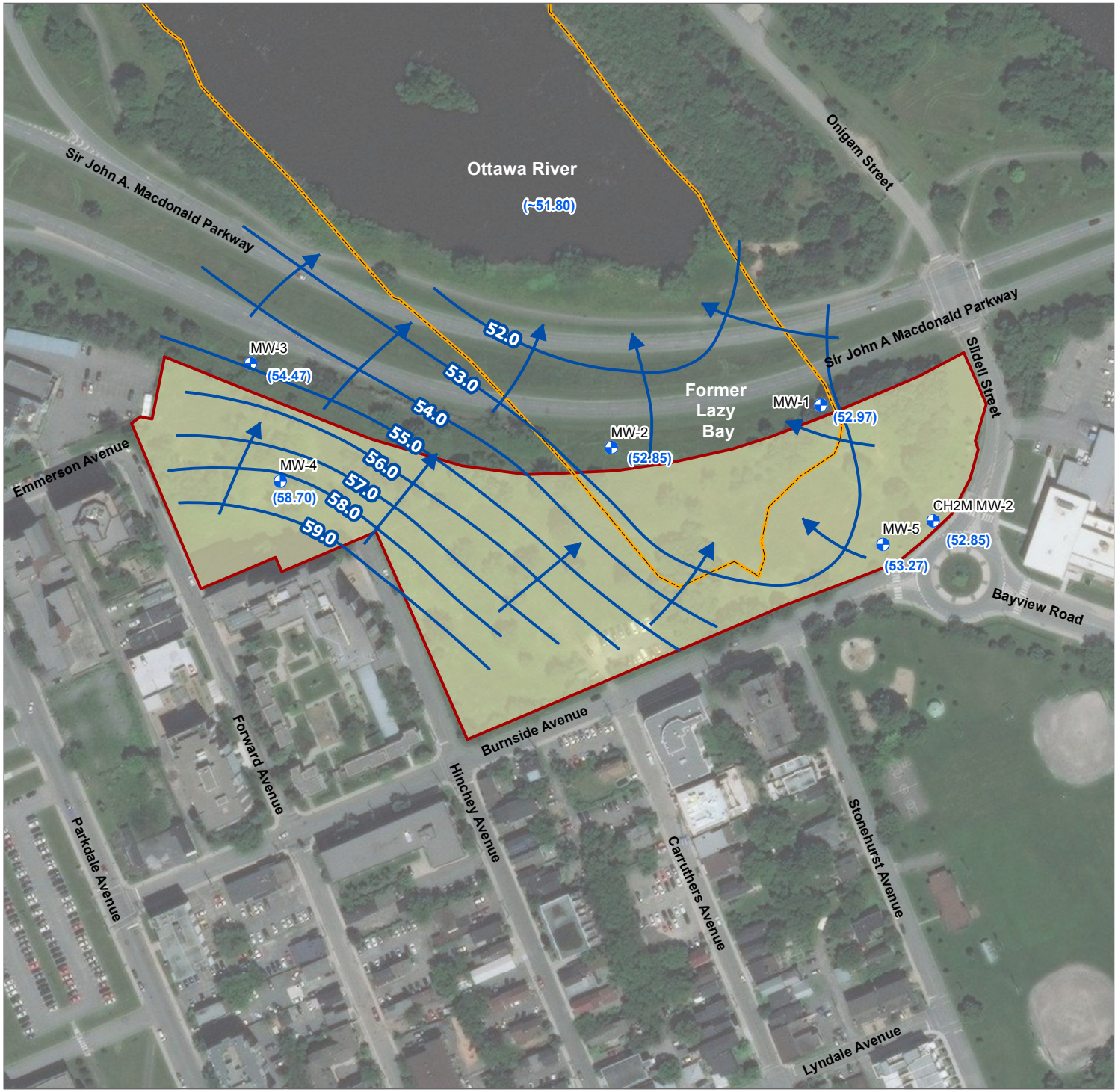

LEGEND

- Burnside Site Boundary
- 1928 Shoreline
- APEC-1, Unknown Quality Fill
- Existing Groundwater Monitoring Well
- (52.85) Water Level Elevation (mASL) October 17, 2014
- 54.0 Interpreted Groundwater Elevation Contour
- Interpreted Direction of Shallow Horizontal Groundwater Flow

Figure 9.8
Groundwater Elevations and Interpreted Flow Directions

Scale 1:2,500

0 10 20 40 60 80
Meters

N

Coordinate System: NAD 1983 MTM 9
Source: NCC property boundary
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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Phase Two Environmental Site Assessment
Burnside Site, Ottawa, ON

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CAD/GIS: ADG
CHECK: KGR
REV: 0

DATE: 21/06/2019

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TP44-1
Sample Date: 24-Nov-00
Sample Interval: 0-0.2 mBGS
Analysis Suite: Metals

No Exceedences

TP44-2
Sample Date: 24-Nov-00
Sample Interval: 0.8 mBGS
Analysis Suite: Metals

Lead 170

SST1
Sample Date: 3-Nov-09
Sample Interval: 0-0.1 mBGS
Analysis Suite: Metals

No Exceedences

TP43-1
Sample Date: 24-Nov-00
Sample Interval: 0.5 mBGS
Analysis Suite: Metals

No Exceedences

TP6A
Sample Date: 8-Jun-00
Sample Interval: 0.5 mBGS
Analysis Suite: Metals

No Exceedences

SST3
Sample Date: 3-Nov-09
Sample Interval: 0-0.1 mBGS
Analysis Suite: Metals

Barium 404

PH-37
Sample Date: 24-Nov-00
Sample Interval: 0.3-0.5 mBG
Analysis Suite: pH

No Exceedences

TP45-1
Sample Date: 24-Nov-00
Sample Interval: 1 mBGS
Analysis Suite: Metals

No Exceedences

BH19-08-1
Sample Date: 24-May-19
Sample Interval: 0.2-0.6 mBGS
Analysis Suite: Metals, Inorganics

Lead 221

TP42-1
Sample Date: 24-Nov-00
Sample Interval: 0.4 mBGS
Analysis Suite: Metals

No Exceedences

TP37-1
Sample Date: 24-Nov-00
Sample Interval: 0-0.2 mBGS
Analysis Suite: Metals

No Exceedences

TP37-2
Sample Date: 24-Nov-00
Sample Interval: 0.5 mBGS
Analysis Suite: Metals

Lead 660

TP46-1
Sample Date: 24-Nov-00
Sample Interval: 0-0.2 mBGS
Analysis Suite: Metals

No Exceedences

TP38-2
Sample Date: 24-Nov-00
Sample Interval: 0.4 mBGS
Analysis Suite: Metals

No Exceedences

TP28-1
Sample Date: 23-Nov-00
Sample Interval: 0-0.2 mBGS
Analysis Suite: Metals

No Exceedences

TP46-2
Sample Date: 24-Nov-00
Sample Interval: 1.3 mBGS
Analysis Suite: Metals

Lead 510

TP28-2
Sample Date: 23-Nov-00
Sample Interval: 0.2 mBGS
Analysis Suite: Metals

No Exceedences

PH-49
Sample Date: 24-Nov-00
Sample Interval: 0.3-0.5 mBGS
Analysis Suite: pH

No Exceedences

TP27-1
Sample Date: 23-Nov-00
Sample Interval: 0.4 mBGS
Analysis Suite: Metals

No Exceedences

TP29-1
Sample Date: 23-Nov-00
Sample Interval: 0-0.2 mBGS
Analysis Suite: Metals

No Exceedences

TP49-1
Sample Date: 24-Nov-00
Sample Interval: 0-0.2 mBGS
Analysis Suite: Metals

Serenium 4

TP29-2
Sample Date: 23-Nov-00
Sample Interval: 0.7 mBGS
Analysis Suite: Metals

Lead 480
Zinc 1300

TP49-2
Sample Date: 24-Nov-00
Sample Interval: 0.5 mBGS
Analysis Suite: Metals

Barium 610
Lead 1100
Zinc 420

TP48-1
Sample Date: 24-Nov-00
Sample Interval: 0.8 mBGS
Analysis Suite: Metals

Lead 190

TP36-1
Sample Date: 24-Nov-00
Sample Interval: 0-0.2 mBGS
Analysis Suite: Metals

No Exceedences

PH-30
Sample Date: 23-Nov-00
Sample Interval: 0.3-0.5 mBGS
Analysis Suite: pH

No Exceedences

TP36-2
Sample Date: 24-Nov-00
Sample Interval: 1.2 mBGS
Analysis Suite: Metals

Lead 170

TP30-1
Sample Date: 23-Nov-00
Sample Interval: 0-0.2 mBGS
Analysis Suite: Metals

No Exceedences

TP3A-1
Sample Date: 8-Jun-00
Sample Interval: 0-0.2 mBGS
Analysis Suite: Metals

No Exceedences

TP1A-1
Sample Date: 8-Jun-00
Sample Interval: 0.4 mBGS
Analysis Suite: Metals

No Exceedences

TP35-1
Sample Date: 23-Nov-00
Sample Interval: 1.2 mBGS
Analysis Suite: Metals

No Exceedences

TP30-2
Sample Date: 23-Nov-00
Sample Interval: 0.7 mBGS
Analysis Suite: Metals

Lead 230

TP3A-2
Sample Date: 8-Jun-00
Sample Interval: 0-0.8 mBGS
Analysis Suite: Metals

Lead 165
Molybdenum 29

SST2
Sample Date: 3-Nov-09
Sample Interval: 0-0.1 mBGS
Analysis Suite: Metals

No Exceedences

TP39-1
Sample Date: 24-Nov-00
Sample Interval: 0-0.2 mBGS
Analysis Suite: Metals

No Exceedences

SST4
Sample Date: 3-Nov-09
Sample Interval: 0-0.1 mBGS
Analysis Suite: Metals

No Exceedences

TP31-1
Sample Date: 23-Nov-00
Sample Interval: 0-0.2 mBGS
Analysis Suite: Metals

Selenium 9

TP47-1
Sample Date: 24-Nov-00
Sample Interval: 0.55 mBGS
Analysis Suite: Metals

Barium 440
Lead 180

TP41-1
Sample Date: 24-Nov-00
Sample Interval: 0.2 mBGS
Analysis Suite: Metals

No Exceedences

TP39-2
Sample Date: 24-Nov-00
Sample Interval: 0.5 mBGS
Analysis Suite: Metals

Lead 520

TP31-2
Sample Date: 23-Nov-00
Sample Interval: 0.4 mBGS
Analysis Suite: Metals

No Exceedence

TP40-2
Sample Date: 24-Nov-00
Sample Interval: 0.9 mBGS
Analysis Suite: Metals

Barium 440
Lead 390

TP40-1
Sample Date: 24-Nov-00
Sample Interval: 0-0.2 mBGS
Analysis Suite: Metals

Selenium 4

TP34-1
Sample Date: 23-Nov-00
Sample Interval: 0.8 mBGS
Analysis Suite: Metals

No Exceedences

BH19-05-1
Sample Date: 24-May-19
Sample Interval: 0-0.8 mBGS
Analysis Suite: Metals, Inorganics

Lead 176

TP33-2
Sample Date: 23-Nov-00
Sample Interval: 0.4 mBGS
Analysis Suite: Metals

Lead 160

MW-3
TP9A
TP10A
exp TP1
BH1
TP8A
TP5A
MW-4
TP4A
TP7A
exp TP3
exp TP4
BH19-7
TP2A
BH19-10
exp TP2
BH19-9
BH19-6
exp TP5
exp TP6
BH2
exp TP7
Forward Avenue
Hinchey Avenue
Burnside Avenue

LEGEND

Burnside Site Boundary

Borehole/Monitoring Well

- No samples submitted for analysis
- No Exceedence of applicable standards
- Exceedence of applicable standards

Test Pit

- No samples submitted for analysis
- No Exceedence of applicable standards
- Exceedence of applicable standards

Sample ID
Date Sampled
Parameters Analyzed
Parameter and Value (µg/g)

MW2-97
Sample Date: 23-Jul-14
Sample Interval: 0.6-1.2 mBGS
Analysis Suite: Metals

Copper 156

Soil Interval Sampled (metres below ground surface)

Applicable Site Standard: MECP Table 7
Residential, Non Potable, Coarse Grained, Shallow Soils

MECP Table 7 (µg/g)	
Parameter	*Standard*
Antimony	7.5
Barium	390
Cadmium	1.2
Copper	140
Lead	120
Mercury	0.27
Molybdenum	6.9
Selenium	2.4
Vanadium	86
Zinc	340

Notes

1) Values in red indicate an exceedence of applicable site standards.

2) Parameters not exceeding applicable site standards are not included in this figure.

Figure 9.9
Plan Distribution of Soil Quality Results - Metals and Inorganics (West)

SCALE 1:800
0 10 20 40
Metres
N

Coordinate System: NAD 1983 MTM 9
Source: NCC property boundary

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

PROJECT No. 18-262-1

Phase Two Environmental Site Assessment
Burnside Site, Ottawa, ON

DESIGN: NMP
CAD/GIS: NMP
CHECK: KGR
REV: 0

DATE: 28/06/2019

Geofirma Engineering Ltd

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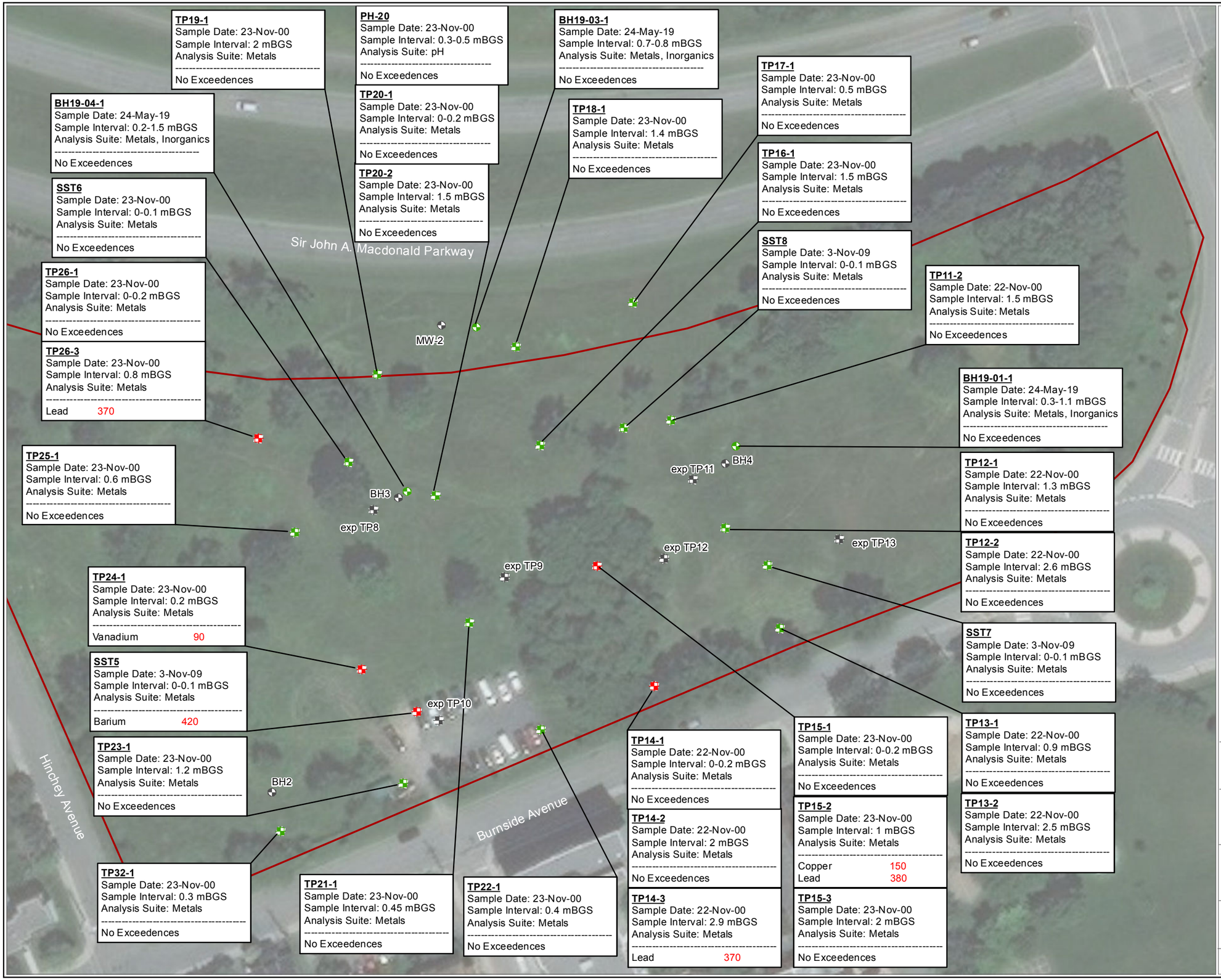

LEGEND

Burnside Site Boundary

Borehole/Monitoring Well

- No samples submitted for analysis
- No Exceedence of applicable standards
- Exceedence of applicable standards

Test Pit

- No samples submitted for analysis
- No Exceedence of applicable standards
- Exceedence of applicable standards

Sample ID — **MW2-97**
Date Sampled — Sample Date: 23-Jul-14
Parameters Analyzed — Sample Interval: 0.6-1.2 mBGS; Analysis Suite: Metals
Parameter and Value (µg/g) — Copper 156
Soil Interval Sampled (metres below ground surface)

Applicable Site Standard: MECP Table 7
Residential, Non Potable, Coarse Grained, Shallow Soils

MECP Table 7 (µg/g)	
Parameter	*Standard*
Antimony	7.5
Barium	390
Cadmium	1.2
Copper	140
Lead	120
Mercury	0.27
Molybdenum	6.9
Selenium	2.4
Vanadium	86
Zinc	340

Notes

1) Values in red indicate an exceedence of applicable site standards.

2) Parameters not exceeding applicable site standards are not included in this figure.

Figure 9.10
Plan Distribution of Soil Quality Results - Metals and Inorganics (Centre)

SCALE 1:800
0 10 20 40
Metres
N

Coordinate System: NAD 1983 MTM 9
Source: NCC property boundary

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

PROJECT No. 18-262-1

Phase Two Environmental Site Assessment
Burnside Site, Ottawa, ON

DESIGN: NMP
CAD/GIS: NMP
CHECK: KGR
REV: 0

DATE: 28/06/2019

Geofirma Engineering Ltd

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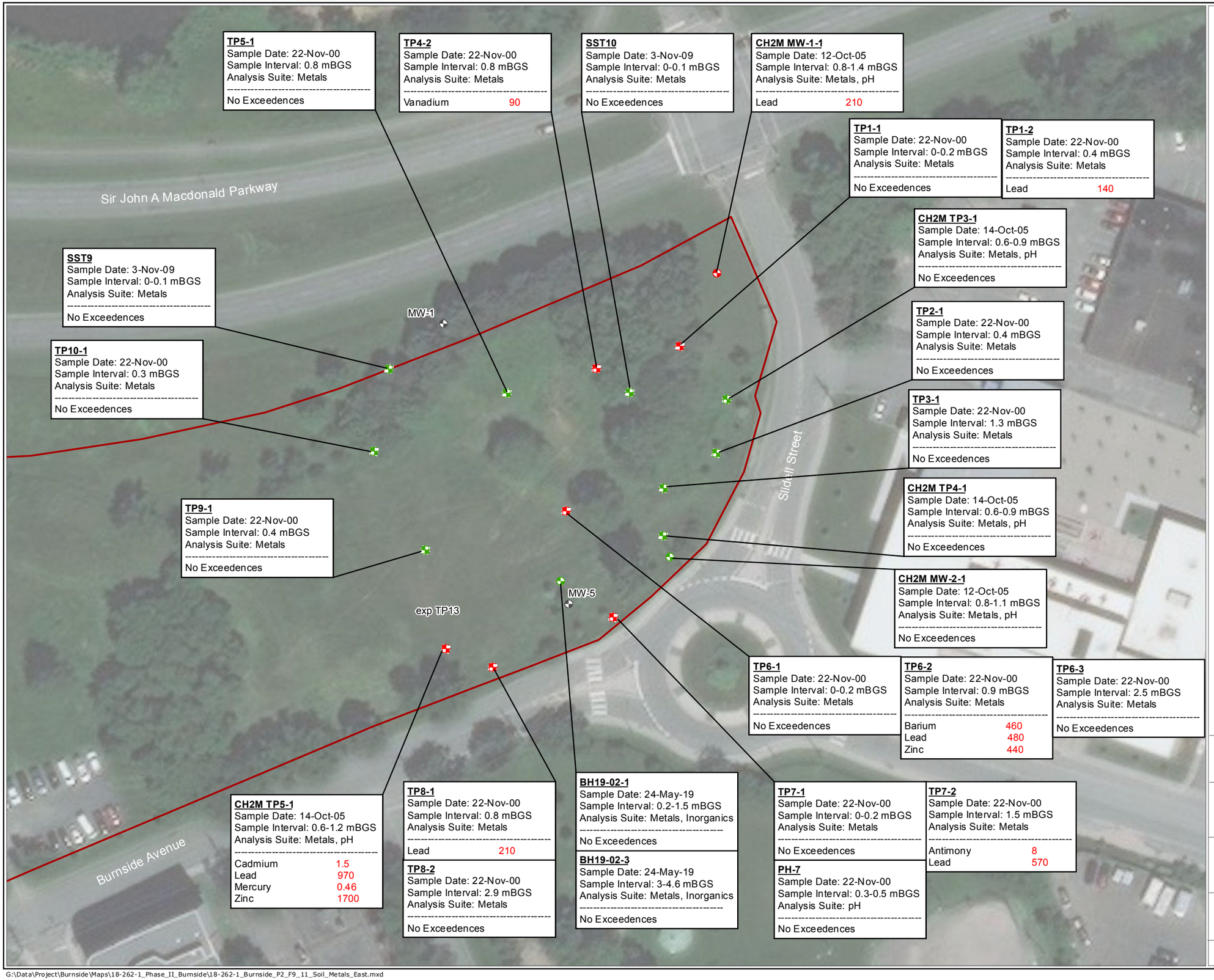


TP5-1
Sample Date: 22-Nov-00
Sample Interval: 0.8 mBGS
Analysis Suite: Metals
No Exceedences

TP4-2
Sample Date: 22-Nov-00
Sample Interval: 0.8 mBGS
Analysis Suite: Metals
Vanadium 90

SST10
Sample Date: 3-Nov-09
Sample Interval: 0-0.1 mBGS
Analysis Suite: Metals
No Exceedences

CH2M MW-1-1
Sample Date: 12-Oct-05
Sample Interval: 0.8-1.4 mBGS
Analysis Suite: Metals, pH
Lead 210

TP1-1
Sample Date: 22-Nov-00
Sample Interval: 0-0.2 mBGS
Analysis Suite: Metals
No Exceedences

TP1-2
Sample Date: 22-Nov-00
Sample Interval: 0.4 mBGS
Analysis Suite: Metals
Lead 140

SST9
Sample Date: 3-Nov-09
Sample Interval: 0-0.1 mBGS
Analysis Suite: Metals
No Exceedences

CH2M TP3-1
Sample Date: 14-Oct-05
Sample Interval: 0.6-0.9 mBGS
Analysis Suite: Metals, pH
No Exceedences

TP10-1
Sample Date: 22-Nov-00
Sample Interval: 0.3 mBGS
Analysis Suite: Metals
No Exceedences

TP2-1
Sample Date: 22-Nov-00
Sample Interval: 0.4 mBGS
Analysis Suite: Metals
No Exceedences

TP3-1
Sample Date: 22-Nov-00
Sample Interval: 1.3 mBGS
Analysis Suite: Metals
No Exceedences

CH2M TP4-1
Sample Date: 14-Oct-05
Sample Interval: 0.6-0.9 mBGS
Analysis Suite: Metals, pH
No Exceedences

TP9-1
Sample Date: 22-Nov-00
Sample Interval: 0.4 mBGS
Analysis Suite: Metals
No Exceedences

CH2M MW-2-1
Sample Date: 12-Oct-05
Sample Interval: 0.8-1.1 mBGS
Analysis Suite: Metals, pH
No Exceedences

TP6-1
Sample Date: 22-Nov-00
Sample Interval: 0-0.2 mBGS
Analysis Suite: Metals
No Exceedences

TP6-2
Sample Date: 22-Nov-00
Sample Interval: 0.9 mBGS
Analysis Suite: Metals
Barium 460
Lead 480
Zinc 440

TP6-3
Sample Date: 22-Nov-00
Sample Interval: 2.5 mBGS
Analysis Suite: Metals
No Exceedences

CH2M TP5-1
Sample Date: 14-Oct-05
Sample Interval: 0.6-1.2 mBGS
Analysis Suite: Metals, pH
Cadmium 1.5
Lead 970
Mercury 0.46
Zinc 1700

TP8-1
Sample Date: 22-Nov-00
Sample Interval: 0.8 mBGS
Analysis Suite: Metals
Lead 210

TP8-2
Sample Date: 22-Nov-00
Sample Interval: 2.9 mBGS
Analysis Suite: Metals
No Exceedences

BH19-02-1
Sample Date: 24-May-19
Sample Interval: 0.2-1.5 mBGS
Analysis Suite: Metals, Inorganics
No Exceedences

BH19-02-3
Sample Date: 24-May-19
Sample Interval: 3-4.6 mBGS
Analysis Suite: Metals, Inorganics
No Exceedences

TP7-1
Sample Date: 22-Nov-00
Sample Interval: 0-0.2 mBGS
Analysis Suite: Metals
No Exceedences

PH-7
Sample Date: 22-Nov-00
Sample Interval: 0.3-0.5 mBGS
Analysis Suite: pH
No Exceedences

TP7-2
Sample Date: 22-Nov-00
Sample Interval: 1.5 mBGS
Analysis Suite: Metals
Antimony 8
Lead 570

LEGEND

Burnside Site Boundary

Borehole/Monitoring Well

- No samples submitted for analysis
- No Exceedence of applicable standards
- Exceedence of applicable standards

Test Pit

- No samples submitted for analysis
- No Exceedence of applicable standards
- Exceedence of applicable standards

Sample ID
Date Sampled
Parameters Analyzed
Parameter and Value (µg/g)
Soil Interval Sampled (metres below ground surface)

MW2-97
Sample Date: 23-Jul-14
Sample Interval: 0.6-1.2 mBGS
Analysis Suite: Metals
Copper 156

Applicable Site Standard: MECP Table 7
Residential, Non Potable, Coarse Grained, Shallow Soils

MECP Table 7 (µg/g)	
Parameter	*Standard*
Antimony	7.5
Barium	390
Cadmium	1.2
Copper	140
Lead	120
Mercury	0.27
Molybdenum	6.9
Selenium	2.4
Vanadium	86
Zinc	340

Notes

1) Values in red indicate an exceedence of applicable site standards.

2) Parameters not exceeding applicable site standards are not included in this figure.

Figure 9.11
Plan Distribution of Soil Quality Results - Metals and Inorganics (East)

SCALE 1:800
0 10 20 40
Metres
N

Coordinate System: NAD 1983 MTM 9
Source: NCC property boundary

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

PROJECT No. 18-262-1

Phase Two Environmental Site Assessment
Burnside Site, Ottawa, ON

DESIGN: NMP
CAD/GIS: NMP
CHECK: KGR
REV: 0

DATE: 28/06/2019

Geofirma Engineering Ltd

G:\Data\Project\Burnside\Maps\18-262-1_Phase_II_Burnside\18-262-1_Burnside_P2_F9_11_Soil_Metals_East.mxd

A

A'

Hinchey Ave.

Slidell St.

West

East

TP24-1	
Sample Date: 23-Nov-00	
Sample Interval: 0.2 mBGS	
Analysis Suite: Metals	
Vanadium	90

TP21-1	
Sample Date: 23-Nov-00	
Sample Interval: 0.45 mBGS	
Analysis Suite: Metals	
No Exceedences	

TP15-1	
Sample Date: 23-Nov-00	
Sample Interval: 0-0.2 mBGS	
Analysis Suite: Metals, PAHs	
No Exceedences	

TP15-2	
Sample Date: 23-Nov-00	
Sample Interval: 1 mBGS	
Analysis Suite: Metals, PAHs	
Copper	150
Lead	380
Acenaphthylene	1.7
Anthracene	4.5
Benzo[a]anthracene	6.6
Benzo[a]pyrene	8.6
Benzo[b+k]fluoranthene	10
Dibenzo[a,h]anthracene	1.5
Indeno[1,2,3-cd]pyrene	3.2
Fluoranthene	12
Methylnaphthalene, 2-(1-)-	1.39
Naphthalene	0.85
Phenanthrene	7.6

TP6-1	
Sample Date: 23-Nov-00	
Sample Interval: 0-0.2 mBGS	
Analysis Suite: Metals	
No Exceedences	

TP6-2	
Sample Date: 23-Nov-00	
Sample Interval: 0.9 mBGS	
Analysis Suite: Metals, PAHs	
Barium	460
Lead	480
Zinc	440
Acenaphthylene	0.32
Benzo[a]anthracene	0.54
Benzo[a]pyrene	0.9
Dibenzo[a,h]anthracene	0.14
Fluoranthene	1.2

TP3-1	
Sample Date: 22-Nov-00	
Sample Interval: 1.3 mBGS	
Analysis Suite: Metals	
No Exceedences	

BH19-05-1	
Sample Date: 24-May-19	
Sample Interval: 0-0.8 mBGS	
Analysis Suite: Metals, Inorganics, PAHs	
Lead	176

TP15-03	
Sample Date: 23-Nov-00	
Sample Interval: 2 mBGS	
Analysis Suite: Metals	
No Exceedences	

TP6-3	
Sample Date: 23-Nov-00	
Sample Interval: 2.5 mBGS	
Analysis Suite: Metals	
No Exceedences	

TP34-1	
Sample Date: 23-Nov-00	
Sample Interval: 0.8 mBGS	
Analysis Suite: Metals	
No Exceedences	

TP31-1	
Sample Date: 23-Nov-00	
Sample Interval: 0-0.2 mBGS	
Analysis Suite: Metals	
Selenium	9

TP31-2	
Sample Date: 23-Nov-00	
Sample Interval: 0.4 mBGS	
Analysis Suite: Metals	
No Exceedences	

CH2M TP3-1	
Sample Date: 14-Oct-05	
Sample Interval: 0.6-0.9 mBGS	
Analysis Suite: Metals, pH, PAHs, PHCs, VOCs	
No Exceedences	

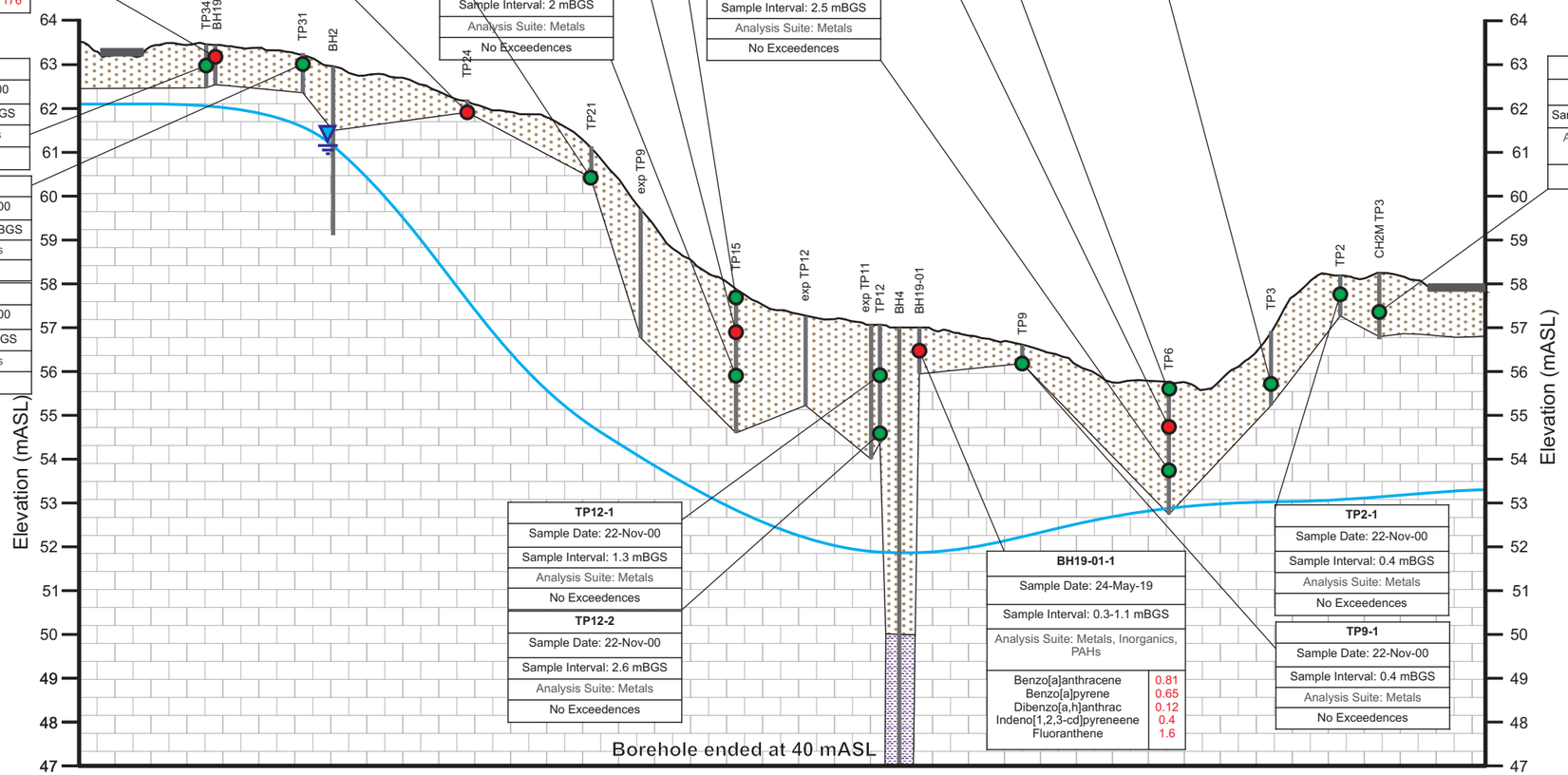
TP12-1	
Sample Date: 22-Nov-00	
Sample Interval: 1.3 mBGS	
Analysis Suite: Metals	
No Exceedences	

TP12-2	
Sample Date: 22-Nov-00	
Sample Interval: 2.6 mBGS	
Analysis Suite: Metals	
No Exceedences	

BH19-01-1	
Sample Date: 24-May-19	
Sample Interval: 0.3-1.1 mBGS	
Analysis Suite: Metals, Inorganics, PAHs	
Benzo[a]anthracene	0.81
Benzo[a]pyrene	0.65
Dibenzo[a,h]anthrac	0.12
Indeno[1,2,3-cd]pyreneene	0.4
Fluoranthene	1.6

TP2-1	
Sample Date: 22-Nov-00	
Sample Interval: 0.4 mBGS	
Analysis Suite: Metals	
No Exceedences	

TP9-1	
Sample Date: 22-Nov-00	
Sample Interval: 0.4 mBGS	
Analysis Suite: Metals	
No Exceedences	



Vertical Exaggeration 1:10

Horizontal Scale

0m 10m 20m 50m

LEGEND

- Fill
- Glacial Till
- Limestone Bedrock
- Monitoring Well Screened Interval
- Shallow Groundwater Elevation

Applicable Site Standard: MECP Table 7
Residential, Non Potable, Coarse Grained, Shallow Soils

MECP Table 7 (µg/g) Metals	
Parameter	Standards
Antimony	7.5
Barium	390
Cadmium	1.2
Copper	140
Lead	120
Mercury	0.27
Molybdenum	6.9
Selenium	2.4
Vanadium	86
Zinc	340

MECP Table 7 (µg/g) PAHs	
Parameter	Standards
Acenaphthylene	0.15
Barium	390
Anthracene	0.67
Benzo[a]anthracene	0.5
Benzo[a]pyrene	0.3
Benzo[b+k]fluoranthene	0.78
Dibenzo[a,h]anthracene	0.1
Indeno[1,2,3-cd]pyrene	0.38
Fluoranthene	62
Methylnaphthalene, 2-(1-)-	0.99
Naphthalene	0.6
Phenanthrene	6.2

Sample ID — MW14-10 — Date
Sample Date: 17-Nov-16
Analysis Suite: Metal, PAHs, BTEX, VOCs
Parameter — Mercury 2.5 — Value (µg/g or µg/L)

Notes

1) Red icons and text indicate an exceedence of applicable site standards or for pH indicates environmentally sensitive site.
2) Green icons and text indicate the sampled medium meet applicable site standards.

Figure 9.12
Vertical Distribution of Soil Quality Results
Cross Section A-A'

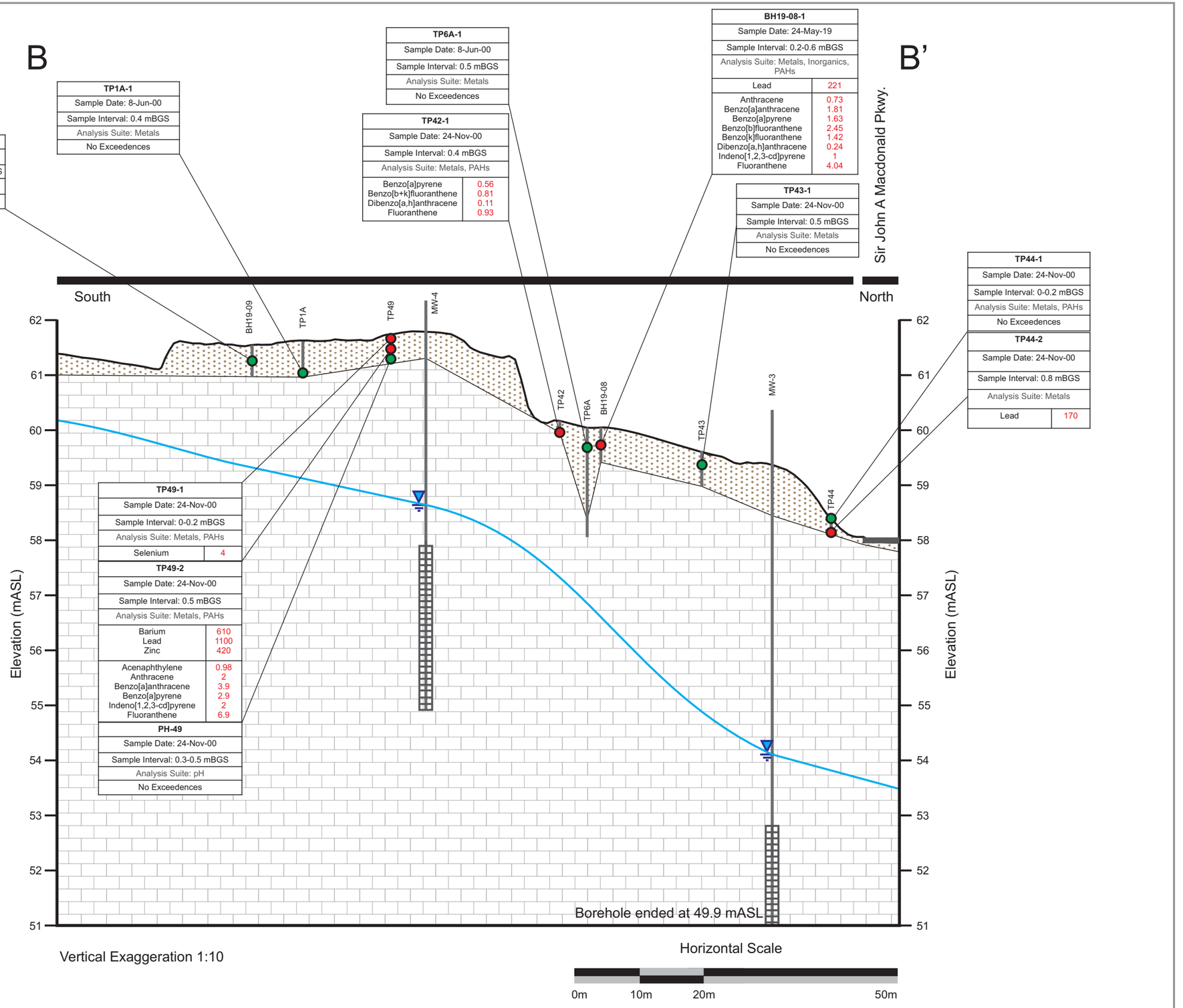
PROJECT No. 18-262-1

Phase Two Environmental Site Assessment
Burnside Site, Ottawa, ON

DESIGN: NMP
CAD: NMP
CHECK: KGR
REV: 0

DATE: 29 May 2019

Geofirma Engineering Ltd



BH19-09-1

Sample Date: 24-May-19
Sample Interval: 0.1-0.6 mBGS
Analysis Suite: PHC/BTEX
No Exceedences

TP1A-1

Sample Date: 8-Jun-00
Sample Interval: 0.4 mBGS
Analysis Suite: Metals
No Exceedences

TP6A-1

Sample Date: 8-Jun-00
Sample Interval: 0.5 mBGS
Analysis Suite: Metals
No Exceedences

TP42-1

Sample Date: 24-Nov-00	
Sample Interval: 0.4 mBGS	
Analysis Suite: Metals, PAHs	
Benzo[a]pyrene	0.56
Benzo[b+k]fluoranthene	0.81
Dibenzo[a,h]anthracene	0.11
Fluoranthene	0.93

BH19-08-1

Sample Date: 24-May-19	
Sample Interval: 0.2-0.6 mBGS	
Analysis Suite: Metals, Inorganics, PAHs	
Lead	221
Anthracene	0.73
Benzo[a]anthracene	1.81
Benzo[a]pyrene	1.63
Benzo[b]fluoranthene	2.45
Benzo[k]fluoranthene	1.42
Dibenzo[a,h]anthracene	0.24
Indeno[1,2,3-cd]pyrene	1
Fluoranthene	4.04

TP43-1

Sample Date: 24-Nov-00
Sample Interval: 0.5 mBGS
Analysis Suite: Metals
No Exceedences

TP44-1

Sample Date: 24-Nov-00
Sample Interval: 0-0.2 mBGS
Analysis Suite: Metals, PAHs
No Exceedences

TP44-2

Sample Date: 24-Nov-00	
Sample Interval: 0.8 mBGS	
Analysis Suite: Metals	
Lead	170

TP49-1

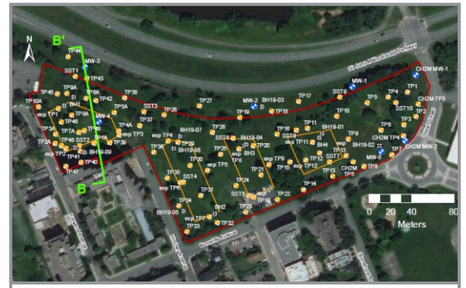
Sample Date: 24-Nov-00	
Sample Interval: 0-0.2 mBGS	
Analysis Suite: Metals, PAHs	
Selenium	4

TP49-2

Sample Date: 24-Nov-00	
Sample Interval: 0.5 mBGS	
Analysis Suite: Metals, PAHs	
Barium	610
Lead	1100
Zinc	420
Acenaphthylene	0.98
Anthracene	2
Benzo[a]anthracene	3.9
Benzo[a]pyrene	2.9
Indeno[1,2,3-cd]pyrene	2
Fluoranthene	6.9

PH-49

Sample Date: 24-Nov-00
Sample Interval: 0.3-0.5 mBGS
Analysis Suite: pH
No Exceedences



LEGEND

- Fill
- Limestone Bedrock
- Monitoring Well Screened Interval
- Shallow Groundwater Elevation

Applicable Site Standard: MECP Table 7
Residential, Non Potable, Coarse Grained, Shallow Soils

MECP Table 7 (µg/g) Metals

Parameter	Standards
Antimony	7.5
Barium	390
Cadmium	1.2
Copper	140
Lead	120
Mercury	0.27
Molybdenum	6.9
Selenium	2.4
Vanadium	86
Zinc	340

MECP Table 7 (µg/g) PAHs

Parameter	Standards
Acenaphthylene	0.15
Barium	390
Anthracene	0.67
Benzo[a]anthracene	0.5
Benzo[a]pyrene	0.3
Benzo[b+k]fluoranthene	0.78
Dibenzo[a,h]anthracene	0.1
Indeno[1,2,3-cd]pyrene	0.38
Fluoranthene	62
Methylnaphthalene, 2-(1-)-	0.99
Naphthalene	0.6
Phenanthrene	6.2

Sample ID — **MW14-10**
Sample Date: 17-Nov-16 — Date
Analysis Suite: Metal, PAHs, BTEX, VOCs
Parameter — Mercury | 2.5 — Value (µg/g or µg/L)

Notes

1) Red icons and text indicate an exceedence of applicable site standards or for pH indicates environmentally sensitive site.
2) Green icons and text indicate the sampled medium meet applicable site standards.

Figure 9.13
Vertical Distribution of Soil Quality Results
Cross Section B-B'

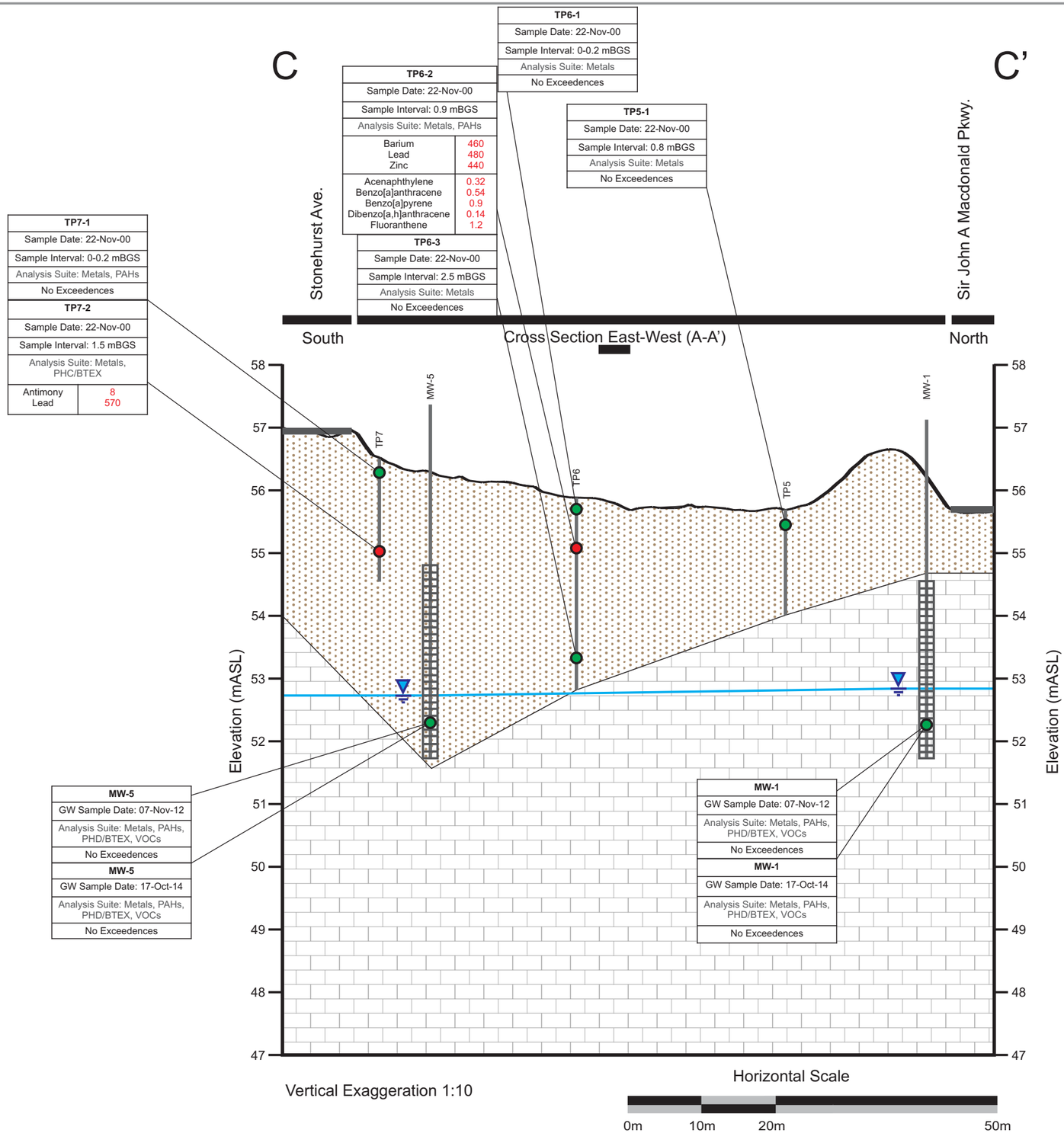
PROJECT No. 18-262-1

Phase Two Environmental Site Assessment
Burnside Site, Ottawa, ON

DESIGN: NMP
CAD: NMP
CHECK: KGR
REV: 0

DATE: 29 May 2019

Geofirma Engineering Ltd



LEGEND

- Fill
- Limestone Bedrock
- Monitoring Well Screened Interval
- Shallow Groundwater Elevation

Applicable Site Standard: MECP Table 7
Residential, Non Potable, Coarse Grained, Shallow Soils

MECP Table 7 (µg/g) Metals	
Parameter	Standards
Antimony	7.5
Barium	390
Cadmium	1.2
Copper	140
Lead	120
Mercury	0.27
Molybdenum	6.9
Selenium	2.4
Vanadium	86
Zinc	340

MECP Table 7 (µg/g) PAHs	
Parameter	Standards
Acenaphthylene	0.15
Barium	390
Anthracene	0.67
Benzo[a]anthracene	0.5
Benzo[a]pyrene	0.3
Benzo[b+k]fluoranthene	0.78
Dibenzo[a,h]anthracene	0.1
Indeno[1,2,3-cd]pyrene	0.38
Fluoranthene	62
Methylnaphthalene, 2-(1-)-	0.99
Naphthalene	0.6
Phenanthrene	6.2

Sample ID — MW14-10
Sample Date: 17-Nov-16 — Date
Analysis Suite: Metal, PAHs, BTEX, VOCs
Parameter — Mercury 2.5 — Value (µg/g or µg/L)

Notes
1) Red icons and text indicate an exceedence of applicable site standards or for pH indicates environmentally sensitive site.
2) Green icons and text indicate the sampled medium meet applicable site standards.

Figure 9.14
Vertical Distribution of Soil Quality Results
Cross Section C-C'

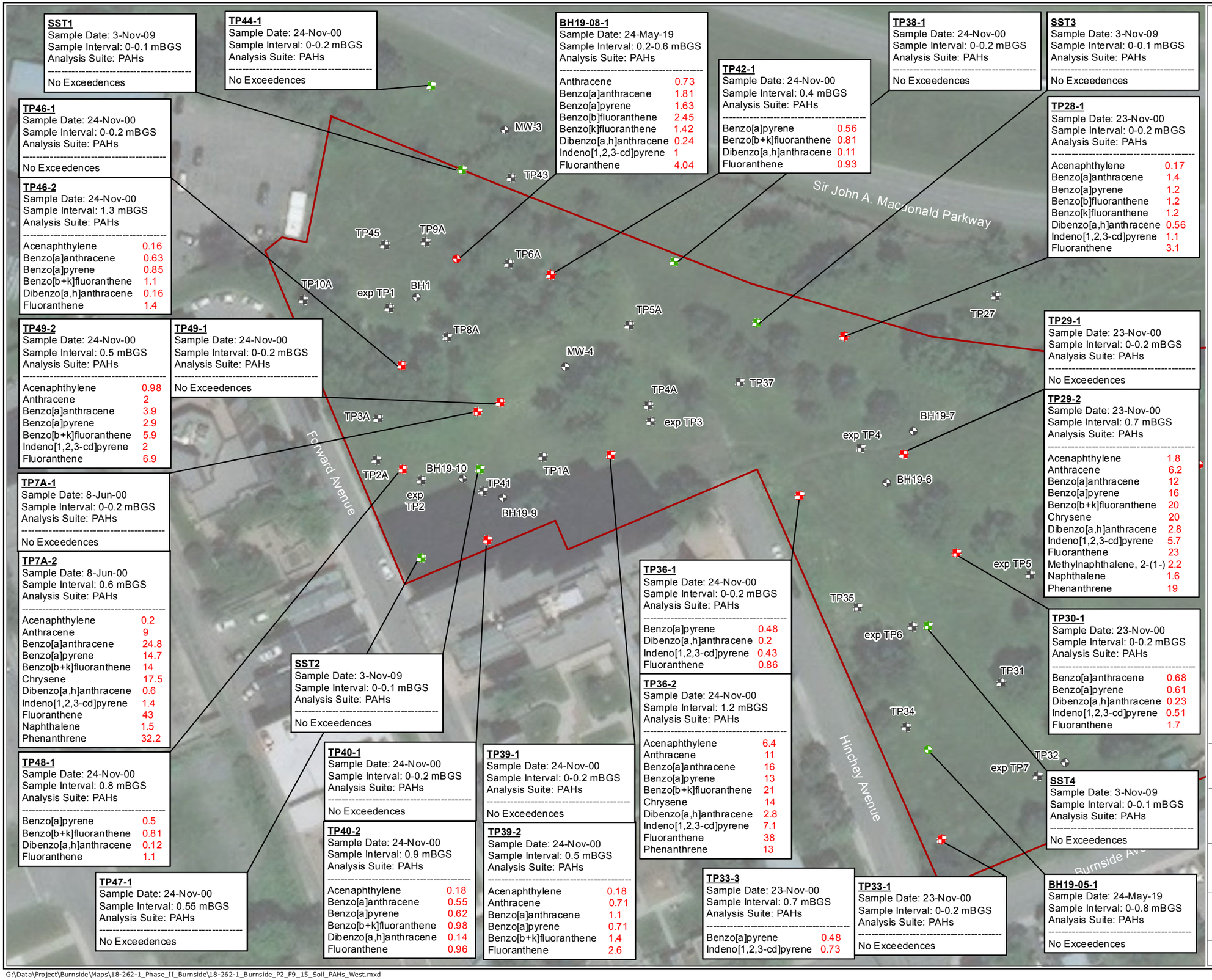
PROJECT No. 18-262-1

Phase Two Environmental Site Assessment
Burnside Site, Ottawa, ON

DESIGN: NMP
CAD: NMP
CHECK: KGR
REV: 0

DATE: 29 May 2019

Geofirma Engineering Ltd



SST1
Sample Date: 3-Nov-09
Sample Interval: 0-0.1 mBGS
Analysis Suite: PAHs

No Exceedences

TP44-1
Sample Date: 24-Nov-00
Sample Interval: 0-0.2 mBGS
Analysis Suite: PAHs

No Exceedences

BH19-08-1
Sample Date: 24-May-19
Sample Interval: 0.2-0.6 mBGS
Analysis Suite: PAHs

Anthracene	0.73
Benzo[a]anthracene	1.81
Benzo[a]pyrene	1.63
Benzo[b]fluoranthene	2.45
Benzo[k]fluoranthene	1.42
Dibenzo[a,h]anthracene	0.24
Indeno[1,2,3-cd]pyrene	1
Fluoranthene	4.04

TP42-1
Sample Date: 24-Nov-00
Sample Interval: 0.4 mBGS
Analysis Suite: PAHs

Benzo[a]pyrene	0.56
Benzo[b+k]fluoranthene	0.81
Dibenzo[a,h]anthracene	0.11
Fluoranthene	0.93

TP38-1
Sample Date: 24-Nov-00
Sample Interval: 0-0.2 mBGS
Analysis Suite: PAHs

No Exceedences

SST3
Sample Date: 3-Nov-09
Sample Interval: 0-0.1 mBGS
Analysis Suite: PAHs

No Exceedences

TP46-1
Sample Date: 24-Nov-00
Sample Interval: 0-0.2 mBGS
Analysis Suite: PAHs

No Exceedences

TP46-2
Sample Date: 24-Nov-00
Sample Interval: 1.3 mBGS
Analysis Suite: PAHs

Acenaphthylene	0.16
Benzo[a]anthracene	0.63
Benzo[a]pyrene	0.85
Benzo[b+k]fluoranthene	1.1
Dibenzo[a,h]anthracene	0.16
Fluoranthene	1.4

TP28-1
Sample Date: 23-Nov-00
Sample Interval: 0-0.2 mBGS
Analysis Suite: PAHs

Acenaphthylene	0.17
Benzo[a]anthracene	1.4
Benzo[a]pyrene	1.2
Benzo[b]fluoranthene	1.2
Benzo[k]fluoranthene	1.2
Dibenzo[a,h]anthracene	0.56
Indeno[1,2,3-cd]pyrene	1.1
Fluoranthene	3.1

TP49-2
Sample Date: 24-Nov-00
Sample Interval: 0.5 mBGS
Analysis Suite: PAHs

Acenaphthylene	0.98
Anthracene	2
Benzo[a]anthracene	3.9
Benzo[a]pyrene	2.9
Benzo[b+k]fluoranthene	5.9
Indeno[1,2,3-cd]pyrene	2
Fluoranthene	6.9

TP49-1
Sample Date: 24-Nov-00
Sample Interval: 0-0.2 mBGS
Analysis Suite: PAHs

No Exceedences

TP29-1
Sample Date: 23-Nov-00
Sample Interval: 0-0.2 mBGS
Analysis Suite: PAHs

No Exceedences

TP29-2
Sample Date: 23-Nov-00
Sample Interval: 0.7 mBGS
Analysis Suite: PAHs

Acenaphthylene	1.8
Anthracene	6.2
Benzo[a]anthracene	12
Benzo[a]pyrene	16
Benzo[b+k]fluoranthene	20
Chrysene	20
Dibenzo[a,h]anthracene	2.8
Indeno[1,2,3-cd]pyrene	5.7
Fluoranthene	23
Methylnaphthalene, 2-(1-)	2.2
Naphthalene	1.6
Phenanthrene	19

TP7A-1
Sample Date: 8-Jun-00
Sample Interval: 0-0.2 mBGS
Analysis Suite: PAHs

No Exceedences

TP7A-2
Sample Date: 8-Jun-00
Sample Interval: 0.6 mBGS
Analysis Suite: PAHs

Acenaphthylene	0.2
Anthracene	9
Benzo[a]anthracene	24.8
Benzo[a]pyrene	14.7
Benzo[b+k]fluoranthene	14
Chrysene	17.5
Dibenzo[a,h]anthracene	0.6
Indeno[1,2,3-cd]pyrene	1.4
Fluoranthene	43
Naphthalene	1.5
Phenanthrene	32.2

SST2
Sample Date: 3-Nov-09
Sample Interval: 0-0.1 mBGS
Analysis Suite: PAHs

No Exceedences

TP36-1
Sample Date: 24-Nov-00
Sample Interval: 0-0.2 mBGS
Analysis Suite: PAHs

Benzo[a]pyrene	0.48
Dibenzo[a,h]anthracene	0.2
Indeno[1,2,3-cd]pyrene	0.43
Fluoranthene	0.86

TP30-1
Sample Date: 23-Nov-00
Sample Interval: 0-0.2 mBGS
Analysis Suite: PAHs

Benzo[a]anthracene	0.68
Benzo[a]pyrene	0.61
Dibenzo[a,h]anthracene	0.23
Indeno[1,2,3-cd]pyrene	0.51
Fluoranthene	1.7

TP36-2
Sample Date: 24-Nov-00
Sample Interval: 1.2 mBGS
Analysis Suite: PAHs

Acenaphthylene	6.4
Anthracene	11
Benzo[a]anthracene	16
Benzo[a]pyrene	13
Benzo[b+k]fluoranthene	21
Chrysene	14
Dibenzo[a,h]anthracene	2.8
Indeno[1,2,3-cd]pyrene	7.1
Fluoranthene	38
Phenanthrene	13

TP48-1
Sample Date: 24-Nov-00
Sample Interval: 0.8 mBGS
Analysis Suite: PAHs

Benzo[a]pyrene	0.5
Benzo[b+k]fluoranthene	0.81
Dibenzo[a,h]anthracene	0.12
Fluoranthene	1.1

TP40-1
Sample Date: 24-Nov-00
Sample Interval: 0-0.2 mBGS
Analysis Suite: PAHs

No Exceedences

TP40-2
Sample Date: 24-Nov-00
Sample Interval: 0.9 mBGS
Analysis Suite: PAHs

Acenaphthylene	0.18
Benzo[a]anthracene	0.55
Benzo[a]pyrene	0.62
Benzo[b+k]fluoranthene	0.98
Dibenzo[a,h]anthracene	0.14
Fluoranthene	0.96

TP39-1
Sample Date: 24-Nov-00
Sample Interval: 0-0.2 mBGS
Analysis Suite: PAHs

No Exceedences

TP39-2
Sample Date: 24-Nov-00
Sample Interval: 0.5 mBGS
Analysis Suite: PAHs

Acenaphthylene	0.18
Anthracene	0.71
Benzo[a]anthracene	1.1
Benzo[a]pyrene	0.71
Benzo[b+k]fluoranthene	1.4
Fluoranthene	2.6

TP47-1
Sample Date: 24-Nov-00
Sample Interval: 0.55 mBGS
Analysis Suite: PAHs

No Exceedences

TP33-3
Sample Date: 23-Nov-00
Sample Interval: 0.7 mBGS
Analysis Suite: PAHs

Benzo[a]pyrene	0.48
Indeno[1,2,3-cd]pyrene	0.73

TP33-1
Sample Date: 23-Nov-00
Sample Interval: 0-0.2 mBGS
Analysis Suite: PAHs

No Exceedences

SST4
Sample Date: 3-Nov-09
Sample Interval: 0-0.1 mBGS
Analysis Suite: PAHs

No Exceedences

BH19-05-1
Sample Date: 24-May-19
Sample Interval: 0-0.8 mBGS
Analysis Suite: PAHs

No Exceedences

LEGEND

Burnside Site Boundary

Borehole/Monitoring Well

- No samples submitted for analysis
- No Exceedence of applicable standards
- Exceedence of applicable standards

Test Pit

- No samples submitted for analysis
- No Exceedence of applicable standards
- Exceedence of applicable standards

Sample ID
Date Sampled
Parameters Analyzed
Parameter and Value (µg/g)

MW2-97
Sample Date: 23-Jul-14
Sample Interval: 0.6-1.2 mBGS
Analysis Suite: PAHs

Anthracene	1.2

Soil Interval Sampled (metres below ground surface)

MECP Table 7 (µg/g)

Applicable Site Standard: MECP Table 7 Residential, Non Potable, Coarse Grained, Shallow Soils

Parameter	*Standard*
Acenaphthylene	0.15
Anthracene	0.67
Benzo[a]anthracene	0.5
Benzo[a]pyrene	0.3
Benzo[b]fluoranthene	0.78
Benzo[k]fluoranthene	0.78
Benzo[b+k]fluoranthene	0.78
Chrysene	7
Dibenzo[a,h]anthracene	0.1
Indeno[1,2,3-cd]pyrene	0.38
Fluoranthene	0.69
Methylnaphthalene, 2-(1-)	0.99
Naphthalene	0.6
Phenanthrene	6.2
Pyrene	78

Notes

1) Values in red indicate an exceedence of applicable site standards.

2) Parameters not exceeding applicable site standards are not included in this figure.

Figure 9.15
Plan Distribution of Soil Quality Results - PAHs (West)

SCALE 1:800
0 10 20 40
Metres

N

Coordinate System: NAD 1983 MTM 9
Source: NCC property boundary

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

PROJECT No. 18-262-1

Phase Two Environmental Site Assessment
Burnside Site, Ottawa, ON

DESIGN: NMP
CAD/GIS: NMP
CHECK: KGR
REV: 0

DATE: 28/06/2019

Geofirma Engineering Ltd

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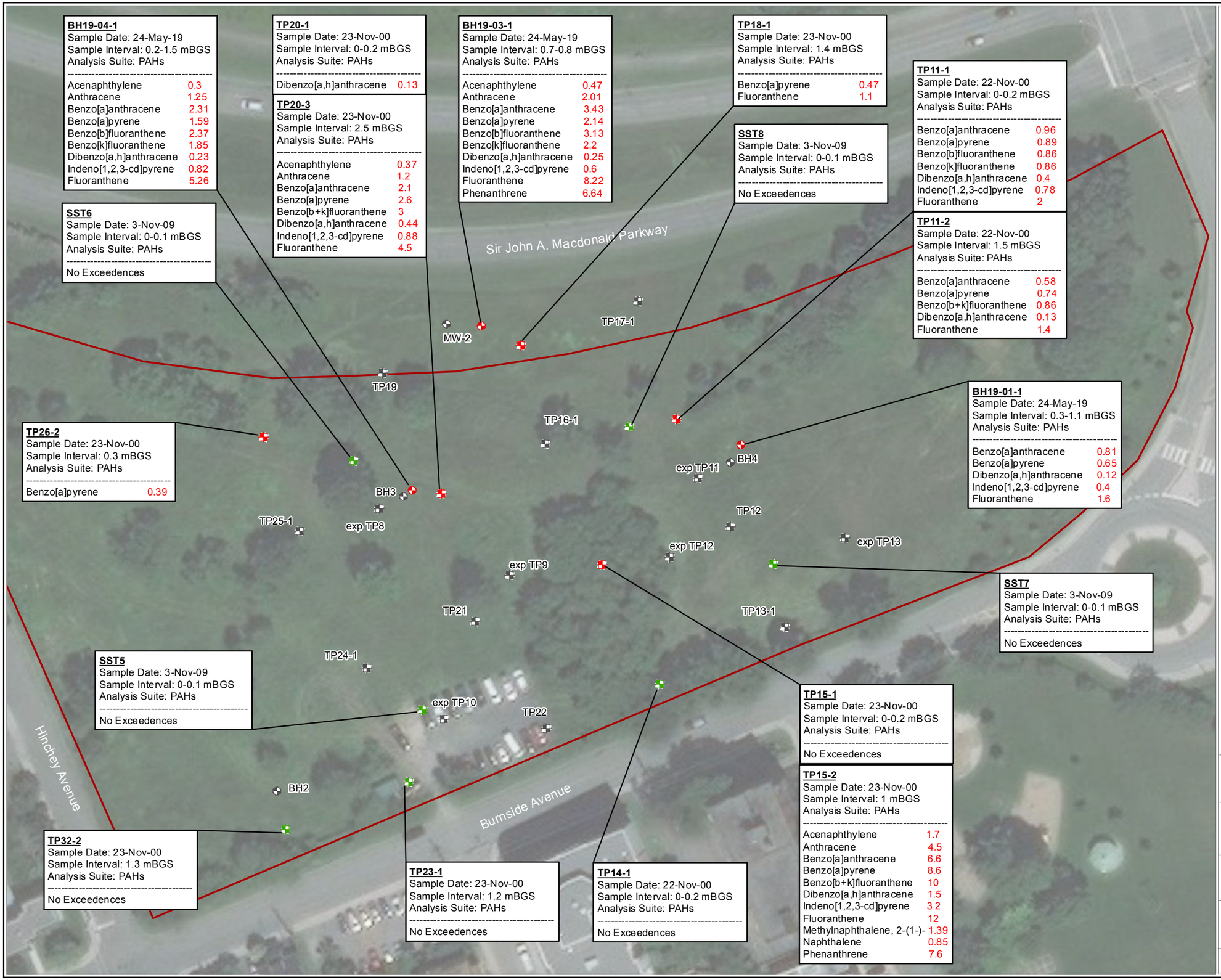

BH19-04-1
Sample Date: 24-May-19
Sample Interval: 0.2-1.5 mBGS
Analysis Suite: PAHs

Acenaphthylene	0.3
Anthracene	1.25
Benzo[a]anthracene	2.31
Benzo[a]pyrene	1.59
Benzo[b]fluoranthene	2.37
Benzo[k]fluoranthene	1.85
Dibenzo[a,h]anthracene	0.23
Indeno[1,2,3-cd]pyrene	0.82
Fluoranthene	5.26

SST6
Sample Date: 3-Nov-09
Sample Interval: 0-0.1 mBGS
Analysis Suite: PAHs

No Exceedences

TP26-2
Sample Date: 23-Nov-00
Sample Interval: 0.3 mBGS
Analysis Suite: PAHs

Benzo[a]pyrene	0.39

TP20-1
Sample Date: 23-Nov-00
Sample Interval: 0-0.2 mBGS
Analysis Suite: PAHs

Dibenzo[a,h]anthracene	0.13

TP20-3
Sample Date: 23-Nov-00
Sample Interval: 2.5 mBGS
Analysis Suite: PAHs

Acenaphthylene	0.37
Anthracene	1.2
Benzo[a]anthracene	2.1
Benzo[a]pyrene	2.6
Benzo[b+k]fluoranthene	3
Dibenzo[a,h]anthracene	0.44
Indeno[1,2,3-cd]pyrene	0.88
Fluoranthene	4.5

BH19-03-1
Sample Date: 24-May-19
Sample Interval: 0.7-0.8 mBGS
Analysis Suite: PAHs

Acenaphthylene	0.47
Anthracene	2.01
Benzo[a]anthracene	3.43
Benzo[a]pyrene	2.14
Benzo[b]fluoranthene	3.13
Benzo[k]fluoranthene	2.2
Dibenzo[a,h]anthracene	0.25
Indeno[1,2,3-cd]pyrene	0.6
Fluoranthene	8.22
Phenanthrene	6.64

TP18-1
Sample Date: 23-Nov-00
Sample Interval: 1.4 mBGS
Analysis Suite: PAHs

Benzo[a]pyrene	0.47
Fluoranthene	1.1

SST8
Sample Date: 3-Nov-09
Sample Interval: 0-0.1 mBGS
Analysis Suite: PAHs

No Exceedences

TP11-1
Sample Date: 22-Nov-00
Sample Interval: 0-0.2 mBGS
Analysis Suite: PAHs

Benzo[a]anthracene	0.96
Benzo[a]pyrene	0.89
Benzo[b]fluoranthene	0.86
Benzo[k]fluoranthene	0.86
Dibenzo[a,h]anthracene	0.4
Indeno[1,2,3-cd]pyrene	0.78
Fluoranthene	2

TP11-2
Sample Date: 22-Nov-00
Sample Interval: 1.5 mBGS
Analysis Suite: PAHs

Benzo[a]anthracene	0.58
Benzo[a]pyrene	0.74
Benzo[b+k]fluoranthene	0.86
Dibenzo[a,h]anthracene	0.13
Fluoranthene	1.4

BH19-01-1
Sample Date: 24-May-19
Sample Interval: 0.3-1.1 mBGS
Analysis Suite: PAHs

Benzo[a]anthracene	0.81
Benzo[a]pyrene	0.65
Dibenzo[a,h]anthracene	0.12
Indeno[1,2,3-cd]pyrene	0.4
Fluoranthene	1.6

SST7
Sample Date: 3-Nov-09
Sample Interval: 0-0.1 mBGS
Analysis Suite: PAHs

No Exceedences

SST5
Sample Date: 3-Nov-09
Sample Interval: 0-0.1 mBGS
Analysis Suite: PAHs

No Exceedences

TP32-2
Sample Date: 23-Nov-00
Sample Interval: 1.3 mBGS
Analysis Suite: PAHs

No Exceedences

TP23-1
Sample Date: 23-Nov-00
Sample Interval: 1.2 mBGS
Analysis Suite: PAHs

No Exceedences

TP14-1
Sample Date: 22-Nov-00
Sample Interval: 0-0.2 mBGS
Analysis Suite: PAHs

No Exceedences

TP15-1
Sample Date: 23-Nov-00
Sample Interval: 0-0.2 mBGS
Analysis Suite: PAHs

No Exceedences

TP15-2
Sample Date: 23-Nov-00
Sample Interval: 1 mBGS
Analysis Suite: PAHs

Acenaphthylene	1.7
Anthracene	4.5
Benzo[a]anthracene	6.6
Benzo[a]pyrene	8.6
Benzo[b+k]fluoranthene	10
Dibenzo[a,h]anthracene	1.5
Indeno[1,2,3-cd]pyrene	3.2
Fluoranthene	12
Methylnaphthalene, 2-(1-)-	1.39
Naphthalene	0.85
Phenanthrene	7.6

LEGEND

Burnside Site Boundary

Borehole/Monitoring Well

- No samples submitted for analysis
- No Exceedence of applicable standards
- Exceedence of applicable standards

Test Pit

- No samples submitted for analysis
- No Exceedence of applicable standards
- Exceedence of applicable standards

Sample ID
Date Sampled
Parameters Analyzed
Parameter and Value (µg/g)
Soil Interval Sampled (metres below ground surface)

MW2-97
Sample Date: 23-Jul-14
Sample Interval: 0.6-1.2 mBGS
Analysis Suite: PAHs

Anthracene	1.2

Applicable Site Standard: MECP Table 7 Residential, Non Potable, Coarse Grained, Shallow Soils	
Parameter	*Standard*
Acenaphthylene	0.15
Anthracene	0.67
Benzo[a]anthracene	0.5
Benzo[a]pyrene	0.3
Benzo[b]fluoranthene	0.78
Benzo[k]fluoranthene	0.78
Benzo[b+k]fluoranthene	0.78
Chrysene	7
Dibenzo[a,h]anthracene	0.1
Indeno[1,2,3-cd]pyrene	0.38
Fluoranthene	0.69
Methylnaphthalene, 2-(1-)	0.99
Naphthalene	0.6
Phenanthrene	6.2
Pyrene	78

Notes

1) Values in red indicate an exceedence of applicable site standards.

2) Parameters not exceeding applicable site standards are not included in this figure.

Figure 9.16
Plan Distribution of Soil Quality Results - PAHs (Centre)

SCALE 1:800
0 10 20 40
Metres
N

Coordinate System: NAD 1983 MTM 9
Source: NCC property boundary

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

PROJECT No. 18-262-1

Phase Two Environmental Site Assessment
Burnside Site, Ottawa, ON

DESIGN: NMP
CAD/GIS: NMP
CHECK: KGR
REV: 0

DATE: 28/06/2019

Geofirma Engineering Ltd

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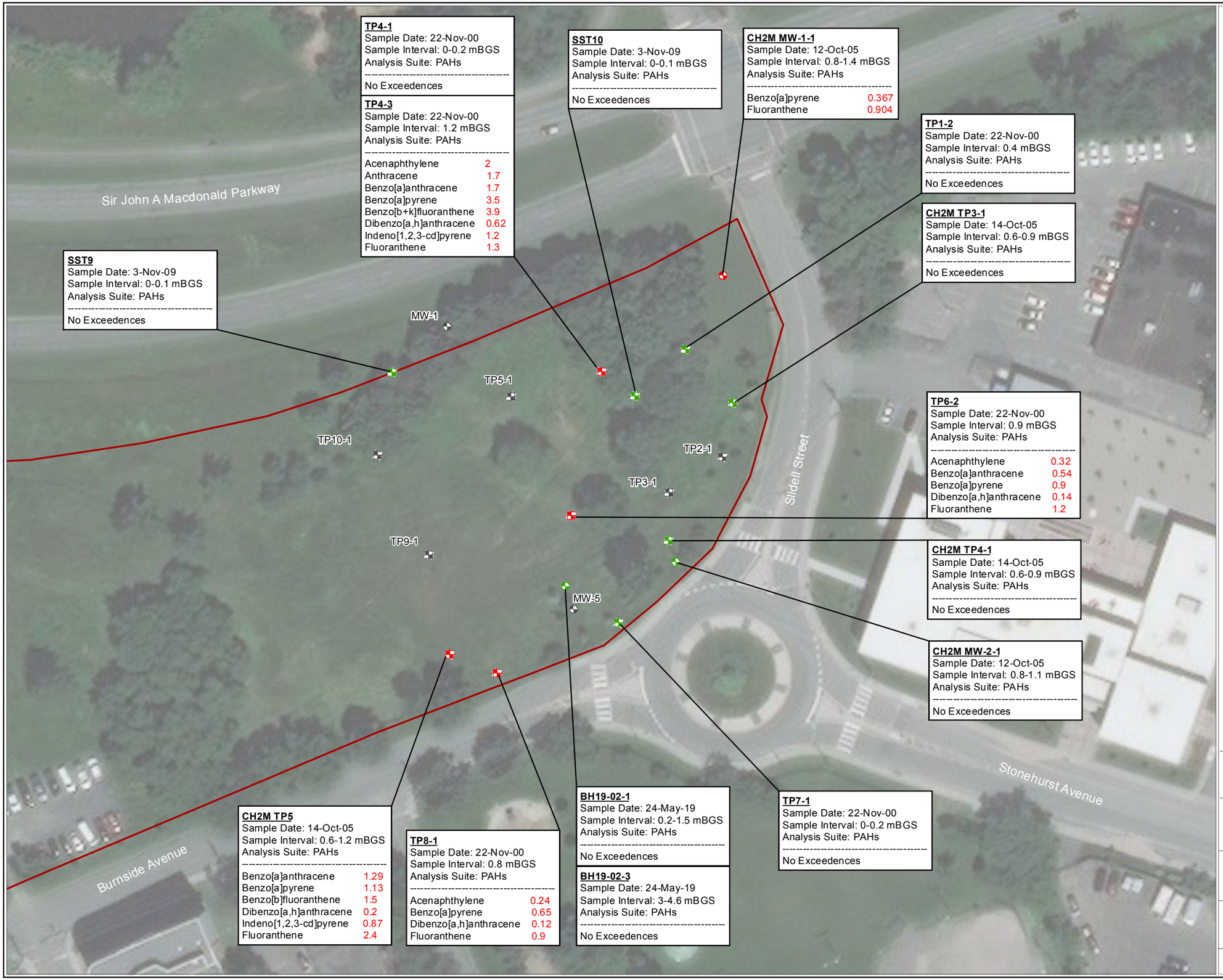

TP4-1
Sample Date: 22-Nov-00
Sample Interval: 0-0.2 mBGS
Analysis Suite: PAHs

No Exceedences

TP4-3
Sample Date: 22-Nov-00
Sample Interval: 1.2 mBGS
Analysis Suite: PAHs

Acenaphthylene	2
Anthracene	1.7
Benzo[a]anthracene	1.7
Benzo[a]pyrene	3.5
Benzo[b+k]fluoranthene	3.9
Dibenzo[a,h]anthracene	0.62
Indeno[1,2,3-cd]pyrene	1.2
Fluoranthene	1.3

SST10
Sample Date: 3-Nov-09
Sample Interval: 0-0.1 mBGS
Analysis Suite: PAHs

No Exceedences

CH2M MW-1-1
Sample Date: 12-Oct-05
Sample Interval: 0.8-1.4 mBGS
Analysis Suite: PAHs

Benzo[a]pyrene	0.367
Fluoranthene	0.904

TP1-2
Sample Date: 22-Nov-00
Sample Interval: 0.4 mBGS
Analysis Suite: PAHs

No Exceedences

CH2M TP3-1
Sample Date: 14-Oct-05
Sample Interval: 0.6-0.9 mBGS
Analysis Suite: PAHs

No Exceedences

SST9
Sample Date: 3-Nov-09
Sample Interval: 0-0.1 mBGS
Analysis Suite: PAHs

No Exceedences

TP6-2
Sample Date: 22-Nov-00
Sample Interval: 0.9 mBGS
Analysis Suite: PAHs

Acenaphthylene	0.32
Benzo[a]anthracene	0.54
Benzo[a]pyrene	0.9
Dibenzo[a,h]anthracene	0.14
Fluoranthene	1.2

CH2M TP4-1
Sample Date: 14-Oct-05
Sample Interval: 0.6-0.9 mBGS
Analysis Suite: PAHs

No Exceedences

CH2M MW-2-1
Sample Date: 12-Oct-05
Sample Interval: 0.8-1.1 mBGS
Analysis Suite: PAHs

No Exceedences

CH2M TP5
Sample Date: 14-Oct-05
Sample Interval: 0.6-1.2 mBGS
Analysis Suite: PAHs

Benzo[a]anthracene	1.29
Benzo[a]pyrene	1.13
Benzo[b]fluoranthene	1.5
Dibenzo[a,h]anthracene	0.2
Indeno[1,2,3-cd]pyrene	0.87
Fluoranthene	2.4

TP8-1
Sample Date: 22-Nov-00
Sample Interval: 0.8 mBGS
Analysis Suite: PAHs

Acenaphthylene	0.24
Benzo[a]pyrene	0.65
Dibenzo[a,h]anthracene	0.12
Fluoranthene	0.9

BH19-02-1
Sample Date: 24-May-19
Sample Interval: 0.2-1.5 mBGS
Analysis Suite: PAHs

No Exceedences

BH19-02-3
Sample Date: 24-May-19
Sample Interval: 3-4.6 mBGS
Analysis Suite: PAHs

No Exceedences

TP7-1
Sample Date: 22-Nov-00
Sample Interval: 0-0.2 mBGS
Analysis Suite: PAHs

No Exceedences

LEGEND

Burnside Site Boundary

Borehole/Monitoring Well

- No samples submitted for analysis
- No Exceedence of applicable standards
- Exceedence of applicable standards

Test Pit

- No samples submitted for analysis
- No Exceedence of applicable standards
- Exceedence of applicable standards

Sample ID
Date Sampled
Parameters Analyzed
Parameter and Value (µg/g)

MW2-97
Sample Date: 23-Jul-14
Sample Interval: 0.6-1.2 mBGS
Analysis Suite: PAHs

Anthracene	1.2

Soil Interval Sampled (metres below ground surface)

MECP Table 7 (µg/g)

Applicable Site Standard: MECP Table 7 Residential, Non Potable, Coarse Grained, Shallow Soils

Parameter	*Standard*
Acenaphthylene	0.15
Anthracene	0.67
Benzo[a]anthracene	0.5
Benzo[a]pyrene	0.3
Benzo[b]fluoranthene	0.78
Benzo[k]fluoranthene	0.78
Benzo[b+k]fluoranthene	0.78
Chrysene	7
Dibenzo[a,h]anthracene	0.1
Indeno[1,2,3-cd]pyrene	0.38
Fluoranthene	0.69
Methylnaphthalene, 2-(1-)	0.99
Naphthalene	0.6
Phenanthrene	6.2
Pyrene	78

Notes

1) Values in red indicate an exceedence of applicable site standards.

2) Parameters not exceeding applicable site standards are not included in this figure.

Figure 9.17
Plan Distribution of Soil Quality Results - PAHs (East)

SCALE 1:800

0 10 20 40

Metres

N

Coordinate System: NAD 1983 MTM 9
Source: NCC property boundary

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

PROJECT No. 18-262-1

Phase Two Environmental Site Assessment
Burnside Site, Ottawa, ON

DESIGN: NMP
CAD/GIS: NMP
CHECK: KGR
REV: 0

DATE: 28/06/2019

Geofirma Engineering Ltd

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BH19-06-1
Sample Date: 24-May-19
Sample Interval: 0-0.8 mBGS
Analysis Suite: PHCs, BTEX

No Exceedences

BH19-07-1
Sample Date: 24-May-19
Sample Interval: 0.5-1.4 mBGS
Analysis Suite: PHCs, BTEX

No Exceedences

TP29-2
Sample Date: 23-Nov-00
Sample Interval: 0.7 mBGS
Analysis Suite: BTEX

No Exceedences

TP16-1
Sample Date: 23-Nov-00
Sample Interval: 1.5 mBGS
Analysis Suite: BTEX

No Exceedences

CH2M TP3-1
Sample Date: 14-Oct-05
Sample Interval: 0.6-0.9 mBGS
Analysis Suite: PHCs

No Exceedences

BH19-10-1
Sample Date: 24-May-19
Sample Interval: 0.3-1.1 mBGS
Analysis Suite: PHCs, BTEX

No Exceedences

BH19-09-1
Sample Date: 24-May-19
Sample Interval: 0.1-0.6 mBGS
Analysis Suite: PHCs, BTEX

No Exceedences

TP41-1
Sample Date: 24-Nov-00
Sample Interval: 0.2 mBGS
Analysis Suite: PHCs, BTEX

Benzene 0.56

CH2M TP5-1
Sample Date: 14-Oct-05
Sample Interval: 0.6-1.2 mBGS
Analysis Suite: PHCs

No Exceedences

TP8-1
Sample Date: 22-Nov-00
Sample Interval: 0.8 mBGS
Analysis Suite: BTEX

No Exceedences

TP7-2
Sample Date: 22-Nov-00
Sample Interval: 1.5 mBGS
Analysis Suite: BTEX

No Exceedences

CH2M TP4-1
Sample Date: 14-Oct-05
Sample Interval: 0.6-0.9 mBGS
Analysis Suite: PHCs, PCBs

No Exceedences

LEGEND

Burnside Site Boundary

Borehole/Monitoring Well

- No samples submitted for analysis
- No Exceedence of applicable standards

Test Pit

- No samples submitted for analysis
- No Exceedence of applicable standards
- Exceedence of applicable standards

Sample ID
Date Sampled
Parameters Analyzed
Parameter and Value (µg/g)
Soil Interval Sampled (metres below ground surface)

MW2-97
Sample Date: 23-Jul-14
Sample Interval: 0.6-1.2 mBGS
Analysis Suite: PHCs/BTEX

Benzene 1.6

Applicable Site Standard: MECP Table 7
Residential, Non Potable, Coarse Grained, Shallow Soils

MECP Table 7 (µg/g)	
Parameter	*Standard*
Benzene	0.21

Notes

1) Values in red indicate an exceedence of applicable site standards.

2) Parameters not exceeding applicable site standards are not included in this figure.

Figure 9.18
Plan Distribution of Soil Quality Results - PHCs/BTEX and PCBs

SCALE 1:1,200
0 10 20 40
Metres

N

Coordinate System: NAD 1983 MTM 9
Source: NCC property boundary

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

PROJECT No. 18-262-1

Phase Two Environmental Site Assessment
Burnside Site, Ottawa, ON

DESIGN: NMP
CAD/GIS: NMP
CHECK: KGR
REV: 0

DATE: 28/06/2019

Geofirma Engineering Ltd

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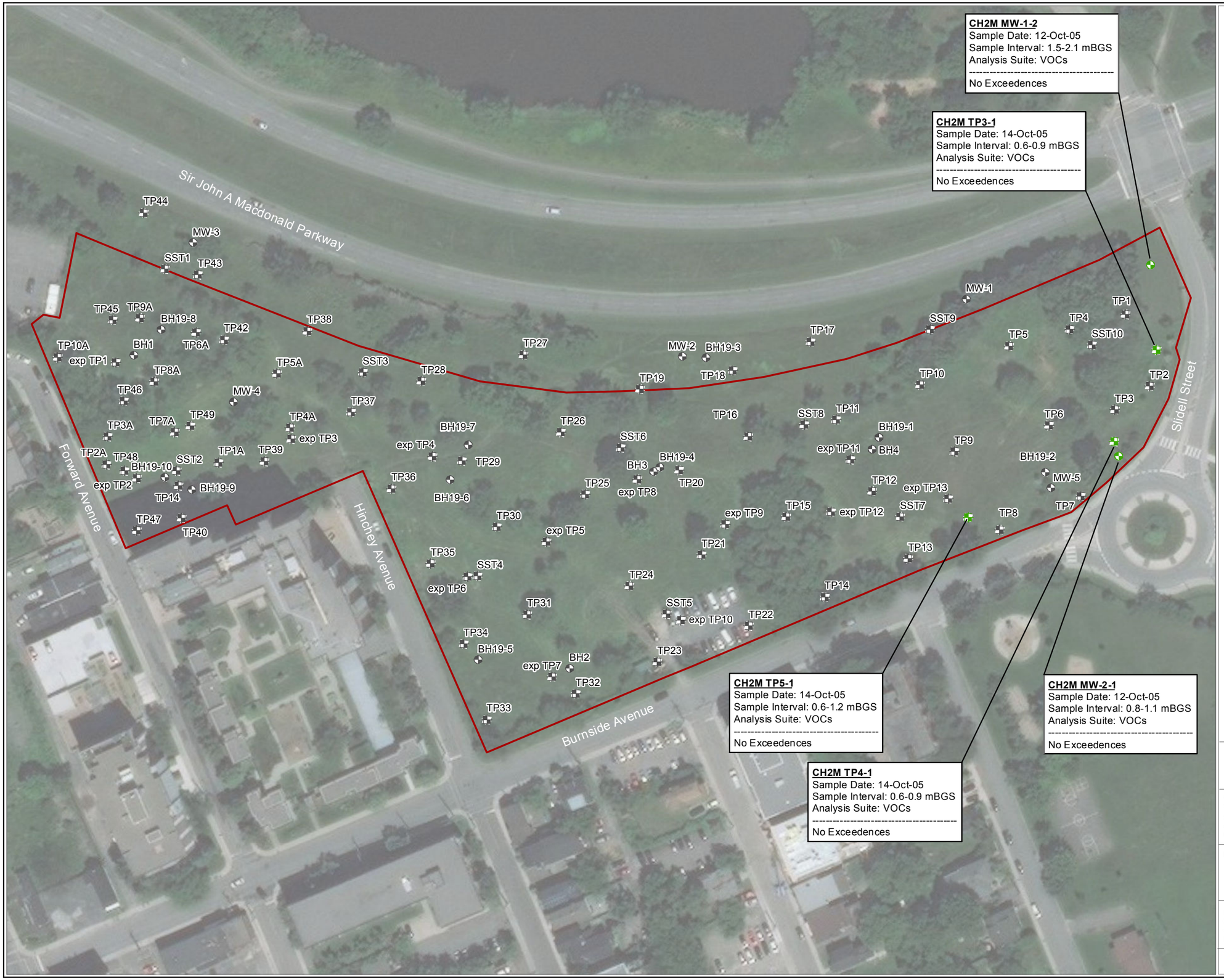

LEGEND

Burnside Site Boundary

Borehole/Monitoring Well

No samples submitted for analysis

No Exceedence of applicable standards

Test Pit

No samples submitted for analysis

No Exceedence of applicable standards

Sample ID — Date Sampled — Parameters Analyzed — Parameter and Value (µg/g) — Soil Interval Sampled (metres below ground surface)

MW2-97
Sample Date: 23-Jul-14
Sample Interval: 0.6-1.2 mBGS
Analysis Suite: VOCs

Acetone 30

No Exceedences of Applicable Site Standard: MECP Table 7 Residential, Non Potable, Coarse Grained, Shallow Soils

Notes

1) Values in red indicate an exceedence of applicable site standards.

2) Parameters not exceeding applicable site standards are not included in this figure.

Figure 9.19
Plan Distribution of Soil Quality Results - VOCs

SCALE 1:1,200

0 10 20 40
Metres

N

Coordinate System: NAD 1983 MTM 9
Source: NCC property boundary

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

PROJECT No. 18-262-1

Phase Two Environmental Site Assessment
Burnside Site, Ottawa, ON

DESIGN: NMP
CAD/GIS: NMP
CHECK: KGR
REV: 0

DATE: 28/06/2019

Geofirma Engineering Ltd

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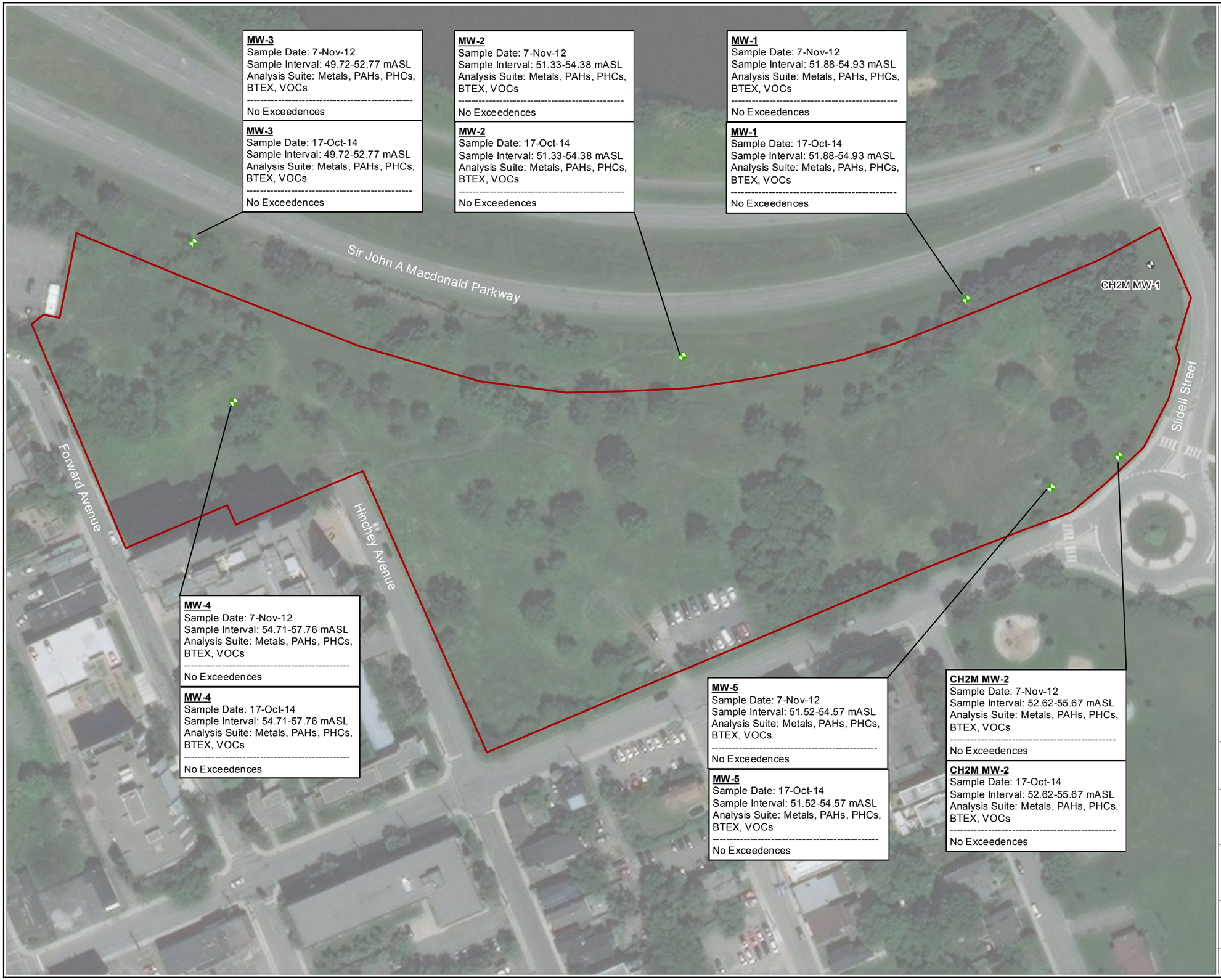

LEGEND

Burnside Site Boundary

Monitoring Well

- No samples submitted for analysis
- No Exceedence of applicable standards

Sample ID
Date Sampled
Parameters Analyzed
Parameter and Value (µg/g)

MW2-97
Sample Date: 23-Jul-14
Sample Interval: 0.6-1.2 mBGS
Analysis Suite: VOCs

Acetone	30

Soil Interval Sampled (metres below ground surface)

No Exceedences of Applicable Site Standard: MECP Table 7 Residential, Non Potable, Coarse Grained, Shallow Soils

Notes

1) Values in red indicate an exceedence of applicable site standards.

2) Parameters not exceeding applicable site standards are not included in this figure.

Figure 9.20
Plan Distribution of Groundwater Quality Results

SCALE 1:1,200
0 10 20 40
Metres

N

Coordinate System: NAD 1983 MTM 9
Source: NCC property boundary

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

PROJECT No. 18-262-1

Phase Two Environmental Site Assessment
Burnside Site, Ottawa, ON

DESIGN: NMP
CAD/GIS: NMP
CHECK: KGR
REV: 0

DATE: 28/06/2019

Geofirma Engineering Ltd

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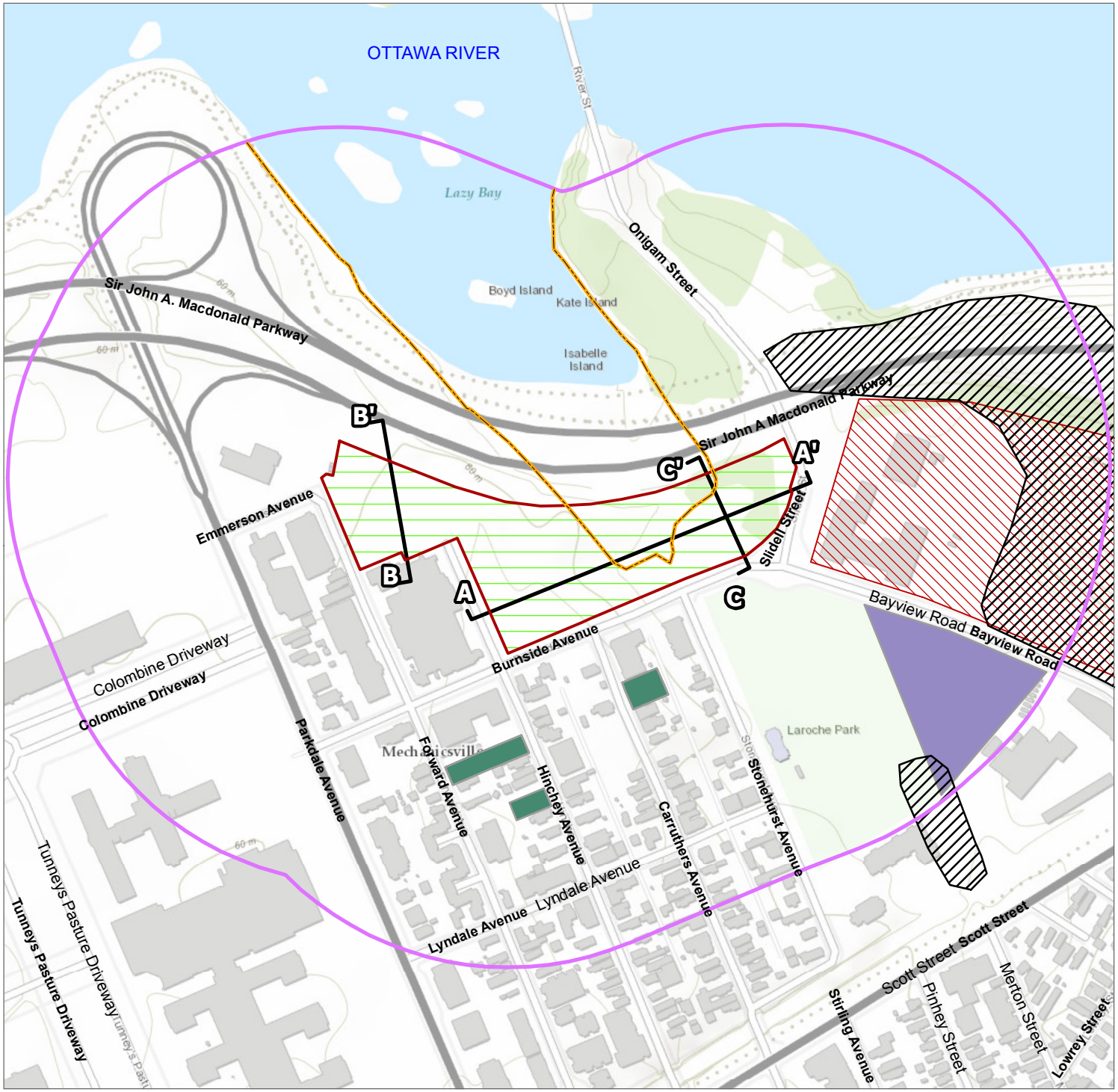


LEGEND

- Burnside Site Boundary
- Phase One Study Area
- 1928 Shoreline
- Cross Section Lines

Potentially Contaminating Activities

- Filled Area (PCA 30)
- Landfills (PCA 30, 58)
- Transportation Yard (PCA 28, 52)
- Metal Fabrication (PCA 34)
- Garages and Potential Petroleum Storage (PCA 28)

Figure 9.21
Phase Two Conceptual Site Model - PCAs and Cross Sections

Scale 1:4,500

0 25 50 100 150 200
Meters

N

Coordinate System: NAD 1983 MTM 9
Source: NCC property boundary
Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

PROJECT No. 18-262-1

Phase Two Environmental Site Assessment
Burnside Site, Ottawa, ON

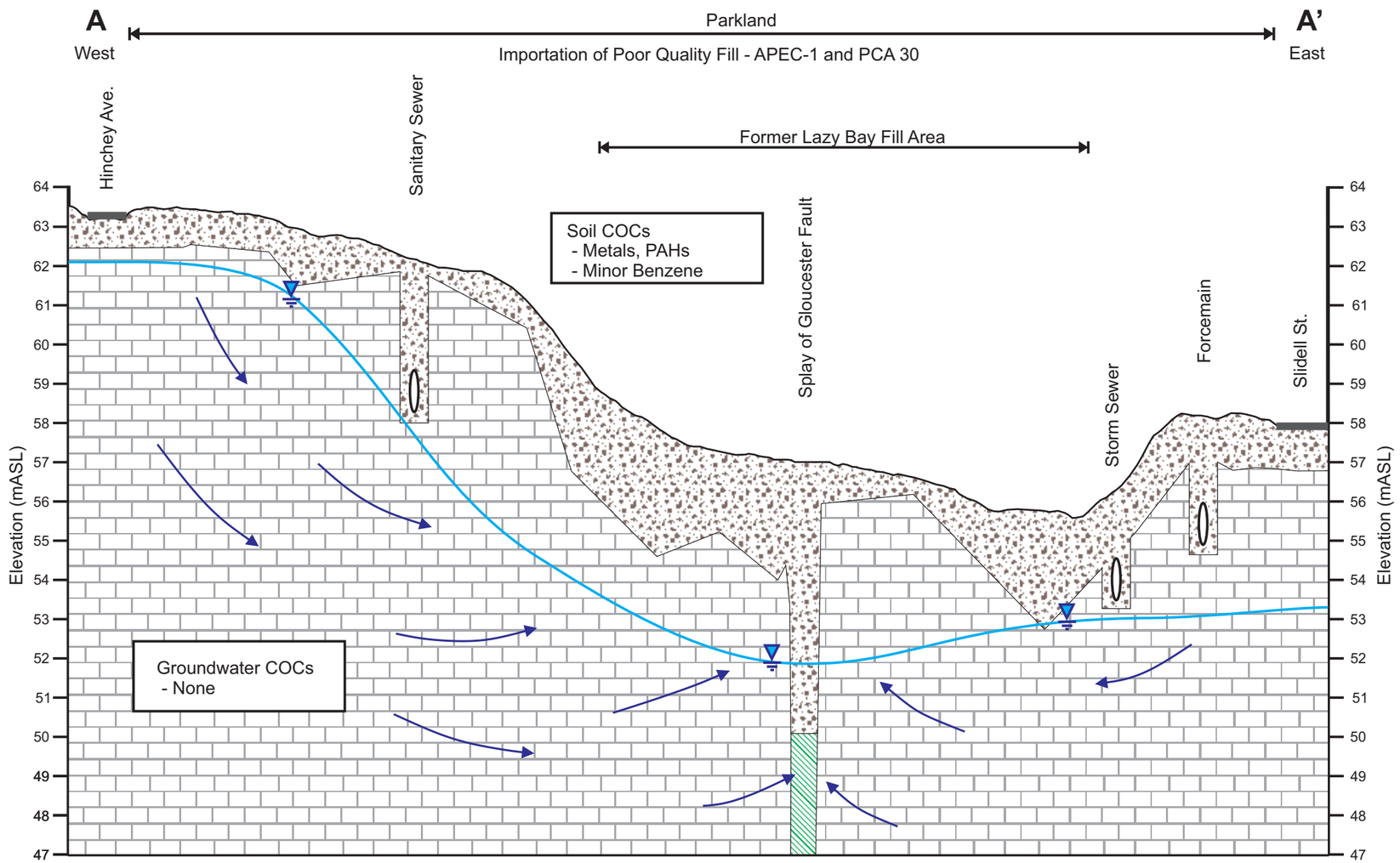
DESIGN: ADG
CAD/GIS: ADG
CHECK: KGR
REV: 0

DATE: 21/06/2019

Geofirma Engineering Ltd

G:\Data\Project\Burnside\Maps\18-262-1_Phase_II_Burnside\18-262-1_Burnside_P2_F9_21_P2CSA_PCA_Sections.mxd

COCs: Metals, PAHs and Minor Benzene in Soil
Human Receptors: Park Visitors, Maintenance/Utility or Construction Workers, Future Commercial Site Users
Ecological Receptors: Terrestrial Receptors (Birds, Mammals, Soil Invertebrates, Plants)
Exposure By: Direct Contact with Site Soil



LEGEND

Fill | Glacial Till | Limestone Bedrock | Groundwater Table | Interpreted Groundwater Flow Direction

Phase Two Conceptual Site Model, Cross Section A-A'
Phase Two ESA, Burnside Site, Ottawa, ON

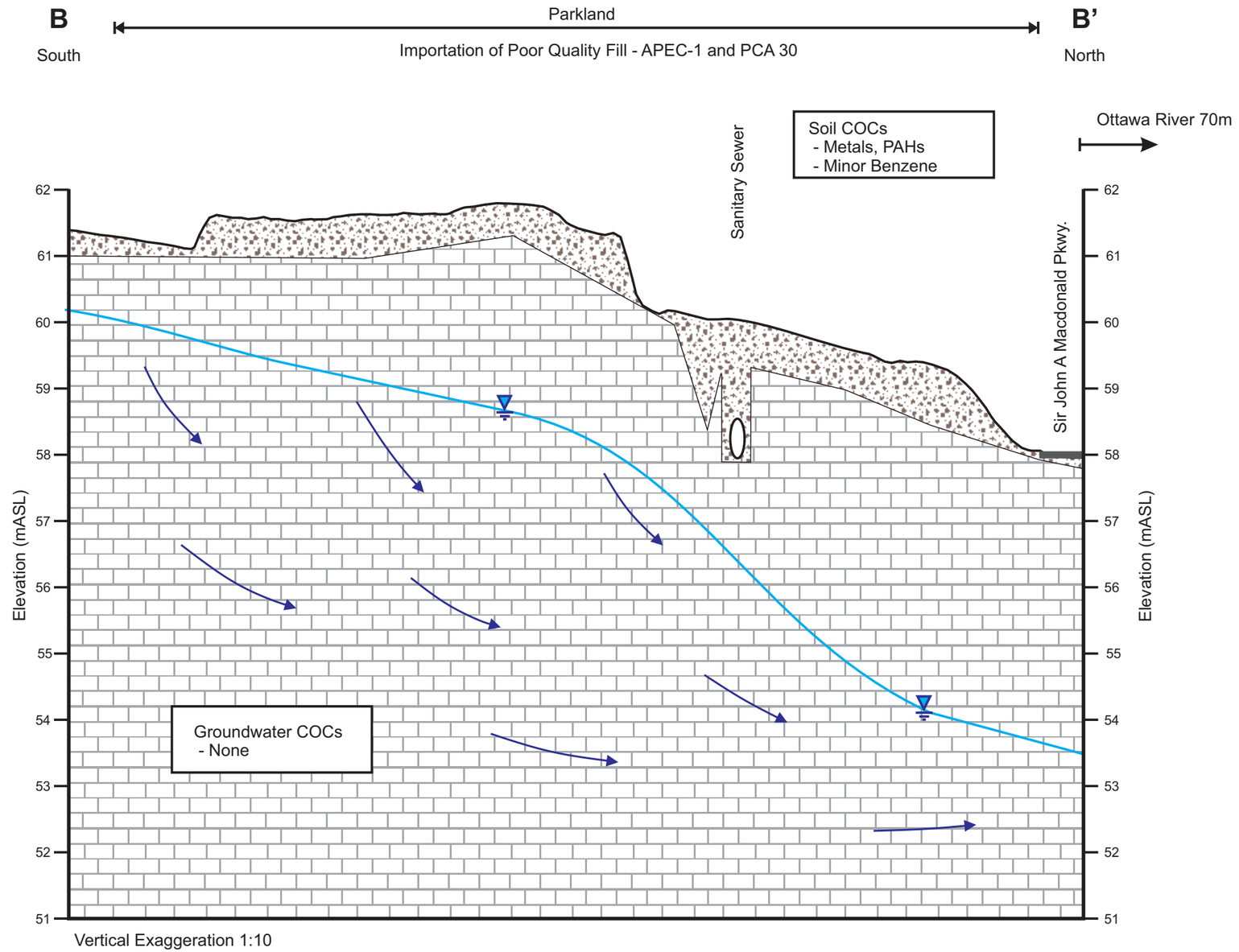
FIGURE 9.22

Doc: 18-262-1_Burnside_P2_F9_22_CSM_AA_R0.cdr"

Prepared by: NMP/ADG
Reviewed by: KGR
Doc. No.: 0
Date: 17 Jun 2019

0m 10m 20m 50m Horizontal Scale

Geofirma Engineering Ltd



LEGEND

Fill | Limestone Bedrock | Groundwater Table | Interpreted Groundwater Flow Direction

Phase Two Conceptual Site Model, Cross Section B-B'
Phase Two ESA, Burnside Site, Ottawa, ON

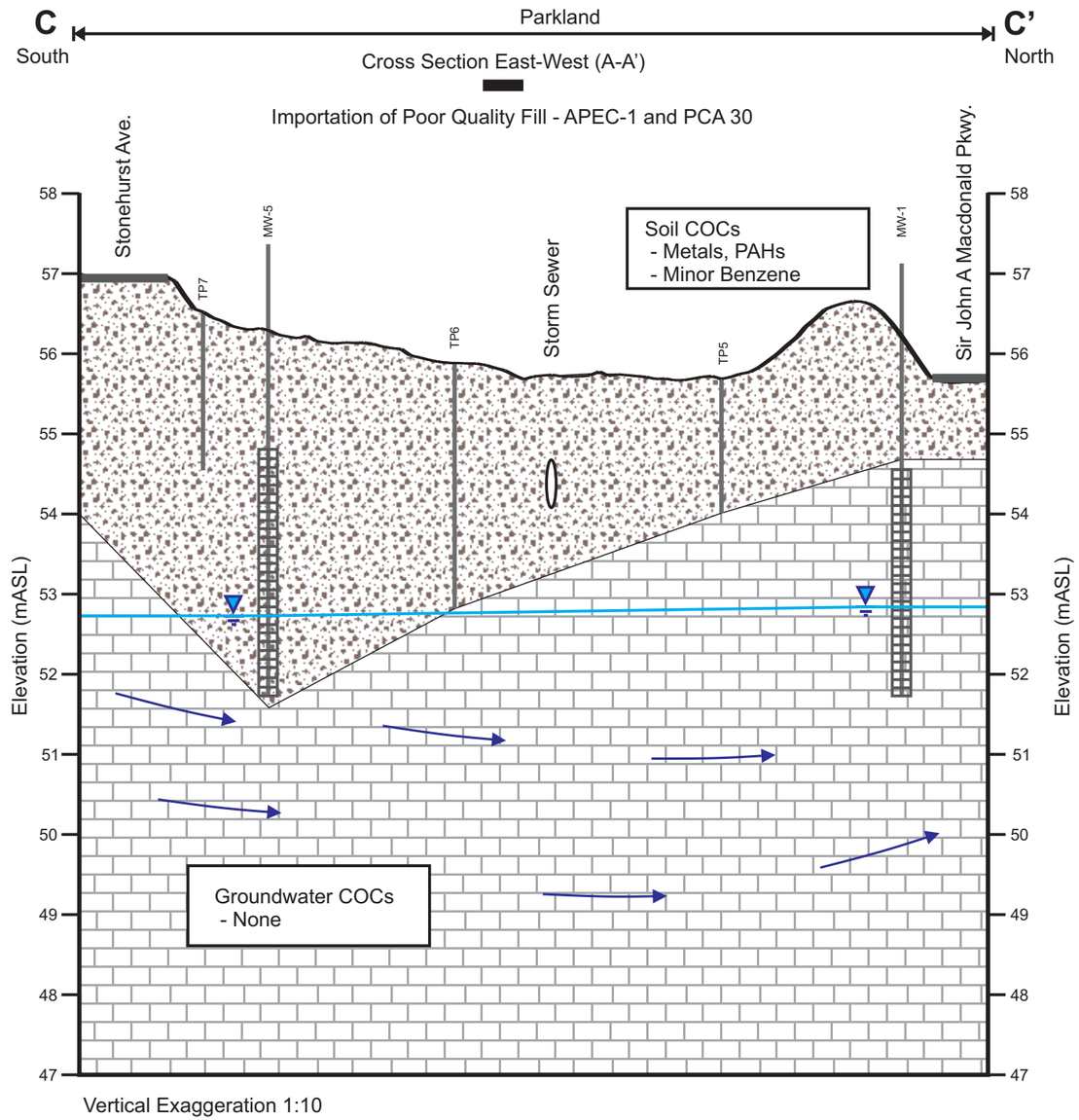
FIGURE 9.23

Doc: 18-262-1_Burnside_P2_F9_23_CSM_BB_R0.cdr"

Prepared by: NMP/ADG
Reviewed by: KGR
Doc. No.: 0
Date: 17 Jun 2019

Horizontal Scale
0m 10m 20m 50m

Geofirma Engineering Ltd



LEGEND

Fill | Limestone Bedrock | Groundwater Table | Interpreted Groundwater Flow Direction

Phase Two Conceptual Site Model, Cross Section C-C'
Phase Two ESA, Burnside Site, Ottawa, ON

FIGURE 9.24

Doc: 18-262-1_Burnside_P2_F9_24_CSM_CC_R0.cdr"

Prepared by: NMP/ADG
Reviewed by: KGR
Doc. No.: 0
Date: 17 Jun 2019

0m 10m 20m 50m Horizontal Scale

Geofirma Engineering Ltd

Table 9.1 - Borehole and Monitoring Well Locations and Completion Details, Burnside Site, Ottawa, Ontario

Borehole/ Monitoring Well ID	MTM Coordinates		Ground Surface Elevation (mASL)	Top of Riser Elevation (mASL)	Total Depth (m)	Depth (mASL)	Stratigraphic Unit	Screen Length (m)	Screened Interval (mASL)
	Easting	Northing							
CH2M MW-2	365151	5030270	57.72*	57.94	5.10	52.62	Bedrock	3.05	52.62-55.67
MW-1	365101	5030321	55.54	56.48	3.66	51.88	Overburden/Bedrock	3.05	51.88-54.93
MW-2	365009	5030302	55.81	56.58	4.48	51.33	Overburden	3.05	51.33-54.38
MW-3	364849	5030399	59.17	60.07	9.45	49.72	Bedrock	3.05	49.72-52.77
MW-4	364862	5030287	61.72	62.75	7.01	54.71	Bedrock	3.05	54.71-57.76
MW-5	365129	5030259	56.09	56.96	4.57	51.52	Overburden	3.05	51.52-54.57

* - ground surface elevation unknown at the time of drilling, value provided is from 2014 LIDAR information

Table 9.2 - Historical and Current Groundwater Elevations, Burnside Site, Ottawa, Ontario

Monitoring Well ID	Ground Surface Elevation (mASL)	Top of Riser Elevation (mASL)	11-Dec-01		16-Oct-02		07-Oct-03	
			Water Level (mBTOR)	Groundwater Elevation (mASL)	Water Level (mBTOR)	Groundwater Elevation (mASL)	Water Level (mBTOR)	Groundwater Elevation (mASL)
MW-1	55.54	56.48	3.410	53.07	3.700	52.78	3.600	52.88
MW-2	55.81	56.58	3.530	53.05	3.470	53.11	3.720	52.86
MW-3	59.17	60.07	5.320	54.75	6.060	54.01	6.410	53.66
MW-4	61.72	62.75	3.160	59.59	4.500	58.25	4.440	58.31
MW-5	56.09	*56.96*	3.530	53.43	3.930	53.03	3.800	53.16
CH2M-MW-1	-- (3)	-- (3)	-- (1)	-- (1)	-- (1)	-- (1)	-- (1)	-- (1)
CH2M-MW-2	-- (3)	57.94	-- (1)	-- (1)	-- (1)	-- (1)	-- (1)	-- (1)

Notes:

All historical groundwater elevations are presented in metres above sea level (mASL)
All recorded water levels are presented in meters below top of riser (mBTOR)
Geodetic Elevation Survey of MW-5 (Top of Riser) complete by Annis, O'Sullivan, Vollebekk Ltd., May 17, 2019
-- = not measured
(1) = Prior to monitoring well installation
(2) = Not measured
(3) = Unknown
(4) = Monitoring well not found / destroyed
(5) = Incorrectly labelled as CH2M-MW1 in historical reports
(6) = Dry well

Table 9.2 - Historical and Current Groundwater Elevations, Burnside Site, Ottawa, Ontario

Monitoring Well ID	Ground Surface Elevation (mASL)	Top of Riser Elevation (mASL)	15-Oct-05		03-Nov-09		07-Nov-12	
			Water Level (mBTOR)	Groundwater Elevation (mASL)	Water Level (mBTOR)	Groundwater Elevation (mASL)	Water Level (mBTOR)	Groundwater Elevation (mASL)
MW-1	55.54	56.48	-- (2)	-- (2)	3.530	52.95	3.380	53.10
MW-2	55.81	56.58	-- (2)	-- (2)	3.710	52.87	3.610	52.97
MW-3	59.17	60.07	-- (2)	-- (2)	4.970	55.10	5.540	54.53
MW-4	61.72	62.75	-- (2)	-- (2)	3.250	59.50	3.910	58.84
MW-5	56.09	*56.96*	3.030	53.93	3.630	53.33	3.720	53.24
CH2M-MW-1	-- (3)	-- (3)	4.470	-- (3)	-- (4)	-- (4)	-- (4)	-- (4)
CH2M-MW-2	-- (3)	57.94	3.810	54.13	5.05 (5)	52.89 (5)	4.95 (5)	52.99 (5)

Notes:

All historical groundwater elevations are presented in metres above sea level (mASL)
All recorded water levels are presented in meters below top of riser (mBTOR)
Geodetic Elevation Survey of MW-5 (Top of Riser) complete by Annis, O'Sullivan, Vollebekk Ltd., May 17, 2019
-- = not measured
(1) = Prior to monitoring well installation
(2) = Not measured
(3) = Unknown
(4) = Monitoring well not found / destroyed
(5) = Incorrectly labelled as CH2M-MW1 in historical reports
(6) = Dry well

Table 9.2 - Historical and Current Groundwater Elevations, Burnside Site, Ottawa, Ontario

Monitoring Well ID	Ground Surface Elevation (mASL)	Top of Riser Elevation (mASL)	17-Oct-14		17-Apr-19	
			Water Level (mBTOR)	Groundwater Elevation (mASL)	Water Level (mBTOR)	Groundwater Elevation (mASL)
MW-1	55.54	56.48	3.510	52.97	-- (6)	-- (6)
MW-2	55.81	56.58	3.730	52.85	3.678	52.90
MW-3	59.17	60.07	5.600	54.47	4.741	55.33
MW-4	61.72	62.75	4.050	58.70	6.338	56.41
MW-5	56.09	*56.96*	3.690	53.27	3.800	53.16
CH2M-MW-1	-- (3)	-- (3)	-- (4)	-- (4)	-- (4)	-- (4)
CH2M-MW-2	-- (3)	57.94	5.090	52.85	5.015	52.93

Notes:

All historical groundwater elevations are presented in metres above sea level (mASL)
All recorded water levels are presented in meters below top of riser (mBTOR)
Geodetic Elevation Survey of MW-5 (Top of Riser) complete by Annis, O'Sullivan, Vollebekk Ltd., May 17, 2019
-- = not measured
(1) = Prior to monitoring well installation
(2) = Not measured
(3) = Unknown
(4) = Monitoring well not found / destroyed
(5) = Incorrectly labelled as CH2M-MW1 in historical reports
(6) = Dry well

Table 9.3 - Soil Sample Locations and Laboratory Analyses, Burnside Site, Ottawa, Ontario

Sample ID	Sample Depth (mBGS)	Sample Collection Date	Sample Analysis Date						Laboratory Report Number
			Metals	PAHs	PHC/BTEX	VOC/BTEX	PCB	General Inorganics	
TP-1 (TP-1A)	0.4	8-Jun-00	8-Jun-00	--	--	--	--	--	2005493
SS-3A	0 - 0.2	8-Jun-00	22-Oct-01	--	--	--	--	--	G5830
TP-3 (TP-3A)	0-0.8	8-Jun-00	8-Jun-00	--	--	--	--	--	2005493
TP-6 (TP-6A)	0.5	8-Jun-00	8-Jun-00	--	--	--	--	--	2005493
SS-7A	0-0.2	8-Jun-00	--	22-Oct-01	--	--	--	--	G5830
TP-7 (TP-7A)	0.6	8-Jun-00	--	8-Jun-00	--	--	--	--	2005493
SS-1	0 - 0.2	22-Nov-00	22-Oct-01	--	--	--	--	--	G5830
TP-1 (0.4)	0.4	22-Nov-00	28-Nov-00	28-Nov-00	--	--	--	--	F1669
TP-2 (0.4)	0.4	22-Nov-00	28-Nov-00	--	--	--	--	--	F1669
TP-3 (1.3)	1.3	22-Nov-00	28-Nov-00	--	--	--	--	--	F1669
SS-4	0-0.2	22-Nov-00	--	22-Oct-01	--	--	--	--	G5830
TP-4 (0.8)	0.8	22-Nov-00	28-Nov-00	--	--	--	--	--	F1669
TP-4 (1.2)	1.2	22-Nov-00	--	28-Nov-00	--	--	--	--	F1669
TP-5 (0.8)	0.8	22-Nov-00	28-Nov-00	--	--	--	--	--	F1669
SS-6	0 - 0.2	22-Nov-00	22-Oct-01	--	--	--	--	--	G5830
TP-6 (0.9)	0.9	22-Nov-00	28-Nov-00	28-Nov-00	--	--	--	--	F1669
TP-6 (2.5)	2.5	22-Nov-00	28-Nov-00	--	--	--	--	--	F1669
SS-7	0 - 0.2	22-Nov-00	22-Oct-01	22-Oct-01	--	--	--	--	G5830
PH-7	0.3 - 0.5	22-Nov-00	--	--	--	--	--	22-Oct-01	G5830
TP-7 (1.5)	1.5	22-Nov-00	28-Nov-00	--	28-Nov-00	--	--	--	F1669
TP-8 (0.8)	0.8	22-Nov-00	28-Nov-00	28-Nov-00	28-Nov-00	--	--	--	F1669
TP-8 (2.9)	2.9	22-Nov-00	28-Nov-00	--	--	--	--	--	F1669
TP-9 (0.4)	0.4	22-Nov-00	28-Nov-00	--	--	--	--	--	F1669
TP-10 (0.3)	0.3	22-Nov-00	28-Nov-00	--	--	--	--	--	F1669
SS-11	0-0.2	22-Nov-00	--	22-Oct-01	--	--	--	--	G5830
TP-11 (1.5)	1.5	22-Nov-00	28-Nov-00	28-Nov-00	--	--	--	--	F1669
TP-12 (1.3)	1.3	22-Nov-00	28-Nov-00	--	--	--	--	--	F1669
TP-12 (2.6)	2.6	22-Nov-00	28-Nov-00	--	--	--	--	--	F1669
TP-13 (0.9)	0.9	22-Nov-00	28-Nov-00	--	--	--	--	--	F1669
TP-13 (2.5)	2.5	22-Nov-00	28-Nov-00	--	--	--	--	--	F1669
SS-14	0 - 0.2	22-Nov-00	22-Oct-01	22-Oct-01	--	--	--	--	G5830
TP-14 (2.0)	2	22-Nov-00	28-Nov-00	--	--	--	--	--	F1669
TP-14 (2.9)	2.9	22-Nov-00	28-Nov-00	--	--	--	--	--	F1669
SS-15	0 - 0.2	23-Nov-00	22-Oct-01	22-Oct-01	--	--	--	--	G5830
TP-15 (1.0)	1	23-Nov-00	28-Nov-00	28-Nov-00	--	--	--	--	F1669
TP-15 (2.0)	2	23-Nov-00	28-Nov-00	--	--	--	--	--	F1669
TP-16 (1.5)	1.5	23-Nov-00	28-Nov-00	--	28-Nov-00	--	--	--	F1669
TP-17 (0.5)	0.5	23-Nov-00	28-Nov-00	--	--	--	--	--	F1669
TP-18 (1.4)	1.4	23-Nov-00	28-Nov-00	28-Nov-00	--	--	--	--	F1669
TP-19 (2.0)	2	23-Nov-00	28-Nov-00	--	--	--	--	--	F1669
SS-20	0 - 0.2	23-Nov-00	22-Oct-01	22-Oct-01	--	--	--	--	G5830
PH-20	0.3-0.5	23-Nov-00	--	--	--	--	--	22-Oct-01	G5830
TP-20 (1.5)	1.5	23-Nov-00	28-Nov-00	--	--	--	--	--	F1669
TP-20 (2.5)	2.5	23-Nov-00	--	28-Nov-00	--	--	--	--	F1669
TP-21 (0.45)	0.45	23-Nov-00	28-Nov-00	--	--	--	--	--	F1669
TP-22 (0.4)	0.4	23-Nov-00	28-Nov-00	--	--	--	--	--	F1669
TP-23 (1.2)	1.2	23-Nov-00	28-Nov-00	28-Nov-00	--	--	--	--	F1669
TP-24 (0.2)	0.2	23-Nov-00	28-Nov-00	--	--	--	--	--	F1669
TP-25 (0.6)	0.6	23-Nov-00	28-Nov-00	--	--	--	--	--	F1669
SS-26	0 - 0.2	23-Nov-00	22-Oct-01	--	--	--	--	--	G5830
TP-26 (0.3)	0.3	23-Nov-00	28-Nov-00	28-Nov-00	--	--	--	--	F1669
TP-26 (0.8)	0.8	23-Nov-00	28-Nov-00	--	--	--	--	--	F1669
TP-27 (0.4)	0.4	23-Nov-00	28-Nov-00	--	--	--	--	--	F1669
SS-28	0 - 0.2	23-Nov-00	22-Oct-01	22-Oct-01	--	--	--	--	G5830
TP-28 (0.2)	0.2	23-Nov-00	28-Nov-00	--	--	--	--	--	F1669
SS-29	0 - 0.2	23-Nov-00	22-Oct-01	22-Oct-01	--	--	--	--	G5830
TP-29 (0.7)	0.7	23-Nov-00	28-Nov-00	28-Nov-00	28-Nov-00	--	--	--	F1669
SS-30	0 - 0.2	23-Nov-00	22-Oct-01	22-Oct-01	--	--	--	--	G5830
PH-30	0.3-0.5	23-Nov-00	--	--	--	--	--	22-Oct-01	G5830
TP-30 (0.7)	0.7	23-Nov-00	28-Nov-00	--	--	--	--	--	F1669
SS-31	0 - 0.2	23-Nov-00	22-Oct-01	--	--	--	--	--	G5830
TP-31 (0.4)	0.4	23-Nov-00	28-Nov-00	--	--	--	--	--	F1669
TP-32 (0.3)	0.3	23-Nov-00	28-Nov-00	--	--	--	--	--	F1669
TP-32 (1.3)	1.3	23-Nov-00	--	28-Nov-00	--	--	--	--	F1669
SS-33	0-0.2	23-Nov-00	--	22-Oct-01	--	--	--	--	G5830
TP-33 (0.4)	0.4	23-Nov-00	28-Nov-00	--	--	--	--	--	F1669
TP-33 (0.7)	0.4	23-Nov-00	--	28-Nov-00	--	--	--	--	F1669
TP-34 (0.8)	0.8	23-Nov-00	28-Nov-00	--	--	--	--	--	F1669
TP-35 (1.2)	1.2	23-Nov-00	28-Nov-00	--	--	--	--	--	F1669
SS-36	0 - 0.2	24-Nov-00	22-Oct-01	22-Oct-01	--	--	--	--	G5830
TP-36 (1.2)	1.2	24-Nov-00	28-Nov-00	28-Nov-00	--	--	--	--	F1669

Table 9.3 - Soil Sample Locations and Laboratory Analyses, Burnside Site, Ottawa, Ontario

Sample ID	Sample Depth (mBGS)	Sample Collection Date	Sample Analysis Date						Laboratory Report Number
			Metals	PAHs	PHC/BTEX	VOC/BTEX	PCB	General Inorganics	
SS-37	0 - 0.2	24-Nov-00	22-Oct-01	--	--	--	--	--	G5830
PH-37	0.3-0.5	24-Nov-00	--	--	--	--	--	22-Oct-01	G5830
TP-37 (0.5)	0.5	24-Nov-00	28-Nov-00	--	--	--	--	--	F1669
SS-38	0-0.2	24-Nov-00	--	22-Oct-01	--	--	--	--	G5830
TP-38 (0.4)	0.4	24-Nov-00	28-Nov-00	--	--	--	--	--	F1669
SS-39	0 - 0.2	24-Nov-00	22-Oct-01	22-Oct-01	--	--	--	--	G5830
TP-39 (0.5)	0.5	24-Nov-00	28-Nov-00	28-Nov-00	--	--	--	--	F1669
SS-40	0 - 0.2	24-Nov-00	22-Oct-01	22-Oct-01	--	--	--	--	G5830
TP-40 (0.9)	0.9	24-Nov-00	28-Nov-00	28-Nov-00	--	--	--	--	F1669
TP-41 (0.2)	0.2	24-Nov-00	28-Nov-00	--	28-Nov-00	--	--	--	F1669
TP-42 (0.4)	0.4	24-Nov-00	28-Nov-00	28-Nov-00	--	--	--	--	F1669
TP-43 (0.5)	0.5	24-Nov-00	28-Nov-00	--	--	--	--	--	F1669
SS-44	0 - 0.2	24-Nov-00	22-Oct-01	22-Oct-01	--	--	--	--	G5830
TP-44 (0.8)	0.8	24-Nov-00	28-Nov-00	--	--	--	--	--	F1669
TP-45 (1.0)	1	24-Nov-00	28-Nov-00	--	--	--	--	--	F1669
SS-46	0 - 0.2	24-Nov-00	22-Oct-01	22-Oct-01	--	--	--	--	G5830
TP-46 (1.3)	1.3	24-Nov-00	28-Nov-00	28-Nov-00	--	--	--	--	F1669
TP-47 (0.55)	0.55	24-Nov-00	28-Nov-00	28-Nov-00	--	--	--	--	F1669
TP-48 (0.8)	0.8	24-Nov-00	28-Nov-00	28-Nov-00	--	--	--	--	F1669
SS-49	0 - 0.2	24-Nov-00	22-Oct-01	22-Oct-01	--	--	--	--	G5830
PH-49	0.3-0.5	24-Nov-00	--	--	--	--	--	22-Oct-01	G5830
TP-49 (0.5)	0.5	24-Nov-00	28-Nov-00	28-Nov-00	--	--	--	--	F1669
CH2M-TP3 (2-3)	0.6-0.9	14-Oct-05	24-Oct-05	21-Oct-05	21-Oct-05	21-Oct-05	--	24-Oct-05	359347
CH2M-TP4 (2-3)	0.6-0.9	14-Oct-05	24-Oct-05	21-Oct-05	21-Oct-05	21-Oct-05	21-Oct-05	24-Oct-05	359347
CH2M-TP5 (2-4)	0.6-1.2	14-Oct-05	24-Oct-05	21-Oct-05	21-Oct-05	21-Oct-05	--	24-Oct-05	359347
CH2M-MW-1(2 1/2-4 1/2)	0.8-1.4	12-Oct-05	24-Oct-05	21-Oct-05	--	--	--	24-Oct-05	359347
CH2M-MW-1(5-7)	1.5-2.1	12-Oct-05	--	--	--	21-Oct-05	--	24-Oct-05	359347
CH2M-MW-2(2 1/2-3 1/2)	0.8-1.1	12-Oct-05	24-Oct-05	21-Oct-05	--	21-Oct-05	--	24-Oct-05	359347
SST1	0-0.1	03-Nov-09	03-Nov-09	03-Nov-09	--	--	--	--	945145
SST2	0-0.1	03-Nov-09	03-Nov-09	03-Nov-09	--	--	--	--	945145
SST3	0-0.1	03-Nov-09	03-Nov-09	03-Nov-09	--	--	--	--	945145
SST4	0-0.1	03-Nov-09	03-Nov-09	03-Nov-09	--	--	--	--	945145
SST5	0-0.1	03-Nov-09	03-Nov-09	03-Nov-09	--	--	--	--	945145
SST6	0-0.1	03-Nov-09	03-Nov-09	03-Nov-09	--	--	--	--	945145
SST7	0-0.1	03-Nov-09	03-Nov-09	03-Nov-09	--	--	--	--	945145
SST8	0-0.1	03-Nov-09	03-Nov-09	03-Nov-09	--	--	--	--	945145
SST9	0-0.1	03-Nov-09	03-Nov-09	03-Nov-09	--	--	--	--	945145
SST10	0-0.1	03-Nov-09	03-Nov-09	03-Nov-09	--	--	--	--	945145
BH19-01-1	0.3-1.1	24-May-19	29-May-19	31-May-19	--	--	--	28-May-19	1921547
BH19-02-1	0.2-1.5	24-May-19	29-May-19	31-May-19	--	--	--	28-May-19	1921547
BH19-02-3	3.0-4.6	24-May-19	29-May-19	31-May-19	--	--	--	28-May-19	1921547
BH19-03-1	0.7-0.8	24-May-19	29-May-19	31-May-19	--	--	--	28-May-19	1921547
BH19-04-1	0.2-1.5	24-May-19	29-May-19	31-May-19	--	--	--	28-May-19	1921547
BH19-05-1	0-0.8	24-May-19	29-May-19	31-May-19	--	--	--	28-May-19	1921547
BH19-06-1	0-0.8	24-May-19	--	--	30-May-19	--	--	--	1921547
BH19-07-1	0.5-1.4	24-May-19	29-May-19	--	30-May-19	--	--	--	1921547
BH19-08-1	0.2-0.6	24-May-19	29-May-19	31-May-19	--	--	--	28-May-19	1921547
BH19-09-1	0.1-0.6	24-May-19	--	--	30-May-19	--	--	--	1921547
BH19-10-1	0.3-1.1	24-May-19	29-May-19	31-May-19	30-May-19	--	--	--	1921547

Notes:
-- = Parameter not analysed
mBGS = meters below ground surface

Table 9.4 - Soil Analytical Results - Metals, Burnside Site, Ottawa, Ontario

Parameter	MECP	TP-1 A	SS-3A	TP-3 A	TP-6 A	SS-1	TP-1	TP-2	TP-3	TP-4	TP-5	SS-6	TP-6	TP-6
Sample Depth (mBGS)>	Table 7	0.4	0 - 0.2	0-0.8	0.5	0 - 0.2	0.4	0.4	1.3	0.8	0.8	0 - 0.2	0.9	2.5
Date Sampled>	(µg/g)	8-Jun-00	8-Jun-00	8-Jun-00	8-Jun-00	22-Nov-00	22-Nov-00	22-Nov-00	22-Nov-00	22-Nov-00	22-Nov-00	22-Nov-00	22-Nov-00	22-Nov-00
Antimony	7.5	--	<1	--	--	<1	<1	<1	<1	<1	<1	<1	1	<1
Arsenic	18	--	<1	--	--	<1	5	3	<1	<1	2	<1	7	2
Barium	390	48	460	152	123	40	130	90	50	340	120	20	460	130
Beryllium	4	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	<0.5	<0.5	1	<0.5
Boron (hot water soluble)	1.5	--	--	--	--	--	--	--	--	--	--	--	--	--
Boron (total)	120	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	1.2	<1	<1	0.9	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chromium Total	160	16	85	25	22	15	20	15	20	90	25	10	20	15
Chromium, Hexavalent	8	--	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	22	<5	20	<5	1	<5	5	5	5	20	5	<5	5	5
Copper	140	11	35	36	16	20	15	15	10	45	15	<5	40	25
Lead	120	16	10	165	41	20	140	55	5	25	20	5	480	45
Mercury	0.27	--	--	--	--	--	--	--	--	--	--	--	--	--
Molybdenum	6.9	3	<1	29	3	<1	<1	<1	<1	<1	<1	<1	2	<1
Nickel	100	10	45	16	14	5	15	15	15	50	20	<5	20	15
Selenium	2.4	--	<1	--	--	<1	<1	<1	<1	<1	<1	<1	<1	<1
Silver	20	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Thallium	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Uranium	23	--	--	--	--	--	--	--	--	--	--	--	--	--
Vanadium	86	17	70	24	26	20	30	20	30	90	30	20	30	30
Zinc	340	30	100	273	51	40	280	60	60	200	100	20	440	160

Notes:

All units are µg/g unless otherwise noted.

NV = No Value.

-- = Parameter not analysed.

mBGS = Meters below ground surface.

<0.5 = not detected above laboratory method detection limit shown

MECP = Soil, Groundwater and Sediment Standards for use under Part XV.1 of the Environmental Protection Act, April 2011.

Table 7 = Generic site condition standards for shallow soils in a non-potable groundwater condition for residential/parkland land use, coarse textured soil.

10 = Indicates concentrations which exceed MECP 2011 Table 7 standards.

Table 9.4 - Soil Analytical Results - Metals, Burnside Site, Ottawa, Ontario

Parameter	MECP	SS-7	SS-77	TP-7	TP-8	TP-8	TP-9	TP-10	TP-11	TP-12	TP-12	TP-13	TP-13
Sample Depth (mBGS)>	Table 7	0 - 0.2	dup SS-7	1.5	0.8	2.9	0.4	0.3	1.5	1.3	2.6	0.9	2.5
Date Sampled>	(µg/g)	22-Nov-00	22-Nov-00	22-Nov-00	22-Nov-00	22-Nov-00	22-Nov-00	22-Nov-00	22-Nov-00	22-Nov-00	22-Nov-00	22-Nov-00	22-Nov-00
Antimony	7.5	<1	1	8	<1	<1	2	<1	<1	<1	<1	<1	<1
Arsenic	18	1	<1	5	4	<1	2	2	2	2	1	1	<1
Barium	390	50	50	130	230	70	170	120	180	100	90	200	70
Beryllium	4	1	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	<0.5
Boron (hot water soluble)	1.5	--	--	--	--	--	--	--	--	--	--	--	--
Boron (total)	120	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	1.2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chromium Total	160	10	5	15	20	15	20	20	30	20	20	45	20
Chromium, Hexavalent	8	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	22	<5	<5	<5	5	5	5	5	10	5	5	10	5
Copper	140	10	10	60	60	5	20	20	20	20	15	25	10
Lead	120	25	45	570	210	10	110	40	40	35	10	10	15
Mercury	0.27	--	--	--	--	--	--	--	--	--	--	--	--
Molybdenum	6.9	<1	<1	1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Nickel	100	5	5	15	15	10	20	15	25	20	10	25	15
Selenium	2.4	5	<1	1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Silver	20	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Thallium	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Uranium	23	--	--	--	--	--	--	--	--	--	--	--	--
Vanadium	86	20	20	30	20	30	30	20	40	30	30	50	40
Zinc	340	40	40	180	240	140	160	80	100	80	60	80	80

Notes:

All units are µg/g unless otherwise noted.
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MECP = Soil, Groundwater and Sediment Standards for use under Part XV.1 of the Environmental Protection Act, April 2011.
Table 7 = Generic site condition standards for shallow soils in a non-potable groundwater condition for residential/parkland land use, coarse textured soil.
10 = Indicates concentrations which exceed MECP 2011 Table 7 standards.

Table 9.4 - Soil Analytical Results - Metals, Burnside Site, Ottawa, Ontario

Parameter	MECP	SS-14	TP-14	TP-14	SS-15	TP-15	TP-15	TP-16	TP-17	TP-18	TP-19	SS-20	TP-20	TP-21
Sample Depth (mBGS)>	Table 7	0 - 0.2	2	2.9	0 - 0.2	1	2	1.5	0.5	1.4	2	0 - 0.2	1.5	0.45
Date Sampled>	(µg/g)	22-Nov-00	22-Nov-00	22-Nov-00	23-Nov-00	23-Nov-00	23-Nov-00	23-Nov-00	23-Nov-00	23-Nov-00	23-Nov-00	23-Nov-00	23-Nov-00	23-Nov-00
Antimony	7.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Arsenic	18	<1	3	10	<1	5	<1	1	2	1	2	<1	1	2
Barium	390	250	220	310	100	180	70	190	220	190	130	130	140	290
Beryllium	4	<0.5	<0.5	<0.5	<0.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5
Boron (hot water soluble)	1.5	--	--	--	--	--	--	--	--	--	--	--	--	--
Boron (total)	120	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	1.2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chromium Total	160	60	25	25	25	25	15	40	35	45	25	25	25	60
Chromium, Hexavalent	8	--	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	22	15	10	10	5	5	<5	10	10	10	10	10	5	10
Copper	140	30	25	30	15	150	15	25	30	25	20	15	20	40
Lead	120	20	100	370	10	380	20	45	50	25	45	15	35	120
Mercury	0.27	--	--	--	--	--	--	--	--	--	--	--	--	--
Molybdenum	6.9	<1	<1	<1	<1	1	<1	<1	<1	<1	<1	<1	<1	<1
Nickel	100	30	25	25	15	20	15	30	25	30	20	15	20	35
Selenium	2.4	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Silver	20	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Thallium	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Uranium	23	--	--	--	--	--	--	--	--	--	--	--	--	--
Vanadium	86	50	30	20	30	30	20	40	40	50	30	40	30	50
Zinc	340	80	80	240	60	160	80	220	200	120	60	60	220	140

Notes:

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Table 7 = Generic site condition standards for shallow soils in a non-potable groundwater condition for residential/parkland land use, coarse textured soil.

10 = Indicates concentrations which exceed MECP 2011 Table 7 standards.

Table 9.4 - Soil Analytical Results - Metals, Burnside Site, Ottawa, Ontario

Parameter	MECP	TP-22	TP-23	TP-24	TP-25	SS-26	TP-26	TP-27	SS-28	TP-28	SS-29	TP-29	SS-30	TP-30
Sample Depth (mBGS)>	Table 7	0.4	1.2	0.2	0.6	0 - 0.2	0.8	0.4	0 - 0.2	0.2	0 - 0.2	0.7	0 - 0.2	0.7
Date Sampled>	(µg/g)	23-Nov-00	23-Nov-00	23-Nov-00	23-Nov-00	23-Nov-00	23-Nov-00	23-Nov-00	23-Nov-00	23-Nov-00	23-Nov-00	23-Nov-00	23-Nov-00	23-Nov-00
Antimony	7.5	<1	<1	<1	<1	<1	<1	<1	1	<1	<1	<1	<1	2
Arsenic	18	<1	1	1	4	<1	3	3	2	2	<1	5	<1	5
Barium	390	30	80	390	180	150	180	150	120	370	200	200	290	150
Beryllium	4	<0.5	1	0.5	1	<0.5	0.5	0.5	1.5	1	<0.5	<0.5	<0.5	<0.5
Boron (hot water soluble)	1.5	--	--	--	--	--	--	--	--	--	--	--	--	--
Boron (total)	120	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	1.2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1.0	<1	<1
Chromium Total	160	10	30	90	30	30	20	20	15	75	50	15	65	20
Chromium, Hexavalent	8	--	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	22	<5	10	20	5	10	5	<5	<5	15	10	<5	20	<5
Copper	140	10	10	45	20	15	20	15	15	45	25	130	35	35
Lead	120	15	40	10	90	15	370	45	90	90	15	480	20	230
Mercury	0.27	--	--	--	--	--	--	--	--	--	--	--	--	--
Molybdenum	6.9	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Nickel	100	5	20	55	20	15	15	15	10	45	25	25	40	15
Selenium	2.4	<1	<1	<1	<1	<1	<1	2	<1	<1	<1	1	<1	<1
Silver	20	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Thallium	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Uranium	23	--	--	--	--	--	--	--	--	--	--	--	--	--
Vanadium	86	20	20	90	20	40	20	20	20	70	50	20	60	20
Zinc	340	60	100	120	80	60	160	60	180	200	80	1300	80	240

Notes:

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Table 7 = Generic site condition standards for shallow soils in a non-potable groundwater condition for residential/parkland land use, coarse textured soil.

10 = Indicates concentrations which exceed MECP 2011 Table 7 standards.

Table 9.4 - Soil Analytical Results - Metals, Burnside Site, Ottawa, Ontario

Parameter	MECP	SS-31	TP-31	TP-32	TP-33	TP-34	TP-35	SS-36	TP-36	SS-37	TP-37	TP-38	SS-39	TP-39
Sample Depth (mBGS)>	Table 7	0 - 0.2	0.4	0.3	0.4	0.8	1.2	0 - 0.2	1.2	0 - 0.2	0.5	0.4	0 - 0.2	0.5
Date Sampled>	(µg/g)	23-Nov-00	23-Nov-00	23-Nov-00	23-Nov-00	23-Nov-00	23-Nov-00	24-Nov-00	24-Nov-00	24-Nov-00	24-Nov-00	24-Nov-00	24-Nov-00	24-Nov-00
Antimony	7.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Arsenic	18	<1	1	4	5	1	4	<1	3	<1	7	1	<1	3
Barium	390	200	320	160	230	30	110	190	320	240	320	380	40	210
Beryllium	4	<0.5	0.5	<0.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	0.5	<0.5	<0.5
Boron (hot water soluble)	1.5	--	--	--	--	--	--	--	--	--	--	--	--	--
Boron (total)	120	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	1.2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chromium Total	160	40	70	30	20	5	15	40	20	50	25	80	10	20
Chromium, Hexavalent	8	--	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	22	10	15	10	5	<5	<5	10	<5	15	5	15	<5	5
Copper	140	20	40	50	35	10	20	20	20	25	30	40	5	25
Lead	120	10	10	65	160	10	95	15	170	25	660	10	10	520
Mercury	0.27	--	--	--	--	--	--	--	--	--	--	--	--	--
Molybdenum	6.9	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Nickel	100	25	40	25	20	10	20	25	15	30	20	50	5	15
Selenium	2.4	9	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Silver	20	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Thallium	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Uranium	23	--	--	--	--	--	--	--	--	--	--	--	--	--
Vanadium	86	50	70	30	20	10	20	40	10	50	20	80	20	20
Zinc	340	60	120	160	200	100	180	60	240	80	240	200	40	180

Notes:

All units are µg/g unless otherwise noted.

NV = No Value.

-- = Parameter not analysed.

mBGS = Meters below ground surface.

<0.5 = not detected above laboratory method detection limit shown

MECP = Soil, Groundwater and Sediment Standards for use under Part XV.1 of the Environmental Protection Act, April 2011.

Table 7 = Generic site condition standards for shallow soils in a non-potable groundwater condition for residential/parkland land use, coarse textured soil.

10 = Indicates concentrations which exceed MECP 2011 Table 7 standards.

Table 9.4 - Soil Analytical Results - Metals, Burnside Site, Ottawa, Ontario

Parameter	MECP	SS-40	TP-40	TP-41	TP-42	TP-43	SS-44	TP-44	TP-45	SS-46	TP-46	TP-47	TP-48
Sample Depth (mBGS)>	Table 7	0 - 0.2	0.9	0.2	0.4	0.5	0 - 0.2	0.8	1	0 - 0.2	1.3	0.55	0.8
Date Sampled>	(µg/g)	24-Nov-00	24-Nov-00	24-Nov-00	24-Nov-00	24-Nov-00	24-Nov-00	24-Nov-00	24-Nov-00	24-Nov-00	24-Nov-00	24-Nov-00	24-Nov-00
Antimony	7.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	4	<1	<1
Arsenic	18	<1	8	1	3	1	<1	3	1	<1	5	2	8
Barium	390	40	440	60	160	280	100	270	70	360	270	440	180
Beryllium	4	1	0.5	<0.5	1	1	<0.5	0.5	1	<0.5	0.5	0.5	1
Boron (hot water soluble)	1.5	--	--	--	--	--	--	--	--	--	--	--	--
Boron (total)	120	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	1.2	<1	1.0	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chromium Total	160	10	25	10	35	65	25	25	30	75	25	75	20
Chromium, Hexavalent	8	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	22	<5	5	<5	10	15	5	5	5	20	10	15	5
Copper	140	5	45	10	20	35	15	40	10	40	45	45	20
Lead	120	20	390	20	120	30	35	170	35	10	510	180	190
Mercury	0.27	--	--	--	--	--	--	--	--	--	--	--	--
Molybdenum	6.9	<1	1	<1	<1	<1	<1	<1	<1	<1	1	<1	<1
Nickel	100	5	20	10	25	40	15	20	20	40	20	45	15
Selenium	2.4	4	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Silver	20	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Thallium	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Uranium	23	--	--	--	--	--	--	--	--	--	--	--	--
Vanadium	86	20	20	20	30	60	30	20	20	70	20	70	20
Zinc	340	40	300	60	180	140	40	300	60	100	220	160	100

Notes:

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MECP = Soil, Groundwater and Sediment Standards for use under Part XV.1 of the Environmental Protection Act, April 2011.

Table 7 = Generic site condition standards for shallow soils in a non-potable groundwater condition for residential/parkland land use, coarse textured soil.

10 = Indicates concentrations which exceed MECP 2011 Table 7 standards.

Table 9.4 - Soil Analytical Results - Metals, Burnside Site, Ottawa, Ontario

Parameter	MECP	SS-49	TP-49	CH2M-TP3	CH2M-TP4	CH2M-TP5	SOIL-DUP-1	CH2M-MW-1	CH2M-MW-2	SST1	SST2	SST3	SST4
Sample Depth (mBGS)>	Table 7	0 - 0.2	0.5	0.6-0.9	0.6-0.9	0.6-1.2	dup CH2M-TP5	0.8-1.4	0.8-1.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled>	(µg/g)	24-Nov-00	24-Nov-00	14-Oct-05	14-Oct-05	14-Oct-05	14-Oct-05	12-Oct-05	12-Oct-05	03-Nov-09	03-Nov-09	03-Nov-09	03-Nov-09
Antimony	7.5	<1	2	<1	1	3	2	<1	<1	<1	<1	<1	<1
Arsenic	18	<1	8	8	5	7	5	2	3	1	1	1	1
Barium	390	60	610	260	140	310	180	200	83	58	62	404	348
Beryllium	4	1	0.5	1.1	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	<0.5	0.6	0.6
Boron (hot water soluble)	1.5	--	--	--	--	--	--	--	--	--	--	--	--
Boron (total)	120	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	1.2	<1	1	1	0.9	1.5	0.9	<0.3	<0.3	<0.5	<0.5	<0.5	<0.5
Chromium Total	160	10	25	27	15	14	13	13	32	17	16	90	73
Chromium, Hexavalent	8	--	--	--	--	--	--	--	--	<0.4	<0.4	<0.4	<0.4
Cobalt	22	5	5	8.8	6.3	4.1	3.8	4.4	9.7	3	5	18	15
Copper	140	10	65	43	120	73	61	18	24	7	11	39	35
Lead	120	25	1100	39	97	970	670	210	16	14	20	24	24
Mercury	0.27	--	--	0.09	0.17	0.46	--	0.19	<0.05	<0.1	<0.1	<0.1	<0.1
Molybdenum	6.9	<1	<1	2	1.2	0.8	<0.5	0.6	1.4	<1	<1	<1	<1
Nickel	100	10	20	18	14	9.4	8.2	8.5	21	8	9	49	41
Selenium	2.4	4	1	2	<1	<1	<1	<1	<1	<1	<1	<1	<1
Silver	20	<5	<5	<0.3	1.1	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Thallium	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Uranium	23	--	--	--	--	--	--	--		--	--	--	--
Vanadium	86	20	20	29	20	20	18	20	44	23	27	76	64
Zinc	340	40	420	100	150	1700	980	75	53	27	34	85	81

Notes:

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MECP = Soil, Groundwater and Sediment Standards for use under Part XV.1 of the Environmental Protection Act, April 2011.

Table 7 = Generic site condition standards for shallow soils in a non-potable groundwater condition for residential/parkland land use, coarse textured soil.

10 = Indicates concentrations which exceed MECP 2011 Table 7 standards.

Table 9.4 - Soil Analytical Results - Metals, Burnside Site, Ottawa, Ontario

Parameter	MECP	SST5	SST6	SST7	SST70	SST8	SST9	SST10	BH19-01-1	BH19-D1	BH19-02-1	BH19-02-3	BH19-03-1
Sample Depth (mBGS)>	Table 7	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1	0.3-1.1	Dup BH19-01-1	0.2-1.5	3.0-4.6	0.7-0.8
Date Sampled>	(µg/g)	03-Nov-09	03-Nov-09	03-Nov-09	03-Nov-09	03-Nov-09	03-Nov-09	03-Nov-09	24-May-19	24-May-19	24-May-19	24-May-19	24-May-19
Antimony	7.5	<1	<1	<1	<1	<1	<1	<1	<1.0	<1.0	1.3	<1.0	<1.0
Arsenic	18	1	<1	1	1	<1	<1	<1	4.2	4.5	5.9	1.9	4
Barium	390	420	144	34	40	74	48	40	158	291	269	73	286
Beryllium	4	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	0.7	<0.5	<0.5	0.7
Boron (hot water soluble)	1.5	--	--	--	--	--	--	--	<0.5	<0.5	<0.5	<0.5	<0.5
Boron (total)	120	--	--	--	--	--	--	--	10.2	12.1	14.4	7	10.2
Cadmium	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium Total	160	82	31	8	10	20	15	10	36	41.1	50.2	12.1	63.5
Chromium, Hexavalent	8	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.2	<0.2	<0.2	<0.2	<0.2
Cobalt	22	17	8	2	3	6	4	4	10.8	12.3	13.6	5.3	14.8
Copper	140	38	17	<5	5	13	11	9	26	29.7	41.9	15.1	37
Lead	120	21	9	9	11	15	20	6	46.3	58.7	92.5	5.3	56.4
Mercury	0.27	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Molybdenum	6.9	<1	<1	<1	<1	<1	<1	<1	<1.0	<1.0	1.1	<1.0	<1.0
Nickel	100	45	17	<5	5	10	8	6	23	26.7	32.7	10.8	38.6
Selenium	2.4	<1	<1	<1	<1	<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0
Silver	20	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Thallium	1	<1	<1	<1	<1	<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0
Uranium	23	--	--	--	--	--	--	--	<1.0	<1.0	<1.0	<1.0	<1.0
Vanadium	86	73	43	17	20	29	21	15	45.7	51.2	55.9	26.6	64.5
Zinc	340	88	42	22	25	29	30	<20	80.9	93.3	130	27.2	107

Notes:

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Table 7 = Generic site condition standards for shallow soils in a non-potable groundwater condition for residential/parkland land use, coarse textured soil.

10 = Indicates concentrations which exceed MECP 2011 Table 7 standards.

Table 9.4 - Soil Analytical Results - Metals, Burnside Site, Ottawa, Ontario

Parameter	MECP	BH19-04-1	BH19-05-1	BH19-08-1
Sample Depth (mBGS)>	Table 7	0.2-1.5	0-0.8	0.2-0.6
Date Sampled>	(µg/g)	24-May-19	24-May-19	24-May-19
Antimony	7.5	<1.0	2	1.1
Arsenic	18	3.9	5.8	4.9
Barium	390	204	225	317
Beryllium	4	0.6	0.6	0.9
Boron (hot water soluble)	1.5	<0.5	<0.5	0.6
Boron (total)	120	10	11.1	18.9
Cadmium	1.2	<0.5	0.5	<0.5
Chromium Total	160	41	39.5	55.8
Chromium, Hexavalent	8	2.5	<0.2	<0.2
Cobalt	22	11.1	10.3	12.3
Copper	140	27.9	42.1	36.6
Lead	120	52	176	221
Mercury	0.27	<0.1	<0.1	<0.1
Molybdenum	6.9	1.4	1.8	<1.0
Nickel	100	25.4	27	32.4
Selenium	2.4	<1.0	<1.0	<1.0
Silver	20	<0.3	<0.3	<0.3
Thallium	1	<1.0	<1.0	<1.0
Uranium	23	<1.0	<1.0	<1.0
Vanadium	86	44.4	41.9	49.9
Zinc	340	83.5	153	205

Notes:

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MECP = Soil, Groundwater and Sediment Standards for use under Part XV.1 of the Environmental Protection Act, April 2011.
Table 7 = Generic site condition standards for shallow soils in a non-potable groundwater condition for residential/parkland land use, coarse textured soil.
10 = Indicates concentrations which exceed MECP 2011 Table 7 standards.

Table 9.5 - Soil Analytical Results - Polycyclic Aromatic Hydrocarbons, Burnside Site, Ottawa, Ontario

Parameter	MECP	SS-7A	TP-7 A	TP-1	SS-4	TP-4	TP-6	SS-7	TP-8	SS-11	TP-11	SS-14
Sample Depth (mBGS)>	Table 7	0 - 0.2	0.6	0.4	0 - 0.2	1.2	0.9	0 - 0.2	0.8	0 - 0.2	1.5	0 - 0.2
Date Sampled>	(µg/g)	8-Jun-00	8-Jun-00	22-Nov-00	22-Nov-00	22-Nov-00	22-Nov-00	22-Nov-00	22-Nov-00	22-Nov-00	22-Nov-00	22-Nov-00
Acenaphthene	7.9	< 0.017	1.7	< 0.018	< 0.017	0.13	0.02	< 0.017	0.039	0.12	0.14	< 0.017
Acenaphthylene	0.15	0.017	0.2	0.036	< 0.017	2	0.32	0.033	0.24	0.05	0.11	< 0.017
Anthracene	0.67	0.066	9	0.036	< 0.017	1.7	0.28	0.033	0.27	0.41	0.47	0.017
Benzo[a]anthracene	0.5	0.21	24.8	0.072	0.017	1.7	0.54	0.099	0.41	0.96	0.58	0.15
Benzo[a]pyrene	0.3	0.2	14.7	0.072	< 0.017	3.5	0.9	0.12	0.65	0.89	0.74	0.12
Benzo[b]fluoranthene	0.78	0.17	--	--	< 0.017	--	--	0.12	--	0.86	--	0.099
Benzo[k]fluoranthene	0.78	0.17	--	--	< 0.017	--	--	0.12	--	0.86	--	0.12
Benzo[g,h,i]perylene	6.6	0.13	2.4	0.054	< 0.017	1.2	0.42	0.15	0.25	0.69	0.25	0.083
Chrysene	7	0.21	17.5	0.09	0.017	1.7	0.6	0.099	0.43	0.87	0.58	0.12
Dibenzo[a,h]anthracene	0.1	0.066	0.6	0.018	< 0.017	0.62	0.14	0.066	0.12	0.4	0.13	0.05
Indeno[1,2,3-cd]pyrene	0.38	0.13	1.4	0.054	< 0.017	1.2	0.38	0.13	0.24	0.78	0.25	0.083
Fluoranthene	0.69	0.46	43	0.14	0.033	1.3	1.2	0.15	0.9	2	1.4	0.2
Fluorene	62	< 0.017	2.2	< 0.018	< 0.017	0.19	0.06	< 0.017	0.059	0.13	0.25	< 0.017
Methylnaphthalene, 1-	NV	< 0.017	--	< 0.018	< 0.017	0.038	0.08	< 0.017	0.02	0.017	0.054	< 0.017
Methylnaphthalene, 2-	NV	< 0.017	--	0.018	< 0.017	0.056	0.12	< 0.017	0.039	0.017	0.036	< 0.017
Methylnaphthalene, 2-(1-)-**	0.99	< 0.017	--	0.018	< 0.017	0.094	0.2	< 0.017	0.059	0.034	0.09	< 0.017
Naphthalene	0.6	< 0.017	1.5	< 0.018	< 0.017	0.038	0.08	< 0.017	0.039	0.066	0.072	< 0.017
Phenanthrene	6.2	0.33	32.2	0.09	< 0.017	0.15	0.52	0.066	0.49	1.6	1.1	0.066
Pyrene	78	0.51	38.3	0.13	0.017	1.6	0.96	0.13	0.73	1.6	1.1	0.17

Notes:

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**The methylnaphthalene standards are applicable to both 1-methylnaphthalene and 2-methylnaphthalene, withthe provision that if both are detected the sum of the two must not exceed the standard.

MECP = Soil, Groundwater and Sediment Standards for use under Part XV.1 of the Environmental Protection Act, April 2011.

Table 7 = Generic site condition standards for shallow soils in a non-potable groundwater condition for residential/parkland land use, coarse textured soil.

10 = Indicates concentrations which exceed MECP 2011 Table 7 standards.

Table 9.5 - Soil Analytical Results - Polycyclic Aromatic Hydrocarbons, Burnside Site, Ottawa, Ontario

Parameter	MECP	SS-15	TP-15	TP-18	SS-20	TP-20	TP-23	TP-26	SS-28	SS-29	SS-129	TP-29
Sample Depth (mBGS)>	Table 7	0 - 0.2	1	1.4	0 - 0.2	2.5	1.2	0.3	0 - 0.2	0 - 0.2	0 - 0.2	0.7
Date Sampled>	(µg/g)	23-Nov-00	23-Nov-00	23-Nov-00	23-Nov-00	23-Nov-00	23-Nov-00	23-Nov-00	23-Nov-00	23-Nov-00	23-Nov-00	23-Nov-00
Acenaphthene	7.9	< 0.017	1.3	0.091	0.017	0.29	< 0.019	< 0.018	0.05	< 0.017	< 0.017	2.5
Acenaphthylene	0.15	< 0.017	1.7	0.14	0.017	0.37	< 0.019	0.12	0.17	< 0.017	< 0.017	1.8
Anthracene	0.67	< 0.017	4.5	0.38	0.083	1.2	< 0.019	0.12	0.41	< 0.017	< 0.017	6.2
Benzo[a]anthracene	0.5	0.05	6.6	0.45	0.31	2.1	< 0.019	0.23	1.4	0.033	0.05	12
Benzo[a]pyrene	0.3	0.033	8.6	0.47	0.28	2.6	< 0.019	0.39	1.2	0.033	0.033	16
Benzo[b]fluoranthene	0.78	0.033	--	--	0.28	--	--	--	1.2	0.033	0.05	--
Benzo[k]fluoranthene	0.78	0.033	--	--	0.28	--	--	--	1.2	0.033	0.05	--
Benzo[g,h,i]perylene	6.6	0.033	3	0.16	0.2	0.81	< 0.019	0.16	0.96	0.033	0.033	5.7
Chrysene	7	0.033	5.9	0.43	0.3	1.9	< 0.019	0.23	1.6	0.033	0.05	11
Dibenzo[a,h]anthracene	0.1	< 0.017	1.5	0.072	0.13	0.44	< 0.019	0.071	0.56	0.017	< 0.017	2.8
Indeno[1,2,3-cd]pyrene	0.38	0.033	3.2	0.18	0.23	0.88	< 0.019	0.16	1.1	0.033	0.033	5.7
Fluoranthene	0.69	0.083	12	1.1	0.59	4.5	< 0.019	0.46	3.1	0.066	0.083	23
Fluorene	62	< 0.017	2.5	0.16	0.017	0.44	< 0.019	0.018	0.15	< 0.017	< 0.017	2.6
Methylnaphthalene, 1-	NV	< 0.017	0.66	0.054	< 0.017	0.11	< 0.019	< 0.018	0.05	< 0.017	< 0.017	1
Methylnaphthalene, 2-	NV	< 0.017	0.73	0.072	< 0.017	0.15	< 0.019	< 0.018	0.05	< 0.017	< 0.017	1.2
Methylnaphthalene, 2-(1-)-**	0.99	< 0.017	1.39	0.126	< 0.017	0.26	< 0.019	< 0.018	0.1	< 0.017	< 0.017	2.2
Naphthalene	0.6	< 0.017	0.85	0.11	< 0.017	0.26	< 0.019	< 0.018	0.13	< 0.017	< 0.017	1.6
Phenanthrene	6.2	0.05	7.6	1	0.3	3.2	< 0.019	0.21	2.6	0.033	0.033	19
Pyrene	78	0.066	9.5	0.83	0.5	3.6	< 0.019	0.39	2.3	0.05	0.066	18

Notes:

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Table 9.5 - Soil Analytical Results - Polycyclic Aromatic Hydrocarbons, Burnside Site, Ottawa, Ontario

Parameter	MECP	SS-30	TP-32	SS-33	TP-33	SS-36	TP-36	SS-38	SS-39	TP-39	SS-40	TP-40
Sample Depth (mBGS)>	Table 7	0 - 0.2	1.3	0 - 0.2	0.7	0 - 0.2	1.2	0 - 0.2	0 - 0.2	0.5	0 - 0.2	0.9
Date Sampled>	(µg/g)	23-Nov-00	23-Nov-00	23-Nov-00	23-Nov-00	24-Nov-00	24-Nov-00	24-Nov-00	24-Nov-00	24-Nov-00	24-Nov-00	24-Nov-00
Acenaphthene	7.9	0.083	< 0.018	< 0.017	0.052	0.033	< 0.71	< 0.017	< 0.017	0.18	< 0.017	0.021
Acenaphthylene	0.15	0.017	0.054	< 0.017	0.12	0.066	6.4	< 0.017	< 0.017	0.18	< 0.017	0.18
Anthracene	0.67	0.31	0.054	< 0.017	0.19	0.13	11	< 0.017	< 0.017	0.71	< 0.017	0.21
Benzo[a]anthracene	0.5	0.68	0.11	0.05	0.38	0.41	16	< 0.017	0.033	1.1	< 0.017	0.55
Benzo[a]pyrene	0.3	0.61	0.11	0.05	0.48	0.48	13	< 0.017	0.033	0.71	< 0.017	0.62
Benzo[b]fluoranthene	0.78	0.53	--	0.05	--	0.45	--	< 0.017	0.017	--	0.017	--
Benzo[k]fluoranthene	0.78	0.5	--	0.05	--	0.38	--	< 0.017	0.017	--	< 0.017	--
Benzo[g,h,i]perylene	6.6	0.43	0.054	0.05	0.26	0.4	5.6	< 0.017	0.033	0.53	< 0.017	0.33
Chrysene	7	0.64	0.11	0.05	0.4	0.41	14	< 0.017	0.033	1.2	< 0.017	0.57
Dibenzo[a,h]anthracene	0.1	0.23	0.018	0.017	0.1	0.2	2.8	< 0.017	< 0.017	< 0.18	< 0.017	0.14
Indeno[1,2,3-cd]pyrene	0.38	0.51	0.054	0.05	0.26	0.43	7.1	< 0.017	0.017	0.35	< 0.017	0.35
Fluoranthene	0.69	1.7	0.2	0.083	0.73	0.86	38	< 0.017	0.05	2.6	< 0.017	0.96
Fluorene	62	0.099	< 0.018	< 0.017	0.052	0.033	0.71	< 0.017	< 0.017	0.18	< 0.017	0.041
Methylnaphthalene, 1-	NV	< 0.017	< 0.018	< 0.017	0.017	< 0.017	< 0.71	< 0.017	< 0.017	< 0.18	< 0.017	< 0.021
Methylnaphthalene, 2-	NV	< 0.017	< 0.018	< 0.017	0.035	< 0.017	< 0.71	< 0.017	< 0.017	< 0.18	< 0.017	< 0.021
Methylnaphthalene, 2-(1-)-**	0.99	< 0.017	< 0.018	< 0.017	0.052	< 0.017	< 0.71	< 0.017	< 0.017	< 0.18	< 0.017	< 0.021
Naphthalene	0.6	< 0.017	< 0.018	< 0.017	0.035	< 0.017	< 0.71	< 0.017	< 0.017	< 0.18	< 0.017	0.021
Phenanthrene	6.2	1.6	0.072	0.05	0.45	0.53	13	< 0.017	0.033	2.1	< 0.017	0.41
Pyrene	78	1.2	0.18	0.066	0.62	0.71	27	< 0.017	0.033	2.1	< 0.017	0.86

Notes:

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Table 7 = Generic site condition standards for shallow soils in a non-potable groundwater condition for residential/parkland land use, coarse textured soil.

10 = Indicates concentrations which exceed MECP 2011 Table 7 standards.

Table 9.5 - Soil Analytical Results - Polycyclic Aromatic Hydrocarbons, Burnside Site, Ottawa, Ontario

Parameter	MECP	TP-42	SS-44	SS-46	TP-46	TP-47	TP-48	SS-49	TP-49	CH2M-TP3	CH2M-TP4
Sample Depth (mBGS)>	Table 7	0.4	0 - 0.2	0 - 0.2	1.3	0.55	0.8	0 - 0.2	0.5	0.6-0.9	0.6-0.9
Date Sampled>	(µg/g)	24-Nov-00	24-Nov-00	24-Nov-00	24-Nov-00	24-Nov-00	24-Nov-00	24-Nov-00	24-Nov-00	14-Oct-05	14-Oct-05
Acenaphthene	7.9	0.037	< 0.017	< 0.017	0.072	0.019	0.039	< 0.017	< 0.98	<0.01	<0.01
Acenaphthylene	0.15	0.13	0.017	< 0.017	0.16	0.057	0.14	< 0.017	0.98	<0.005	<0.005
Anthracene	0.67	0.2	0.017	< 0.017	0.36	0.11	0.21	< 0.017	2	0.019	0.008
Benzo[a]anthracene	0.5	0.48	0.066	< 0.017	0.63	0.21	0.46	0.033	3.9	0.08	0.04
Benzo[a]pyrene	0.3	0.56	0.099	< 0.017	0.85	0.19	0.5	0.017	2.9	0.057	0.027
Benzo[b]fluoranthene	0.78	--	0.12	0.017	--	--	--	0.017	--	0.08	0.037
Benzo[k]fluoranthene	0.78	--	0.12	< 0.017	--	--	--	0.017	--	0.03	0.02
Benzo[g,h,i]perylene	6.6	0.26	0.099	< 0.017	0.33	0.11	0.27	< 0.017	2	0.05	0.02
Chrysene	7	0.48	0.099	< 0.017	0.62	0.19	0.44	0.017	3.9	0.06	0.03
Dibenzo[a,h]anthracene	0.1	0.11	0.033	< 0.017	0.16	0.057	0.12	< 0.017	< 0.98	<0.02	<0.02
Indeno[1,2,3-cd]pyrene	0.38	0.28	0.099	< 0.017	0.36	0.11	0.29	< 0.017	2	0.05	0.02
Fluoranthene	0.69	0.93	0.099	0.017	1.4	0.34	1.1	0.05	6.9	0.128	0.061
Fluorene	62	0.037	< 0.017	< 0.017	0.11	0.038	0.077	< 0.017	< 0.98	<0.005	<0.005
Methylnaphthalene, 1-	NV	< 0.019	0.033	< 0.017	0.054	< 0.019	0.019	< 0.017	< 0.98	0.01	<0.005
Methylnaphthalene, 2-	NV	< 0.019	0.033	< 0.017	0.054	< 0.019	0.039	< 0.017	< 0.98	0.007	<0.005
Methylnaphthalene, 2-(1-)-**	0.99	< 0.019	0.066	< 0.017	0.108	< 0.019	0.058	< 0.017	< 0.98	0.017	<0.005
Naphthalene	0.6	0.019	0.05	< 0.017	0.11	< 0.019	0.039	< 0.017	< 0.98	<0.005	<0.005
Phenanthrene	6.2	0.43	0.066	0.017	0.94	0.27	0.83	0.033	4.9	0.062	0.029
Pyrene	78	0.85	0.099	0.017	1.2	0.29	0.91	0.033	5.9	0.111	0.053

Notes:

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10 = Indicates concentrations which exceed MECP 2011 Table 7 standards.

Table 9.5 - Soil Analytical Results - Polycyclic Aromatic Hydrocarbons, Burnside Site, Ottawa, Ontario

Parameter	MECP	CH2M-TP5	CH2M-MW-1	CH2M-MW-2	SST1	SST2	SST3	SST4	SST5	SST6
Sample Depth (mBGS)>	Table 7	0.6-1.2	0.8-1.4	0.8-1.1	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled>	(µg/g)	14-Oct-05	12-Oct-05	12-Oct-05	03-Nov-09	03-Nov-09	03-Nov-09	03-Nov-09	03-Nov-09	03-Nov-09
Acenaphthene	7.9	0.01	0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Acenaphthylene	0.15	0.076	0.029	<0.05	<0.02	<0.02	<0.02	0.05	0.02	<0.02
Anthracene	0.67	0.147	0.136	<0.05	<0.02	0.02	<0.02	0.08	0.02	<0.02
Benzo[a]anthracene	0.5	1.29	0.44	0.2	0.03	0.05	0.03	0.12	0.03	0.04
Benzo[a]pyrene	0.3	1.13	0.367	<0.05	0.03	0.04	0.03	0.12	0.03	0.03
Benzo[b]fluoranthene	0.78	1.5	0.453	0.07	0.04	0.07	0.05	0.17	0.05	0.05
Benzo[k]fluoranthene	0.78	0.67	0.22	<0.1	0.02	0.03	0.03	0.12	0.03	0.03
Benzo[g,h,i]perylene	6.6	0.75	0.2	<0.2	0.02	0.03	0.02	0.09	0.03	0.02
Chrysene	7	1.19	0.36	<0.1	0.04	0.05	0.04	0.15	0.04	0.04
Dibenzo[a,h]anthracene	0.1	0.2	0.05	<0.2	<0.02	<0.02	<0.02	0.02	<0.02	<0.02
Indeno[1,2,3-cd]pyrene	0.38	0.87	0.22	<0.2	0.02	0.03	0.02	0.08	0.02	0.02
Fluoranthene	0.69	2.4	0.904	0.12	0.07	0.12	0.07	0.28	0.06	0.09
Fluorene	62	0.032	0.041	<0.05	<0.02	<0.02	<0.02	0.02	<0.02	<0.02
Methylnaphthalene, 1-	NV	0.015	0.025	<0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Methylnaphthalene, 2-	NV	0.008	0.012	<0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Methylnaphthalene, 2-(1-)-**	0.99	0.023	0.037	<0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Naphthalene	0.6	0.02	0.015	<0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Phenanthrene	6.2	1.12	0.566	0.1	0.03	0.05	0.03	0.13	0.02	0.04
Pyrene	78	2.05	0.75	0.1	0.06	0.09	0.05	0.23	0.05	0.07

Notes:

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Table 7 = Generic site condition standards for shallow soils in a non-potable groundwater condition for residential/parkland land use, coarse textured soil.

10 = Indicates concentrations which exceed MECP 2011 Table 7 standards.

Table 9.5 - Soil Analytical Results - Polycyclic Aromatic Hydrocarbons, Burnside Site, Ottawa, Ontario

Parameter	MECP	SST7	SST70	SST8	SST9	SST10	BH19-01-1	BH19-D1	BH19-02-1
Sample Depth (mBGS)>	Table 7	0-0.1	Dup SST7	0-0.1	0-0.1	0-0.1	0.3-1.1	Dup 19-01-1	0.2-1.5
Date Sampled>	(µg/g)	03-Nov-09	03-Nov-09	03-Nov-09	03-Nov-09	03-Nov-09	24-May-19	24-May-19	24-May-19
Acenaphthene	7.9	0.02	<0.02	<0.02	<0.02	<0.02	0.1	0.08	0.04
Acenaphthylene	0.15	0.04	0.02	0.02	<0.02	<0.02	0.07	0.09	0.07
Anthracene	0.67	0.11	0.04	0.07	0.03	<0.02	0.36	0.24	0.13
Benzo[a]anthracene	0.5	0.2	0.1	0.17	0.06	0.02	0.81	0.5	0.25
Benzo[a]pyrene	0.3	0.17	0.09	0.15	0.05	<0.02	0.65	0.43	0.21
Benzo[b]fluoranthene	0.78	0.26	0.14	0.25	0.07	0.02	0.77	0.57	0.36
Benzo[k]fluoranthene	0.78	0.15	0.09	0.15	0.03	<0.02	0.36	0.25	0.26
Benzo[g,h,i]perylene	6.6	0.11	0.06	0.1	0.04	<0.02	0.48	0.42	0.14
Chrysene	7	0.21	0.11	0.19	0.06	0.02	0.82	0.56	0.3
Dibenzo[a,h]anthracene	0.1	0.03	<0.02	0.03	<0.02	<0.02	0.12	0.09	0.04
Indeno[1,2,3-cd]pyrene	0.38	0.1	0.06	0.1	0.03	<0.02	0.4	0.3	0.12
Fluoranthene	0.69	0.46	0.22	0.37	0.14	0.03	1.6	1.11	0.55
Fluorene	62	0.03	<0.02	<0.02	<0.02	<0.02	0.12	0.1	0.05
Methylnaphthalene, 1-	NV	<0.02	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	0.02
Methylnaphthalene, 2-	NV	<0.02	<0.02	<0.02	<0.02	<0.02	0.04	0.02	0.03
Methylnaphthalene, 2-(1-)-**	0.99	<0.02	<0.02	<0.02	<0.02	<0.02	0.07	0.04	0.05
Naphthalene	0.6	<0.02	<0.02	<0.02	<0.02	<0.02	0.07	0.04	0.04
Phenanthrene	6.2	0.26	0.1	0.15	0.06	<0.02	1.23	0.71	0.36
Pyrene	78	0.38	0.18	0.31	0.11	0.02	1.3	0.89	0.46

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Table 7 = Generic site condition standards for shallow soils in a non-potable groundwater condition for residential/parkland land use, coarse textured soil.

10 = Indicates concentrations which exceed MECP 2011 Table 7 standards.

Table 9.5 - Soil Analytical Results - Polycyclic Aromatic Hydrocarbons, Burnside Site, Ottawa, Ontario

Parameter Sample Depth (mBGS)> Date Sampled>	MECP Table 7 (µg/g)	BH19-02-3 3.0-4.6 24-May-19	BH19-03-1 0.7-0.8 24-May-19	BH19-04-1 0.2-1.5 24-May-19	BH19-05-1 0-0.8 24-May-19	BH19-08-1 0.2-0.6 24-May-19
Acenaphthene	7.9	<0.02	0.42	0.37	0.03	0.19
Acenaphthylene	0.15	<0.02	0.47	0.3	0.09	0.11
Anthracene	0.67	<0.02	2.01	1.25	0.11	0.73
Benzo[a]anthracene	0.5	<0.02	3.43	2.31	0.28	1.81
Benzo[a]pyrene	0.3	<0.02	2.14	1.59	0.24	1.63
Benzo[b]fluoranthene	0.78	<0.02	3.13	2.37	0.43	2.45
Benzo[k]fluoranthene	0.78	<0.02	2.2	1.85	0.26	1.42
Benzo[g,h,i]perylene	6.6	<0.02	0.97	0.87	0.17	1.07
Chrysene	7	<0.02	3.38	2.35	0.33	1.92
Dibenzo[a,h]anthracene	0.1	<0.02	0.25	0.23	0.04	0.24
Indeno[1,2,3-cd]pyrene	0.38	<0.02	0.6	0.82	0.13	1
Fluoranthene	0.69	<0.02	8.22	5.26	0.59	4.04
Fluorene	62	<0.02	0.8	0.53	0.03	0.22
Methylnaphthalene, 1-	NV	<0.02	0.11	0.1	<0.02	0.06
Methylnaphthalene, 2-	NV	<0.02	0.1	0.12	<0.02	0.06
Methylnaphthalene, 2-(1-)-**	0.99	<0.04	0.21	0.21	<0.04	0.12
Naphthalene	0.6	<0.01	0.12	0.21	0.02	0.11
Phenanthrene	6.2	<0.02	6.64	4.16	0.37	2.27
Pyrene	78	<0.02	6.08	4.06	0.49	3.12

Notes:

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Table 7 = Generic site condition standards for shallow soils in a non-potable groundwater condition for residential/parkland land use, coarse textured soil.

10 = Indicates concentrations which exceed MECP 2011 Table 7 standards.

Table 9.6- Soil Analytical Results - Petroleum Hydrocarbons, BTEX and PCBs, Burnside Site, Ottawa, Ontario

Parameter	MECP	TP-7	TP-8	TP-16	TP-29	TP-41	CH2M-TP3	CH2M-TP4	CH2M-TP5	CH2M-MW-1	CH2M-MW-2
Sample Depth (mBGS)>	Table 7	1.5	0.8	1.5	0.7	0.2	0.6-0.9	0.6-0.9	0.6-1.2	1.5-2.1	0.8-1.1
Date Sampled>	(µg/g)	22-Nov-00	22-Nov-00	23-Nov-00	23-Nov-00	24-Nov-00	14-Oct-05	14-Oct-05	14-Oct-05	12-Oct-05	12-Oct-05
F1 PHCs (C6-C10)	55	--	--	--	--	--	<10	<10	19	--	--
F2 PHCs (C10-C16)	98	--	--	--	--	--	<10	<10	<10	--	--
F3 PHCs (C16-C34)	300	--	--	--	--	--	42	12	<10	--	--
F4 PHCs (C34-C50)	2800	--	--	--	--	--	<10	<10	<10	--	--
Petroleum Hydrocarbons (gasoline)	NV	<10	<10	<10	<10	<10	--	--	--	--	--
Petroleum Hydrocarbons (diesel)	NV	<10	30	30	360	10	--	--	--	--	--
Petroleum Hydrocarbons (gasoline + diesel)	NV	<10	30	30	360	10	--	--	--	--	--
Petroleum Hydrocarbons (heavy oils)	NV	100	100	250	500	100	--	--	--	--	--
Benzene	0.21	< 0.040	< 0.040	< 0.040	< 0.040	0.56	0.008	0.003	0.006	0.003	0.002
Ethylbenzene	2	< 0.040	< 0.040	< 0.040	< 0.040	< 0.040	<0.002	<0.002	<0.002	<0.002	<0.002
Toluene	2.3	< 0.040	< 0.040	< 0.040	< 0.040	< 0.040	0.091	0.005	0.005	0.01	0.007
Xylenes, m,p-	NV	< 0.040	< 0.040	< 0.040	< 0.040	0.04	<0.002	<0.002	<0.002	0.008	0.007
Xylene, o-	NV	< 0.040	< 0.040	< 0.040	< 0.040	< 0.040	<0.002	<0.002	<0.002	<0.002	<0.002
Xylenes, Total	3.1	< 0.040	< 0.040	< 0.040	< 0.040	0.04	<0.003	<0.003	<0.003	0.008	0.007
Total PCB	0.35	--	--	--	--	--	--	<0.02	--	--	

Notes:

All units are µg/g unless otherwise noted.
NV = No Value.
-- = Parameter not analysed.
mBGS = Meters below ground surface.
<0.5 = not detected above laboratory method detection limit shown
MECP = Soil, Groundwater and Sediment Standards for use under Part XV.1 of the Environmental Protection Act, April 2011.
Table 7 = Generic site condition standards for shallow soils in a non-potable groundwater condition for residential/parkland land use, coarse textured soil.
10 = Indicates concentrations which exceed MECP 2011 Table 7 standards.

Table 9.6- Soil Analytical Results - Petroleum Hydrocarbons, BTEX and PCBs, Burnside Site, Ottawa, Ontario

Parameter Sample Depth (mBGS)> Date Sampled>	**MECP** **Table 7** **(µg/g)**	**BH19-06-1** 0-0.8 24-May-19	**BH19-07-1** 0.5-1.4 24-May-19	**BH19-09-1** 0.1-0.6 24-May-19	**BH19-10-1** 0.3-1.1 24-May-19
F1 PHCs (C6-C10)	55	<7	<7	<7	<7
F2 PHCs (C10-C16)	98	<4	<4	5	<4
F3 PHCs (C16-C34)	300	<8	71	33	45
F4 PHCs (C34-C50)	2800	<6	40	11	30
Petroleum Hydrocarbons (gasoline)	NV	--	--	--	--
Petroleum Hydrocarbons (diesel)	NV	--	--	--	--
Petroleum Hydrocarbons (gasoline + diesel)	NV	--	--	--	--
Petroleum Hydrocarbons (heavy oils)	NV	--	--	--	--
Benzene	0.21	<0.02	<0.02	<0.02	<0.02
Ethylbenzene	2	<0.05	<0.05	<0.05	<0.05
Toluene	2.3	<0.05	<0.05	<0.05	<0.05
Xylenes, m,p-	NV	<0.05	<0.05	<0.05	<0.05
Xylene, o-	NV	<0.05	<0.05	<0.05	<0.05
Xylenes, Total	3.1	<0.05	<0.05	<0.05	<0.05
Total PCB	0.35	--	--	--	--

Notes:

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-- = Parameter not analysed.

mBGS = Meters below ground surface.

<0.5 = not detected above laboratory method detection limit shown

MECP = Soil, Groundwater and Sediment Standards for use under Part XV.1 of the Environmental Protection

Table 7 = Generic site condition standards for shallow soils in a non-potable groundwater condition for reside coarse textured soil.

10 = Indicates concentrations which exceed MECP 2011 Table 7

Table 9.7 - Soil Analytical Results - Volatile Organic Compounds, Burnside Site, Ottawa, Ontario

Parameter Sample Depth (mBGS)> Date Sampled>	MECP Table 7 (µg/g)	CH2M-TP3 0.6-0.9 14-Oct-05	CH2M-TP4 0.6-0.9 14-Oct-05	CH2M-TP5 0.6-1.2 14-Oct-05	CH2M-MW-1 1.5-2.1 12-Oct-05	CH2M-MW-2 0.8-1.1 12-Oct-05
Acetone	16	<0.1	<0.1	<0.1	<0.1	<0.1
Bromodichloromethane	13	<0.002	<0.002	<0.002	<0.002	<0.002
Bromoform	0.27	<0.002	<0.002	<0.002	<0.002	<0.002
Bromomethane	0.05	<0.002	<0.002	<0.002	<0.002	<0.002
Carbon Tetrachloride	0.05	<0.002	<0.002	<0.002	<0.002	<0.002
Chlorobenzene	2.4	<0.002	<0.002	<0.002	<0.002	<0.002
Chloroform	0.05	<0.002	<0.002	<0.002	<0.002	<0.002
Dibromochloromethane	9.4	<0.002	<0.002	<0.002	<0.002	<0.002
Dichlorobenzene, 1,2-	3.4	<0.002	<0.002	<0.002	<0.002	<0.002
Dichlorobenzene, 1,3-	4.8	<0.002	<0.002	<0.002	<0.002	<0.002
Dichlorobenzene, 1,4-	0.083	<0.002	<0.002	<0.002	<0.002	<0.002
Dichloroethane, 1,1-	3.5	<0.002	<0.002	<0.002	<0.002	<0.002
Dichloroethane, 1,2-	0.05	<0.002	<0.002	<0.002	<0.002	<0.002
Dichloroethylene, 1,1-	0.05	<0.002	<0.002	<0.002	<0.002	<0.002
Dichloroethylene, cis-1,2-	3.4	<0.002	<0.002	<0.002	<0.002	<0.002
Dichloroethylene, trans-1,2-	0.084	<0.002	<0.002	<0.002	<0.002	<0.002
Dichloropropylene, cis-1,3-	NV	<0.002	<0.002	<0.002	<0.002	<0.002
Dichloropropylene, trans-1,3-	NV	<0.002	<0.002	<0.002	<0.002	<0.002
Dichloropropylene, cis+trans	0.05	<0.002	<0.002	<0.002	<0.002	<0.002
Dichloropropane, 1,2-	0.05	<0.002	<0.002	<0.002	<0.002	<0.002
Ethylene Dibromide	0.05	<0.002	<0.002	<0.002	<0.002	<0.002
Methyl Ethyl Ketone	16	<0.002	<0.002	<0.002	<0.002	<0.002
Methyl Isobutyl Ketone	1.7	<0.002	<0.002	<0.002	<0.002	<0.002
Methyl t-Butyl Ether	0.75	<0.002	<0.002	<0.002	<0.002	<0.002
Methylene Chloride	0.1	<0.002	<0.002	<0.002	<0.002	<0.002
Styrene	0.7	<0.002	<0.002	<0.002	<0.002	<0.002
Tetrachloroethane, 1,1,1,2-	0.058	<0.002	<0.002	<0.002	<0.002	<0.002
Tetrachloroethane, 1,1,2,2-	0.05	<0.002	<0.002	<0.002	<0.002	<0.002
Tetrachloroethylene	0.28	<0.002	<0.002	<0.002	<0.002	<0.002
Trichloroethane, 1,1,1-	0.38	<0.002	<0.002	<0.002	<0.002	<0.002
Trichloroethane, 1,1,2-	0.05	<0.002	<0.002	<0.002	<0.002	<0.002
Trichloroethylene	0.061	<0.002	<0.002	<0.002	<0.002	<0.002
Vinyl chloride	0.02	<0.002	<0.002	<0.002	<0.002	<0.002

Notes:

All units are µg/g unless otherwise noted.

NV = No Value.

-- = Parameter not analysed.

mBGS = Meters below ground surface.

MECP = Soil, Groundwater and Sediment Standards for use under Part XV.1 of the Environmental Protection Act, April 2011.

Table 7 = Generic site condition standards for shallow soils in a non-potable groundwater condition for residential/parkland land use, coarse textured soil.

10 = Indicates concentrations which exceed MECP 2011 Table 3 standards.

Table 9.8 - Soil Analytical Results - General Inorganics, Burnside Site, Ottawa, Ontario

Parameter	MECP	PH-7	PH-20	PH-30	PH-37	PH-49	CH2M-TP3	CH2M-TP4	CH2M-TP5	CH2M-MW-1-1	CH2M-MW-1-2	CH2M-MW-2
Sample Depth (mBGS)>	Table 7	0.3-0.5	0.3-0.5	0.3-0.5	0.3-0.5	0.3-0.5	0.6-0.9	0.6-0.9	0.6-1.2	0.8-1.4	1.5-2.1	0.8-1.1
Date Sampled>		22-Nov-00	23-Nov-00	23-Nov-00	24-Nov-00	24-Nov-00	14-Oct-05	14-Oct-05	14-Oct-05	12-Oct-05	12-Oct-05	12-Oct-05
General Inorganics												
SAR	5 µg/g	--	--	--	--	--	--	--	--	--	--	--
Conductivity	700 uS/cm	--	--	--	--	--	--	--	--	--	--	--
Cyanide, free	0.051 µg/g	--	--	--	--	--	--	--	--	--	--	--
pH	5 to 9	8.09	7.98	7.88	7.93	7.78	7.03	7.39	6.93	7.46	7.51	7.46

Parameter	MECP	BH19-01-1	BH19-D1	BH19-02-1	BH19-02-3	BH19-03-1	BH19-04-1	BH19-05-1	BH19-08-1
Sample Depth (mBGS)>	Table 7	0.3-1.1	Dup of BH19-01-1	0.2-1.5	3.0-4.6	0.7-0.8	0.2-1.5	0-0.8	0.2-0.6
Date Sampled>		24-May-19	24-May-19	24-May-19	24-May-19	24-May-19	24-May-19	24-May-19	24-May-19
General Inorganics									
SAR	5 µg/g	0.17	0.39	0.38	0.39	0.24	0.12	0.12	0.37
Conductivity	700 uS/cm	185	183	180	136	238	160	197	235
Cyanide, free	0.051 µg/g	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
pH	5 to 9	7.74	7.66	7.79	7.86	7.74	7.73	7.66	7.61

Notes:

-- = Parameter not analysed.

mBGS = Meters below ground surface.

MECP = Soil, Groundwater and Sediment Standards for use under Part XV.1 of the Environmental Protection Act, April 2011.

Table 7 = Generic site condition standards for shallow soils in a non-potable groundwater condition for residential/parkland land use, coarse textured soil.

10 = Indicates concentrations which exceed MECP 2011 Table 7 standards.

Table 9.9 - Maximum Concentrations in Soil, Burnside Site, Ottawa, Ontario

Parameter	Max Soil Concentration (µg/g)	Sample Location	Depth (mBGS)	Parameter	Max Soil Concentration (µg/g)	Location	Depth (mBGS)
Metals				*Petroleum Hydrocarbons and BTEX*			
Antimony	8	TP-7	1.5	F1 PHCs (C6-C10)	19	CH2M TP-5	0.6-1.2
Arsenic	10	TP-14	2.9	F2 PHCs (C10-C16)	5	BH19-09	0.1-0.6
Barium	610	TP-49	0.5	F3 PHCs (C16-C34)	71	BH19-07	0.5-1.4
Beryllium	1.5	SS-28	0-0.2	F4 PHCs (C34-C50)	40	BH19-07	0.5-1.4
Boron (HWS)	0.6	BH19-08	0.2-0.6	Benzene	0.56	TP-41	0.2
Boron (total)	18.9	BH19-08	0.2-0.6	Ethylbenzene	ND	NA	NA
Cadmium	1.5	CH2M TP-5	0.6-1.2	Toluene	0.091	CH2M TP-3	0.6-0.9
Chromium Total*	90	TP-49	0.8	Xylenes, m,p-	0.04	TP-41	0.2
Chromium, Hexavalent	2.5	BH19-04	0.2-1.5	Xylene, o-	ND	NA	NA
Cobalt*	20	TP-4	0.8	Xylenes, Total	0.04	TP-41	0.2
Copper	150	TP-15	1	*Volatile Organic Compounds*			
Lead	1100	TP-45	0.5	Acetone	ND	NA	NA
Mercury	0.46	CH2M TP-5	0.6-1.2	Bromodichloromethane	ND	NA	NA
Molybdenum	29	TP-3A	0-0.8	Bromoform	ND	NA	NA
Nickel	55	TP-24	0.2	Bromomethane	ND	NA	NA
Selenium*	9	SS-31	0-0.2	Carbon Tetrachloride	ND	NA	NA
Silver	1.1	CH2M TP-4	0.6-0.9	Chlorobenzene	ND	NA	NA
Thallium	ND	NA	NA	Chloroform	ND	NA	NA
Uranium	ND	NA	NA	Dibromochloromethane	ND	NA	NA
Vanadium*	90	TP-4	0.8	Dichlorobenzene, 1,2-	ND	NA	NA
Zinc	1700	CH2M TP-5	0.6-1.2	Dichlorobenzene, 1,3-	ND	NA	NA
Inorganics				Dichlorobenzene, 1,4-	ND	NA	NA
SAR	0.39	BH19-02	3.0-4.6	Dichloroethane, 1,1-	ND	NA	NA
Conductivity µS/cm	238	BH19-03	0.7-0.8	Dichloroethane, 1,2-	ND	NA	NA
Cyanide, free	ND	NA	NA	Dichloroethylene, 1,1-	ND	NA	NA
Polycyclic Aromatic Hydrocarbons				Dichloroethylene, cis-1,2-	ND	NA	NA
Acenaphthene	2.5	TP-29	0.7	Dichloroethylene, trans-1,2-	ND	NA	NA
Acenaphthylene	6.4	TP-36	1.2	Dichloropropylene,cis-1,3-	ND	NA	NA
Anthracene	11	TP-36	1.2	Dichloropropylene,trans-1,3	ND	NA	NA
Benzo[a]anthracene	24.8	TP-7A	0.6	Dichloropropylene,cis+trans	ND	NA	NA
Benzo[a]pyrene	16	TP-29	0.7	Dichloropropane, 1,2-	ND	NA	NA
Benzo[b]fluoranthene	3.13	BH19-03	0.7-0.8	Ethylene Dibromide	ND	NA	NA
Benzo[k]fluoranthene	2.2	BH19-03	0.7-0.8	Methyl Ethyl Ketone	ND	NA	NA
Benzo[g,h,i]perylene	5.7	TP-29	0.7	Methyl Isobutyl Ketone	ND	NA	NA
Chrysene	17.5	TP-7A	0.6	Methyl t-Butyl Ether	ND	NA	NA
Dibenzo[a,h]anthracene*	2.8	TP-29	0.7	Methylene Chloride	ND	NA	NA
Indeno[1,2,3-cd]pyrene	7.1	TP-36	1.2	Styrene	ND	NA	NA
Fluoranthene	43	TP-7A	0.6	Tetrachloroethane, 1,1,1,2-	ND	NA	NA
Fluorene	2.6	TP-29	0.7	Tetrachloroethane, 1,1,2,2-	ND	NA	NA
Methylnaphthalene, 1-	1	TP-29	0.7	Tetrachloroethylene	ND	NA	NA
Methylnaphthalene, 2-	1.2	TP-29	0.7	Trichloroethane, 1,1,1-	ND	NA	NA
Methylnaphthalene, 2&1	2.2	TP-29	0.7	Trichloroethane, 1,1,2-	ND	NA	NA
Naphthalene	1.6	TP-29	0.7	Trichloroethylene	ND	NA	NA
Phenanthrene	32.2	TP-7A	0.6	Vinyl chloride	ND	NA	NA
Pyrene	38.3	TP-7A	0.6				
Polychlorinated Biphenyl							
Total PCB	ND	NA	NA				

Notes:

ND = Parameter not detected above laboratory detections limits

NA = Not applicable

* = maximum concentration found in more than one sample

Table 9.10 - Groundwater Sample Locations and Laboratory Analyses, Burnside Site, Ottawa, Ontario

Monitoring Well / Sample ID	Sample Interval (mASL)	Sample Collection Date	Sample Analysis Date							Laboratory Report Number
			Metals			PAHs	PHC (F2-F4)	PHC (F1) / BTEX	VOCs	
			Hg	CrVI	Others					
CH2M MW-2	52.62-55.67	7-Nov-12	9-Nov-12	9-Nov-12	9-Nov-12	10-Nov-12	9-Nov-12	9-Nov-12	10-Nov-12	1245252
		17-Oct-14	23-Oct-14	22-Oct-14	--	21-Oct-14	24-Oct-14	21-Oct-14	22-Oct-14	R3201080
		17-Oct-14	--	--	24-Oct-14	--	--	--	--	R1671257
MW-1	51.88-54.93	7-Nov-12	9-Nov-12	9-Nov-12	9-Nov-12	10-Nov-12	9-Nov-12	9-Nov-12	10-Nov-12	1245252
		17-Oct-14	23-Oct-14	22-Oct-14	--	21-Oct-14	24-Oct-14	21-Oct-14	22-Oct-14	R3201080
		17-Oct-14	--	--	24-Oct-14	--	--	--	--	R1671257
MW-2	51.33-54.38	7-Nov-12	9-Nov-12	9-Nov-12	9-Nov-12	10-Nov-12	9-Nov-12	9-Nov-12	10-Nov-12	1245252
		17-Oct-14	23-Oct-14	22-Oct-14	--	21-Oct-14	24-Oct-14	21-Oct-14	22-Oct-14	R3201080
		17-Oct-14	--	--	24-Oct-14	--	--	--	--	R1671257
MW-3	49.72-52.77	7-Nov-12	9-Nov-12	9-Nov-12	9-Nov-12	10-Nov-12	9-Nov-12	9-Nov-12	10-Nov-12	1245252
		17-Oct-14	23-Oct-14	22-Oct-14	--	21-Oct-14	24-Oct-14	21-Oct-14	22-Oct-14	R3201080
		17-Oct-14	--	--	24-Oct-14	--	--	--	--	R1671257
MW-4	54.71-57.76	7-Nov-12	9-Nov-12	9-Nov-12	9-Nov-12	10-Nov-12	9-Nov-12	9-Nov-12	10-Nov-12	1245252
		17-Oct-14	23-Oct-14	22-Oct-14	--	21-Oct-14	24-Oct-14	21-Oct-14	22-Oct-14	R3201080
		17-Oct-14	--	--	24-Oct-14	--	--	--	--	R1671257
MW-5	51.52-54.57	7-Nov-12	9-Nov-12	9-Nov-12	9-Nov-12	10-Nov-12	9-Nov-12	9-Nov-12	10-Nov-12	1245252
		17-Oct-14	23-Oct-14	22-Oct-14	--	21-Oct-14	24-Oct-14	21-Oct-14	22-Oct-14	R3201080
		17-Oct-14	--	--	24-Oct-14	--	--	--	--	R1671257

Table 9.11 - Groundwater Analytical Results - Metals, Burnside Site, Ottawa, Ontario

Parameter	MECP	CH2M MW-2		MW-1			MW-2			MW-3	
Stratigraphic Unit>	Table 7	Overburden/Bedrock		Bedrock			Overburden			Bedrock	
Date Sampled>	(µg/L)	07-Nov-12	17-Oct-14	07-Nov-12	Duplicate	17-Oct-14	07-Nov-12	17-Oct-14	Duplicate	07-Nov-12	17-Oct-14
Antimony	16000	0.6	<0.6	<0.5	<0.5	<0.6	<0.5	<0.6	<0.6	1.7	<0.6
Arsenic	1500	<1	<0.2	<1	<1	<0.2	<1	<0.2	<0.2	5	1
Barium	23000	43	82	456	385	460	384	360	360	118	120
Beryllium	53	<0.5	<1	<0.5	<0.5	<1	<0.5	<1	<1	<0.5	<1
Boron (total)	36000	58	100	219	142	130	221	160	160	174	90
Cadmium	2.1	<0.1	<0.02	<0.1	<0.1	<0.02	<0.1	<0.02	<0.02	<0.1	<0.02
Chromium	640	<1	<1	5	6	<1	5	<1	<1	<1	<1
Hexvalent (IV) Chromium	110	<10	<0.5	<10	<10	<0.5	<10	<0.5	<0.5	<10	<0.5
Cobalt	52	4.2	0.35	<0.5	<0.5	0.33	<0.5	<0.3	<0.3	<0.5	0.3
Copper	69	<0.5	1.7	<0.5	0.6	<0.2	<0.5	<0.2	<0.2	<0.5	<0.2
Lead	20	<0.1	<0.2	<0.1	<0.1	<0.2	<0.1	<0.2	<0.2	<0.1	<0.2
Molybdenum	7300	3.3	0.54	0.5	0.6	<0.2	<0.5	<0.2	<0.2	2.4	1.7
Mercury	0.1	<0.1	<0.01	<0.1	<0.1	<0.01	<0.1	<0.01	<0.01	<0.1	0.02
Nickel	390	6	4.7	5	5	<0.5	3	<0.5	<0.5	4	1.4
Selenium	50	<1	<0.2	<1	<1	0.88	<1	0.44	0.49	<1	<0.2
Silver	1.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Sodium	1800000	53900	70000	281000	278000	140000	247000	170000	170000	48400	37000
Thallium	400	<0.1	<0.2	<0.1	<0.1	<0.2	<0.1	<0.2	<0.2	<0.1	<0.2
Uranium	330	1.9	1.4	0.9	0.8	0.11	<0.1	0.13	0.16	8.3	1.1
Vanadium	200	2.9	<1	6.5	8.1	<1	5.5	1.1	1.2	3.7	<1
Zinc	890	5	3.5	<5	<5	<3	<5	<3	<3	<5	<3

Notes:

All units are µg/L unless otherwise noted.

NV = No Value.

-- = Parameter not analysed.

<0.1 = not detected above the laboratory method detection limit shown

MECP = Soil, Groundwater and Sediment Standards for use under Part XV.1 of the Environmental Protection Act, April 2011.

Table 7 = Generic site condition standards for shallow soils in a non-potable ground water condition for residential/parkland land use, coarse textured soil

10 = Indicates concentrations which exceed MECP 2011 Table 7 standards

Table 9.11 - Groundwater Analytical Results - Metals, Burnside Site, Ottawa, Ontario

Parameter	MECP	MW-4		MW-5		Field
Stratigraphic Unit>	Table 7	Bedrock		Overburden		Blank
Date Sampled>	(µg/L)	07-Nov-12	17-Oct-14	07-Nov-12	17-Oct-14	07-Nov-12
Antimony	16000	25.6	<0.6	0.6	<0.6	<0.5
Arsenic	1500	<1	2.8	<1	<0.2	<1
Barium	23000	124	91	160	190	<1
Beryllium	53	<0.5	<1	<0.5	<1	<0.5
Boron (total)	36000	66	27	112	100	<10
Cadmium	2.1	<0.1	<0.02	<0.1	0.087	<0.1
Chromium	640	<1	<1	14	<1	<1
Hexvalent (IV) Chromium	110	<10	<0.5	<10	<0.5	<10
Cobalt	52	0.6	0.47	1.7	1.1	<0.5
Copper	69	0.7	0.31	3.9	1.6	<0.5
Lead	20	<0.1	<0.2	<0.1	<0.2	<0.1
Molybdenum	7300	1.3	1.6	1.3	2.2	<0.5
Mercury	0.1	<0.1	<0.01	<0.1	<0.01	<0.1
Nickel	390	6	1.5	8	4	<1
Selenium	50	3	<0.2	<1	<0.2	<1
Silver	1.2	<0.1	<0.1	<0.1	<0.1	<0.1
Sodium	1800000	39400	23000	1080000	860000	<200
Thallium	400	<0.1	<0.2	<0.1	<0.2	<0.1
Uranium	330	1.8	0.75	1.8	2.2	<0.1
Vanadium	200	7.8	<1	3.4	<1	<0.5
Zinc	890	<5	<3	<5	<3	<5

Notes:

All units are µg/L unless otherwise noted.

NV = No Value.

-- = Parameter not analysed.

<0.1 = not detected above the laboratory method detection limit shown

MECP = Soil, Groundwater and Sediment Standards for use under Part XV.1 of the Environmental Protection Act, April 2011.

Table 7 = Generic site condition standards for shallow soils in a non-potable ground water condition for residential/parkland land use, coarse textured soil

10 = Indicates concentrations which exceed MECP 2011 Table 7 standards

Table 9.12 - Groundwater Analytical Results - Polycyclic Aromatic Hydrocarbons, Burnside Site, Ottawa, Ontario

Parameter	MECP	CH2M MW-2		MW-1			MW-2			MW-3	
Stratigraphic Unit>	Table 7	Overburden/Bedrock		Bedrock			Overburden			Bedrock	
Date Sampled>	(µg/L)	07-Nov-12	17-Oct-14	07-Nov-12	Duplicate	17-Oct-14	07-Nov-12	17-Oct-14	Duplicate	07-Nov-12	17-Oct-14
Acenaphthene	17	<0.05	<0.01	0.16	0.14	0.13	0.31	0.28	0.3	<0.05	<0.01
Acenaphthylene	1	0.83	<0.01	0.19	0.56	<0.01	0.08	<0.01	<0.01	<0.05	<0.01
Anthracene	1	<0.01	<0.01	0.04	0.15	<0.01	0.08	0.011	0.012	<0.01	<0.01
Benzo[a]anthracene	1.8	<0.01	<0.01	0.17	0.2	0.017	0.17	<0.01	<0.01	<0.01	<0.01
Benzo[a]pyrene	0.81	<0.01	<0.01	0.12	0.11	0.015	0.11	<0.01	<0.01	<0.01	<0.01
Benzo[b]fluoranthene	0.75	<0.05	<0.01	0.11	0.12	0.021	0.1	<0.01	<0.01	<0.05	<0.01
Benzo[k]fluoranthene	0.4	<0.05	<0.01	0.06	0.12	<0.01	0.05	<0.01	<0.01	<0.05	<0.01
Benzo[g,h,i]perylene	0.2	<0.05	<0.01	0.1	0.07	<0.01	0.09	<0.01	<0.01	<0.05	<0.01
Chrysene	0.7	<0.05	<0.01	0.15	0.25	0.016	0.15	<0.01	<0.01	<0.05	<0.01
Dibenzo[a,h]anthracene	0.4	<0.05	<0.01	<0.05	<0.05	<0.01	<0.05	<0.01	<0.01	<0.05	<0.01
Indeno[1,2,3-cd]pyrene	0.2	<0.05	<0.01	0.07	0.08	<0.01	0.07	<0.01	<0.01	<0.05	<0.01
Fluoranthene	44	<0.01	<0.01	0.29	0.4	0.066	0.37	0.068	0.064	<0.01	<0.01
Fluorene	290	<0.05	<0.01	0.06	0.07	0.023	<0.05	<0.01	<0.01	<0.05	<0.01
Methylnaphthalene, 1-	NV	<0.05	<0.01	<0.05	0.05	<0.01	<0.05	<0.01	<0.01	<0.05	<0.01
Methylnaphthalene, 2-	NV	<0.05	<0.01	0.06	0.05	<0.01	<0.05	<0.01	<0.01	0.06	<0.01
Methylnaphthalene, 2-(1-)	1500	<0.1	<0.01	0.1	<0.1	<0.01	<0.1	<0.01	<0.01	0.06	<0.01
Naphthalene	7	0.5	<0.01	0.2	0.32	0.019	0.13	<0.01	<0.01	0.23	<0.01
Phenanthrene	380	0.06	<0.01	0.15	0.24	0.027	0.15	0.014	<0.01	0.08	<0.01
Pyrene	5.7	<0.01	<0.01	0.32	0.41	0.047	0.39	0.049	0.045	<0.01	<0.01

Notes:

All units are µg/L unless otherwise noted.

NV = No Value.

-- = Parameter not analysed.

<0.1 = not detected above the laboratory method detection limit shown

* The methylnaphthalene standards are applicable to both 1-methylnaphthalene and 2-methylnaphthalene, with the provision that if both are detected the sum of the two must not exceed the standard.

MECP = Soil, Groundwater and Sediment Standards for use under Part XV.1 of the Environmental Protection Act, April 2011.

Table 7 = Generic site condition standards for shallow soils in a non-potable ground water condition for residential/parkland land use, coarse textured soil

10 = Indicates concentrations which exceed MECP 2011 Table 7 standards

Table 9.12 - Groundwater Analytical Results - Polycyclic Aromatic Hydrocarbons, Burnside Site, Ottawa, Ontario

Parameter	MECP	MW-4		MW-5		Field
Stratigraphic Unit>	Table 7	Bedrock		Overburden		Blank
Date Sampled>	(µg/L)	07-Nov-12	17-Oct-14	07-Nov-12	17-Oct-14	07-Nov-12
Acenaphthene	17	<0.05	<0.01	<0.05	<0.01	<0.05
Acenaphthylene	1	<0.05	<0.01	0.24	<0.01	<0.05
Anthracene	1	<0.01	<0.01	0.04	<0.01	<0.01
Benzo[a]anthracene	1.8	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo[a]pyrene	0.81	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo[b]fluoranthene	0.75	<0.05	<0.01	<0.05	<0.01	<0.05
Benzo[k]fluoranthene	0.4	<0.05	<0.01	<0.05	<0.01	<0.05
Benzo[g,h,i]perylene	0.2	<0.05	<0.01	<0.05	<0.01	<0.05
Chrysene	0.7	<0.05	<0.01	<0.05	<0.01	<0.05
Dibenzo[a,h]anthracene	0.4	<0.05	<0.01	<0.05	<0.01	<0.05
Indeno[1,2,3-cd]pyrene	0.2	<0.05	<0.01	<0.05	<0.01	<0.05
Fluoranthene	44	<0.01	<0.01	<0.01	<0.01	<0.01
Fluorene	290	<0.05	<0.01	<0.05	<0.01	<0.05
Methylnaphthalene, 1-	NV	<0.05	<0.01	0.07	<0.01	<0.05
Methylnaphthalene, 2-	NV	<0.05	<0.01	0.06	<0.01	<0.05
Methylnaphthalene, 2-(1-)	1500	<0.1	<0.01	0.12	<0.01	<0.1
Naphthalene	7	<0.05	<0.01	0.2	<0.01	<0.05
Phenanthrene	380	<0.05	<0.01	0.1	<0.01	<0.05
Pyrene	5.7	<0.01	<0.01	<0.01	<0.01	<0.01

Notes:

All units are µg/L unless otherwise noted.

NV = No Value.

-- = Parameter not analysed.

<0.1 = not detected above the laboratory method detection limit shown

* The methylnaphthalene standards are applicable to both 1-methylnaphthalene and 2-methylnaphthalene, with the provision that if both are detected the sum of the two must not exceed the standard.

MECP = Soil, Groundwater and Sediment Standards for use under Part XV.1 of the Environmental Protection Act, April 2011.

Table 7 = Generic site condition standards for shallow soils in a non-potable ground water condition for residential/parkland land use, coarse textured soil

10 = Indicates concentrations which exceed MECP 2011 Table 7 standards

Table 9.13 - Groundwater Analytical Results - Petroluem Hydrocarbons and BTEX, Burnside Site, Ottawa, Ontario

Parameter	MECP	CH2M MW-2		MW-1			MW-2			MW-3	
Stratigraphic Unit>	Table 7	Overburden/Bedrock		Bedrock			Overburden			Bedrock	
Date Sampled>	(µg/L)	07-Nov-12	17-Oct-14	07-Nov-12	Duplicate	17-Oct-14	07-Nov-12	17-Oct-14	Duplicate	07-Nov-12	17-Oct-14
F1 PHCs (C6-C10)	420	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25
F2 PHCs (C10-C16)	150	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
F3 PHCs (C16-C34)	500	<100	<200	<100	<100	<200	<100	<200	<200	<100	<200
F4 PHCs (C34-C50)	500	<100	<200	<100	<100	<200	<100	<200	<200	<100	<200
Benzene	0.5	<0.5	<0.1	<0.5	<0.5	<0.1	<0.5	<0.1	<0.1	<0.5	<0.1
Ethylbenzene	54	<0.5	<0.1	<0.5	<0.5	<0.1	<0.5	<0.1	<0.1	<0.5	<0.1
Toluene	320	<0.5	<0.2	<0.5	<0.5	<0.2	<0.5	<0.2	<0.2	<0.5	<0.2
Xylenes, m,p-	NV	<0.5	<0.1	<0.5	<0.5	<0.1	<0.5	<0.1	<0.1	<0.5	<0.1
Xylene, o-	NV	<0.5	<0.1	<0.5	<0.5	<0.1	<0.5	<0.1	<0.1	<0.5	<0.1
Xylenes, Total	72	<0.5	<0.1	<0.5	<0.5	<0.1	<0.5	<0.1	<0.1	<0.5	<0.1

Notes:

All units are µg/L unless otherwise noted.

NV = No Value.

-- = Parameter not analysed.

<0.1 = not detected above the laboratory method detection limit shown

MECP = Soil, Groundwater and Sediment Standards for use under Part XV.1 of the Environmental Protection Act, April 2011.

Table 7 = Generic site condition standards for shallow soils in a non-potable ground water condition for residential/parkland land use, coarse textured soil

10 = Indicates concentrations which exceed MECP 2011 Table 7 standards

Table 9.13 - Groundwater Analytical Results - Petroluem Hydrocarbons and BTEX, Burnside Site, Ottawa, Ontario

Parameter	MECP	MW-4		MW-5		Field		Trip	
Stratigraphic Unit>	Table 7	Bedrock		Overburden		Blank		Blank	
Date Sampled>	(µg/L)	07-Nov-12	17-Oct-14	07-Nov-12	17-Oct-14	07-Nov-12	17-Oct-14	07-Nov-12	17-Oct-14
F1 PHCs (C6-C10)	420	<25	<25	<25	<25	<25	--	<25	--
F2 PHCs (C10-C16)	150	<100	<100	<100	<100	<100	--	<100	--
F3 PHCs (C16-C34)	500	<100	<200	<100	<200	<100	--	<100	--
F4 PHCs (C34-C50)	500	<100	<200	<100	<200	<100	--	<100	--
Benzene	0.5	<0.5	<0.1	<0.5	<0.1	<0.5	<0.1	<0.5	<0.1
Ethylbenzene	54	<0.5	<0.1	<0.5	<0.1	<0.5	<0.1	<0.5	<0.1
Toluene	320	<0.5	<0.2	<0.5	<0.2	<0.5	<0.2	<0.5	<0.2
Xylenes, m,p-	NV	<0.5	<0.1	<0.5	<0.1	<0.5	<0.1	<0.5	<0.1
Xylene, o-	NV	<0.5	<0.1	<0.5	<0.1	<0.5	<0.1	<0.5	<0.1
Xylenes, Total	72	<0.5	<0.1	<0.5	<0.1	<0.5	<0.1	<0.5	<0.1

Notes:

All units are µg/L unless otherwise noted.

NV = No Value.

-- = Parameter not analysed.

<0.1 = not detected above the laboratory method detection limit shown

MECP = Soil, Groundwater and Sediment Standards for use under Part XV.1 of the Environmental Protection Act, April 2011.

Table 7 = Generic site condition standards for shallow soils in a non-potable ground water condition for residential/parkland land use, coarse textured soil

10 = Indicates concentrations which exceed MECP 2011 Table 7 standards

Table 9.14 - Groundwater Analytical Results - Volatile Organic Compounds, Burnside Site, Ottawa, Ontario

Parameter	MECP	CH2M MW-2		MW-1			MW-2			MW-3	
Stratigraphic Unit>	Table 7	Overburden/Bedrock		Bedrock			Overburden			Bedrock	
Date Sampled>	(µg/L)	07-Nov-12	17-Oct-14	07-Nov-12	Duplicate	17-Oct-14	07-Nov-12	17-Oct-14	Duplicate	07-Nov-12	17-Oct-14
Acetone	100000	<5	<10	<5	<5	<10	<5	<10	<10	<5	<10
Benzene	0.5	<0.5	<0.1	<0.5	<0.5	<0.1	<0.5	<0.1	<0.1	<0.5	<0.1
Bromodichloromethane	67000	<0.5	<0.1	<0.5	<0.5	<0.1	<0.5	<0.1	<0.1	<0.5	<0.1
Bromoform	5	<0.5	<0.2	<0.5	<0.5	<0.2	<0.5	<0.2	<0.2	<0.5	<0.2
Bromomethane	0.89	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	0.2	<0.2	<0.1	<0.2	<0.2	<0.1	<0.2	<0.1	<0.1	<0.2	<0.1
Chlorobenzene	140	<0.5	<0.1	<0.5	<0.5	<0.1	<0.5	<0.1	<0.1	<0.5	<0.1
Chloroform	2	<0.5	<0.1	<0.5	<0.5	<0.1	<0.5	<0.1	<0.1	<0.5	<0.1
Dibromochloromethane	65000	<0.5	<0.2	<0.5	<0.5	<0.2	<0.5	<0.2	<0.2	<0.5	<0.2
Dichlorobenzene, 1,2-	150	<0.5	<0.2	<0.5	<0.5	<0.2	<0.5	<0.2	<0.2	<0.5	<0.2
Dichlorobenzene, 1,3-	7600	<0.5	<0.2	<0.5	<0.5	<0.2	<0.5	<0.2	<0.2	<0.5	<0.2
Dichlorobenzene, 1,4-	0.5	<0.5	<0.2	<0.5	<0.5	<0.2	<0.5	<0.2	<0.2	<0.5	<0.2
Dichlorodifluoromethane	3500	<1	<0.5	<1	<1	<0.5	<1	<0.5	<0.5	<1	<0.5
Dichloroethane, 1,1-	11	<0.5	<0.1	<0.5	<0.5	<0.1	<0.5	<0.1	<0.1	<0.5	0.59
Dichloroethane, 1,2-	0.5	<0.5	<0.2	<0.5	<0.5	<0.2	<0.5	<0.2	<0.2	<0.5	<0.2
Dichloroethylene, 1,1-	0.5	<0.5	<0.1	<0.5	<0.5	<0.1	<0.5	<0.1	<0.1	<0.5	<0.1
Dichloroethylene, cis-1,2-	1.6	<0.5	<0.1	<0.5	<0.5	<0.1	<0.5	<0.1	<0.1	<0.5	<0.1
Dichloroethylene, trans-1,2-	1.6	<0.5	<0.1	<0.5	<0.5	<0.1	<0.5	<0.1	<0.1	<0.5	<0.1
Dichloropropane, 1,2-	0.58	<0.5	<0.1	<0.5	<0.5	<0.1	<0.5	<0.1	<0.1	<0.5	<0.1
Dichloropropylene, cis-1,3-	NV	<0.5	<0.2	<0.5	<0.5	<0.2	<0.5	<0.2	<0.2	<0.5	<0.2
Dichloropropylene, trans-1,3-	NV	<0.5	<0.2	<0.5	<0.5	<0.2	<0.5	<0.2	<0.2	<0.5	<0.2
Dichloropropylene,cis + trans	0.5	<0.5	<0.2	<0.5	<0.5	<0.2	<0.5	<0.2	<0.2	<0.5	<0.2
Ethylbenzene	54	<0.5	<0.1	<0.5	<0.5	<0.1	<0.5	<0.1	<0.1	<0.5	<0.1
Ethylene Dibromide	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Hexane	5	<1	<0.5	<1	<1	<0.5	<1	<0.5	<0.5	<1	<0.5
Methylene Chloride	26	<5	<0.5	<5	<5	<0.5	<5	<0.5	<0.5	<5	<0.5
Methyl Isobutyl Ketone	5200	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Methyl Ethyl Ketone	21000	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Methyl t-butyl ether	15	<2	<0.2	<2	<2	<0.2	<2	<0.2	<0.2	<2	<0.2
Styrene	43	<0.5	<0.2	<0.5	<0.5	<0.2	<0.5	<0.2	<0.2	<0.5	<0.2
Tetrachloroethane, 1,1,1,2-	1.1	<0.5	<0.2	<0.5	<0.5	<0.2	<0.5	<0.2	<0.2	<0.5	<0.2
Tetrachloroethane, 1,1,2,2-	0.5	<0.5	<0.2	<0.5	<0.5	<0.2	<0.5	<0.2	<0.2	<0.5	<0.2
Tetrachloroethylene	0.5	<0.5	<0.1	<0.5	<0.5	<0.1	<0.5	<0.1	<0.1	<0.5	<0.1
Toluene	320	<0.5	<0.2	<0.5	<0.5	<0.2	<0.5	<0.2	<0.2	<0.5	<0.2
Trichloroethane, 1,1,1-	23	<0.5	<0.1	<0.5	<0.5	<0.1	<0.5	<0.1	<0.1	<0.5	<0.1
Trichloroethane, 1,1,2-	0.5	<0.5	<0.2	<0.5	<0.5	<0.2	<0.5	<0.2	<0.2	<0.5	<0.2
Trichloroethylene	0.5	<0.5	<0.1	<0.5	<0.5	<0.1	<0.5	<0.1	<0.1	<0.5	<0.1
Trichlorofluoromethane	2000	<1	<0.2	<1	<1	<0.2	<1	<0.2	<0.2	<1	<0.2
Vinyl chloride	0.5	<0.5	<0.2	<0.5	<0.5	<0.2	<0.5	<0.2	<0.2	<0.5	<0.2
Xylenes, m,p-	NV	<0.5	<0.1	<0.5	<0.5	<0.1	<0.5	<0.1	<0.1	<0.5	<0.1
Xylene, o-	NV	<0.5	<0.1	<0.5	<0.5	<0.1	<0.5	<0.1	<0.1	<0.5	<0.1
Xylenes, Total	72	<0.5	<0.1	<0.5	<0.5	<0.1	<0.5	<0.1	<0.1	<0.5	<0.1

Notes:

All units are µg/L unless otherwise noted.
NV = No Value.
-- = Parameter not analysed.
<0.1 = not detected above the laboratory method detection limit shown
MECP = Soil, Groundwater and Sediment Standards for use under Part XV.1 of the Environmental Protection Act, April 2011.
Table 7 = Generic site condition standards for shallow soils in a non-potable ground water condition for residential/parkland land use, coarse textured soil
10 = Indicates concentrations which exceed MECP 2011 Table 7 standards

Table 9.14 - Groundwater Analytical Results - Volatile Organic Compounds, Burnside Site, Ottawa, Ontario

Parameter	MECP	MW-4		MW-5		Field		Trip	
Stratigraphic Unit>	Table 7	Bedrock		Overburden		Blank		Blank	
Date Sampled>	(µg/L)	07-Nov-12	17-Oct-14	07-Nov-12	17-Oct-14	07-Nov-12	17-Oct-14	07-Nov-12	17-Oct-14
Acetone	100000	<5	<10	<5	<10	<5	<10	<5	<10
Benzene	0.5	<0.5	<0.1	<0.5	<0.1	<0.5	<0.1	<0.5	<0.1
Bromodichloromethane	67000	<0.5	<0.1	<0.5	<0.1	<0.5	<0.1	<0.5	<0.1
Bromoform	5	<0.5	<0.2	<0.5	<0.2	<0.5	<0.2	<0.5	<0.2
Bromomethane	0.89	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	0.2	<0.2	<0.1	<0.2	<0.1	<0.2	<0.1	<0.2	<0.1
Chlorobenzene	140	<0.5	<0.1	<0.5	<0.1	<0.5	<0.1	<0.5	<0.1
Chloroform	2	<0.5	<0.1	<0.5	<0.1	<0.5	<0.1	<0.5	<0.1
Dibromochloromethane	65000	<0.5	<0.2	<0.5	<0.2	<0.5	<0.2	<0.5	<0.2
Dichlorobenzene, 1,2-	150	<0.5	<0.2	<0.5	<0.2	<0.5	<0.2	<0.5	<0.2
Dichlorobenzene, 1,3-	7600	<0.5	<0.2	<0.5	<0.2	<0.5	<0.2	<0.5	<0.2
Dichlorobenzene, 1,4-	0.5	<0.5	<0.2	<0.5	<0.2	<0.5	<0.2	<0.5	<0.2
Dichlorodifluoromethane	3500	<1	<0.5	<1	<0.5	<1	<0.5	<1	<0.5
Dichloroethane, 1,1-	11	<0.5	<0.1	<0.5	0.4	<0.5	<0.1	<0.5	<0.1
Dichloroethane, 1,2-	0.5	<0.5	<0.2	<0.5	<0.2	<0.5	<0.2	<0.5	<0.2
Dichloroethylene, 1,1-	0.5	<0.5	<0.1	<0.5	<0.1	<0.5	<0.1	<0.5	<0.1
Dichloroethylene, cis-1,2-	1.6	<0.5	<0.1	<0.5	1.2	<0.5	<0.1	<0.5	<0.1
Dichloroethylene, trans-1,2-	1.6	<0.5	<0.1	<0.5	0.11	<0.5	<0.1	<0.5	<0.1
Dichloropropane, 1,2-	0.58	<0.5	<0.1	<0.5	<0.1	<0.5	<0.1	<0.5	<0.1
Dichloropropylene, cis-1,3-	NV	<0.5	<0.2	<0.5	<0.2	<0.5	<0.2	<0.5	<0.2
Dichloropropylene, trans-1,3-	NV	<0.5	<0.2	<0.5	<0.2	<0.5	<0.2	<0.5	<0.2
Dichloropropylene,cis + trans	0.5	<0.5	<0.2	<0.5	<0.2	<0.5	<0.2	<0.5	<0.2
Ethylbenzene	54	<0.5	<0.1	<0.5	<0.1	<0.5	<0.1	<0.5	<0.1
Ethylene Dibromide	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Hexane	5	<1	<0.5	<1	<0.5	<1	<0.5	<1	<0.5
Methylene Chloride	26	<5	<0.5	<5	<0.5	<5	<0.5	<5	<0.5
Methyl Isobutyl Ketone	5200	<5	<5	<5	<5	<5	<5	<5	<5
Methyl Ethyl Ketone	21000	<5	<5	<5	<5	<5	<5	<5	<5
Methyl t-butyl ether	15	<2	<0.2	<2	<0.2	<2	<0.2	<2	<0.2
Styrene	43	<0.5	<0.2	<0.5	<0.2	<0.5	<0.2	<0.5	<0.2
Tetrachloroethane, 1,1,1,2-	1.1	<0.5	<0.2	<0.5	<0.2	<0.5	<0.2	<0.5	<0.2
Tetrachloroethane, 1,1,2,2-	0.5	<0.5	<0.2	<0.5	<0.2	<0.5	<0.2	<0.5	<0.2
Tetrachloroethylene	0.5	<0.5	<0.1	<0.5	<0.1	<0.5	<0.1	<0.5	<0.1
Toluene	320	<0.5	<0.2	<0.5	<0.2	<0.5	<0.2	<0.5	<0.2
Trichloroethane, 1,1,1-	23	<0.5	<0.1	<0.5	<0.1	<0.5	<0.1	<0.5	<0.1
Trichloroethane, 1,1,2-	0.5	<0.5	<0.2	<0.5	<0.2	<0.5	<0.2	<0.5	<0.2
Trichloroethylene	0.5	<0.5	<0.1	<0.5	<0.1	<0.5	<0.1	<0.5	<0.1
Trichlorofluoromethane	2000	<1	<0.2	<1	<0.2	<1	<0.2	<1	<0.2
Vinyl chloride	0.5	<0.5	<0.2	<0.5	<0.2	<0.5	<0.2	<0.5	<0.2
Xylenes, m,p-	NV	<0.5	<0.1	<0.5	<0.1	<0.5	<0.1	<0.5	<0.1
Xylene, o-	NV	<0.5	<0.1	<0.5	<0.1	<0.5	<0.1	<0.5	<0.1
Xylenes, Total	72	<0.5	<0.1	<0.5	<0.1	<0.5	<0.1	<0.5	<0.1

Notes:

All units are µg/L unless otherwise noted.
NV = No Value.
-- = Parameter not analysed.
<0.1 = not detected above the laboratory method detection limit shown
MECP = Soil, Groundwater and Sediment Standards for use under Part XV.1 of the Environmental Protection Act, April 2011.
Table 7 = Generic site condition standards for shallow soils in a non-potable ground water condition for residential/parkland land use, coarse textured soil
10 = Indicates concentrations which exceed MECP 2011 Table 7 standards

Table 9.15 - Maximum Concentrations in Groundwater, Burnside Site, Ottawa, Ontario

Parameter	Max GW Concentration (µg/L)	Sample Location	Elevation (mASL)	Parameter	Max GW Concentration (µg/L)	Sample Location	Elevation (mASL)
Metals				*Petroleum Hydrocarbons and BTEX*			
Antimony	25.6	MW-4	54.90-57.91	F1 PHCs (C6-C10)	ND	NA	NA
Arsenic	5	MW-3	49.93-52.93	F2 PHCs (C10-C16)	ND	NA	NA
Barium	460	MW-1	51.77-54.77	F3 PHCs (C16-C34)	ND	NA	NA
Beryllium	ND	NA	NA	F4 PHCs (C34-C50)	ND	NA	NA
Boron (total)	221	MW-2	51.97-55.00	Benzene	ND	NA	NA
Cadmium	0.087	MW-5	51.74-54.81	Ethylbenzene	ND	NA	NA
Chromium	14	MW-5	51.74-54.81	Toluene	ND	NA	NA
Chromium, Hexavalent	ND	NA	NA	Xylenes, m,p-	ND	NA	NA
Cobalt	4.2	CH2 MW-2	51.77-54.77	Xylene, o-	ND	NA	NA
Copper	3.9	MW-5	51.74-54.81	Xylenes, Total	ND	NA	NA
Lead	ND	NA	NA	*Volatile Organic Compounds*			
Molybdenum	3.3	CH2 MW-2	51.77-54.77	Acetone	ND	NA	NA
Mercury	0.02	MW-3	49.93-52.93	Bromodichloromethane	ND	NA	NA
Nickel	8	MW-5		Bromoform	ND	NA	NA
Selenium	3	MW-4	54.90-57.91	Bromomethane	ND	NA	NA
Silver	ND	NA	NA	Carbon Tetrachloride	ND	NA	NA
Sodium	1080000	MW-5	51.74-54.81	Chlorobenzene	ND	NA	NA
Thallium	ND	NA	NA	Chloroform	ND	NA	NA
Uranium	8.3	MW-3	49.93-52.93	Dibromochloromethane	ND	NA	NA
Vanadium	8.1	MW-1	51.77-54.77	Dichlorobenzene, 1,2-	ND	NA	NA
Zinc	5	CH2 MW-2	51.77-54.77	Dichlorobenzene, 1,3-	ND	NA	NA
cyclic Aromatic Hydrocarbons				Dichlorobenzene, 1,4-	ND	NA	NA
Acenaphthene	0.31	MW-2	51.97-55.00	Dichlorodifluoromethane	ND	NA	NA
Acenaphthylene	0.83	CH2 MW-2	51.77-54.77	Dichloroethane, 1,1-	0.59	MW-3	49.93-52.93
Anthracene	0.15	MW-1	51.77-54.77	Dichloroethane, 1,2-	ND	NA	NA
Benzo[a]anthracene	0.2	MW-1	51.77-54.77	Dichloroethylene, 1,1-	ND	NA	NA
Benzo[a]pyrene	0.12	MW-1	51.77-54.77	Dichloroethylene, cis-1,2-	1.2	MW-5	51.74-54.81
Benzo[b]fluoranthene	0.12	MW-1	51.77-54.77	Dichloroethylene, trans-1,2-	0.11	MW-5	51.74-54.81
Benzo[k]fluoranthene	0.12	MW-1	51.77-54.77	Dichloropropylene,cis-1,3-	ND	NA	NA
Benzo[g,h,i]perylene	0.1	MW-1	51.77-54.77	Dichloropropylene,trans-1,3	ND	NA	NA
Chrysene	0.25	MW-1	51.77-54.77	Dichloropropylene,cis+trans	ND	NA	NA
Dibenzo[a,h]anthracene	ND	NA	NA	Dichloropropane, 1,2-	ND	NA	NA
Indeno[1,2,3-cd]pyrene	0.08	MW-1	51.77-54.77	Ethylene Dibromide	ND	NA	NA
Fluoranthene	0.4	MW-1	51.77-54.77	Hexane	ND	NA	NA
Fluorene	0.07	MW-1	51.77-54.77	Methyl Ethyl Ketone	ND	NA	NA
Methylnaphthalene, 1-	0.07	MW-5	51.74-54.81	Methyl Isobutyl Ketone	ND	NA	NA
Methylnaphthalene, 2-	0.06	MW-5	51.74-54.81	Methyl t-Butyl Ether	ND	NA	NA
Methylnaphthalene, 2&1	0.12	MW-5	51.74-54.81	Methylene Chloride	ND	NA	NA
Naphthalene	0.5	CH2 MW-2	51.77-54.77	Styrene	ND	NA	NA
Phenanthrene	0.24	MW-1	51.77-54.77	Tetrachloroethane, 1,1,1,2-	ND	NA	NA
Pyrene	0.41	MW-1	51.77-54.77	Tetrachloroethane, 1,1,2,2-	ND	NA	NA
				Tetrachloroethylene	ND	NA	NA
				Trichloroethane, 1,1,1-	ND	NA	NA
				Trichloroethane, 1,1,2-	ND	NA	NA
				Trichloroethylene	ND	NA	NA
				Trichlorofluoromethane	ND	NA	NA
				Vinyl chloride	ND	NA	NA

Notes:
ND = Parameter not detected above laboratory detections limits
NA = Not applicable

Appendix A

Sampling and Analysis Plan

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April 15, 2019 Ref. No.: 18-262-1

Phase Two ESA Site Sampling and Analysis Plan: NCC Burnside Site, Ottawa, ON

BACKGROUND

The Phase One ESA documents that historical site use of the property included the importation of large amounts of fill materials in the area of former Lazy Bay and over the remainder of the site. This historical filling of the site is the only identified APEC for the property and extends over the entire property. Historical site investigations show that the imported fill is generally of poor quality being contaminated by metals, PAHs and to a lesser degree potentially PHCs and BTEX above applicable MECP Table 7 standards for the coarse-textured shallow soil site under non-potable groundwater conditions.

Several years of groundwater sampling completed at the site over a 13 year period (i.e., 2001 to 2014) show that these soil contaminants of potential concern (COPCs) do not create groundwater contamination at the site. Consequently, sampling and analytical testing of groundwater quality is not part of the Phase Two ESA sampling and analysis plan. However, collection of water levels in existing wells and presenting all such data as geodetic elevations (e.g., mASL) is part of the Phase Two sampling and analyses plan as all historical water level measurements were reported to an arbitrary local site datum.

Review of historical soil quality testing shows that such testing does not encompass the full suite of metals, PHCs and other inorganic contaminants currently regulated under O.Reg. 153/04. Historical soil quality testing typically did not analyze soil for boron, hot-water-soluble boron, hexavalent chromium, mercury, uranium, cyanide, electrical conductivity and sodium adsorption ratio and PHC-F1 to -F4. Historical test pit and borehole drilling investigations also did not investigate fill quality below a depth of 3.0 mBGS.

As documented in the Phase One ESA Report, Phase Two ESA investigations should include drilling boreholes and laboratory testing in areas of fill thickness greater than 3 m (e.g., in and near the Lazy Bay fill area). Additional testing of fill for metals and PAHs is recommended to improve spatial coverage and address O.Reg. 153/04 delineation requirements. Testing of fill quality for PHC-F1 to -F4 and BTEX near the historical $TPH_{gas/diesel}$ and $TPH_{heavy\ oil}$ hotspot as well as similar testing at the benzene hotspot is also recommended to address O.Reg. 153/04 delineation requirements. All borehole soil samples should be field screened using a combustible gas detector and/or organic vapour meter.

The intention of the Phase Two ESA for the NCC Burnside property is to address soil quality conditions existing today, as compared to current MECP standards, to support application for a municipal zoning change for the property from parkland to residential or commercial to facilitate development the site. This proposed sampling and analysis plan describes the proposed borehole drilling, soil sampling and analytical activities to achieve these Phase Two ESA goals.

Proposed borehole locations are selected to provide areal coverage of the site and to obtain overburden and fill quality information in addition to further delineation of the horizontal and vertical extent of possible soil contamination in the overburden fill of the site. The proposed drilling program includes 10 new boreholes at the site, as summarized in the following table and as shown in the appended Figure A.1.

Summary of Borehole Drilling and Soil Sampling Location Rationale, NCC Burnside Site

Borehole ID	***Location Rationale***
BH19-01	Quality testing of soil for O.Reg. 153/04 listed metals, general inorganics (EC, SAR, CN, pH) and PAHs below depth of 3 m near EXP borehole BH4 in former Lazy Bay Fill Area
BH19-02	Quality testing of soil for O.Reg. 153/04 listed metals, general inorganics (EC, SAR, CN, pH) and PAHs below depth of 3 m near Intera well MW5 in former Lazy Bay Fill Area
BH19-03	Quality testing of soil for O.Reg. 153/04 listed metals, general inorganics (EC, SAR, CN, pH) and PAHs below depth of 3 m near Intera well MW2 in former Lazy Bay Fill Area
BH19-04	Quality testing of soil for O.Reg. 153/04 listed metals, general inorganics (EC, SAR, CN, pH) and PAHs below depth of 3 m near DE&S TP20 in near edge of former Lazy Bay Fill Area
BH19-05	Quality testing of soil for O.Reg. 153/04 listed metals, general inorganics (EC, SAR, CN, pH) and PAHs above of 2 m near DE&S TP34 to increase spatial coverage
BH19-06 & BH19-07	Quality testing of soil for O.Reg. 153/04 listed TPH and BTEX parameters to provide horizontal delineation above a depth of 2 m near TPH hotspot near DE&S TP29
BH19-08	Quality testing of soil for O.Reg.153/04 listed metals, general inorganics (EC, SAR, CN, pH) and PAHs above of 2 m near DE&S TP9Ato increase spatial coverage
BH19-09 &BH19-10	Quality testing of soil for O.Reg. 153/04 listed TPH and BTEX parameters to provide horizontal delineation above a depth of 2 m near benzene hotspot near DE&S TP41

Key Site Information

- Overburden thickness at the site typically ranges from 1 to 3 m and consists mostly of imported fill that locally has been impacted by former site uses. Overburden thickness approaching 3 to 6 m is greatest in the former Lazy Bay fill area (as shown on Figure A.1).
- Contaminants of potential concern in fill are metals and polycyclic aromatic hydrocarbons (PAHs), and to a lesser extent potentially PHCs and BTEX.
- The groundwater table is typically found at depths of 3-5 mBGS near the bedrock surface. Groundwater flow at the NCC Burnside site in north to the Ottawa River.
- There are six accessible and useable groundwater monitoring wells at the site.

The Phase Two ESA Investigation will consist of the following tasks:

- Task 1 – Underground Utility Locates;
- Task 2 – Borehole Drilling, Soil Screening and Soil Sampling;
- Task 3 –Surveying and Water Level Monitoring of Existing Wells; and
- Task 4 – Laboratory Soil Quality Analyses.

TASK 1 – UNDERGROUND UTILITY LOCATES

Prior to any intrusive site activities the clearance of all public and private underground utilities for site will need to be undertaken by a commercial utility locator (USL-1).

TASK 2 – BOREHOLE DRILLING, SOIL SCREENING AND SOIL SAMPLING

Task 2 will involve the drilling to assumed bedrock refusal, soil screening and soil sampling at 10 locations with expected depth to bedrock ranging from <2 m to 6 m. Drilling and continuous soil sampling will be completed using a track-mounted GM100GT GeoMachine using direct push drilling technology. Use of direct-push drilling technology and soil sample volume requirements should not generate excess soil requiring disposal.

During the drilling of each new borehole, continuous samples of fill will be collected, logged for stratigraphy and screened in the field for visual, olfactory and instrument evidence of contamination. Instrument soil screening will include measurement of total combustible vapours using a calibrated Combustible Gas Indicator and measurement of total organic vapours using a calibrated Photoionization Detector.

Representative samples the fill layer in boreholes BH19-01 to BH19-05 and BH19-08 (typically one sample per borehole) will be collected for laboratory analysis of MECP-listed metals and general inorganic parameters (electrical conductivity [EC], sodium absorption ratio [SAR], cyanide [CN] and pH) and for PAHs. One blind QA/QC duplicate soil sample will be collected and submitted for analysis of MECP-listed metals, general inorganics and PAHs.

Representative samples of the fill layer in boreholes BH19-06, BH19-07, BH19-09 and BH19-10 (typically one sample per borehole) will be collected for laboratory analysis of PHCs and BTEX to assess extent of previously identified TPH and benzene hotspots.

An allowance has been made in the sampling and analysis plan to complete additional PHC, BTEX and PCB analyses on soil if field conditions and screening information warrant such analyses. .

TASK 3 – SURVEYING AND WATER LEVEL MONITORING OF EXISITING WELLS

Task 3 will involve surveying and water level monitoring of accessible groundwater monitoring wells at the NCC Burnside site. A licensed Ontario Land Surveyor will complete a geodetic elevation survey of the top of one the existing groundwater monitoring wells (e.g. MW-5) to tie all of the monitoring to geodetic elevations.

Water levels will be measured in all six accessible groundwater monitoring wells with levels expressed in meters above sea level (mASL) for use in the Phase Two ESA Report.

TASK 4 – LABORATORY SOIL QUALITY ANALYSES

Collected soil samples will be submitted to Paracel Laboratories Ltd, Ottawa in coolers with ice packs under chain of custody procedures for analysis of O.Reg. 153/04-listed metals, general inorganics, PAHs, PHCs and BTEX following O.Reg. 153/04 MECP-approved analytical methods.

Applicable Geofirma Field Protocols:

- FP01_Decontamination
- FP03_Direct Push Drilling and Soil Sampling
- FP05_Mointoring Well Gauging
- FP18_Field Logbooks

Attach: Figure A.1 – APEC and Proposed Drilling and Soil Sampling Locations

Doc. ID:	18-262-1_Burnside Site_Phase Two ESA_Sampling Plan_R0A.docx	
Revision Number:	0	Date: April 15, 2019
Prepared By:	Kenneth Raven, P.Eng., P.Geo., QP_{ESA}	
Reviewed By:	Glen Briscoe, P.Eng.	

LEGEND

- Burnside Site Boundary
- 1928 Shoreline
- Existing Groundwater Monitoring Well
- Proposed Drill Hole and Soil Sampling

Area of Potential Environmental Concern

- APEC-1, Unknown Quality Fill

Figure A.1
APEC and Proposed Drilling and Soil Sampling Locations

Scale 1:2,500

0 10 20 40 60 80
Meters

N

Coordinate System: NAD 1983 MTM 9
Source: NCC property boundary
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

PROJECT No. 18-262-1

Phase Two Environmental Site Assessment
Burnside Site, Ottawa, ON

DESIGN: ADG
CAD/GIS: ADG
CHECK: KGR
REV: 0

DATE: 14/06/2019

Geofirma Engineering Ltd

G:\Data\Project\Burnside\Maps\18-262-1_Phase_II_Burnside\18-262-1_Burnside_P2_A1_APEC_ProposedDrilling.mxd

Appendix B

Test Pit Logs and Borehole Stratigraphic and Instrumentation Logs

DE+S, 2000

Table D.1 Test Pit Summary

Test Pit	Soil/Fill Description	Sample	CGI Reading
TP-1	Fine brown sand and gravel fill with plastic, metal and polystyrene insulation over bedrock at 0.5 mBGS.	at 0.4mBGS	15 ppm
TP-2	Light grey/brown clayey sand fill to over broken rock with brick and concrete to bedrock at 0.6 mBGS.	composite 0.4-0.6 mBGS	0 ppm
TP-3	Located adjacent to an old poured concrete foundation on rock. Dark brown topsoil, waste rock and concrete at surface over sand with bricks, plastic, polystyrene insulation, glass, minor asphalt and shingles over bedrock at 0.8 mBGS.	composite of fill	0 ppm
TP-4	Excavated through fill pile of sand and gravel with minor concrete over grass and topsoil over grey clayey sand over broken rock from 0.3 to 0.6 mBGS. Bedrock at 0.6 mBGS.	composite of sand	25 ppm
TP-5	Grey/brown clayey sand over broken rock from 0.3 to 0.6 mBGS. Bedrock at 0.6 mBGS. CGI in test pit = 0 ppm.	composite	50 ppm
TP-6	Grey/brown clayey sand with broken rock with an asphalt layer at 0.45 mBGS (likely former Hinchey Ave.) Test pit terminated at 1.7 mBGS, bedrock not encountered. CGI reading in test pit = 5 ppm.	soil beneath asphalt layer	30 ppm
TP-7	Excavated through fill pile of clayey sand and gravel over grass over grey/brown clayey sand to 0.4 mBGS over sand fill with brick, concrete and minor metal. Ash and asphalt shingle layer at 0.6 mBGS. Slight hydrocarbon odour in test pit near buried shingles. Bedrock @ 1.2 mBGS. CGI reading in test pit = 10-15 ppm.	composite of fill at 0.6 mBGS	60 ppm
TP-8	Grey/brown clayey sand to 0.4 mBGS over sand fill with broken rock, brick, wood, concrete and minor glass and metal. Bedrock @ 1.4 mBGS.	composite of fill	40 ppm
TP-9	Topsoil over grey/brown clayey sand to 0.4 mBGS over fine and medium brown sand with broken rock. Terminated at 1.5 mBGS, bedrock not encountered.	no sample	--
TP-10	Grey/brown clayey sand to 0.5 mBGS over sand fill with broken rock, wood and brick. Bedrock at 1 mBGS.	composite	20 ppm

Table B1 - Test Pit Summary

TEST PIT NUMBER: TP-1
DATE : November 22, 2000
TOTAL DEPTH: 0.4 mBGS

Sample ID	Depth	Stratigraphy	Odour	Stain	CGI (ppm)	Analysis
	0-0.2 m	Topsoil: organic, rooty.	no	no	-	NA
TP-1 (0.4)	0.2-0.4 m	Sandy fill: Brown, with small pieces of concrete. Dry.	no	no	16	PAH, metals

TEST PIT NUMBER: TP-2
DATE : November 22, 2000
TOTAL DEPTH: 0.4 mBGS

Sample ID	Depth	Stratigraphy	Odour	Stain	CGI (ppm)	Analysis
	0-0.2 m	Topsoil: organic, rooty.	no	no	-	NA
TP-2 (0.4)	0.2-0.4 m	Sandy fill: Brown, with pebbles and cobbles. Dry.	no	no	4	metals

TEST PIT NUMBER: TP-3
DATE : November 22, 2000
TOTAL DEPTH: 1.6 mBGS

Sample ID	Depth	Stratigraphy	Odour	Stain	CGI (ppm)	Analysis
	0-0.2 m	Topsoil: organic, rooty.	no	no	-	NA
TP-3 (0.3)	0.2-0.4 m	Sandy fill: Light brown. Dry.	no	no	4	NA
TP-3 (0.6)	0.4-0.8 m	Sandy fill: Dark brown, very rooty, pieces of dry wood.	no	no	4	NA
TP-3 (1.3)	0.8-1.6 m	Sandy fill: Brown, with pebbles and cobbles. Dry.	no	no	2	metals

TEST PIT NUMBER: TP-4
DATE : November 22, 2000
TOTAL DEPTH: 1.4 mBGS

Sample ID	Depth	Stratigraphy	Odour	Stain	CGI (ppm)	Analysis
	0-0.2 m	Topsoil: organic, rooty.	no	no	-	NA
TP-4 (0.3)	0.2-0.6 m	Sandy fill: Light brown, rooty. Dry.	no	no	10	NA
TP-4 (0.65)	0.6-0.8 m	Sandy fill: Dark brown, rooty, pieces of wood and wood chips. Dry.	no	no	5	NA
TP-4 (0.8)	0.8-1.0 m	Grey silty clay fill mixed with light brown sandy fill: Dry	no	no	8	metals
TP-4 (1.2)	1.0-1.4 m	Sandy fill: Dark brown, mostly rotted wood, some glass bottles and pieces of concrete. Dry.	no	no	4	PAH

NA Sample not analysed

Table B1 - Test Pit Summary

TEST PIT NUMBER: TP-5
DATE : November 22, 2000
TOTAL DEPTH: 1.6 mBGS

Sample ID	Depth	Stratigraphy	Odour	Stain	CGI (ppm)	Analysis
	0-0.3 m	Topsoil: organic, rooty.	no	no	-	NA
TP-5 (0.4)	0.3-0.5 m	Sandy fill: Dark brown-black, rooty. Dry.	no	no	5	metals
TP-5 (0.8)	0.5-0.9 m	Sandy fill: Brown, rooty, with rotted wood and angular pebbles. Dry.	no	no	8	NA
TP-5 (1.0)	0.9-1.2 m	Sandy fill: Grey, rooty, >50% angular pebbles, Dry.	no	no	9	NA
TP-5 (1.4)	1.2-1.6 m	Sandy fill: Light brown, rooty. Dry	no	no	3	NA

TEST PIT NUMBER: TP-6
DATE : November 22, 2000
TOTAL DEPTH: 3.0 mBGS

Sample ID	Depth	Stratigraphy	Odour	Stain	CGI (ppm)	Analysis
	0-0.4 m	Sandy topsoil: brown to dark brown, rooty.	no	no	-	NA
TP-6 (0.45)	0.4-0.5 m	Sandy fill: Light brown, rooty. Dry.	no	no	13	NA
TP-6 (0.9)	0.5-1.0 m	Sandy fill: Dark brown, rooty, with some grey-red areas, possibly ash. Bricks, glass bottles, rotted wood, pieces of metal. Dry.	no	no	10	PAH, metals
TP-6 (1.3)	1.0-1.5 m	Clayey sandy fill: Dark brown to brown, rooty, with rotted wood and some shiny bituminous pieces. Slightly moist.	no	no	26	NA
TP-6 (1.9)	1.5-3.0 m	Silty sandy fill: Reddish-brown to dark brown with pebbles and bricks, glass, a crushed metal bucket. Slightly moist to wet. Groundwater penetration at 2.9 mBGS.	no	no	10	NA
TP-6 (2.5)			no	no	8	metals
TP-6 (2.9) soil TP-6 water			no	no	18	soil: NA water: metals, general chemistry and ions.

TEST PIT NUMBER: TP-7
DATE : November 22, 2000
TOTAL DEPTH: 1.9 mBGS

Sample ID	Depth	Stratigraphy	Odour	Stain	CGI (ppm)	Analysis
	0-0.2 m	Topsoil: organic, rooty.	no	no	-	NA
	0.2-0.4 m	Sandy fill: Dark brown, with angular pebbles and cobbles. Dry.	no	no	-	NA
TP-7 (0.4)	0.4-0.6 m	Sandy fill: Light brown, rooty, with shards of glass and brick. Dry.	no	no	13	NA
TP-7 (0.7)	0.6-1.9 m	Silty sandy fill: Brown to dark brown with rust-coloured patches (large one @ 1.5 mBGS), glass and metal. Dry.	no	no	3	NA
TP-7 (1.5)			no	no	27	metals, BTEX/TPH

NA Sample not analysed

Table B1 - Test Pit Summary

TEST PIT NUMBER: TP-8
DATE : November 22, 2000
TOTAL DEPTH: 3.0 mBGS

Sample ID	Depth	Stratigraphy	Odour	Stain	CGI (ppm)	Analysis
	0-0.2 m	Topsoil: organic, rooty.	no	no	-	NA
TP-8 (0.3)	0.2-0.4 m	Sandy fill: Dark brown, with angular pebbles and cobbles. Dry.	no	no	6	NA
TP-8 (0.5)	0.4-0.6 m	Sandy fill: Light brown, rooty, with shards of glass and brick. Dry.	no	no	8	NA
TP-8 (0.8)	0.6-1.0 m	Sandy fill: Dark brown, rooty, with some grey-red areas, possibly ash. Bricks, glass bottles, rotted wood, pieces of metal. Dry.	no	no	26	PAH, metals, BTEX/TPH
TP-8 (1.8)	1.0-3.0 m	Sandy fill: Reddish-brown with cobbles and boulders. Dry.	no	no	26	NA
TP-8 (2.9)			no	no	20	metals

TEST PIT NUMBER: TP-9
DATE : November 22, 2000
TOTAL DEPTH: 0.4 mBGS

Sample ID	Depth	Stratigraphy	Odour	Stain	CGI (ppm)	Analysis
	0-0.2 m	Topsoil: organic, rooty.	no	no	-	NA
TP-9 (0.4)	0.2-0.4 m	Sandy fill: Dark brown, with angular pebbles and cobbles. Dry.	no	no	8	metals

TEST PIT NUMBER: TP-10
DATE : November 22, 2000
TOTAL DEPTH: 0.3 mBGS

Sample ID	Depth	Stratigraphy	Odour	Stain	CGI (ppm)	Analysis
	0-0.15 m	Topsoil: organic, rooty.	no	no	-	NA
TP-10 (0.3)	0.15-0.3 m	Sandy fill: Dark brown, with angular pebbles and cobbles and bricks. Dry.	no	no	6	metals

TEST PIT NUMBER: TP-11
DATE : November 22, 2000
TOTAL DEPTH: 2.0 mBGS

Note: large concrete slab 0.5 mBGS on south side of TP and metal cable and wire 0.6 mBGS

Sample ID	Depth	Stratigraphy	Odour	Stain	CGI (ppm)	Analysis
	0-0.2 m	Topsoil: organic, rooty.	no	no	-	NA
TP-11 (0.5)	0.2-1.4 m	Silty sandy fill: Dark brown, with bricks, concrete pieces, boulders, rock slabs. Dry.	no	no	13	NA
TP-11 (1.5)	1.4-2.0 m	Clayey sandy fill: Grey-brown, with darker and lighter areas (possibly ash). Wood, bricks, metal, boulders. Dry.	no	no	22	metals

NA Sample not analysed

Table B1 - Test Pit Summary

TEST PIT NUMBER: TP-12
DATE : November 22, 2000
TOTAL DEPTH: 2.7 mBGS

Sample ID	Depth	Stratigraphy	Odour	Stain	CGI (ppm)	Analysis
	0-0.2 m	Topsoil: organic, rooty.	no	no	-	NA
TP-12 (0.5)	02-0.6 m	Sandy fill: Dark brown, with angular pebbles and cobbles and bricks. Dry.	no	no	10	NA
TP-12 (1.3)	0.6-2.2 m	Sandy fill: Brown, compacted with some rust-coloured areas. Glass, fabric, brick, old insulated wire. Dry.	no	no	18	metals
TP-12 (2.6)	2.2-2.7 m	Sandy fill: Light brown to brown. Slightly moist at the bottom.	no	no	16	metals

TEST PIT NUMBER: TP-13
DATE : November 22, 2000
TOTAL DEPTH: 3.0 mBGS

Sample ID	Depth	Stratigraphy	Odour	Stain	CGI (ppm)	Analysis
TP-13 (0.3)	0-0.5 m	Topsoil: organic, rooty, with bricks and pebbles.	no	no	7	NA
TP-13 (0.55)	0.5-0.6 m	Sandy fill: Brown, rooty. Dry.	no	no	12	NA
TP-13 (0.9)	0.6-1.0	Clayey sandy fill: Brown-grey with rotted wood and glass. Dry.	no	no	22	metals
TP-13 (1.7)	1.0-3.0	Sandy fill: Brown to dark brown with brick and rotted wood. Dry.	no	no	13	NA
TP-13 (2.5)			no	no	22	metals

TEST PIT NUMBER: TP-14
DATE : November 22, 2000
TOTAL DEPTH: 3.0 mBGS

Sample ID	Depth	Stratigraphy	Odour	Stain	CGI (ppm)	Analysis
	0-0.3 m	Topsoil: organic, rooty.	no	no	-	NA
TP-14 (0.8)	0.3-3.0 m	Sandy fill: Brown. Rooty, many angular pebbles and cobbles. Scrap metal and wire near the bottom. Dry.	no	no	6	NA
TP-14 (2.0)			no	no	2	metals
TP-14 (2.9)			no	no	12	metals

TEST PIT NUMBER: TP-15
DATE : November 23, 2000
TOTAL DEPTH: 3.0 mBGS

Sample ID	Depth	Stratigraphy	Odour	Stain	CGI (ppm)	Analysis
	0-0.25 m	Topsoil: organic, rooty.	no	no	-	NA
TP-15 (0.3)	0.25-0.5 m	Sandy fill: Dark brown, with angular pebbles and cobbles. Dry.	no	no	5	NA
TP-15 (1.0)	0.5-3.0 m	Sandy fill: Brown, with many pebbles and cobbles. Garbage in fill down to 2.0 mBGS: plastic, metal, bricks. Dry.	no	no	5	PAH, metals
TP-15 (2.0)			no	no	7	metals
TP-15 (3.0)			no	no	12	NA

NA Sample not analysed

Table B1 - Test Pit Summary

TEST PIT NUMBER: TP-16
DATE : November 23, 2000
TOTAL DEPTH: 2.0 mBGS

Sample ID	Depth	Stratigraphy	Odour	Stain	CGI (ppm)	Analysis
	0-0.2 m	Topsoil: organic, rooty, some sandy lenses.	no	no	-	NA
TP-16 (0.5)	0.2-1.2 m	Silty sandy fill: Brown, with pebbles, cobbles, brick, metal wire. Dry.	no	no	8	NA
TP-16 (1.5)	1.2-2.0 m	Clayey sandy fill: Grey-brown, with bricks, rotted wood, pebbles and cobbles.	no	no	28	metals, BTEX/TPH
TP-16 (2.0)			no	no	12	NA

TEST PIT NUMBER: TP-17
DATE : November 23, 2000
TOTAL DEPTH: 0.6 mBGS

Sample ID	Depth	Stratigraphy	Odour	Stain	CGI (ppm)	Analysis
	0-0.4 m	Topsoil: clayey, grey.	no	no	-	NA
TP-17 (0.5)	0.4-0.6 m	Silty sandy fill: Brown, with pebbles, cobbles. Dry.	no	no	4	metals

TEST PIT NUMBER: TP-18
DATE : November 23, 2000
TOTAL DEPTH: 1.5 mBGS

Sample ID	Depth	Stratigraphy	Odour	Stain	CGI (ppm)	Analysis
TP-18 (0.4)	0-0.5 m	Topsoil: clayey sandy, rooty.	no	no	14	NA
TP-18 (1.4)	0.5-1.5 m	Clayey sandy fill: Rooty, with pebbles, cobbles, wood. Moist at the bottom.	no	no	8	PAH, metals

TEST PIT NUMBER: TP-19
DATE : November 23, 2000
TOTAL DEPTH: 2.0 mBGS

Sample ID	Depth	Stratigraphy	Odour	Stain	CGI (ppm)	Analysis
	0-0.2 m	Topsoil: organic, rooty.	no	no	-	NA
TP-19 (1.0)	0.2-2.0 m	Clayey sandy fill: With pebbles, cobbles, bricks. Dry.	no	no	12	NA
TP-19 (2.0)			no	no	16	metals

NA Sample not analysed

Table B1 - Test Pit Summary

TEST PIT NUMBER: TP-20
DATE : November 23, 2000
TOTAL DEPTH: 3.0 mBGS

Sample ID	Depth	Stratigraphy	Odour	Stain	CGI (ppm)	Analysis
	0-0.2 m	Topsoil: organic, rooty.	no	no	-	NA
TP-20 (0.5)	0.2-2.5 m	Clayey sandy fill: With pebbles, cobbles, concrete pieces and slab, bricks, rock slabs.	no	no	7	NA
TP-20 (1.5)			no	no	20	metals
TP-20 (2.5)	2.5-3.0 m	Silty sandy fill: With concrete pieces, brick, metal, glass, wood, possible ash. Dry.	no	no	10	PAH

TEST PIT NUMBER: TP-21
DATE : November 23, 2000
TOTAL DEPTH: 0.5 mBGS

Sample ID	Depth	Stratigraphy	Odour	Stain	CGI (ppm)	Analysis
	0-0.4 m	Topsoil: clayey, rooty.	no	no	-	NA
TP-21 (0.45)	0.4-0.5 m	Silty sandy fill: Brown, dry.	no	no	10	metals

TEST PIT NUMBER: TP-22
DATE : November 23, 2000
TOTAL DEPTH: 0.6 mBGS

Sample ID	Depth	Stratigraphy	Odour	Stain	CGI (ppm)	Analysis
	0-0.4 m	Topsoil: clayey, rooty.	no	no	-	NA
TP-22 (0.4)	0.4-0.5 m	Sandy fill: Light brown, rooty, with glass and brick. Dry.	no	no	8	metals
TP-22 (0.5)	0.5-0.6 m	Silty sandy fill: Brown, dry.	no	no	7	NA

TEST PIT NUMBER: TP-23
DATE : November 23, 2000
TOTAL DEPTH: 1.3 mBGS

Sample ID	Depth	Stratigraphy	Odour	Stain	CGI (ppm)	Analysis
	0-0.1 m	Topsoil: organic, rooty.	no	no	-	NA
TP-23 (0.3)	0.1-0.6 m	Silty sandy fill: Brown, with reddish areas, pebbles and cobbles, glass. Dry.	no	no	10	NA
TP-23 (1.2)	0.6-1.3 m	Clayey sandy fill: Red-brown with pebbles and cobbles. Dry.	no	no	2	PAH, metals

NA Sample not analysed

Table B1 - Test Pit Summary

TEST PIT NUMBER: TP-24
DATE : November 23, 2000
TOTAL DEPTH: 0.3 mBGS

Sample ID	Depth	Stratigraphy	Odour	Stain	CGI (ppm)	Analysis
	0-0.1 m	Topsoil: organic, rooty.	no	no	-	NA
TP-24 (0.2)	0.1-0.3 m	Silty sandy clayey fill: Brown, dry.	no	no	20	metals

TEST PIT NUMBER: TP-25
DATE : November 23, 2000
TOTAL DEPTH: 0.7 mBGS

Sample ID	Depth	Stratigraphy	Odour	Stain	CGI (ppm)	Analysis
	0-0.2 m	Topsoil: clayey, rooty.	no	no	-	NA
TP-25 (0.6)	0.2-0.7 m	Silty sandy fill: Brown, rooty, with pebbles and cobbles. Dry.	no	no	3	metals

TEST PIT NUMBER: TP-26
DATE : November 23, 2000
TOTAL DEPTH: 1.0 mBGS

Sample ID	Depth	Stratigraphy	Odour	Stain	CGI (ppm)	Analysis
	0-0.2 m	Topsoil: organic, rooty.	no	no	-	NA
TP-26 (0.3)	0.2-0.5 m	Sandy fill: Light brown with a lens of white ash. Dry.	no	no	0	NA
TP-26 (0.8)	0.5-1.0 m	Sandy fill: Brown. Siltier and ligther brown at the bottom. Dry.	no	no	0	metals

TEST PIT NUMBER: TP-27
DATE : November 23, 2000
TOTAL DEPTH: 0.5 mBGS

Sample ID	Depth	Stratigraphy	Odour	Stain	CGI (ppm)	Analysis
TP-27 (0.3)	0-0.3 m	Topsoil: clayey, sandy, brown at bottom.	no	no	0	NA
TP-27 (0.4)	0.3-0.5 m	Silty sandy fill: Brown-red with pebbles and cobbles. Dry.	no	no	0	metals

TEST PIT NUMBER: TP-28
DATE : November 23, 2000
TOTAL DEPTH: 0.2 mBGS

Sample ID	Depth	Stratigraphy	Odour	Stain	CGI (ppm)	Analysis
TP-28 (0.2)	0-0.2 m	Topsoil: clayey, sandy, rooty.	no	no	0	metals

NA Sample not analysed

Table B1 - Test Pit Summary

TEST PIT NUMBER: TP-29
DATE : November 23, 2000
TOTAL DEPTH: 1.0 mBGS

Sample ID	Depth	Stratigraphy	Odour	Stain	CGI (ppm)	Analysis
	0-0.15 m	Topsoil: grey, clayey, sandy.	no	no	-	NA
TP-29 (0.4)	0.15-0.5 m	Clayey fill: Grey-brown with pebbles. Dry.	no	no	22	NA
TP-29 (0.7)	0.5-0.8 m	Sandy fill: Dark brown, with pebbles and cobbles, metal, wood and possibly ash. Dry/	no	no	30	PAH, metals, BTEX/TPH
TP-29 (0.9)	0.8-1.0 m	Silty sandy fill: Brown with pebbles and cobbles, metal, wood. Slightly moist.	no	no	18	NA

TEST PIT NUMBER: TP-30
DATE : November 23, 2000
TOTAL DEPTH: 1.1 mBGS

Sample ID	Depth	Stratigraphy	Odour	Stain	CGI (ppm)	Analysis
	0-0.1 m	Topsoil: grey, clayey, sandy.	no	no	-	NA
TP-30 (0.2)	0.1-0.3 m	Clayey fill: Grey-brown with pebbles. Dry.	no	no	14	NA
TP-30 (0.5)	0.3-0.6 m	Silty sandy fill: Light brown to brown with pebbles and cobbles, bricks. Dry.	no	no	9	NA
TP-30 (0.7)	0.6-1.1 m	Silty sandy fill: Brown with pebbles and cobbles, bricks. Dry.	no	no	15	metals

TEST PIT NUMBER: TP-31
DATE : November 23, 2000
TOTAL DEPTH: 0.75 mBGS

Sample ID	Depth	Stratigraphy	Odour	Stain	CGI (ppm)	Analysis
	0-0.15 m	Topsoil: rocky.	no	no	-	NA
TP-31 (0.4)	0.15-0.5 m	Silty sandy fill: Grey-brown with pebbles and cobbles, metal, glass. Dry.	no	no	3	metals
TP-31 (0.6)	0.5-0.75 m	Sandy fill: Brown, with pebbles and cobbles, metal, glass. Dry.	no	no	2	NA

TEST PIT NUMBER: TP-32
DATE : November 23, 2000
TOTAL DEPTH: 1.5 mBGS

Sample ID	Depth	Stratigraphy	Odour	Stain	CGI (ppm)	Analysis
	0-0.3 m	Topsoil: organic, rooty.	no	no	-	NA
TP-32 (0.3)	0.3-0.7 m	Sandy fill: Brown, with pebbles. Dry.	no	no	0	metals
TP-32 (0.9)	0.7-1.0 m	Sandy fill: Dark to light brown with many bricks, metal, metal pipe and pebbles.	no	no	0	NA
TP-32 (1.3)	1.0-1.5 m	Sandy fill: Brown to light brown with white ash, bricks, pebbles. Dry.	no	no	0	PAH

NA Sample not analysed

Table B1 - Test Pit Summary

TEST PIT NUMBER: TP-33
DATE : November 23, 2000
TOTAL DEPTH: 0.8 mBGS

Sample ID	Depth	Stratigraphy	Odour	Stain	CGI (ppm)	Analysis
	0-0.2 m	Topsoil: organic, rooty.	no	no	-	NA
TP-33 (0.4)	0.2-0.5 m	Sandy fill: Light brown to brown, with pebbles and cobbles, metal, bricks. Dry.	no	no	2	metals
TP-33 (0.7)	0.5-0.8 m	Sandy fill: Brown with white ash, metal, bricks, pebbles. Dry.	no	no	0	PAH

TEST PIT NUMBER: TP-34
DATE : November 23, 2000
TOTAL DEPTH: 1.0 mBGS

Sample ID	Depth	Stratigraphy	Odour	Stain	CGI (ppm)	Analysis
	0-0.2 m	Topsoil: organic, rooty.	no	no	-	NA
TP-34 (0.4)	0.2-0.5 m	Sandy fill: Brown, with pebbles and cobbles, metal, bricks. Dry.	no	no	0	NA
TP-34 (0.8)	0.5-1.0 m	Sandy fill: Light brown (gets lighter at bottom) with metal, bricks, pebbles and cobbles. Dry.	no	no	2	metals

TEST PIT NUMBER: TP-35
DATE : November 23, 2000
TOTAL DEPTH: 1.6 mBGS

Sample ID	Depth	Stratigraphy	Odour	Stain	CGI (ppm)	Analysis
	0-0.2 m	Topsoil: organic, rooty.	no	no	-	NA
TP-35 (0.3)	0.2-0.4 m	Sandy fill: Light brown, rooty, with glass and brick. Dry.	no	no	0	NA
TP-35 (1.2)	0.4-1.6 m	Sandy fill: Brown with many pebbles, cobbles, boulders. Dry.	no	no	0	metals

TEST PIT NUMBER: TP-36
DATE : November 24, 2000
TOTAL DEPTH: 2.3 mBGS

Note: concrete foundation on west side of TP

Sample ID	Depth	Stratigraphy	Odour	Stain	CGI (ppm)	Analysis
	0-0.3 m	Topsoil: organic, rooty.	no	no	-	NA
TP-36 (0.4)	0.3-0.5 m	Sandy fill: Dark brown, with pebbles and cobbles, and metal. Dry.	no	no	4	NA
TP-36 (0.5)	0.5-0.6 m	Sandy fill: Brown with pebbles, cobbles. Dry.	no	no	3	NA
TP-36 (1.2)	0.6-1.4 m	Sandy fill: Light brown to whitish grey with ash, bricks, paint, glass, metal, wood, many pebbles and cobbles. Dry.	no	no	4	PAH, metals
TP-36 (2.2)	1.4-2.3 m	Sandy fill: Brown with possible ash, metal, glass, pebbles and cobbles. Dry.	no	no	4	NA

NA Sample not analysed

Table B1 - Test Pit Summary

TEST PIT NUMBER: TP-37
DATE : November 24, 2000
TOTAL DEPTH: 1.0 mBGS

Note: bedrock undulates. At south end of TP it is at 0.6 mBGS

Sample ID	Depth	Stratigraphy	Odour	Stain	CGI (ppm)	Analysis
	0-0.2 m	Topsoil: organic, rooty.	no	no	-	NA
TP-37 (0.5)	0.2-0.8 m	Sandy fill: Brown, with pebbles and cobbles, glass, wood. Dry.	no	no	5	metals
TP-37 (1.0)	0.8-1.0 m	Silty sandy fill: Light brown with pebbles and cobbles. Dry.	no	no	6	NA

TEST PIT NUMBER: TP-38
DATE : November 24, 2000
TOTAL DEPTH: 0.4 mBGS

Sample ID	Depth	Stratigraphy	Odour	Stain	CGI (ppm)	Analysis
TP-38 (0.4)	0-0.4 m	Topsoil: organic, rooty.	no	no	5	metals

TEST PIT NUMBER: TP-39
DATE : November 24, 2000
TOTAL DEPTH: 0.6 mBGS

Sample ID	Depth	Stratigraphy	Odour	Stain	CGI (ppm)	Analysis
	0-0.15 m	Topsoil: grey, sandy.	no	no	-	NA
TP-39 (0.25)	0.15-0.3 m	Sandy fill: Brown, with pebbles. Dry.	no	no	4	NA
TP-39 (0.5)	0.3-0.6 m	Silty sandy fill: Brown (darkens near bottom) with pebbles and cobbles, bricks. Dry.	no	no	14	PAH, metals

TEST PIT NUMBER: TP-40
DATE : November 24, 2000
TOTAL DEPTH: 1.0 mBGS

Sample ID	Depth	Stratigraphy	Odour	Stain	CGI (ppm)	Analysis
	0-0.1 m	Topsoil: organic, rooty.	no	no	-	NA
TP-40 (0.2)	0.1-0.25 m	Sandy fill: Light brown, with pebbles. Dry.	no	no	16	NA
TP-40 (0.5)	0.25-0.65m	Sandy fill: Brown, with pebbles. Dry.	no	no	16	NA
TP-40 (0.9)	0.65-1.0 m	Silty sandy fill: Dark brown with pebbles and cobbles, bricks. Slightly moist.	no	no	16	PAH, metals

NA Sample not analysed

Table B1 - Test Pit Summary

TEST PIT NUMBER: TP-41
DATE : November 24, 2000
TOTAL DEPTH: 0.95 mBGS

Sample ID	Depth	Stratigraphy	Odour	Stain	CGI (ppm)	Analysis
	0-0.1 m	Topsoil: sandy.	no	no	-	NA
TP-41 (0.2)	0.1-0.3 m	Sandy fill: Brown, with pebbles. Dry.	no	no	42	metals, BTEX/TPH
TP-41 (0.7)	0.3-0.95 m	Silty sandy fill: Dark brown (gets darker at bottom). Slightly moist.	no	no	26	NA

TEST PIT NUMBER: TP-42
DATE : November 24, 2000
TOTAL DEPTH: 0.5 mBGS

Sample ID	Depth	Stratigraphy	Odour	Stain	CGI (ppm)	Analysis
	0-0.2 m	Topsoil: organic, rooty.	no	no	-	NA
TP-42 (0.4)	0.2-0.5 m	Silty sandy fill: Brown with pebbles. Dry.	no	no	14	PAH, metals

TEST PIT NUMBER: TP-43
DATE : November 24, 2000
TOTAL DEPTH: 0.6 mBGS

Sample ID	Depth	Stratigraphy	Odour	Stain	CGI (ppm)	Analysis
	0-0.2 m	Topsoil: organic, rooty.	no	no	-	NA
TP-43 (0.5)	0.2-0.6 m	Silty sandy fill: Brown, reddish-brown at bottom, with pebbles. Dry.	no	no	11	metals

TEST PIT NUMBER: TP-44
DATE : November 24, 2000
TOTAL DEPTH: 0.9 mBGS

Sample ID	Depth	Stratigraphy	Odour	Stain	CGI (ppm)	Analysis
	0-0.15 m	Topsoil: organic, rooty.	no	no	-	NA
TP-44 (0.4)	0.15-0.55m	Clayey sandy fill: Grey-brown with pebbles and cobbles, glass. Dry.	no	no	20	NA
TP-44 (0.8)	0.55-0.9 m	Sandy fill: Brown, gets clayey and reddish-brown near the bottom, with pebbles and cobbles and glass. Dry.	no	no	18	metals

NA Sample not analysed

Table B1 - Test Pit Summary

TEST PIT NUMBER: TP-45
DATE : November 24, 2000
TOTAL DEPTH: 1.25 mBGS

Sample ID	Depth	Stratigraphy	Odour	Stain	CGI (ppm)	Analysis
	0-0.15 m	Topsoil: organic, rooty.	no	no	-	NA
TP-45 (0.2)	0.15-0.3 m	Sandy fill: Brown, with pebbles and cobbles. Dry.	no	no	10	NA
TP-45 (0.6)	0.3-0.6 m	Clayey sandy fill: Grey-brown. Slightly moist.	no	no	8	NA
TP-45 (1.0)	0.6-1.25 m	Silty sandy fill: Brown with pebbles and cobbles. Wet at bottom.	no	no	16	metals

TEST PIT NUMBER: TP-46
DATE : November 24, 2000
TOTAL DEPTH: 1.5 mBGS

Note: a concrete foundation lay next to TP

Sample ID	Depth	Stratigraphy	Odour	Stain	CGI (ppm)	Analysis
	0-0.3 m	Topsoil: sandy.	no	no	-	NA
TP-46 (0.8)	0.3-1.5 m	Sandy fill: Brown, with pebbles and cobbles, metal, wood. Dry.	no	no	13	NA
TP-46 (1.3)		0.3-0.6 m: with lots of ash, slag and some brown-red areas. 0.6-0.8 m: with some light brown sandier lenses.	no	no	12	PAH, metals

TEST PIT NUMBER: TP-47
DATE : November 24, 2000
TOTAL DEPTH: 0.6 mBGS

Sample ID	Depth	Stratigraphy	Odour	Stain	CGI (ppm)	Analysis
	0-0.1 m	Clay fill: hard, compacted.	no	no	-	NA
TP-47 (0.15)	0.1-0.2 m	Sandy fill: Brown. Dry.	no	no	6	NA
TP-47 (0.55)	0.2-0.6 m	Clayey sandy fill: Brown, with pebbles and cobbles, grey and more clayey at bottom. Dry.	no	no	10	PAH, metals

TEST PIT NUMBER: TP-48
DATE : November 24, 2000
TOTAL DEPTH: 0.9 mBGS

Sample ID	Depth	Stratigraphy	Odour	Stain	CGI (ppm)	Analysis
	0-0.25 m	Clay fill: Grey-brown, hard, compacted, with pebbles.	no	no	-	NA
TP-48 (0.3)	0.25-0.4 m	Sandy fill: Red-brown with pebbles and cobbles, metal. Dry.	no	no	12	NA
TP-48 (0.8)	0.4-0.9 m	Sandy fill: Brown, gets clayey and darker at bottom. With pebbles and cobbles, metal. Dry.	no	no	18	PAH, metals

NA Sample not analysed

Table B1 - Test Pit Summary

TEST PIT NUMBER: TP-49
DATE : November 24, 2000
TOTAL DEPTH: 0.6 mBGS

Sample ID	Depth	Stratigraphy	Odour	Stain	CGI (ppm)	Analysis
	0-0.1 m	Sandy fill. (top cover)	no	no	-	NA
	0.1-0.2 m	Sandy fill: Red-brown with pebbles and cobbles, metal. Dry.	no	no	-	NA
TP-49 (0.2)	0.2-0.4 m	Clayey sandy fill: Grey-brown with pebbles and cobbles, metal, wood. Dry.	no	no	14	NA
TP-49 (0.5)	0.4-0.6 m	Sandy fill: Brown with pebbles and cobbles, glass and metal. Dry.	no	no	20	PAH, metals

NA Sample not analysed

BOREHOLE STRATIGRAPHIC AND INSTRUMENTATION LOG

Project Number: 01-242-1

Client: NCC

Site Location: Burnside Avenue, Ottawa

Ground Surface Elevation: 93.069 mASD

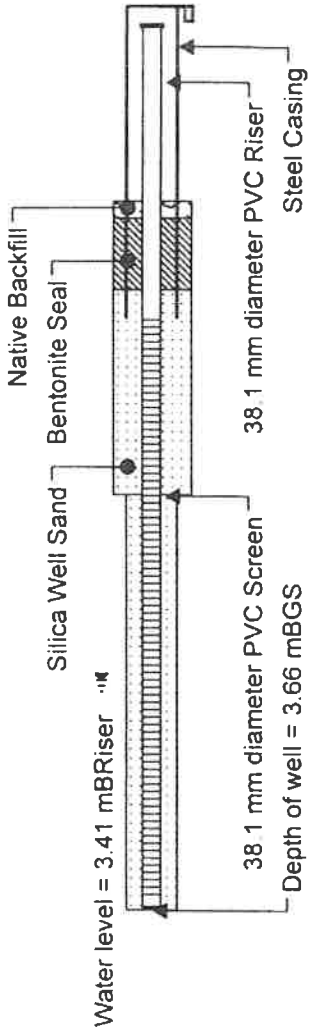
Borehole Number: MW-1

Date Completed: October 17, 2001

Drilling Method: Hollow Stem Auger and Air Hammer

Supervisor: AMC

DEPTH BGS (ft / m)	SAMPLES	LAB SAMPLE	BLOW COUNT	CGI (ppm)	PID (ppm)	LOG	STRATIGRAPHIC DESCRIPTION	INSTALLATION
ft / m							GROUND SURFACE	
0							FILL Augered through topsoil underlain by brown/grey sandy fill with pebbles to bedrock refusal at 1.52 mBGS.	
5 / 1							BEDROCK Air hammered through bedrock to 3.66 mBGS.	
12 / 4							BOREHOLE TERMINATED	



INTERA

BOREHOLE STRATIGRAPHIC AND INSTRUMENTATION LOG

Project Number: 01-242-1

Client: NCC

Site Location: Burnside Avenue, Ottawa

Ground Surface Elevation: 93.337 mASD

Borehole Number: MW-2

Date Completed: October 17, 2001

Drilling Method: Hollow Stem Auger

Supervisor: AMC

DEPTH BGS (ft / m)	SAMPLES	LAB SAMPLE	BLOW COUNT	CGI (ppm)	PID (ppm)	LOG	STRATIGRAPHIC DESCRIPTION	INSTALLATION
ft / m							GROUND SURFACE	
0							FILL Augered through topsoil underlain by clayey sandy fill with pebbles and cobbles to 4.57 mBGS.	Native Backfill Bentonite Seal Silica Well Sand Depth of water = 3.53 BRiser 38.1 mm diameter PVC Riser Steel Casing 38.1 mm diameter PVC Screen Depth of well = 4.48 mBGS
15							BOREHOLE TERMINATED	

INTERA

BOREHOLE STRATIGRAPHIC AND INSTRUMENTATION LOG

Project Number: 01-242-1

Client: NCC

Site Location: Burnside Avenue, Ottawa

Ground Surface Elevation: 96.698 mASD

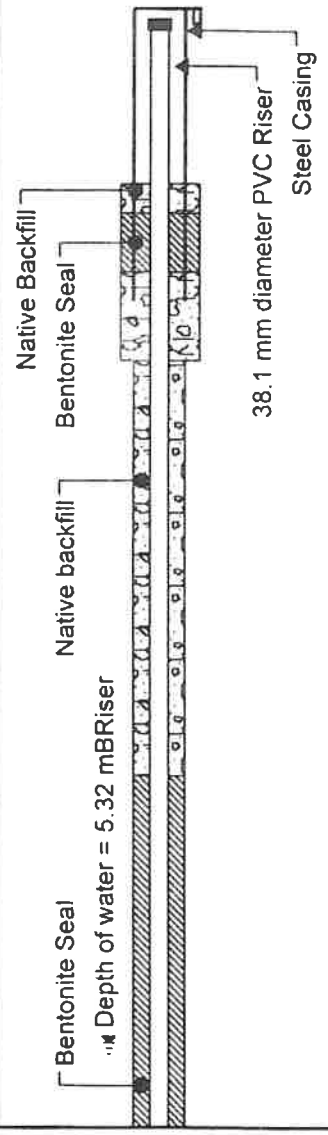
Borehole Number: MW-3

Date Completed: October 17, 2001

Drilling Method: Hollow Stem Auger and Air Hammer

Supervisor: AMC

DEPTH BGS (ft / m)	SAMPLES	LAB SAMPLE	BLOW COUNT	CGI (ppm)	PID (ppm)	LOG	STRATIGRAPHIC DESCRIPTION	INSTALLATION
ft / m							GROUND SURFACE	
0							FILL Augered through topsoil underlain by brown/grey sandy fill with clay, silt and pebbles to bedrock refusal at 0.91 mBGS.	
3 / 1							BEDROCK Air hammered through bedrock to 9.45 mBGS.	
15 / 4								



INTERA

BOREHOLE STRATIGRAPHIC AND INSTRUMENTATION LOG

Project Number: 01-242-1

Client: NCC

Site Location: Burnside Avenue, Ottawa

Ground Surface Elevation: 96.698 mASD

Borehole Number: MW-3

Date Completed: October 17, 2001

Drilling Method: Hollow Stem Auger and Air Hammer

Supervisor: AMC

DEPTH BGS	SAMPLES	LAB SAMPLE	BLOW COUNT	CGI (ppm)	PID (ppm)	LOG	STRATIGRAPHIC DESCRIPTION	INSTALLATION
16 5 17 18 19 6 20 21 22 23 7 24 25 26 8 27 28 29 9 30 31 32 33 10 34							BOREHOLE TERMINATED	Silica Well Sand; 38.1 mm diameter PVC Screen; Depth of well = 9.45 mBGS

INTERA

BOREHOLE STRATIGRAPHIC AND INSTRUMENTATION LOG

Project Number: 01-242-1

Client: NCC

Site Location: Burnside Avenue, Ottawa

Ground Surface Elevation: 99.250 mASD

Borehole Number: MW-4

Date Completed: October 17, 2001

Drilling Method: Hollow Stem Auger and Air Hammer

Supervisor: AMC

DEPTH BGS (ft / m)	SAMPLES	LAB SAMPLE	BLOW COUNT	CGI (ppm)	PID (ppm)	LOG	STRATIGRAPHIC DESCRIPTION	INSTALLATION
ft: -3 to 15; m: 1 to 4							GROUND SURFACE	Steel Casing; 38.1 mm diameter PVC Riser; Native Backfill; Bentonite Seal; Depth of water = 3.16 mBRiser; Silica Well Sand
							FILL Augered through topsoil underlain by brown/grey sandy fill with clay, pebbles, cobbles and metal to bedrock refusal at 0.61 mBGS.	
							BEDROCK Air hammered through bedrock to 7.01 mBGS.	

INTERA

BOREHOLE STRATIGRAPHIC AND INSTRUMENTATION LOG

Project Number: 01-242-1

Client: NCC

Site Location: Burnside Avenue, Ottawa

Ground Surface Elevation: 99.250 mASD

Borehole Number: MW-4

Date Completed: October 17, 2001

Drilling Method: Hollow Stem Auger and Air Hammer

Supervisor: AMC

DEPTH BGS	SAMPLES	LAB SAMPLE	BLOW COUNT	CGI (ppm)	PID (ppm)	LOG	STRATIGRAPHIC DESCRIPTION	INSTALLATION
16 5 17 18 19 6 20 21 22 23 7 24 25 26 8 27 28 29 9 30 31 32 33 10 34							BOREHOLE TERMINATED	38.1 mm diameter PVC Screen Depth of well = 7.01 mBGS

INTERA

BOREHOLE STRATIGRAPHIC AND INSTRUMENTATION LOG

Project Number: 01-242-1

Client: NCC

Site Location: Burnside Avenue, Ottawa

Ground Surface Elevation: 93.620 mASD

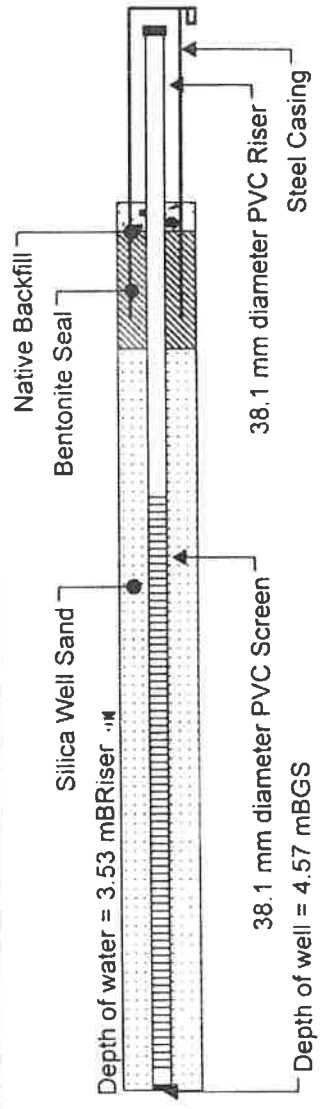
Borehole Number: MW-5

Date Completed: October 17, 2001

Drilling Method: Hollow Stem Auger

Supervisor: AMC

DEPTH BGS (ft / m)	SAMPLES	LAB SAMPLE	BLOW COUNT	CGI (ppm)	PID (ppm)	LOG	STRATIGRAPHIC DESCRIPTION	INSTALLATION
ft: -3 to 15; m: 1 to 4							GROUND SURFACE	
0 to 5 ft / 0 to 1 m							FILL Augered through topsoil underlain by brown/grey sandy fill with silt, pebbles, cobbles, glass and metal to 4.57 mBGS.	
5 to 10 ft / 1 to 3 m								
10 to 15 ft / 3 to 4 m								
							BOREHOLE TERMINATED	



INTERA

CH2MHILL

SHEET 1 OF 1

RECORD OF MONITORING WELL: CH2M - MW-1

LOCATION: Ottawa - River St.
PROJECT NUMBER: 316461
DRILLER: Downing Drilling

DATE DRILLED: 12 October 2005
BORING METHOD: HQ CORE
TOP OF PIPE:

LOGGED BY: KA
GROUND ELEVATION:
Datum:

DEPTH (mbgs)	SAMPLES: RECOVERY (cm)	SAMPLES: PIPE	SAMPLES: BLOWS/6"	SOIL DESCRIPTION	STRATA PLOT	ELEV / DEPTH (mbgs)	WELL CONSTRUCTION DETAILS	ORGANIC VAPOUR READINGS PID (ppm)
	36		3 10 16 8	Grass cover layer **TOP SOIL** Trace gravel, dark brown, rootlets, moist **SAND** Light brown, loose, dry, black cinders present, 2.5 cm of rusted metal debris Rock fragments, asphalt fragments, metal debris			Above-ground protective well casing in cement seal Bentonite pellet seal	
				SAND Medium to fine				
1	12		9 11 9 50/5"	**SAND** Fine, olive grey, becoming light brown, black cinders present, loose, moist **SAND** Medium to fine, trace gravel, white, loose, moist 5 cm of red brick fragments and white powder				
	24		6 12 40 50/3"	**SAND and ORGANICS (FILL)** Rootlets, dark brown, moist sandy **SILT** Some gravel, brown to grey, dense				
2				**LIMESTONE (Ordovician)** (Verulam Formation): Grey to dark grey, interbedded with shales, fossils present			No. 3 Silica sand pack 2" diameter PVC Sch. 40, No. 10 slot well screen Water level measured 4.47 mbgs, October 14, 2005	
3								
4								
5				End of borehole at 5.79 mbgs				

CH2M HILL Canada Limited

CH2MHILL

SHEET 1 OF 1

RECORD OF MONITORING WELL: CH2M - MW-2

LOCATION: Ottawa - River St.
PROJECT NUMBER: 316461
DRILLER: Downing Drilling

DATE DRILLED: 12 October 2005
BORING METHOD: HQ CORE
TOP OF PIPE:

LOGGED BY: KA
GROUND ELEVATION:
Datum:

DEPTH (mbgs)	SAMPLES: RECOVERY (cm)	SAMPLES: TYPE	SAMPLES: BLOWS/6 in.	SOIL DESCRIPTION	STRATA PLOT	ELEV (masl) / DEPTH (mbgs)	WELL CONSTRUCTION DETAILS	ORGANIC VAPOUR READINGS PID (ppm)
	30		2 5 9 38	Grass cover layer **TOP SOIL** Dark brown, grass, rootlets, moist Asphalt layer, black **SAND and GRAVEL** Trace gravel, light brown, loose, dry			Above ground protective well casing in cement seal Bentonite pellet seal	10 20 30 40
1	16		17 50/2"	silty **SAND** Trace gravel, light brown, loose, dry **IGNEOUS** Granite **IGNEOUS** Loose igneous and limestone fragments, red, white and grey			No. 3 Silica sand pack	
2				**LIMESTONE (Ordovician)** (Verulam Formation) Grey to dark grey interbedded with shales, fossils present			2" diameter PVC, Sch. 40, No. 10 slot well screen	
3								
4							Water level measured 3.81 mbgs, October 14, 2005	
5				End of borehole at 5.1 mbgs				

CH2MHILL

SHEET 1 OF 1

RECORD OF TEST PIT: TP-3

LOCATION: Ottawa - River St | PROJECT NUMBER: 316461 | DRILLER: C.A.C.E
DATE DRILLED: 14 October 2005 | BORING METHOD: Backhoe
LOGGED BY: KA | GROUND ELEVATION: | DATUM:

DEPTH (mbgs)	SAMPLES: RECOVERY (cm)	SAMPLES: TYPE	SAMPLES: BLOWS/0.15 m	SOIL DESCRIPTION	ELEV / DEPTH (mbgs)	TEST PIT DETAILS	⊕ ORGANIC VAPOUR READINGS PID (ppm) 12 24 36 48
				TOP SOIL Dark brown, grass cover, rootlets			
				SAND Medium to fine, red to orange staining, loose, moist	0.25		
				Slate rock fragments, grey, red brick fragments	0.60		
				Wood debris, fibrous, brown	0.67		
				silty **SAND** Fine, trace grey, some gravel, light grey, rock fragments	0.73		
				clayey **SILT** Brown, rock fragments	0.79		
1							⊕
				Bedrock encountered	1.22		
2							

CH2MHILL

SHEET 1 OF 1

RECORD OF TEST PIT: TP-4

LOCATION: Ottawa - River St
PROJECT NUMBER: 316461
DRILLER: C.A.C.E

DATE DRILLED: 14 October 2005
BORING METHOD: Backhoe

LOGGED BY: KA
GROUND ELEVATION:
DATUM:

DEPTH (mbgs)	SAMPLES: RECOVERY (%)	SAMPLES: TYPE	SAMPLES: BLOWS/0.15 m	SOIL DESCRIPTION	STRATA PLOT	ELEV / DEPTH (mbgs)	TEST PIT DETAILS	⊕ ORGANIC VAPOUR READINGS PID (ppm) 12 24 36 48
				TOP SOIL Grass cover, rootlets				
				SAND Medium to fine, light brown, becoming black with depth, rootlets rock fragments		0.25		
				sandy **SILT** Some clay, rock fragments, rootlets Metal debris, plastic pieces, rubber, fan belt, old glass bottles, red brick fragments, broken plates		0.52		⊕
						0.88		
1								
2								

CH2M HILL Canada Limited

SCANBH OTTAWA 2005.GPJ CG&S.GDT 20/10/05

CH2MHILL

SHEET 1 OF 1

RECORD OF TEST PIT: TP-5

LOCATION: Ottawa - River St
PROJECT NUMBER: 316461
DRILLER: C.A.C.E.
DATE DRILLED: 14 October 2005
BORING METHOD: Backhoe
LOGGED BY: KA
GROUND ELEVATION:
DATUM:

DEPTH (mbgs)	SAMPLES: RECOVERY (mm)	SAMPLES: TYPE	SAMPLES: BLOWS/0.15 m	SOIL DESCRIPTION	STRATA PLOT	ELEV / DEPTH (m)	TEST PIT DETAILS	⊕ ORGANIC VAPOUR READINGS (ppm) 12 24 36 48
				TOP SOIL: Dark brown, grass cover, rootlets				
				SAND: Fine, light brown, poorly sorted		0.25		
1				**FILL**: *Red brick debris, glass, wood fragments, black, fibrous metal debris, roots*		0.61		⊕
				SAND: Coarse to fine, gravel and boulders, trace clay, brown, loose		1.37		
2				Groundwater seepage at bottom of test pit		2.37		

Log of Borehole BH 1

Project No: OTT-00245595-A0

Project: Preliminary Geotechnical Investigation - Burnside OPA and ZBLA Supporting Studies

Location: Burnside Avenue, Ottawa, ON.

Figure No. 4

Page 1 of 1

Date Drilled: April 5, 2018

Drill Type: CME-75 Track Mounted Drill Rig

Datum: Geodetic Elevation

Logged by: A.N. Checked by: S.P.

Split Spoon Sample	⊠	Combustible Vapour Reading	□
Auger Sample	▮	Natural Moisture Content	×
SPT (N) Value	○	Atterberg Limits	⊢—○
Dynamic Cone Test	——	Undrained Triaxial at % Strain at Failure	⊕
Shelby Tube	■	Shear Strength by Penetrometer Test	▲
Shear Strength by Vane Test	+ S		

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth	Standard Penetration Test N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Wt. kN/m³
		Power augered to 1.2 m auger refusal depth.	59.17	0	20 40 60 80 / 50 100 150 200	250 500 750 / 20 40 60		
		LIMESTONE BEDROCK Aphanitic to fine grained, medium to thickly bedded, grey, (good and excellent quality)	58.0	1			Run 1	
			57.57	2				
				3			Run 2	
			54.9	4				
		Borehole Terminated at 4.3 m Depth						

LOG OF BOREHOLE BOREHOLE LOGS - 245595 - BURNSIDE AVE.GPJ TROW OTTAWA.GDT 5/9/18

NOTES:

1. Borehole data requires interpretation by EXP before use by others
2. 19 mm diameter standpipe piezometer installed as shown.
3. Field work supervised by an EXP representative
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-00245595-A0

WATER LEVEL RECORDS

Elapsed Time	Water Level (m)	Hole Open To (m)
On Completion	N/A	
32 days	1.6	

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %
1	1.2 - 2.7	100	88
2	2.7 - 4.3	100	100

Log of Borehole BH 2

Project No: OTT-00245595-A0

Project: Preliminary Geotechnical Investigation - Burnside OPA and ZBLA Supporting Studies

Location: Burnside Avenue, Ottawa, ON.

Figure No. 5

Page 1 of 1

Date Drilled: April 4, 2018

Drill Type: CME-75 Track Mounted Drill Rig

Datum: Geodetic Elevation

Logged by: A.N. Checked by: S.P.

Split Spoon Sample	⊠	Combustible Vapour Reading	□
Auger Sample	▮	Natural Moisture Content	×
SPT (N) Value	○	Atterberg Limits	⊢—○
Dynamic Cone Test	——	Undrained Triaxial at % Strain at Failure	⊕
Shelby Tube	■	Shear Strength by Penetrometer Test	▲
Shear Strength by Vane Test	+ S		

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth	Standard Penetration Test N Value (20 40 60 80) / Shear Strength kPa (50 100 150 200)	Combustible Vapour Reading (ppm) (250 500 750) / Natural Moisture Content % Atterberg Limits (% Dry Weight) (20 40 60)	SAMPLES	Natural Unit Wt kN/m³
		Power augered to 1.9 m auger refusal depth.	63.49	0				
				1				
			61.6	2				
		LIMESTONE BEDROCK Aphanitic to fine grained, medium to thickly bedded, grey, (poor and excellent quality)	61.19				Run 1	
				3			Run 2	
			59.2	4				
		Borehole Terminated at 4.3 m Depth						

LOG OF BOREHOLE BOREHOLE LOGS - 245595 - BURNSIDE AVE.GPJ TROW OTTAWA.GDT 5/9/18

NOTES:

1. Borehole data requires interpretation by EXP before use by others.
2. 19 mm diameter standpipe piezometer installed as shown.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions.
5. Log to be read with EXP Report OTT-00245595-A0.

WATER LEVEL RECORDS

Elapsed Time	Water Level (m)	Hole Open To (m)
On Completion	N/A	
33 days	2.3	

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %
1	1.9 - 2.7	100	30
2	2.7 - 4.3	100	95

Log of Borehole BH 3

Project No: OTT-00245595-A0

Project: Preliminary Geotechnical Investigation - Burnside OPA and ZBLA Supporting Studies

Location: Burnside Avenue, Ottawa, ON.

Figure No. 6

Page 1 of 1

Date Drilled: April 4, 2018

Drill Type: CME-75 Track Mounted Drill Rig

Datum: Geodetic Elevation

Logged by: A.N. Checked by: S.P.

Split Spoon Sample	⊠	Combustible Vapour Reading	□
Auger Sample	▮	Natural Moisture Content	×
SPT (N) Value	○	Atterberg Limits	⊢○
Dynamic Cone Test	——	Undrained Triaxial at % Strain at Failure	⊕
Shelby Tube	■	Shear Strength by Penetrometer Test	▲
Shear Strength by Vane Test	+ S		

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth	Standard Penetration Test N Value 20 40 60 80 / Shear Strength kPa 50 100 150 200	Combustible Vapour Reading (ppm) 250 500 750 / Natural Moisture Content % Atterberg Limits (% Dry Weight) 20 40 60	SAMPLES	Natural Unit Wt kN/m³
		Power augered to 1.0 m auger refusal depth.	60.27	0				
		LIMESTONE BEDROCK Aphanitic to fine grained, medium to thickly bedded, grey, (very poor and excellent quality)	59.3	1			Run 1	
			58.27	2			Run 2	
		Borehole Terminated at 2.9 m Depth	57.4					

NOTES:

1. Borehole data requires interpretation by EXP before use by others.
2. 19 mm diameter standpipe piezometer installed as shown.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions.
5. Log to be read with EXP Report OTT-00245595-A0.

WATER LEVEL RECORDS

Elapsed Time	Water Level (m)	Hole Open To (m)
On Completion	N/A	
33 days	2.0	

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %
1	1 - 1.3	100	0
2	1.3 - 2.9	100	100

LOG OF BOREHOLE BOREHOLE LOGS - 245595 - BURNSIDE AVE.GPJ TROW OTTAWA.GDT 5/9/18

Log of Borehole BH 4

Project No: OTT-00245595-A0

Project: Preliminary Geotechnical Investigation - Burnside OPA and ZBLA Supporting Studies

Location: Burnside Avenue, Ottawa, ON.

Figure No. 7

Page 1 of 3

Date Drilled: April 4 and 5, 2018

Drill Type: CME-75 Track Mounted Drill Rig

Datum: Geodetic Elevation

Logged by: A.N. Checked by: S.P.

Split Spoon Sample ⊠
Auger Sample ▮▯
SPT (N) Value ○
Dynamic Cone Test ——
Shelby Tube ■
Shear Strength by Vane Test +S

Combustible Vapour Reading □
Natural Moisture Content ×
Atterberg Limits ⊢—○
Undrained Triaxial at % Strain at Failure ⊕
Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth	Standard Penetration Test N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Wt kN/m³
		Power augered to 1.3 m auger refusal depth.	57.22	0	20 40 60 80 / 50 100 150 200	250 500 750 / 20 40 60		
		FILL Silty sand with gravel, cobbles, boulders, concrete, glass and wood debris, grey. Borehole advanced from 1.3 m to 7.4 m depths by coring technique.	55.9	1			Run 1	
				2				
				3			Run 2	
				4				
				5			Run 3	
				6				
				7			Run 4	
		GLACIAL TILL Silty clayey sand with gravel, cobbles, boulders, grey, (very dense) Borehole advanced from 7.4 m to 24.0 m depths by coring techniques.	49.8	8			Run 5	
				9				
				10			Run 6	

Continued Next Page

NOTES

1. Borehole data requires interpretation by EXP before use by others
2. Borehole backfilled upon completion of drilling
3. Field work supervised by an EXP representative
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-00245595-A0

WATER LEVEL RECORDS

Elapsed Time	Water Level (m)	Hole Open To (m)
On Completion	N/A	

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

LOG OF BOREHOLE BOREHOLE LOGS - 245595 - BURNSIDE AVE.GPJ TROW OTTAWA.GDT 5/9/18

Log of Borehole BH 4

Project No: OTT-00245595-A0

Project: Preliminary Geotechnical Investigation - Burnside OPA and ZBLA Supporting Studies

Figure No. 7

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth	Standard Penetration Test N Value (20 40 60 80) / Shear Strength kPa (50 100 150 200)	Combustible Vapour Reading (ppm) (250 500 750) / Natural Moisture Content % Atterberg Limits (% Dry Weight) (20 40 60)	SAMPLES	Natural Unit Wt kN/m³
		GLACIAL TILL Silty clayey sand with gravel, cobbles, boulders, grey, (very dense) Borehole advanced from 7.4 m to 24.0 m depths by coring techniques. *(continued)*	47.22	10 11 12 13 14 15 16 17 18 19 20 21 22	55		Run 7 Run 8 Run 9 Run 10 Run 11 Run 12 Run 13 Run 14	

Continued Next Page

NOTES:

1. Borehole data requires interpretation by EXP before use by others.
2. Borehole backfilled upon completion of drilling.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions.
5. Log to be read with EXP Report OTT-00245595-A0.

WATER LEVEL RECORDS		
Elapsed Time	Water Level (m)	Hole Open To (m)
On Completion	N/A	

CORE DRILLING RECORD			
Run No.	Depth (m)	% Rec.	RQD %

Log of Borehole BH 4

Project No: OTT-00245595-A0

Project: Preliminary Geotechnical Investigation - Burnside OPA and ZBLA Supporting Studies

Figure No. 7

Page 3 of 3

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth	Standard Penetration Test N Value (20 40 60 80) / Shear Strength kPa (50 100 150 200)	Combustible Vapour Reading (ppm) (250 500 750) / Natural Moisture Content % Atterberg Limits (% Dry Weight) (20 40 60)	SAMPLES	Natural Unit Wt. kN/m³
		GLACIAL TILL Silty clayey sand with gravel, cobbles, boulders, grey, (very dense) Borehole advanced from 7.4 m to 24.0 m depths by coring techniques. *(continued)*	35.22	22 23 24			Run 15	
		Dynamic Cone Penetration Test (DCPT) conducted from 24.0 m to cone refusal depth at 24.1 m. **Cone Refusal at 24.1 m Depth**	33.2 33.1					

NOTES:

1. Borehole data requires interpretation by EXP before use by others
2. Borehole backfilled upon completion of drilling.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-00245595-A0

WATER LEVEL RECORDS		
Elapsed Time	Water Level (m)	Hole Open To (m)
On Completion	N/A	

CORE DRILLING RECORD			
Run No.	Depth (m)	% Rec.	RQD %

LOG OF BOREHOLE BOREHOLE LOGS - 245595 - BURNSIDE AVE.GPJ TROW OTTAWA.GDT 5/9/18

Log of Test Pit TP 1

Project No: OTT-00245595-A0

Project: Preliminary Geotechnical Investigation - Burnside OPA and ZBLA Supporting Studies

Location: Burnside Avenue, Ottawa, ON.

Figure No. 8

Page 1 of 1

Date Drilled: March 29, 2018

Drill Type: Rubber Tired Backhoe

Datum: Geodetic Elevation

Logged by: M.L. Checked by: S.P.

Split Spoon Sample	⊠	Combustible Vapour Reading	□
Auger Sample	▮	Natural Moisture Content	×
SPT (N) Value	o	Atterberg Limits	⊢—○
Dynamic Cone Test	——	Undrained Triaxial at % Strain at Failure	⊕
Shelby Tube	■	Shear Strength by Penetrometer Test	▲
Shear Strength by Vane Test	+ S		

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth	Standard Penetration Test N Value 20 40 60 80 / Shear Strength kPa 50 100 150 200	Combustible Vapour Reading (ppm) 250 500 750 / Natural Moisture Content % Atterberg Limits (% Dry Weight) 20 40 60	SAMPLES	Natural Unit Wt. kN/m³
		TOPSOIL ~100 mm	59.17	0				
		FILL Mixture of silty sand and silty clay, gravel, cobbles, boulders, angular blast-rock pieces, brick and glass debris, brown and grey, moist	59.1					
				1				
			58.0					
		Bucket Refusal at 1.2 m Depth						

NOTES

1. Borehole data requires interpretation by EXP before use by others
2. Test Pit backfilled upon completion.
3. Field work supervised by an EXP representative
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-00245595-A0

WATER LEVEL RECORDS

Elapsed Time	Water Level (m)	Hole Open To (m)
On Completion	Dry	1.1

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

LOG OF BOREHOLE TP LOGS - 245595 - BURNSIDE AVE.GPJ TROW OTTAWA.GDT 5/9/18

Log of Test Pit TP 2

Project No: OTT-00245595-A0

Project: Preliminary Geotechnical Investigation - Burnside OPA and ZBLA Supporting Studies

Location: Burnside Avenue, Ottawa, ON.

Figure No. 9

Page. 1 of 1

Date Drilled: 'March 29, 2018

Drill Type: Rubber Tired Backhoe

Datum: Geodetic Elevation

Logged by: M.L. Checked by: S.P.

Split Spoon Sample	⊠	Combustible Vapour Reading	□
Auger Sample	▮	Natural Moisture Content	×
SPT (N) Value	○	Atterberg Limits	⊢—○
Dynamic Cone Test	——	Undrained Triaxial at % Strain at Failure	⊕
Shelby Tube	■	Shear Strength by Penetrometer Test	▲
Shear Strength by Vane Test	+ S		

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth	Standard Penetration Test N Value 20 40 60 80 / Shear Strength 50 100 150 200 kPa	Combustible Vapour Reading (ppm) 250 500 750 / Natural Moisture Content % Atterberg Limits (% Dry Weight) 20 40 60	SPT mm	Natural Unit Wt kN/m³
		TOPSOIL ~ 50 mm	60.08 / 60.0	0				
		FILL Gravelly silty sand, cobbles, asphalt debris, brown, moist	59.7					
		GLACIAL TILL Silty clayey sand with gravel, brown, moist	59.6			×		
		Bucket Refusal at 0.5 m Depth						

LOG OF BOREHOLE TP LOGS - 245595 - BURNSIDE AVE.GPJ TROW OTTAWA.GDT 5/9/18

NOTES:

1. Borehole data requires interpretation by EXP before use by others.
2. Test Pit backfilled upon completion.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-00245595-A0

WATER LEVEL RECORDS		
Elapsed Time	Water Level (m)	Hole Open To (m)
On Completion	Dry	0.5

CORE DRILLING RECORD			
Run No.	Depth (m)	% Rec.	RQD %

Log of Test Pit TP 3

Project No: OTT-00245595-A0

Project: Preliminary Geotechnical Investigation - Burnside OPA and ZBLA Supporting Studies

Location: Burnside Avenue, Ottawa, ON.

Date Drilled: March 29, 2018

Drill Type: Rubber Tired Backhoe

Datum: Geodetic Elevation

Logged by: M.L. Checked by: S.P.

Figure No. 10

Page 1 of 1

Split Spoon Sample	⊠	Combustible Vapour Reading	□
Auger Sample	▮▮	Natural Moisture Content	×
SPT (N) Value	○	Atterberg Limits	⊢—○
Dynamic Cone Test	——	Undrained Triaxial at % Strain at Failure	⊕
Shelby Tube	■	Shear Strength by Penetrometer Test	▲
Shear Strength by Vane Test	+ S		

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth m	Standard Penetration Test N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Wt kN/m³
		TOPSOIL ~50 mm	62.18	0				
		FILL Gravelly silty sand, cobbles, asphalt debris, brown, moist	62.1			×		
		GLACIAL TILL Silty clayey sand with gravel, brown, moist	62.0					
		Bucket Refusal at 0.3 m Depth	61.9					

Standard Penetration Test N Value: 20 40 60 80

Shear Strength kPa: 50 100 150 200

Combustible Vapour Reading (ppm): 250 500 750

Natural Moisture Content % / Atterberg Limits (% Dry Weight): 20 40 60

NOTES:

1. Borehole data requires interpretation by EXP before use by others
2. Test Pit backfilled upon completion.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-00245595-A0

WATER LEVEL RECORDS

Elapsed Time	Water Level (m)	Hole Open To (m)
On Completion	Dry	0.3

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

LOG OF BOREHOLE TP LOGS - 245595 - BURNSIDE AVE.GPJ TROW OTTAWA.GDT 5/9/18

Log of Test Pit TP 4

Project No: OTT-00245595-A0

Project: Preliminary Geotechnical Investigation - Burnside OPA and ZBLA Supporting Studies

Location: Burnside Avenue, Ottawa, ON.

Figure No. 11

Page 1 of 1

Date Drilled: March 29, 2018

Drill Type: Rubber Tired Backhoe

Datum: Geodetic Elevation

Logged by: M.L. Checked by: S.P.

Split Spoon Sample	⊠	Combustible Vapour Reading	□
Auger Sample	▮	Natural Moisture Content	×
SPT (N) Value	○	Atterberg Limits	⊢—○
Dynamic Cone Test	——	Undrained Triaxial at % Strain at Failure	⊕
Shelby Tube	■	Shear Strength by Penetrometer Test	▲
Shear Strength by Vane Test	+ S		

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth	Standard Penetration Test N Value 20 40 60 80 / Shear Strength kPa 50 100 150 200	Combustible Vapour Reading (ppm) 250 500 750 / Natural Moisture Content % Atterberg Limits (% Dry Weight) 20 40 60	SAMPLES	Natural Unit Wt kN/m³
		FILL Mixture of silty sand and silty clay, gravel, cobbles, angular blast-rock pieces, roots, dark brown and grey, moist to wet	62.74	0				
			61.9					
		Bucket Refusal at 0.8 m Depth						

NOTES:

1. Borehole data requires interpretation by EXP before use by others.
2. Test Pit backfilled upon completion.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions.
5. Log to be read with EXP Report OTT-00245595-A0.

WATER LEVEL RECORDS

Elapsed Time	Water Level (m)	Hole Open To (m)
On Completion	Dry	0.8

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

LOG OF BOREHOLE TP LOGS - 245595 - BURNSIDE AVE.GPJ TROW OTTAWA.GDT 5/9/18

Log of Test Pit TP 5

Project No: OTT-00245595-A0

Project: Preliminary Geotechnical Investigation - Burnside OPA and ZBLA Supporting Studies

Location: Burnside Avenue, Ottawa, ON.

Date Drilled: March 29, 2018

Drill Type: Rubber Tired Backhoe

Datum: Geodetic Elevation

Logged by: M.L. Checked by: S.P.

Figure No. 12

Page 1 of 1

Split Spoon Sample	⊠	Combustible Vapour Reading	□
Auger Sample	▮	Natural Moisture Content	×
SPT (N) Value	○	Atterberg Limits	⊢—○
Dynamic Cone Test	——	Undrained Triaxial at % Strain at Failure	⊕
Shelby Tube	■	Shear Strength by Penetrometer Test	▲
Shear Strength by Vane Test	+ S		

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth	Standard Penetration Test N Value 20 40 60 80 / Shear Strength kPa 50 100 150 200	Combustible Vapour Reading (ppm) 250 500 750 / Natural Moisture Content % Atterberg Limits (% Dry Weight) 20 40 60	SAMPLES	Natural Unit Wt. kN/m³
		FILL Silty clayey gravel with sand, cobbles and angular blast-rock pieces, brick debris, brown to reddish brown and grey, moist to wet	62.32	0				
			61.1	1				
		Bucket Refusal at 1.2 m Depth						

NOTES:

1. Borehole data requires interpretation by EXP before use by others
2. Test Pit backfilled upon completion.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-00245595-A0

WATER LEVEL RECORDS

Elapsed Time	Water Level (m)	Hole Open To (m)
On Completion	Dry	1.2

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

LOG OF BOREHOLE TP LOGS - 245595 - BURNSIDE AVE.GPJ TROW OTTAWA.GDT 5/9/18

Log of Test Pit TP 6

Project No: OTT-00245595-A0

Project: Preliminary Geotechnical Investigation - Burnside OPA and ZBLA Supporting Studies

Location: Burnside Avenue, Ottawa, ON.

Figure No. 13

Page 1 of 1

Date Drilled: March 29, 2018

Drill Type: Rubber Tired Backhoe

Datum: Geodetic Elevation

Logged by: M.L. Checked by: S.P.

Split Spoon Sample	⊠	Combustible Vapour Reading	□
Auger Sample	▮	Natural Moisture Content	×
SPT (N) Value	○	Atterberg Limits	⊢—○
Dynamic Cone Test	——	Undrained Triaxial at % Strain at Failure	⊕
Shelby Tube	■	Shear Strength by Penetrometer Test	▲
Shear Strength by Vane Test	+ S		

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth	Standard Penetration Test N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Wt kN/m³
		FILL Mixture of silty sand and silty clay, gravel, cobbles, boulders, angular blast-rock pieces, brick debris, brown and grey, moist to wet	63.16	0	20 40 60 80 50 100 150 200 kPa	250 500 750 20 40 60		
				1				
			61.6					
		Bucket Refusal at 1.6 m Depth						

NOTES:

1. Borehole data requires interpretation by EXP before use by others
2. Test Pit backfilled upon completion.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-00245595-A0

WATER LEVEL RECORDS		
Elapsed Time	Water Level (m)	Hole Open To (m)
On Completion	Dry	1.6

CORE DRILLING RECORD			
Run No.	Depth (m)	% Rec.	RQD %

LOG OF BOREHOLE TP LOGS - 245595 - BURNSIDE AVE.GPJ TROW OTTAWA.GDT 5/9/18

Log of Test Pit TP 7

Project No: OTT-00245595-A0

Project: Preliminary Geotechnical Investigation - Burnside OPA and ZBLA Supporting Studies

Location: Burnside Avenue, Ottawa, ON.

Figure No. 14

Page 1 of 1

Date Drilled: March 29, 2018

Drill Type: Rubber Tired Backhoe

Datum: Geodetic Elevation

Logged by: M.L. Checked by: S.P.

Split Spoon Sample	⊠	Combustible Vapour Reading	□
Auger Sample	▮▯	Natural Moisture Content	×
SPT (N) Value	O	Atterberg Limits	⊢—⊖
Dynamic Cone Test	——	Undrained Triaxial at % Strain at Failure	⊕
Shelby Tube	■	Shear Strength by Penetrometer Test	▲
Shear Strength by Vane Test	+ S		

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth
			63.49	0
		TOPSOIL ~50 mm	63.4	
		FILL Mixture of silty sand and silty clay, gravel, cobbles, boulders, angular blast-rock pieces, brick and metal debris, brown and grey, moist		1
			62.0	
		LIMESTONE BEDROCK Weathered, grey	61.8	
		Bucket Refusal at 1.7 m Depth		

Standard Penetration Test N Value: 20 40 60 80

Shear Strength kPa: 50 100 150 200

Combustible Vapour Reading (ppm): 250 500 750

Natural Moisture Content % Atterberg Limits (% Dry Weight): 20 40 60

SAMPLES

Natural Unit Wt. kN/m³

LOG OF BOREHOLE TP LOGS - 245595 - BURNSIDE AVE.GPJ TROW OTTAWA.GDT 5/9/18

NOTES:

1. Borehole data requires interpretation by EXP before use by others
2. Test Pit backfilled upon completion.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-00245595-A0

WATER LEVEL RECORDS

Elapsed Time	Water Level (m)	Hole Open To (m)
On Completion	Dry	1.4

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

Log of Test Pit TP 8

Project No: OTT-00245595-A0

Project: Preliminary Geotechnical Investigation - Burnside OPA and ZBLA Supporting Studies

Location: Burnside Avenue, Ottawa, ON.

Figure No. 15

Page. 1 of 1

Date Drilled: March 29, 2018

Drill Type: Rubber Tired Backhoe

Datum: Geodetic Elevation

Logged by: M.L. Checked by: S.P.

Split Spoon Sample ⊠
Auger Sample ▮▯
SPT (N) Value ○
Dynamic Cone Test ——
Shelby Tube ■
Shear Strength by Vane Test +S

Combustible Vapour Reading □
Natural Moisture Content ×
Atterberg Limits ⊢—○
Undrained Triaxial at % Strain at Failure ⊕
Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth m	Standard Penetration Test N Value 20 40 60 80 / Shear Strength 50 100 150 200 kPa	Combustible Vapour Reading (ppm) 250 500 750 / Natural Moisture Content % Atterberg Limits (% Dry Weight) 20 40 60	SAMPLES	Natural Unit Wt kN/m³
		TOPSOIL ~150 mm	60.27	0				
		FILL Mixture of silty sand and silty clay, gravel, cobbles, boulders, brick and wood debris, brown and grey, moist to wet	60.1					
		GLACIAL TILL Silty clayey sand with gravel, brown, moist to wet	59.6					
		Bucket Refusal at 0.8 m Depth	59.5					

NOTES:

1. Borehole data requires interpretation by EXP before use by others
2. Test Pit backfilled upon completion.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-00245595-A0

WATER LEVEL RECORDS		
Elapsed Time	Water Level (m)	Hole Open To (m)
On Completion	Dry	0.8

CORE DRILLING RECORD			
Run No.	Depth (m)	% Rec.	RQD %

LOG OF BOREHOLE TP LOGS - 245595 - BURNSIDE AVE.GPJ TROW OTTAWA.GDT 5/9/18

Log of Test Pit TP 9

Project No: OTT-00245595-A0

Project: Preliminary Geotechnical Investigation - Burnside OPA and ZBLA Supporting Studies

Location: Burnside Avenue, Ottawa, ON.

Figure No. 16

Page 1 of 1

Date Drilled: March 29, 2018

Drill Type: Rubber Tired Backhoe

Datum: Geodetic Elevation

Logged by: M.L. Checked by: S.P.

Split Spoon Sample ⊠
Auger Sample ▮▯
SPT (N) Value ○
Dynamic Cone Test ——
Shelby Tube ■
Shear Strength by Vane Test +S

Combustible Vapour Reading □
Natural Moisture Content ×
Atterberg Limits |—○
Undrained Triaxial at % Strain at Failure ⊕
Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth
		TOPSOIL ~100 mm	59.78	0
		FILL Gravel with silty clay and sand, cobbles, boulders, angular blast-rock pieces, roots, asphalt, brick, glass, metal debris, dark brown to brown, moist to wet	59.7	
				1
				2
			57.2	
		Bucket Refusal at 2.6 m Depth		

Standard Penetration Test N Value: 20 40 60 80
Shear Strength kPa: 50 100 150 200
Combustible Vapour Reading (ppm): 250 500 750
Natural Moisture Content (% Dry Weight) / Atterberg Limits (% Dry Weight): 20 40 60
SAMPLES
Natural Unit Wt. kN/m³

NOTES:
1. Borehole data requires interpretation by EXP before use by others.
2. Test Pit backfilled upon completion.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions.
5. Log to be read with EXP Report OTT-00245595-A0.

WATER LEVEL RECORDS

Elapsed Time	Water Level (m)	Hole Open To (m)
On Completion	Dry	2.3

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

LOG OF BOREHOLE TP LOGS - 245595 - BURNSIDE AVE.GPJ TROW OTTAWA.GDT 5/9/18

Log of Test Pit TP 10

Project No: OTT-00245595-A0

Project: Preliminary Geotechnical Investigation - Burnside OPA and ZBLA Supporting Studies

Location: Burnside Avenue, Ottawa, ON

Date Drilled: March 29, 2018

Drill Type: Rubber Tired Backhoe

Datum: Geodetic Elevation

Logged by: M.L. Checked by: S.P.

Figure No. 17

Page. 1 of 1

Split Spoon Sample ⊠
Auger Sample ▮▯
SPT (N) Value ○
Dynamic Cone Test ——
Shelby Tube ■
Shear Strength by Vane Test +S

Combustible Vapour Reading □
Natural Moisture Content ×
Atterberg Limits ⊢—○
Undrained Triaxial at % Strain at Failure ⊕
Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth	Standard Penetration Test N Value (20, 40, 60, 80) / Shear Strength kPa (50, 100, 150, 200)	Combustible Vapour Reading ppm (250, 500, 750) / Natural Moisture Content % Atterberg Limits (% Dry Weight) (20, 40, 60)	SAMPLES	Natural Unit Wt kN/m³
		FILL Mixture of silty sand and silty clay, gravel, cobbles, boulders and angular blast-rock pieces, reddish brown and grey, moist to wet	62.37	0		×		
		Bucket Refusal at 0.9 m Depth	61.5					

NOTES:
1. Borehole data requires interpretation by EXP before use by others
2. Test Pit backfilled upon completion.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions.
5. Log to be read with EXP Report OTT-00245595-A0

WATER LEVEL RECORDS

Elapsed Time	Water Level (m)	Hole Open To (m)
On Completion	Dry	0.9

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

LOG OF BOREHOLE TP LOGS - 245595 - BURNSIDE AVE.GPJ TROW/OTTAWA.GDT 5/9/18

Log of Test Pit TP 11

Project No: OTT-00245595-A0

Project: Preliminary Geotechnical Investigation - Burnside OPA and ZBLA Supporting Studies

Location: Burnside Avenue, Ottawa, ON.

Figure No. 18

Page 1 of 1

Date Drilled: March 29, 2018

Drill Type: Rubber Tired Backhoe

Datum: Geodetic Elevation

Logged by: M.L. Checked by: S.P.

Split Spoon Sample ⊠
Auger Sample ▮▮
SPT (N) Value ○
Dynamic Cone Test ——
Shelby Tube ■
Shear Strength by Vane Test +S

Combustible Vapour Reading □
Natural Moisture Content ×
Atterberg Limits |—○
Undrained Triaxial at % Strain at Failure ⊕
Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth
		TOPSOIL ~ 100 mm	57.22	0
		FILL Silty clayey gravel with sand, cobbles, angular blast-rock pieces, asphalt, brick and wood debris, brown and grey, moist	57.1	
				1
				2
				3
		Test Pit Terminated at 3.2 m Depth	54.0	

Standard Penetration Test N Value: 20 40 60 80
Shear Strength kPa: 50 100 150 200
Combustible Vapour Reading (ppm): 250 500 750
Natural Moisture Content % / Atterberg Limits (% Dry Weight): 20 40 60
SAMPLES
Natural Unit Wt kN/m³

LOG OF BOREHOLE TP LOGS - 245595 - BURNSIDE AVE.GPJ TROW OTTAWA.GDT 5/9/18

NOTES:
1. Borehole data requires interpretation by EXP before use by others
2. Test Pit backfilled upon completion.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-00245595-A0

WATER LEVEL RECORDS

Elapsed Time	Water Level (m)	Hole Open To (m)
On Completion	Dry	2.6

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

Log of Test Pit TP 12

Project No: OTT-00245595-A0

Project: Preliminary Geotechnical Investigation - Burnside OPA and ZBLA Supporting Studies

Location: Burnside Avenue, Ottawa, ON.

Figure No. 19

Page. 1 of 1

Date Drilled: 'March 29, 2018

Drill Type: Rubber Tired Backhoe

Datum: Geodetic Elevation

Logged by: M.L. Checked by: S.P.

Split Spoon Sample
Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Shear Strength by Vane Test (S)
Combustible Vapour Reading
Natural Moisture Content
Atterberg Limits
Undrained Triaxial at % Strain at Failure
Shear Strength by Penetrometer Test

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth	Standard Penetration Test N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Wt. kN/m³
		TOPSOIL ~100 mm	57.36 / 57.3	0	20 40 60 80 / 50 100 150 200	250 500 750 / 20 40 60		
		FILL Mixture of silty sand and silty clay, gravel, cobbles, boulders, angular blast-rock pieces, roots, asphalt, brick and concrete pieces, brown to dark brown, moist to wet		1				
		GLACIAL TILL Silty sand with clay, gravel, cobbles, brown and grey, moist	55.7 / 55.4					
		Bucket Refusal at 2.0 m Depth		2				

NOTES:

1. Borehole data requires interpretation by EXP before use by others
2. Test Pit backfilled upon completion.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-00245595-A0

WATER LEVEL RECORDS		
Elapsed Time	Water Level (m)	Hole Open To (m)
On Completion	Dry	1.9

CORE DRILLING RECORD			
Run No.	Depth (m)	% Rec.	RQD %

LOG OF BOREHOLE TP LOGS - 245595 - BURNSIDE AVE.GPJ TROW.OTTAWA.GDT 5/9/18

Log of Test Pit TP 13

Project No: OTT-00245595-A0

Project: Preliminary Geotechnical Investigation - Burnside OPA and ZBLA Supporting Studies

Location: Burnside Avenue, Ottawa, ON.

Figure No. 20

Page 1 of 1

Date Drilled: March 29, 2018

Drill Type: Rubber Tired Backhoe

Datum: Geodetic Elevation

Logged by: M.L. Checked by: S.P.

Split Spoon Sample	⊠	Combustible Vapour Reading	□
Auger Sample	▮	Natural Moisture Content	×
SPT (N) Value	○	Atterberg Limits	⊢—○
Dynamic Cone Test	——	Undrained Triaxial at % Strain at Failure	⊕
Shelby Tube	■	Shear Strength by Penetrometer Test	▲
Shear Strength by Vane Test	+ S		

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic Elevation m	Depth m	Standard Penetration Test N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SPT 'N' Value	Natural Unit Wt kN/m³
		TOPSOIL ~100 mm	56.79	0	20 40 60 80 / 50 100 150 200	250 500 750 / 20 40 60		
			56.7					
		FILL Sand with silt and gravel, cobbles, boulders, angular blast-rock pieces, roots, brick debris, brown and grey, moist to wet		1		×		
				2		×		
			53.8	3				
		Test Pit Terminated at 3.0 m Depth						

NOTES:

1. Borehole data requires interpretation by EXP before use by others
2. Test Pit backfilled upon completion.
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-00245595-A0

WATER LEVEL RECORDS		
Elapsed Time	Water Level (m)	Hole Open To (m)
On Completion	Dry	2.6

CORE DRILLING RECORD			
Run No.	Depth (m)	% Rec.	RQD %

LOG OF BOREHOLE TP LOGS - 245595 - BURNSIDE AVE.GPJ TROW OTTAWA.GDT 5/9/18

BOREHOLE STRATIGRAPHIC AND INSTRUMENTATION LOG

Borehole Number: BH19-01

Project Number: 18-262-1
Client: National Capital Commission
Site Location: Burnside NCC
Coordinates: 365073E, 5030276N (MTM)
Drilling Method: Direct Push
Drilling Rig: Geomachine GM100GT

MOE Well ID: N/A
Date Completed: May 24, 2019
Supervisor: CAM
Logged By: CAM
Ground Surface Elevation: 56.92 mASL
Date of Water Level Measurement: N/A

DEPTH BGS (ft / m)	SAMPLES	LAB SAMPLE	BLOW COUNT	CGI (ppm)	PID (ppm)	LOG	SRATIGRAPHIC DESCRIPTION	INSTALLATION
0 / 0							GROUND SURFACE	No Well Installation
0 – 1 / 0 – 0.3							TOPSOIL silty sand and clay, fine to medium grained, low plasticity, no odour, light brown, moist to dry.	
1 – 3 / 0.3 – 1		X		0	0		FILL silty sand and gravel, some plant debris, medium to coarse grained, no odour, brown and grey, dry.	
3 / 1							BOREHOLE TERMINATED Total Depth of BH19-01 1.07 mBGS	

BOREHOLE STRATIGRAPHIC AND INSTRUMENTATION LOG

Borehole Number: BH19-02

Project Number: 18-262-1
Client: National Capital Commission
Site Location: Burnside NCC
Coordinates: 365127E, 5030264N (MTM)
Drilling Method: Direct Push
Drilling Rig: Geomachine GM100GT

MOE Well ID: N/A
Date Completed: May 24, 2019
Supervisor: CAM
Logged By: CAM
Ground Surface Elevation: 56.21 mASL
Date of Water Level Measurement: N/A

DEPTH BGS (ft / m)	SAMPLES	LAB SAMPLE	BLOW COUNT	CGI (ppm)	PID (ppm)	LOG	SRATIGRAPHIC DESCRIPTION	INSTALLATION
0 / 0							GROUND SURFACE	No Well Installation
0 – 0.5							TOPSOIL sandy silt with some plant debris, fine grained, no odour, brown, moist.	
0.5 – 3		X		5	1		FILL silty sand and gravel, coarse grained, no odour, light brown, dry.	
3 – 10				5	1			
10 – 15		X		0	0		SAND poorly sorted sand, coarse grained, no odour, brown, wet.	
15 – 16.5				0	0		SAND sand to silty sand, coarsens upwards, fine to medium grained, no odour, brown-grey, wet.	
16.5 / 5.03							BOREHOLE TERMINATED Total Depth of BH19-02 5.03 mBGS	

BOREHOLE STRATIGRAPHIC AND INSTRUMENTATION LOG

Borehole Number: BH19-03

Project Number: 18-262-1
Client: National Capital Commission
Site Location: Burnside NCC
Coordinates: 365016E, 5030302N (MTM)
Drilling Method: Direct Push
Drilling Rig: Geomachine GM100GT

MOE Well ID: N/A
Date Completed: May 24, 2019
Supervisor: CAM
Logged By: CAM
Ground Surface Elevation: 56.51 mASL
Date of Water Level Measurement: N/A

DEPTH BGS (ft / m)	SAMPLES	LAB SAMPLE	BLOW COUNT	CGI (ppm)	PID (ppm)	LOG	SRATIGRAPHIC DESCRIPTION	INSTALLATION
0 / 0							GROUND SURFACE	No Well Installation
0 – 2 / 0 – 1							TOPSOIL clay and silt, fine grained, low plasticity, no odour, grey, moist.	
2 – 3 / 1		X		5	1		FILL silty sand and gravel, medium to coarse grained, no odour, brown, dry.	
							BOREHOLE TERMINATED Total Depth of BH19-03 0.76 mBGS	

BOREHOLE STRATIGRAPHIC AND INSTRUMENTATION LOG

Borehole Number: BH19-04

Project Number: 18-262-1
Client: National Capital Commission
Site Location: Burnside NCC
Coordinates: 365001E, 5030266N (MTM)
Drilling Method: Direct Push
Drilling Rig: Geomachine GM100GT

MOE Well ID: N/A
Date Completed: May 24, 2019
Supervisor: CAM
Logged By: CAM
Ground Surface Elevation: 59.83 mASL
Date of Water Level Measurement: N/A

DEPTH BGS (ft / m)	SAMPLES	LAB SAMPLE	BLOW COUNT	CGI (ppm)	PID (ppm)	LOG	SRATIGRAPHIC DESCRIPTION	INSTALLATION
0 / 0							GROUND SURFACE	No Well Installation
0 – 0.5							TOPSOIL silt, fine grained, no odour, brown-grey, moist.	
0.5 – 5 / 0 – 1.52		X		5	1		FILL silty sand and gravel, no odour, brown, moist to wet.	
5 / 1.52							BOREHOLE TERMINATED Total Depth of BH19-04 1.52 mBGS	

BOREHOLE STRATIGRAPHIC AND INSTRUMENTATION LOG

Borehole Number: BH19-05

Project Number: 18-262-1
Client: National Capital Commission
Site Location: Burnside NCC
Coordinates: 364942E, 5030203N (MTM)
Drilling Method: Direct Push
Drilling Rig: Geomachine GM100GT

MOE Well ID: N/A
Date Completed: May 24, 2019
Supervisor: CAM
Logged By: CAM
Ground Surface Elevation: 63.58 mASL
Date of Water Level Measurement: N/A

DEPTH BGS (ft / m)	SAMPLES	LAB SAMPLE	BLOW COUNT	CGI (ppm)	PID (ppm)	LOG	SRATIGRAPHIC DESCRIPTION	INSTALLATION
0							GROUND SURFACE	No Well Installation
0 – 1							TOPSOIL silt with organic material, fine grained, no odour, grey, moist to dry.	
1 – 2		X		15	1		FILL silty sand with gravel, some brick fragments, medium to coarse grained, no odour, brown, moist.	
2 – 3 / 1							BOREHOLE TERMINATED Total Depth of BH19-05 0.76 mBGS	
3 – 18 / 1 – 5								

Prepared By: CAM
Reviewed By: TKG
Doc: 18-262-1_R0A.GPJ
Template: GEOFIRMA_TEMPLATE.GDT

Geofirma Engineering Ltd

BOREHOLE STRATIGRAPHIC AND INSTRUMENTATION LOG

Borehole Number: BH19-06

Project Number: 18-262-1
Client: National Capital Commission
Site Location: Burnside NCC
Coordinates: 364933E, 5030262N (MTM)
Drilling Method: Direct Push
Drilling Rig: Geomachine GM100GT

MOE Well ID: N/A
Date Completed: May 24, 2019
Supervisor: CAM
Logged By: CAM
Ground Surface Elevation: 62.55 mASL
Date of Water Level Measurement: N/A

DEPTH BGS (ft / m)	SAMPLES	LAB SAMPLE	BLOW COUNT	CGI (ppm)	PID (ppm)	LOG	SRATIGRAPHIC DESCRIPTION	INSTALLATION
0 / 0							GROUND SURFACE	No Well Installation
0 – 1 / 0							TOPSOIL sandy silt and clay, fine grained, low plasticity, no odour, grey, moist to dry.	
1 – 2 / 0 – 1		X		5	0		FILL gravel and sand, coarse grained, no odour, grey-brown, dry.	
2.5 / 0.76							BOREHOLE TERMINATED Total Depth of BH19-06 0.76 mBGS	

BOREHOLE STRATIGRAPHIC AND INSTRUMENTATION LOG

Borehole Number: BH19-07

Project Number: 18-262-1
Client: National Capital Commission
Site Location: Burnside NCC
Coordinates: 364939E, 5030273N (MTM)
Drilling Method: Direct Push
Drilling Rig: Geomachine GM100GT

MOE Well ID: N/A
Date Completed: May 24, 2019
Supervisor: CAM
Logged By: CAM
Ground Surface Elevation: 62.12 mASL
Date of Water Level Measurement: N/A

DEPTH BGS (ft / m)	SAMPLES	LAB SAMPLE	BLOW COUNT	CGI (ppm)	PID (ppm)	LOG	SRATIGRAPHIC DESCRIPTION	INSTALLATION
0 / 0							GROUND SURFACE	No Well Installation
0 – 1.5							TOPSOIL clay, fine grained, plastic, no odour, grey, moist.	
1.5 – 4.5 / 0.5 – 1.4		X		0	0		FILL sand with some gravel, brick fragments, medium grained, no odour, brown, moist to dry.	
4.5 / 1.4							BOREHOLE TERMINATED Total Depth of BH19-07 1.37 mBGS	

BOREHOLE STRATIGRAPHIC AND INSTRUMENTATION LOG

Borehole Number: BH19-08

Project Number: 18-262-1
Client: National Capital Commission
Site Location: Burnside NCC
Coordinates: 364838E, 5030312N (MTM)
Drilling Method: Direct Push
Drilling Rig: Geomachine GM100GT

MOE Well ID: N/A
Date Completed: May 24, 2019
Supervisor: CAM
Logged By: CAM
Ground Surface Elevation: 59.36 mASL
Date of Water Level Measurement: N/A

DEPTH BGS (ft / m)	SAMPLES	LAB SAMPLE	BLOW COUNT	CGI (ppm)	PID (ppm)	LOG	SRATIGRAPHIC DESCRIPTION	INSTALLATION
0							GROUND SURFACE	No Well Installation
0 – 0.5							TOPSOIL silt and clay, fine to medium grained, no odour, brown, moist.	
0.5 – 2		X		5	0		FILL silt with sand, some gravel, coarse grained, no odour, grey-brown, moist.	
2 (0.61 m)							BOREHOLE TERMINATED Total Depth of BH19-08 0.61 mBGS	

Prepared By: CAM
Reviewed By: TKG
Doc: 18-262-1_R0A.GPJ
Template: GEOFIRMA_TEMPLATE.GDT

Geofirma Engineering Ltd

BOREHOLE STRATIGRAPHIC AND INSTRUMENTATION LOG

Borehole Number: BH19-09

Project Number: 18-262-1
Client: National Capital Commission
Site Location: Burnside NCC
Coordinates: 364848E, 5030259N (MTM)
Drilling Method: Direct Push
Drilling Rig: Geomachine GM100GT

MOE Well ID: N/A
Date Completed: May 24, 2019
Supervisor: CAM
Logged By: CAM
Ground Surface Elevation: 60.90 mASL
Date of Water Level Measurement: N/A

DEPTH BGS (ft / m)	SAMPLES	LAB SAMPLE	BLOW COUNT	CGI (ppm)	PID (ppm)	LOG	SRATIGRAPHIC DESCRIPTION	INSTALLATION
0 / 0							GROUND SURFACE	No Well Installation
0 – 1 / 0 – 0.3							TOPSOIL sand with silt, fine to medium grained, no odour, brown, moist.	
1 – 2 / 0.3 – 0.6		X		5	1		FILL gravel and sand, coarse grained, no odour, grey, dry.	
2 / 0.6							BOREHOLE TERMINATED Total Depth of BH19-09 0.61 mBGS	

BOREHOLE STRATIGRAPHIC AND INSTRUMENTATION LOG

Borehole Number: BH19-10

Project Number: 18-262-1
Client: National Capital Commission
Site Location: Burnside NCC
Coordinates: 364839E, 5030263N (MTM)
Drilling Method: Direct Push
Drilling Rig: Geomachine GM100GT

MOE Well ID: N/A
Date Completed: May 24, 2019
Supervisor: CAM
Logged By: CAM
Ground Surface Elevation: 60.63 mASL
Date of Water Level Measurement: N/A

DEPTH BGS (ft / m)	SAMPLES	LAB SAMPLE	BLOW COUNT	CGI (ppm)	PID (ppm)	LOG	SRATIGRAPHIC DESCRIPTION	INSTALLATION
0 / 0				5	1		GROUND SURFACE	No Well Installation
0 / 0							TOPSOIL silty sand, organic, fine to medium grained, no odour, brown, moist.	
1 / 0.3		X					FILL gravel with sand, coarse grained, no odour, grey, dry.	
3.5 / 1							BOREHOLE TERMINATED Total Depth of BH19-10 1.07 mBGS	

Appendix C

Laboratory Certificates of Analysis

ACCUTEST LABORATORIES LTD.

REPORT OF ANALYSIS

Client: Duke Engineering & Services
Attn: Ms. Krista Trounce

Report Number: 2005493
Date: Jun 20,2000
Date Submitted: Jun 8,2000
Date Collected: Jun 8,2000
Project: 99-202-18

Sample Matrix: SOIL

PARAMETER	UNITS	MDL	RN 70595 TP-7				
Acenaphthylene	µg/g	0.1	0.2				
Acenaphthene	µg/g	0.1	1.7				
Anthracene	µg/g	0.1	9.0				
Benzo(a)anthracene	µg/g	0.1	24.8				
Benzo(a)pyrene	µg/g	0.1	14.7				
Benzo(b)fluoranthene	µg/g	0.1	10.8				
Benzo(k)fluoranthene	µg/g	0.1	3.2				
Benzo(g,h,i)perylene	µg/g	0.1	2.4				
Chrysene	µg/g	0.1	17.5				
Dibenzo(a,h)anthracene	µg/g	0.1	0.6				
Fluoranthene	µg/g	0.1	43.0				
Fluorene	µg/g	0.1	2.2				
Indeno(1,2,3-c,d)pyrene	µg/g	0.1	1.4				
Naphthalene	µg/g	0.1	1.5				
Phenanthrene	µg/g	0.1	32.2				
Pyrene	µg/g	0.1	38.3				

ND = Not Detected (< MDL) MDL = Method Detection Limit

Comment:

APPROVAL: _____

146 Colonnade Road, Unit 8, Nepean, Ontario K2E 7Y1 Tel:(613)727-5692 Fax:(613)727-5222

ACCUTEST LABORATORIES LTD.

REPORT OF ANALYSIS

Client: Duke Engineering & Services

ATT: Ms. Krista Trounce

Report Number: 2005493
Date: 2000-06-20
Date Submitted: 2000-06-08
Date Collected: 2000-06-08
Project: 99-202-18

P.O. Number:
Matrix: Soil

PARAMETER	UNITS	MDL	70594 TP-6	70596 TP-1	70597 TP-3		
Ag	ug/g	1	<1	<1	<1		
Al	ug/g	1	11000	5200	10500		
Ba	ug/g	1	123	48	152		
Be	ug/g	1	<1	<1	<1		
Ca	ug/g	100	205000	104000	118000		
Cd	ug/g	0.5	<0.5	<0.5	0.9		
Co	ug/g	1	1	<1	<1		
Cr	ug/g	1	22	16	25		
Cu	ug/g	1	16	11	36		
Fe	ug/g	1	13700	8220	13700		
Pb	ug/g	3	41	16	165		
Mg	ug/g	100	33400	14700	8000		
Mn	ug/g	1	466	261	471		
Mo	ug/g	1	3	3	29		
Ni	ug/g	1	14	10	16		
K	ug/g	100	4970	1530	3050		
Na	ug/g	100	1280	949	1140		
Sr	ug/g	1	234	74	137		
Tl	ug/g	4	<4	<4	<4		
V	ug/g	1	26	17	24		
Zn	ug/g	1	51	30	273		

MDL = Method Detection Limit INC = Incomplete

Comment:

Metals analysis was performed on an aqua-regia digest of the sample material.

APPROVAL:

146 Colonnade Road, Unit 8, Nepean, Ontario, K2E 7Y1 Tel:(613)727-5692 Fax:(613)727-5222

Paracel Laboratories Ltd.

Certificate of Analysis

Order #: F1669

Duke Engineering & Services Inc.
265 Carling Avenue, suite 208
Ottawa, Ontario K1S 2E1
Attn: **Ms. Krista Trounce**

Tel: 613-232-2525
Fax: 613-232-7149

Client Reference:
Project: 00-313-12
Reference:

Report Date: 12/05/00
Order Date: 11/28/00
Sample Date: 11/22/00

This Certificate of Analysis contains analytical data for the following samples:

Paracel ID	Client ID
F1669.1	TP-46 (1.3)
F1669.2	TP-47 (0.55)
F1669.3	TP-48 (0.8)
F1669.4	TP-49 (0.5)
F1669.5	TP-39 (0.5)
F1669.6	TP-40 (0.9)
F1669.7	TP-42 (0.4)
F1669.8	TP-36 (1.2)
F1669.9	TP-33 (0.7)
F1669.10	TP-32 (1.3)
F1669.11	TP-29 (0.7)
F1669.12	TP-26 (0.3)
F1669.13	TP-15 (1.0)
F1669.14	TP-11 (1.5)
F1669.15	TP-6 (0.9)
F1669.16	TP-1 (0.4)
F1669.17	TP-4 (1.2)
F1669.18	TP-23 (1.2)
F1669.19	TP-20 (2.5)
F1669.20	TP-8 (0.8)
F1669.21	TP-18 (1.4)
F1669.22	TP-32 (0.3)
F1669.23	TP-33 (0.4)
F1669.24	TP-26 (0.8)
F1669.25	TP-15 (2.0)
F1669.26	TP-4 (0.8)
F1669.27	TP-20 (1.5)
F1669.28	TP-9 (0.4)
F1669.29	TP-8 (2.9)
F1669.30	TP-6 (2.5)
F1669.31	TP-17 (0.5)
F1669.32	TP-44 (0.8)
F1669.33	TP-34 (0.8)
F1669.34	TP-35 (1.2)
F1669.35	TP-30 (0.7)
F1669.36	TP-16 (1.5)
F1669.37	TP-5 (0.8)
F1669.38	TP-28 (0.2)
F1669.39	TP-22 (0.4)
F1669.40	TP-31 (0.4)
F1669.41	TP-10 (0.3)
F1669.42	TP-12 (2.6)
F1669.43	TP-2 (0.4)
F1669.44	TP-12 (1.3)
F1669.45	TP-3 (1.3)
F1669.46	TP-45 (1.0)
F1669.47	TP-37 (0.5)
F1669.48	TP-41 (0.2)
F1669.49	TP-38 (0.4)
F1669.50	TP-43 (0.5)
F1669.51	TP-7 (1.5)
F1669.52	TP-13 (2.5)
F1669.53	TP-27 (0.4)
F1669.54	TP-21 (0.45)
F1669.55	TP-19 (2.0)
F1669.56	TP-13 (0.9)
F1669.57	TP-25 (0.6)
F1669.58	TP-14 (2.9)
F1669.59	TP-14 (2.0)
F1669.60	TP-24 (0.2)

Approval: Dale Robertson, B.Sc.

Paracel Laboratories Ltd.

Certificate of Analysis

Order #: F1669

Report Date: 12/05/00
Order Date: 11/28/00
Sample Date: 11/22/00

Client: **Duke Engineering & Services Inc.**

Client Ref:

Project: **00-313-12**

Matrix: Soil

Parameter	MDL	TP-46 (1.3) F1669.1	TP-47 (0.55) F1669.2	TP-48 (0.8) F1669.3
Antimony	1.0 ug/g	4.0	< 1.0	< 1.0
Arsenic	1.0 ug/g	5.0	2.0	8.0
Barium	10 ug/g	270	440	180
Beryllium	0.50 ug/g	0.50	0.50	1.0
Cadmium	1.0 ug/g	< 1.0	< 1.0	< 1.0
Calcium	200 ug/g	33000	18000	27000
Chromium	5.0 ug/g	25	75	20
Cobalt	5.0 ug/g	10	15	5.0
Copper	5.0 ug/g	45	45	20
Iron	200 ug/g	23000	33000	24000
Lead	5.0 ug/g	510	180	190
Magnesium	200 ug/g	4400	18000	5600
Molybdenum	1.0 ug/g	1.0	< 1.0	< 1.0
Nickel	5.0 ug/g	20	45	15
Selenium	1.0 ug/g	< 1.0	< 1.0	< 1.0
Silver	5.0 ug/g	< 5.0	< 5.0	< 5.0
Sodium	200 ug/g	400	1000	200
Thallium	1.0 ug/g	< 1.0	< 1.0	< 1.0
Tin	5.0 ug/g	15	< 5.0	5.0
Vanadium	10 ug/g	20	70	20
Zinc	20 ug/g	220	160	100
Acenaphthene	0.017 ug/g	0.072	0.019	0.039
Acenaphthylene	0.017 ug/g	0.16	0.057	0.14
Anthracene	0.017 ug/g	0.36	0.11	0.21
Benzo[a]anthracene	0.017 ug/g	0.63	0.21	0.46
Benzo[a]pyrene	0.017 ug/g	0.85	0.19	0.50
Benzo[b+k]fluoranthene	0.033 ug/g	1.1	0.31	0.81
Benzo[ghi]perylene	0.017 ug/g	0.33	0.11	0.27
Biphenyl	0.017 ug/g	< 0.018	< 0.019	< 0.019
Chrysene	0.017 ug/g	0.62	0.19	0.44
Dibenzo[a,h]anthracene	0.017 ug/g	0.16	0.057	0.12
Fluoranthene	0.017 ug/g	1.4	0.34	1.1
Fluorene	0.017 ug/g	0.11	0.038	0.077
Indeno[1,2,3-cd]pyrene	0.017 ug/g	0.36	0.11	0.29

		TP-46 (1.3)	TP-47 (0.55)	TP-48 (0.8)
		F1669.1	F1669.2	F1669.3
1-Methylnaphthalene	0.017 ug/g	0.054	< 0.019	0.019
2-Methylnaphthalene	0.017 ug/g	0.054	< 0.019	0.039
Naphthalene	0.017 ug/g	0.11	< 0.019	0.039
Phenanthrene	0.017 ug/g	0.94	0.27	0.83
Pyrene	0.017 ug/g	1.2	0.29	0.91
2-Fluorobiphenyl	surrogate	123%	106%	117%
p-Terphenyl d-14	surrogate	112%	93%	120%

Matrix: Soil

Parameter	MDL	TP-49 (0.5)	TP-39 (0.5)	TP-40 (0.9)
		F1669.4	F1669.5	F1669.6
Antimony	1.0 ug/g	2.0	< 1.0	< 1.0
Arsenic	1.0 ug/g	8.0	3.0	8.0
Barium	10 ug/g	610	210	440
Beryllium	0.50 ug/g	0.50	< 0.50	0.50
Cadmium	1.0 ug/g	1.0	< 1.0	1.0
Calcium	200 ug/g	35000	55000	23000
Chromium	5.0 ug/g	25	20	25
Cobalt	5.0 ug/g	5.0	5.0	5.0
Copper	5.0 ug/g	65	25	45
Iron	200 ug/g	19000	14000	26000
Lead	5.0 ug/g	1100	520	390
Magnesium	200 ug/g	4400	9800	5200
Molybdenum	1.0 ug/g	< 1.0	< 1.0	1.0
Nickel	5.0 ug/g	20	15	20
Selenium	1.0 ug/g	1.0	< 1.0	1.0
Silver	5.0 ug/g	< 5.0	< 5.0	< 5.0
Sodium	200 ug/g	400	400	400
Thallium	1.0 ug/g	< 1.0	< 1.0	< 1.0
Tin	5.0 ug/g	20	10	50
Vanadium	10 ug/g	20	20	20
Zinc	20 ug/g	420	180	300
Acenaphthene	0.017 ug/g	< 0.98	0.18	0.021
Acenaphthylene	0.017 ug/g	0.98	0.18	0.18
Anthracene	0.017 ug/g	2.0	0.71	0.21
Benzo[a]anthracene	0.017 ug/g	3.9	1.1	0.55

		TP-49 (0.5)	TP-39 (0.5)	TP-40 (0.9)
		F1669.4	F1669.5	F1669.6
Benzo[a]pyrene	0.017 ug/g	2.9	0.71	0.62
Benzo[b+k]fluoranthene	0.033 ug/g	5.9	1.4	0.98
Benzo[ghi]perylene	0.017 ug/g	2.0	0.53	0.33
Biphenyl	0.017 ug/g	< 0.98	< 0.18	< 0.021
Chrysene	0.017 ug/g	3.9	1.2	0.57
Dibenzo[a,h]anthracene	0.017 ug/g	< 0.98	< 0.18	0.14
Fluoranthene	0.017 ug/g	6.9	2.6	0.96
Fluorene	0.017 ug/g	< 0.98	0.18	0.041
Indeno[1,2,3-cd]pyrene	0.017 ug/g	2.0	0.35	0.35
1-Methylnaphthalene	0.017 ug/g	< 0.98	< 0.18	< 0.021
2-Methylnaphthalene	0.017 ug/g	< 0.98	< 0.18	< 0.021
Naphthalene	0.017 ug/g	< 0.98	< 0.18	0.021
Phenanthrene	0.017 ug/g	4.9	2.1	0.41
Pyrene	0.017 ug/g	5.9	2.1	0.86
2-Fluorobiphenyl	surrogate	NA - Dilution	NA - Dilution	124%
p-Terphenyl d-14	surrogate	NA - Dilution	NA - Dilution	108%

Matrix: Soil

Parameter	MDL	TP-42 (0.4)	TP-36 (1.2)	TP-33 (0.7)
		F1669.7	F1669.8	F1669.9
Antimony	1.0 ug/g	< 1.0	< 1.0	
Arsenic	1.0 ug/g	3.0	3.0	
Barium	10 ug/g	160	320	
Beryllium	0.50 ug/g	1.0	< 0.50	
Cadmium	1.0 ug/g	< 1.0	< 1.0	
Calcium	200 ug/g	47000	100000	
Chromium	5.0 ug/g	35	20	
Cobalt	5.0 ug/g	10	< 5.0	
Copper	5.0 ug/g	20	20	
Iron	200 ug/g	22000	6200	
Lead	5.0 ug/g	120	170	
Magnesium	200 ug/g	13000	5200	
Molybdenum	1.0 ug/g	< 1.0	< 1.0	
Nickel	5.0 ug/g	25	15	
Selenium	1.0 ug/g	< 1.0	< 1.0	
Silver	5.0 ug/g	< 5.0	< 5.0	

		TP-42 (0.4)	TP-36 (1.2)	TP-33 (0.7)
		F1669.7	F1669.8	F1669.9
Sodium	200 ug/g	400	400	
Thallium	1.0 ug/g	< 1.0	< 1.0	
Tin	5.0 ug/g	< 5.0	15	
Vanadium	10 ug/g	30	10	
Zinc	20 ug/g	180	240	
Acenaphthene	0.017 ug/g	0.037	< 0.71	0.052
Acenaphthylene	0.017 ug/g	0.13	6.4	0.12
Anthracene	0.017 ug/g	0.20	11	0.19
Benzo[a]anthracene	0.017 ug/g	0.48	16	0.38
Benzo[a]pyrene	0.017 ug/g	0.56	13	0.48
Benzo[b+k]fluoranthene	0.033 ug/g	0.81	21	0.73
Benzo[ghi]perylene	0.017 ug/g	0.26	5.6	0.26
Biphenyl	0.017 ug/g	< 0.019	< 0.71	< 0.017
Chrysene	0.017 ug/g	0.48	14	0.40
Dibenzo[a,h]anthracene	0.017 ug/g	0.11	2.8	0.10
Fluoranthene	0.017 ug/g	0.93	38	0.73
Fluorene	0.017 ug/g	0.037	0.71	0.052
Indeno[1,2,3-cd]pyrene	0.017 ug/g	0.28	7.1	0.26
1-Methylnaphthalene	0.017 ug/g	< 0.019	< 0.71	0.017
2-Methylnaphthalene	0.017 ug/g	< 0.019	< 0.71	0.035
Naphthalene	0.017 ug/g	0.019	< 0.71	0.035
Phenanthrene	0.017 ug/g	0.43	13	0.45
Pyrene	0.017 ug/g	0.85	27	0.62
2-Fluorobiphenyl	surrogate	115%	NA - Dilution	106%
p-Terphenyl d-14	surrogate	101%	NA - Dilution	89%

Matrix: Soil

Parameter	MDL	TP-32 (1.3)	TP-29 (0.7)	TP-26 (0.3)
		F1669.10	F1669.11	F1669.12
Antimony	1.0 ug/g		< 1.0	
Arsenic	1.0 ug/g		5.0	
Barium	10 ug/g		200	
Beryllium	0.50 ug/g		< 0.50	
Cadmium	1.0 ug/g		1.0	
Calcium	200 ug/g		54000	
Chromium	5.0 ug/g		15	

Paracel Laboratories Ltd.

Certificate of Analysis

Order #: F1669

Report Date: 12/05/00
Order Date: 11/28/00
Sample Date: 11/22/00

Client: **Duke Engineering & Services Inc.**

Client Ref:

Project: **00-313-12**

		TP-32 (1.3)	TP-29 (0.7)	TP-26 (0.3)
		F1669.10	F1669.11	F1669.12
Cobalt	5.0 ug/g		< 5.0	
Copper	5.0 ug/g		130	
Iron	200 ug/g		15000	
Lead	5.0 ug/g		480	
Magnesium	200 ug/g		5200	
Molybdenum	1.0 ug/g		< 1.0	
Nickel	5.0 ug/g		25	
Selenium	1.0 ug/g		1.0	
Silver	5.0 ug/g		< 5.0	
Sodium	200 ug/g		400	
Thallium	1.0 ug/g		< 1.0	
Tin	5.0 ug/g		15	
Vanadium	10 ug/g		20	
Zinc	20 ug/g		1300	
Benzene	0.040 ug/g		< 0.040	
Ethylbenzene	0.040 ug/g		< 0.040	
Toluene	0.040 ug/g		< 0.040	
m/p-Xylene	0.040 ug/g		< 0.040	
o-Xylene	0.040 ug/g		< 0.040	
Toluene-D8	surrogate		96%	
Petroleum Hydrocarbons (gasoline)	10 ug/g		< 10	
Petroleum Hydrocarbons (diesel)	10 ug/g		360	
Petroleum Hydrocarbons (heavy oils)	50 ug/g		500	
Acenaphthene	0.017 ug/g	< 0.018	2.5	< 0.018
Acenaphthylene	0.017 ug/g	0.054	1.8	0.12
Anthracene	0.017 ug/g	0.054	6.2	0.12
Benzo[a]anthracene	0.017 ug/g	0.11	12	0.23
Benzo[a]pyrene	0.017 ug/g	0.11	16	0.39
Benzo[b+k]fluoranthene	0.033 ug/g	0.18	20	0.43
Benzo[ghi]perylene	0.017 ug/g	0.054	5.7	0.16
Biphenyl	0.017 ug/g	< 0.018	0.22	< 0.018
Chrysene	0.017 ug/g	0.11	11	0.23
Dibenzo[a,h]anthracene	0.017 ug/g	0.018	2.8	0.071
Fluoranthene	0.017 ug/g	0.20	23	0.46
Fluorene	0.017 ug/g	< 0.018	2.6	0.018

		TP-32 (1.3)	TP-29 (0.7)	TP-26 (0.3)
		F1669.10	F1669.11	F1669.12
Indeno[1,2,3-cd]pyrene	0.017 ug/g	0.054	5.7	0.16
1-Methylnaphthalene	0.017 ug/g	< 0.018	1.0	< 0.018
2-Methylnaphthalene	0.017 ug/g	< 0.018	1.2	< 0.018
Naphthalene	0.017 ug/g	< 0.018	1.6	< 0.018
Phenanthrene	0.017 ug/g	0.072	19	0.21
Pyrene	0.017 ug/g	0.18	18	0.39
2-Fluorobiphenyl	surrogate	108%	NA - Dilution	119%
p-Terphenyl d-14	surrogate	89%	NA - Dilution	106%

Matrix: Soil

Parameter	MDL	TP-15 (1.0)	TP-11 (1.5)	TP-6 (0.9)
		F1669.13	F1669.14	F1669.15
Antimony	1.0 ug/g	< 1.0	< 1.0	1.0
Arsenic	1.0 ug/g	5.0	2.0	7.0
Barium	10 ug/g	180	180	460
Beryllium	0.50 ug/g	0.50	< 0.50	1.0
Cadmium	1.0 ug/g	< 1.0	< 1.0	< 1.0
Calcium	200 ug/g	29000	61000	36000
Chromium	5.0 ug/g	25	30	20
Cobalt	5.0 ug/g	5.0	10	5.0
Copper	5.0 ug/g	150	20	40
Iron	200 ug/g	20000	18000	14000
Lead	5.0 ug/g	380	40	480
Magnesium	200 ug/g	6600	11000	3200
Molybdenum	1.0 ug/g	1.0	< 1.0	2.0
Nickel	5.0 ug/g	20	25	20
Selenium	1.0 ug/g	< 1.0	< 1.0	< 1.0
Silver	5.0 ug/g	< 5.0	< 5.0	< 5.0
Sodium	200 ug/g	400	600	400
Thallium	1.0 ug/g	< 1.0	< 1.0	< 1.0
Tin	5.0 ug/g	20	< 5.0	5.0
Vanadium	10 ug/g	30	40	30
Zinc	20 ug/g	160	100	440
Acenaphthene	0.017 ug/g	1.3	0.14	0.020
Acenaphthylene	0.017 ug/g	1.7	0.11	0.32
Anthracene	0.017 ug/g	4.5	0.47	0.28

		TP-15 (1.0)	TP-11 (1.5)	TP-6 (0.9)
		F1669.13	F1669.14	F1669.15
Benzo[a]anthracene	0.017 ug/g	6.6	0.58	0.54
Benzo[a]pyrene	0.017 ug/g	8.6	0.74	0.90
Benzo[b+k]fluoranthene	0.033 ug/g	10	0.86	1.1
Benzo[ghi]perylene	0.017 ug/g	3.0	0.25	0.42
Biphenyl	0.017 ug/g	0.16	0.018	< 0.020
Chrysene	0.017 ug/g	5.9	0.58	0.60
Dibenzo[a,h]anthracene	0.017 ug/g	1.5	0.13	0.14
Fluoranthene	0.017 ug/g	12	1.4	1.2
Fluorene	0.017 ug/g	2.5	0.25	0.060
Indeno[1,2,3-cd]pyrene	0.017 ug/g	3.2	0.25	0.38
1-Methylnaphthalene	0.017 ug/g	0.66	0.054	0.080
2-Methylnaphthalene	0.017 ug/g	0.73	0.036	0.12
Naphthalene	0.017 ug/g	0.85	0.072	0.080
Phenanthrene	0.017 ug/g	7.6	1.1	0.52
Pyrene	0.017 ug/g	9.5	1.1	0.96
2-Fluorobiphenyl	surrogate	122%	89%	108%
p-Terphenyl d-14	surrogate	110%	78%	89%

Matrix: Soil

Parameter	MDL	TP-1 (0.4)	TP-4 (1.2)	TP-23 (1.2)
		F1669.16	F1669.17	F1669.18
Antimony	1.0 ug/g	< 1.0		< 1.0
Arsenic	1.0 ug/g	5.0		1.0
Barium	10 ug/g	130		80
Beryllium	0.50 ug/g	< 0.50		1.0
Cadmium	1.0 ug/g	< 1.0		< 1.0
Calcium	200 ug/g	15000		5400
Chromium	5.0 ug/g	20		30
Cobalt	5.0 ug/g	5.0		10
Copper	5.0 ug/g	15		10
Iron	200 ug/g	15000		33000
Lead	5.0 ug/g	140		40
Magnesium	200 ug/g	4200		4800
Molybdenum	1.0 ug/g	< 1.0		< 1.0
Nickel	5.0 ug/g	15		20
Selenium	1.0 ug/g	< 1.0		< 1.0

		TP-1 (0.4)	TP-4 (1.2)	TP-23 (1.2)
		F1669.16	F1669.17	F1669.18
Silver	5.0 ug/g	< 5.0		< 5.0
Sodium	200 ug/g	400		400
Thallium	1.0 ug/g	< 1.0		< 1.0
Tin	5.0 ug/g	< 5.0		< 5.0
Vanadium	10 ug/g	30		20
Zinc	20 ug/g	280		100
Acenaphthene	0.017 ug/g	< 0.018	0.13	< 0.019
Acenaphthylene	0.017 ug/g	0.036	2.0	< 0.019
Anthracene	0.017 ug/g	0.036	1.7	< 0.019
Benzo[a]anthracene	0.017 ug/g	0.072	1.7	< 0.019
Benzo[a]pyrene	0.017 ug/g	0.072	3.5	< 0.019
Benzo[b+k]fluoranthene	0.033 ug/g	0.14	3.9	< 0.037
Benzo[ghi]perylene	0.017 ug/g	0.054	1.2	< 0.019
Biphenyl	0.017 ug/g	< 0.018	< 0.019	< 0.019
Chrysene	0.017 ug/g	0.090	1.7	< 0.019
Dibenzo[a,h]anthracene	0.017 ug/g	0.018	0.62	< 0.019
Fluoranthene	0.017 ug/g	0.14	1.3	< 0.019
Fluorene	0.017 ug/g	< 0.018	0.19	< 0.019
Indeno[1,2,3-cd]pyrene	0.017 ug/g	0.054	1.2	< 0.019
1-Methylnaphthalene	0.017 ug/g	< 0.018	0.038	< 0.019
2-Methylnaphthalene	0.017 ug/g	0.018	0.056	< 0.019
Naphthalene	0.017 ug/g	< 0.018	0.038	< 0.019
Phenanthrene	0.017 ug/g	0.090	0.15	< 0.019
Pyrene	0.017 ug/g	0.13	1.6	< 0.019
2-Fluorobiphenyl	surrogate	113%	109%	118%
p-Terphenyl d-14	surrogate	94%	81%	102%

Matrix: Soil

Parameter	MDL	TP-20 (2.5)	TP-8 (0.8)	TP-18 (1.4)
		F1669.19	F1669.20	F1669.21
Antimony	1.0 ug/g		< 1.0	< 1.0
Arsenic	1.0 ug/g		4.0	1.0
Barium	10 ug/g		230	190
Beryllium	0.50 ug/g		< 0.50	< 0.50
Cadmium	1.0 ug/g		< 1.0	< 1.0
Calcium	200 ug/g		17000	57000

		TP-20 (2.5)	TP-8 (0.8)	TP-18 (1.4)
		F1669.19	F1669.20	F1669.21
Chromium	5.0 ug/g		20	45
Cobalt	5.0 ug/g		5.0	10
Copper	5.0 ug/g		60	25
Iron	200 ug/g		12000	22000
Lead	5.0 ug/g		210	25
Magnesium	200 ug/g		2400	11000
Molybdenum	1.0 ug/g		< 1.0	< 1.0
Nickel	5.0 ug/g		15	30
Selenium	1.0 ug/g		< 1.0	< 1.0
Silver	5.0 ug/g		< 5.0	< 5.0
Sodium	200 ug/g		600	1000
Thallium	1.0 ug/g		< 1.0	< 1.0
Tin	5.0 ug/g		30	10
Vanadium	10 ug/g		20	50
Zinc	20 ug/g		240	120
Benzene	0.040 ug/g		< 0.040	
Ethylbenzene	0.040 ug/g		< 0.040	
Toluene	0.040 ug/g		< 0.040	
m/p-Xylene	0.040 ug/g		< 0.040	
o-Xylene	0.040 ug/g		< 0.040	
Toluene-D8	surrogate		97%	
Petroleum Hydrocarbons (gasoline)	10 ug/g		< 10	
Petroleum Hydrocarbons (diesel)	10 ug/g		30	
Petroleum Hydrocarbons (heavy oils)	50 ug/g		100	
Acenaphthene	0.017 ug/g	0.29	0.039	0.091
Acenaphthylene	0.017 ug/g	0.37	0.24	0.14
Anthracene	0.017 ug/g	1.2	0.27	0.38
Benzo[a]anthracene	0.017 ug/g	2.1	0.41	0.45
Benzo[a]pyrene	0.017 ug/g	2.6	0.65	0.47
Benzo[b+k]fluoranthene	0.033 ug/g	3.0	0.75	0.65
Benzo[ghi]perylene	0.017 ug/g	0.81	0.25	0.16
Biphenyl	0.017 ug/g	0.037	< 0.020	0.018
Chrysene	0.017 ug/g	1.9	0.43	0.43
Dibenzo[a,h]anthracene	0.017 ug/g	0.44	0.12	0.072
Fluoranthene	0.017 ug/g	4.5	0.90	1.1

		TP-20 (2.5)	TP-8 (0.8)	TP-18 (1.4)
		F1669.19	F1669.20	F1669.21
Fluorene	0.017 ug/g	0.44	0.059	0.16
Indeno[1,2,3-cd]pyrene	0.017 ug/g	0.88	0.24	0.18
1-Methylnaphthalene	0.017 ug/g	0.11	0.020	0.054
2-Methylnaphthalene	0.017 ug/g	0.15	0.039	0.072
Naphthalene	0.017 ug/g	0.26	0.039	0.11
Phenanthrene	0.017 ug/g	3.2	0.49	1.00
Pyrene	0.017 ug/g	3.6	0.73	0.83
2-Fluorobiphenyl	surrogate	NA - Dilution	133%	129%
p-Terphenyl d-14	surrogate	NA - Dilution	116%	118%

Matrix: Soil

Parameter	MDL	TP-32 (0.3)	TP-33 (0.4)	TP-26 (0.8)
		F1669.22	F1669.23	F1669.24
Antimony	1.0 ug/g	< 1.0	< 1.0	< 1.0
Arsenic	1.0 ug/g	4.0	5.0	3.0
Barium	10 ug/g	160	230	180
Beryllium	0.50 ug/g	< 0.50	0.50	0.50
Cadmium	1.0 ug/g	< 1.0	< 1.0	< 1.0
Calcium	200 ug/g	27000	54000	28000
Chromium	5.0 ug/g	30	20	20
Cobalt	5.0 ug/g	10	5.0	5.0
Copper	5.0 ug/g	50	35	20
Iron	200 ug/g	23000	18000	20000
Lead	5.0 ug/g	65	160	370
Magnesium	200 ug/g	6600	5200	4400
Molybdenum	1.0 ug/g	< 1.0	< 1.0	< 1.0
Nickel	5.0 ug/g	25	20	15
Selenium	1.0 ug/g	< 1.0	< 1.0	< 1.0
Silver	5.0 ug/g	< 5.0	< 5.0	< 5.0
Sodium	200 ug/g	400	400	200
Thallium	1.0 ug/g	< 1.0	< 1.0	< 1.0
Tin	5.0 ug/g	5.0	10	< 5.0
Vanadium	10 ug/g	30	20	20
Zinc	20 ug/g	160	200	160

Matrix: Soil

Parameter	MDL	TP-15 (2.0) F1669.25	TP-4 (0.8) F1669.26	TP-20 (1.5) F1669.27
Antimony	1.0 ug/g	< 1.0	< 1.0	< 1.0
Arsenic	1.0 ug/g	< 1.0	< 1.0	1.0
Barium	10 ug/g	70	340	140
Beryllium	0.50 ug/g	< 0.50	0.50	< 0.50
Cadmium	1.0 ug/g	< 1.0	< 1.0	< 1.0
Calcium	200 ug/g	46000	11000	42000
Chromium	5.0 ug/g	15	90	25
Cobalt	5.0 ug/g	< 5.0	20	5.0
Copper	5.0 ug/g	15	45	20
Iron	200 ug/g	12000	38000	17000
Lead	5.0 ug/g	20	25	35
Magnesium	200 ug/g	13000	16000	9000
Molybdenum	1.0 ug/g	< 1.0	< 1.0	< 1.0
Nickel	5.0 ug/g	15	50	20
Selenium	1.0 ug/g	< 1.0	< 1.0	< 1.0
Silver	5.0 ug/g	< 5.0	< 5.0	< 5.0
Sodium	200 ug/g	400	1600	400
Thallium	1.0 ug/g	< 1.0	< 1.0	< 1.0
Tin	5.0 ug/g	< 5.0	< 5.0	< 5.0
Vanadium	10 ug/g	20	90	30
Zinc	20 ug/g	80	200	220

Matrix: Soil

Parameter	MDL	TP-9 (0.4) F1669.28	TP-8 (2.9) F1669.29	TP-6 (2.5) F1669.30
Antimony	1.0 ug/g	2.0	< 1.0	< 1.0
Arsenic	1.0 ug/g	2.0	< 1.0	2.0
Barium	10 ug/g	170	70	130
Beryllium	0.50 ug/g	< 0.50	< 0.50	< 0.50
Cadmium	1.0 ug/g	< 1.0	< 1.0	< 1.0
Calcium	200 ug/g	58000	6000	14000
Chromium	5.0 ug/g	20	15	15
Cobalt	5.0 ug/g	5.0	5.0	5.0
Copper	5.0 ug/g	20	5.0	25
Iron	200 ug/g	16000	21000	17000
Lead	5.0 ug/g	110	10	45

		TP-9 (0.4)	TP-8 (2.9)	TP-6 (2.5)
		F1669.28	F1669.29	F1669.30
Magnesium	200 ug/g	9600	4800	6400
Molybdenum	1.0 ug/g	< 1.0	< 1.0	< 1.0
Nickel	5.0 ug/g	20	10	15
Selenium	1.0 ug/g	< 1.0	< 1.0	< 1.0
Silver	5.0 ug/g	< 5.0	< 5.0	< 5.0
Sodium	200 ug/g	400	600	400
Thallium	1.0 ug/g	< 1.0	< 1.0	< 1.0
Tin	5.0 ug/g	10	< 5.0	< 5.0
Vanadium	10 ug/g	30	30	30
Zinc	20 ug/g	160	140	160

Matrix: Soil

Parameter	MDL	TP-17 (0.5)	TP-44 (0.8)	TP-34 (0.8)
		F1669.31	F1669.32	F1669.33
Antimony	1.0 ug/g	< 1.0	< 1.0	< 1.0
Arsenic	1.0 ug/g	2.0	3.0	1.0
Barium	10 ug/g	220	270	30
Beryllium	0.50 ug/g	< 0.50	0.50	< 0.50
Cadmium	1.0 ug/g	< 1.0	< 1.0	< 1.0
Calcium	200 ug/g	54000	37000	52000
Chromium	5.0 ug/g	35	25	5.0
Cobalt	5.0 ug/g	10	5.0	< 5.0
Copper	5.0 ug/g	30	40	10
Iron	200 ug/g	20000	22000	8600
Lead	5.0 ug/g	50	170	10
Magnesium	200 ug/g	11000	5400	16000
Molybdenum	1.0 ug/g	< 1.0	< 1.0	< 1.0
Nickel	5.0 ug/g	25	20	10
Selenium	1.0 ug/g	< 1.0	< 1.0	< 1.0
Silver	5.0 ug/g	< 5.0	< 5.0	< 5.0
Sodium	200 ug/g	600	400	200
Thallium	1.0 ug/g	< 1.0	< 1.0	< 1.0
Tin	5.0 ug/g	< 5.0	10	< 5.0
Vanadium	10 ug/g	40	20	10
Zinc	20 ug/g	200	300	100

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Order #: F1669

Report Date: 12/05/00
Order Date: 11/28/00
Sample Date: 11/22/00

Client: **Duke Engineering & Services Inc.**

Client Ref:

Project: **00-313-12**

Matrix: Soil

Parameter	MDL	TP-35 (1.2) F1669.34	TP-30 (0.7) F1669.35	TP-16 (1.5) F1669.36
Antimony	1.0 ug/g	< 1.0	2.0	< 1.0
Arsenic	1.0 ug/g	4.0	5.0	1.0
Barium	10 ug/g	110	150	190
Beryllium	0.50 ug/g	< 0.50	< 0.50	< 0.50
Cadmium	1.0 ug/g	< 1.0	< 1.0	< 1.0
Calcium	200 ug/g	66000	37000	43000
Chromium	5.0 ug/g	15	20	40
Cobalt	5.0 ug/g	< 5.0	< 5.0	10
Copper	5.0 ug/g	20	35	25
Iron	200 ug/g	14000	14000	22000
Lead	5.0 ug/g	95	230	45
Magnesium	200 ug/g	6400	4400	11000
Molybdenum	1.0 ug/g	< 1.0	< 1.0	< 1.0
Nickel	5.0 ug/g	20	15	30
Selenium	1.0 ug/g	< 1.0	< 1.0	< 1.0
Silver	5.0 ug/g	< 5.0	< 5.0	< 5.0
Sodium	200 ug/g	400	400	800
Thallium	1.0 ug/g	< 1.0	< 1.0	< 1.0
Tin	5.0 ug/g	< 5.0	5.0	< 5.0
Vanadium	10 ug/g	20	20	40
Zinc	20 ug/g	180	240	220
Benzene	0.040 ug/g			< 0.040
Ethylbenzene	0.040 ug/g			< 0.040
Toluene	0.040 ug/g			< 0.040
m/p-Xylene	0.040 ug/g			< 0.040
o-Xylene	0.040 ug/g			< 0.040
Toluene-D8	surrogate			96%
Petroleum Hydrocarbons (gasoline)	10 ug/g			< 10
Petroleum Hydrocarbons (diesel)	10 ug/g			30
Petroleum Hydrocarbons (heavy oils)	50 ug/g			250

Matrix: Soil

Parameter	MDL	TP-5 (0.8) F1669.37	TP-28 (0.2) F1669.38	TP-22 (0.4) F1669.39
Antimony	1.0 ug/g	< 1.0	< 1.0	< 1.0
Arsenic	1.0 ug/g	2.0	2.0	< 1.0
Barium	10 ug/g	120	370	30
Beryllium	0.50 ug/g	< 0.50	1.0	< 0.50
Cadmium	1.0 ug/g	< 1.0	< 1.0	< 1.0
Calcium	200 ug/g	56000	19000	8600
Chromium	5.0 ug/g	25	75	10
Cobalt	5.0 ug/g	5.0	15	< 5.0
Copper	5.0 ug/g	15	45	10
Iron	200 ug/g	18000	33000	8200
Lead	5.0 ug/g	20	90	15
Magnesium	200 ug/g	9200	14000	3000
Molybdenum	1.0 ug/g	< 1.0	< 1.0	< 1.0
Nickel	5.0 ug/g	20	45	5.0
Selenium	1.0 ug/g	< 1.0	< 1.0	< 1.0
Silver	5.0 ug/g	< 5.0	< 5.0	< 5.0
Sodium	200 ug/g	400	1000	400
Thallium	1.0 ug/g	< 1.0	< 1.0	< 1.0
Tin	5.0 ug/g	< 5.0	< 5.0	< 5.0
Vanadium	10 ug/g	30	70	20
Zinc	20 ug/g	100	200	60

Matrix: Soil

Parameter	MDL	TP-31 (0.4) F1669.40	TP-10 (0.3) F1669.41	TP-12 (2.6) F1669.42
Antimony	1.0 ug/g	< 1.0	< 1.0	< 1.0
Arsenic	1.0 ug/g	1.0	2.0	1.0
Barium	10 ug/g	320	120	90
Beryllium	0.50 ug/g	0.50	< 0.50	< 0.50
Cadmium	1.0 ug/g	< 1.0	< 1.0	< 1.0
Calcium	200 ug/g	40000	32000	13000
Chromium	5.0 ug/g	70	20	20
Cobalt	5.0 ug/g	15	5.0	5.0
Copper	5.0 ug/g	40	20	15
Iron	200 ug/g	33000	15000	15000
Lead	5.0 ug/g	10	40	10

		TP-31 (0.4)	TP-10 (0.3)	TP-12 (2.6)
		F1669.40	F1669.41	F1669.42
Magnesium	200 ug/g	21000	7200	4600
Molybdenum	1.0 ug/g	< 1.0	< 1.0	< 1.0
Nickel	5.0 ug/g	40	15	10
Selenium	1.0 ug/g	< 1.0	< 1.0	< 1.0
Silver	5.0 ug/g	< 5.0	< 5.0	< 5.0
Sodium	200 ug/g	1200	400	400
Thallium	1.0 ug/g	< 1.0	< 1.0	< 1.0
Tin	5.0 ug/g	< 5.0	5.0	< 5.0
Vanadium	10 ug/g	70	20	30
Zinc	20 ug/g	120	80	60

Matrix: Soil

Parameter	MDL	TP-2 (0.4)	TP-12 (1.3)	TP-3 (1.3)
		F1669.43	F1669.44	F1669.45
Antimony	1.0 ug/g	< 1.0	< 1.0	< 1.0
Arsenic	1.0 ug/g	3.0	2.0	< 1.0
Barium	10 ug/g	90	100	50
Beryllium	0.50 ug/g	< 0.50	< 0.50	< 0.50
Cadmium	1.0 ug/g	< 1.0	< 1.0	< 1.0
Calcium	200 ug/g	19000	42000	5800
Chromium	5.0 ug/g	15	20	20
Cobalt	5.0 ug/g	5.0	5.0	5.0
Copper	5.0 ug/g	15	20	10
Iron	200 ug/g	18000	15000	19000
Lead	5.0 ug/g	55	35	5.0
Magnesium	200 ug/g	4000	11000	6000
Molybdenum	1.0 ug/g	< 1.0	< 1.0	< 1.0
Nickel	5.0 ug/g	15	20	15
Selenium	1.0 ug/g	< 1.0	< 1.0	< 1.0
Silver	5.0 ug/g	< 5.0	< 5.0	< 5.0
Sodium	200 ug/g	200	400	200
Thallium	1.0 ug/g	< 1.0	< 1.0	< 1.0
Tin	5.0 ug/g	5.0	< 5.0	< 5.0
Vanadium	10 ug/g	20	30	30
Zinc	20 ug/g	60	80	60

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Project: **00-313-12**

Matrix: Soil

Parameter	MDL	TP-45 (1.0) F1669.46	TP-37 (0.5) F1669.47	TP-41 (0.2) F1669.48
Antimony	1.0 ug/g	< 1.0	< 1.0	< 1.0
Arsenic	1.0 ug/g	1.0	7.0	1.0
Barium	10 ug/g	70	320	60
Beryllium	0.50 ug/g	1.0	0.50	< 0.50
Cadmium	1.0 ug/g	< 1.0	< 1.0	< 1.0
Calcium	200 ug/g	54000	64000	46000
Chromium	5.0 ug/g	30	25	10
Cobalt	5.0 ug/g	5.0	5.0	< 5.0
Copper	5.0 ug/g	10	30	10
Iron	200 ug/g	20000	27000	9400
Lead	5.0 ug/g	35	660	20
Magnesium	200 ug/g	5600	4200	6800
Molybdenum	1.0 ug/g	< 1.0	< 1.0	< 1.0
Nickel	5.0 ug/g	20	20	10
Selenium	1.0 ug/g	< 1.0	< 1.0	< 1.0
Silver	5.0 ug/g	< 5.0	< 5.0	< 5.0
Sodium	200 ug/g	200	200	200
Thallium	1.0 ug/g	< 1.0	< 1.0	< 1.0
Tin	5.0 ug/g	< 5.0	110	< 5.0
Vanadium	10 ug/g	20	20	20
Zinc	20 ug/g	60	240	60
Benzene	0.040 ug/g			0.56
Ethylbenzene	0.040 ug/g			< 0.040
Toluene	0.040 ug/g			< 0.040
m/p-Xylene	0.040 ug/g			0.040
o-Xylene	0.040 ug/g			< 0.040
Toluene-D8	surrogate			96%
Petroleum Hydrocarbons (gasoline)	10 ug/g			< 10
Petroleum Hydrocarbons (diesel)	10 ug/g			10
Petroleum Hydrocarbons (heavy oils)	50 ug/g			100

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Matrix: Soil

Parameter	MDL	TP-38 (0.4) F1669.49	TP-43 (0.5) F1669.50	TP-7 (1.5) F1669.51
Antimony	1.0 ug/g	< 1.0	< 1.0	8.0
Arsenic	1.0 ug/g	1.0	1.0	5.0
Barium	10 ug/g	380	280	130
Beryllium	0.50 ug/g	0.50	1.0	< 0.50
Cadmium	1.0 ug/g	< 1.0	< 1.0	< 1.0
Calcium	200 ug/g	31000	26000	28000
Chromium	5.0 ug/g	80	65	15
Cobalt	5.0 ug/g	15	15	< 5.0
Copper	5.0 ug/g	40	35	60
Iron	200 ug/g	38000	34000	15000
Lead	5.0 ug/g	10	30	570
Magnesium	200 ug/g	19000	13000	4800
Molybdenum	1.0 ug/g	< 1.0	< 1.0	1.0
Nickel	5.0 ug/g	50	40	15
Selenium	1.0 ug/g	< 1.0	< 1.0	1.0
Silver	5.0 ug/g	< 5.0	< 5.0	< 5.0
Sodium	200 ug/g	1400	800	400
Thallium	1.0 ug/g	< 1.0	< 1.0	< 1.0
Tin	5.0 ug/g	< 5.0	< 5.0	25
Vanadium	10 ug/g	80	60	30
Zinc	20 ug/g	200	140	180
Benzene	0.040 ug/g			< 0.040
Ethylbenzene	0.040 ug/g			< 0.040
Toluene	0.040 ug/g			< 0.040
m/p-Xylene	0.040 ug/g			< 0.040
o-Xylene	0.040 ug/g			< 0.040
Toluene-D8	surrogate			94%
Petroleum Hydrocarbons (gasoline)	10 ug/g			< 10
Petroleum Hydrocarbons (diesel)	10 ug/g			< 10
Petroleum Hydrocarbons (heavy oils)	50 ug/g			100

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Order #: F1669

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Client: **Duke Engineering & Services Inc.**

Client Ref:

Project: **00-313-12**

Matrix: Soil

Parameter	MDL	TP-13 (2.5) F1669.52	TP-27 (0.4) F1669.53	TP-21 (0.45) F1669.54
Antimony	1.0 ug/g	< 1.0	< 1.0	< 1.0
Arsenic	1.0 ug/g	< 1.0	3.0	2.0
Barium	10 ug/g	70	150	290
Beryllium	0.50 ug/g	< 0.50	0.50	0.50
Cadmium	1.0 ug/g	< 1.0	< 1.0	< 1.0
Calcium	200 ug/g	9200	73000	34000
Chromium	5.0 ug/g	20	20	60
Cobalt	5.0 ug/g	5.0	< 5.0	10
Copper	5.0 ug/g	10	15	40
Iron	200 ug/g	22000	16000	26000
Lead	5.0 ug/g	15	45	120
Magnesium	200 ug/g	6600	5200	13000
Molybdenum	1.0 ug/g	< 1.0	< 1.0	< 1.0
Nickel	5.0 ug/g	15	15	35
Selenium	1.0 ug/g	< 1.0	2.0	< 1.0
Silver	5.0 ug/g	< 5.0	< 5.0	< 5.0
Sodium	200 ug/g	400	200	800
Thallium	1.0 ug/g	< 1.0	< 1.0	< 1.0
Tin	5.0 ug/g	< 5.0	< 5.0	< 5.0
Vanadium	10 ug/g	40	20	50
Zinc	20 ug/g	80	60	140

Matrix: Soil

Parameter	MDL	TP-19 (2.0) F1669.55	TP-13 (0.9) F1669.56	TP-25 (0.6) F1669.57
Antimony	1.0 ug/g	< 1.0	< 1.0	< 1.0
Arsenic	1.0 ug/g	2.0	1.0	4.0
Barium	10 ug/g	130	200	180
Beryllium	0.50 ug/g	< 0.50	0.50	1.0
Cadmium	1.0 ug/g	< 1.0	< 1.0	< 1.0
Calcium	200 ug/g	48000	18000	32000
Chromium	5.0 ug/g	25	45	30
Cobalt	5.0 ug/g	10	10	5.0
Copper	5.0 ug/g	20	25	20
Iron	200 ug/g	16000	24000	21000
Lead	5.0 ug/g	45	10	90

		TP-19 (2.0)	TP-13 (0.9)	TP-25 (0.6)
		F1669.55	F1669.56	F1669.57
Magnesium	200 ug/g	9000	8200	5200
Molybdenum	1.0 ug/g	< 1.0	< 1.0	< 1.0
Nickel	5.0 ug/g	20	25	20
Selenium	1.0 ug/g	< 1.0	< 1.0	< 1.0
Silver	5.0 ug/g	< 5.0	< 5.0	< 5.0
Sodium	200 ug/g	400	800	200
Thallium	1.0 ug/g	< 1.0	< 1.0	< 1.0
Tin	5.0 ug/g	< 5.0	< 5.0	5.0
Vanadium	10 ug/g	30	50	20
Zinc	20 ug/g	60	80	80

Matrix: Soil

Parameter	MDL	TP-14 (2.9)	TP-14 (2.0)	TP-24 (0.2)
		F1669.58	F1669.59	F1669.60
Antimony	1.0 ug/g	< 1.0	< 1.0	< 1.0
Arsenic	1.0 ug/g	10	3.0	1.0
Barium	10 ug/g	310	220	390
Beryllium	0.50 ug/g	< 0.50	< 0.50	0.50
Cadmium	1.0 ug/g	< 1.0	< 1.0	< 1.0
Calcium	200 ug/g	58000	63000	22000
Chromium	5.0 ug/g	25	25	90
Cobalt	5.0 ug/g	10	10	20
Copper	5.0 ug/g	30	25	45
Iron	200 ug/g	34000	19000	40000
Lead	5.0 ug/g	370	100	10
Magnesium	200 ug/g	7400	10000	18000
Molybdenum	1.0 ug/g	< 1.0	< 1.0	< 1.0
Nickel	5.0 ug/g	25	25	55
Selenium	1.0 ug/g	< 1.0	< 1.0	< 1.0
Silver	5.0 ug/g	< 5.0	< 5.0	< 5.0
Sodium	200 ug/g	400	400	1400
Thallium	1.0 ug/g	< 1.0	< 1.0	< 1.0
Tin	5.0 ug/g	60	< 5.0	< 5.0
Vanadium	10 ug/g	20	30	90
Zinc	20 ug/g	240	80	120

Date: 12/05/00

Order #: F1669

Certificate of Analysis - QA/QC Data

Client: **Duke Engineering & Services Inc.**

Client Ref:

Project: 00-313-12

Blank QC Results - Matrix: Soil

Parameter	Method	DL	Measured
Antimony	EPA 6020	1.0 ug/g	< 1.0
Arsenic	EPA 6020	1.0 ug/g	< 1.0
Barium	EPA 6020	10 ug/g	< 10
Beryllium	EPA 6020	0.50 ug/g	< 0.50
Cadmium	EPA 6020	1.0 ug/g	< 1.0
Chromium	EPA 6020	5.0 ug/g	< 5.0
Cobalt	EPA 6020	5.0 ug/g	< 5.0
Copper	EPA 6020	5.0 ug/g	< 5.0
Lead	EPA 6020	5.0 ug/g	< 5.0
Molybdenum	EPA 6020	1.0 ug/g	< 1.0
Nickel	EPA 6020	5.0 ug/g	< 5.0
Selenium	EPA 6020	1.0 ug/g	< 1.0
Silver	EPA 6020	5.0 ug/g	< 5.0
Thallium	EPA 6020	1.0 ug/g	< 1.0
Tin	EPA 6020	5.0 ug/g	< 5.0
Vanadium	EPA 6020	10 ug/g	< 10
Zinc	EPA 6020	20 ug/g	< 20
Benzene	SW-846 Method 8260/3550	0.040 ug/g	< 0.040
Ethylbenzene	SW-846 Method 8260/3550	0.040 ug/g	< 0.040
Toluene	SW-846 Method 8260/3550	0.040 ug/g	< 0.040
m/p-Xylene	SW-846 Method 8260/3550	0.040 ug/g	< 0.040
o-Xylene	SW-846 Method 8260/3550	0.040 ug/g	< 0.040
Toluene-D8 (surrogate)	SW-846 Method 8260/3550	n/a	94%
Petroleum Hydrocarbons - gasoline	SW-846 Method 8000A/3500A	10 ug/g	< 10
Petroleum Hydrocarbons - diesel	SW-846 Method 8000A/3500A	10 ug/g	< 10
Petroleum Hydrocarbons - heavy oils	Gravimetric	50 ug/g	< 50
Acenaphthene	Modified SW-846 Method 8270	0.017 ug/g	< 0.017
Acenaphthylene	Modified SW-846 Method 8270	0.017 ug/g	< 0.017
Anthracene	Modified SW-846 Method 8270	0.017 ug/g	< 0.017
Benzo[a]anthracene	Modified SW-846 Method 8270	0.017 ug/g	< 0.017
Benzo[a]pyrene	Modified SW-846 Method 8270	0.017 ug/g	< 0.017
Benzo[b+k]fluoranthene	Modified SW-846 Method 8270	0.033 ug/g	< 0.033
Benzo[ghi]perylene	Modified SW-846 Method 8270	0.017 ug/g	< 0.017
Biphenyl	Modified SW-846 Method 8270	0.017 ug/g	< 0.017
Chrysene	Modified SW-846 Method 8270	0.017 ug/g	< 0.017
Dibenzo[a,h]anthracene	Modified SW-846 Method 8270	0.017 ug/g	< 0.017
Fluoranthene	Modified SW-846 Method 8270	0.017 ug/g	< 0.017
Fluorene	Modified SW-846 Method 8270	0.017 ug/g	< 0.017
Indeno[1,2,3-cd]pyrene	Modified SW-846 Method 8270	0.017 ug/g	< 0.017
1-Methylnaphthalene	Modified SW-846 Method 8270	0.017 ug/g	< 0.017
2-Methylnaphthalene	Modified SW-846 Method 8270	0.017 ug/g	< 0.017
Naphthalene	Modified SW-846 Method 8270	0.017 ug/g	< 0.017
Phenanthrene	Modified SW-846 Method 8270	0.017 ug/g	< 0.017
Pyrene	Modified SW-846 Method 8270	0.017 ug/g	< 0.017
2-Fluorobiphenyl (surrogate)	Modified SW-846 Method 8270	n/a	78%
p-Terphenyl d-14 (surrogate)	Modified SW-846 Method 8270	n/a	89%

Certificate of Analysis - QA/QC Data

Client: **Duke Engineering & Services Inc.**

Client Ref:

Project: **00-313-12**

Reference Standard QC Results - Matrix: Soil

Parameter	Expected	LLA - ULA	Recovery
Antimony	125 ug/g	80% - 120%	96%
Arsenic	125 ug/g	80% - 120%	98%
Barium	125 ug/g	80% - 120%	93%
Beryllium	125 ug/g	80% - 120%	103%
Cadmium	125 ug/g	80% - 120%	105%
Chromium	125 ug/g	80% - 120%	94%
Cobalt	125 ug/g	80% - 120%	82%
Copper	125 ug/g	80% - 120%	92%
Lead	125 ug/g	80% - 120%	96%
Molybdenum	125 ug/g	80% - 120%	99%
Nickel	125 ug/g	80% - 120%	91%
Selenium	125 ug/g	80% - 120%	106%
Silver	125 ug/g	80% - 120%	102%
Thallium	125 ug/g	80% - 120%	95%
Tin	125 ug/g	80% - 120%	100%
Vanadium	125 ug/g	80% - 120%	95%
Zinc	125 ug/g	80% - 120%	101%
Benzene	2.5 ug/g	50% - 150%	112%
Ethylbenzene	2.5 ug/g	37% - 162%	105%
Toluene	2.5 ug/g	50% - 150%	106%
m/p-Xylene	5.0 ug/g	50% - 150%	104%
o-Xylene	2.5 ug/g	70% - 130%	103%
Toluene-D8 (surrogate)	100%	50% - 150%	92%
Petroleum Hydrocarbons - gasoline	100 ug/g	50% - 150%	105%
Petroleum Hydrocarbons - diesel	300 ug/g	50% - 150%	120%
Acenaphthene	0.33 ug/g	47% - 145%	89%
Acenaphthylene	0.33 ug/g	33% - 145%	89%
Anthracene	0.33 ug/g	27% - 133%	80%
Benzo[a]anthracene	0.33 ug/g	33% - 143%	78%
Benzo[a]pyrene	0.33 ug/g	17% - 163%	108%
Benzo[b+k]fluoranthene	0.67 ug/g	11% - 162%	86%
Benzo[ghi]perylene	0.33 ug/g	1% - 219%	89%
Biphenyl	0.33 ug/g	35% - 114%	79%
Chrysene	0.33 ug/g	17% - 168%	88%
Dibenzo[a,h]anthracene	0.33 ug/g	1% - 227%	98%
Fluoranthene	0.33 ug/g	26% - 137%	92%
Fluorene	0.33 ug/g	59% - 121%	94%
Indeno[1,2,3-cd]pyrene	0.33 ug/g	1% - 171%	96%
1-Methylnaphthalene	0.33 ug/g	35% - 114%	94%
2-Methylnaphthalene	0.33 ug/g	35% - 114%	99%
Naphthalene	0.33 ug/g	21% - 133%	87%
Phenanthrene	0.33 ug/g	54% - 120%	88%
Pyrene	0.33 ug/g	52% - 115%	90%
2-Fluorobiphenyl (surrogate)	100%	43% - 116%	100%
p-Terphenyl d-14 (surrogate)	100%	33% - 141%	105%

Certificate of Analysis - QA/QC Data

Client: **Duke Engineering & Services Inc.**

Client Ref:

Project: 00-313-12

Spike QC Results - Matrix: Soil

Parameter	Expected	Measured	ULA - LLA	Meas./Expt.
Antimony	129 ug/g	125	70% - 130%	97%
Arsenic	130 ug/g	116	70% - 130%	90%
Barium	397 ug/g	395	70% - 130%	99%
Beryllium	126 ug/g	122	70% - 130%	97%
Cadmium	126 ug/g	121	70% - 130%	96%
Chromium	149 ug/g	133	70% - 130%	89%
Cobalt	133 ug/g	113	70% - 130%	85%
Copper	169 ug/g	151	70% - 130%	89%
Lead	633 ug/g	666	70% - 130%	105%
Molybdenum	126 ug/g	112	70% - 130%	89%
Nickel	147 ug/g	131	70% - 130%	89%
Selenium	126 ug/g	120	70% - 130%	95%
Silver	125 ug/g	115	70% - 130%	92%
Thallium	125 ug/g	122	70% - 130%	98%
Tin	141 ug/g	134	70% - 130%	95%
Vanadium	143 ug/g	127	70% - 130%	88%
Zinc	336 ug/g	327	70% - 130%	97%
Benzene	3.8 ug/g	4.4	50% - 150%	118%
Ethylbenzene	3.8 ug/g	4.4	37% - 162%	117%
Toluene	3.8 ug/g	4.4	50% - 150%	117%
m/p-Xylene	7.5 ug/g	8.7	50% - 150%	116%
o-Xylene	3.8 ug/g	4.4	70% - 130%	116%
Toluene-D8 (surrogate)	100 %	93	50% - 150%	93%
Petroleum Hydrocarbons - gasoline	50 ug/g	48	50% - 150%	96%
Petroleum Hydrocarbons - diesel	150 ug/g	187	50% - 150%	125%
Petroleum Hydrocarbons - heavy oils	500 ug/g	445	75% - 125%	89%
Acenaphthene	0.33 ug/g	0.20	47% - 147%	61%
Acenaphthylene	0.33 ug/g	0.19	33% - 145%	58%
Anthracene	0.33 ug/g	0.20	27% - 133%	60%
Benzo[a]anthracene	0.33 ug/g	0.21	33% - 143%	64%
Benzo[a]pyrene	0.33 ug/g	0.26	17% - 163%	79%
Benzo[b+k]fluoranthene	0.66 ug/g	0.44	11% - 162%	66%
Benzo[ghi]perylene	0.33 ug/g	0.21	1% - 219%	64%
Biphenyl	0.33 ug/g	0.18	23% - 120%	54%
Chrysene	0.33 ug/g	0.22	17% - 168%	67%
Dibenzo[a,h]anthracene	0.33 ug/g	0.23	1% - 227%	68%
Fluoranthene	0.33 ug/g	0.23	26% - 137%	69%
Fluorene	0.33 ug/g	0.22	59% - 121%	67%
Indeno[1,2,3-cd]pyrene	0.33 ug/g	0.22	1% - 171%	68%
1-Methylnaphthalene	0.33 ug/g	0.24	23% - 120%	71%
2-Methylnaphthalene	0.33 ug/g	0.25	23% - 120%	76%
Naphthalene	0.33 ug/g	0.21	21% - 133%	64%
Phenanthrene	0.33 ug/g	0.22	54% - 120%	66%
Pyrene	0.33 ug/g	0.22	52% - 115%	67%
2-Fluorobiphenyl (surrogate)	100 %	76	30% - 115%	76%
p-Terphenyl d-14 (surrogate)	100 %	78	18% - 137%	78%

Date: 12/05/00

Certificate of Analysis - QA/QC Data

Order #: F1669

Client: **Duke Engineering & Services Inc.**

Client Ref:

Project: **00-313-12**

Duplicate QA Results - Matrix: Soil

Parameter	units	Detection Limit	Sample Result	Duplicate Result
Antimony	ug/g	1.0	4.0	3.0
Arsenic	ug/g	1.0	5.0	5.0
Barium	ug/g	10	270	270
Beryllium	ug/g	0.50	0.50	0.50
Cadmium	ug/g	1.0	< 1.0	< 1.0
Chromium	ug/g	5.0	25	25
Cobalt	ug/g	5.0	10	10
Copper	ug/g	5.0	45	45
Lead	ug/g	5.0	510	520
Molybdenum	ug/g	1.0	1.0	1.0
Nickel	ug/g	5.0	20	25
Selenium	ug/g	1.0	< 1.0	1.0
Silver	ug/g	5.0	< 5.0	< 5.0
Thallium	ug/g	1.0	< 1.0	< 1.0
Tin	ug/g	5.0	15	15
Vanadium	ug/g	10	20	20
Zinc	ug/g	20	220	200
Benzene	ug/g	0.040	< 0.040	< 0.040
Ethylbenzene	ug/g	0.040	< 0.040	< 0.040
Toluene	ug/g	0.040	< 0.040	< 0.040
m/p-Xylene	ug/g	0.040	< 0.040	< 0.040
o-Xylene	ug/g	0.040	< 0.040	< 0.040
Toluene-D8 (surrogate)	percent	n/a	95%	95%
Petroleum Hydrocarbons - gasoline	ug/g	10	< 10	< 10
Petroleum Hydrocarbons - diesel	ug/g	10	< 10	< 10
Petroleum Hydrocarbons - heavy oils	ug/g	50	< 50	< 50
Acenaphthene	ug/g	0.018	0.072	0.036
Acenaphthylene	ug/g	0.018	0.16	0.13
Anthracene	ug/g	0.018	0.36	0.22
Benzo[a]anthracene	ug/g	0.018	0.63	0.56
Benzo[a]pyrene	ug/g	0.018	0.85	0.60
Benzo[b+k]fluoranthene	ug/g	0.036	1.1	0.91
Benzo[ghi]perylene	ug/g	0.018	0.33	0.27
Biphenyl	ug/g	0.018	< 0.018	< 0.018
Chrysene	ug/g	0.018	0.62	0.52
Dibenzo[a,h]anthracene	ug/g	0.018	0.16	0.13
Fluoranthene	ug/g	0.018	1.4	1.1
Fluorene	ug/g	0.018	0.11	0.072
Indeno[1,2,3-cd]pyrene	ug/g	0.018	0.36	0.31
1-Methylnaphthalene	ug/g	0.018	0.054	0.036
2-Methylnaphthalene	ug/g	0.018	0.054	0.036
Naphthalene	ug/g	0.018	0.11	0.036
Phenanthrene	ug/g	0.018	0.94	0.56
Pyrene	ug/g	0.018	1.2	0.92
2-Fluorobiphenyl (surrogate)	percent	n/a	123%	109%
p-Terphenyl d-14 (surrogate)	percent	n/a	112%	101%

Paracel Laboratories Ltd.

Glossary of Terms

Date: **12/05/00**

MDL	The laboratory Detection Limit. The value is based on instrument response and is the lowest level that can be quantitated with confidence
n/a	Not applicable to this particular analysis.
NV	No Value, typically used for calculated results when the divisor is zero.
Surrogate Data	Surrogates are 'not naturally occuring' compounds which are added to the sample prior to analysis in order to monitor method performance. The results of the surrogate recoveries are reported in percent.
Blank	The results from the analysis of a matrix blank in the same run.
Duplicate Data	The results from an intralaboratory split sample that has been processed identically to that of the primary sample. Result for split sample are listed together with the results from the primary sample.
Reference Standard	Results from the analysis of a Reference Standard. A Reference Standard is a standard that contains the parameters of interest and is procured from a source secondary to the Calibration standard. EXPECTED: The actual concentration of the analyte in the Reference Standard. RECOVERY - Recovery of the spiked material reported in percent.
Spike Data	The results obtained from a sample fortified at a known level. The recovery of the spike is dependent on the level of the analyte found in the sample and spike. EXPECTED - Calculated value of the sample results + fortification amount which yield 100 % Recovery MEASURED - Results from the analysis of the fortified sample RECOVERY - Recovery of the spiked material reported in percent.
LLA	Lower Limit of Acceptability for QC recovery data.
ULA	Upper Limit of Acceptability for QC recovery data.

Paracel Laboratories Ltd.

Certificate of Analysis

Order #: G5830

Duke Engineering & Services Inc.

265 Carling Avenue, suite 208
Ottawa, Ontario K1S 2E1
Attn: **Mr. Mac Carmichael**

Tel: 613-232-2525
Fax: 613-232-7149

Client Reference:
Project: 01-242-1
Reference: Burnside

Report Date: 11/01/01
Order Date: 10/22/01
Sample Date: 10/17/01

This Certificate of Analysis contains analytical data for the following samples:

Paracel ID	Client ID
G5830.1	SS-44
G5830.2	SS-38
G5830.3	SS-49
G5830.4	PH-49
G5830.5	SS-7A
G5830.6	SS-46
G5830.7	SS-3A
G5830.8	SS-7
G5830.9	PH-7
G5830.10	SS-77
G5830.11	SS-6
G5830.12	SS-1
G5830.13	SS-4
G5830.14	SS-14
G5830.15	SS-11
G5830.16	SS-15
G5830.17	SS-20
G5830.18	PH-20
G5830.19	SS-26
G5830.20	SS-29
G5830.21	SS-129
G5830.22	SS-36
G5830.23	SS-37
G5830.24	PH-37
G5830.25	SS-28
G5830.26	SS-30
G5830.27	PH-30
G5830.28	SS-31
G5830.29	SS-33
G5830.30	SS-40
G5830.31	SS-39

Approval: _____ Dale Robertson, B.Sc.

Paracel Laboratories Ltd.

Certificate of Analysis

Order #: G5830

Report Date: 11/01/01
Order Date: 10/22/01
Sample Date: 10/17/01

Client: **Duke Engineering & Services Inc.**

Client Ref:

Project: **01-242-1**

Matrix: Soil		SS-44	SS-38	SS-49
Parameter	MDL	G5830.1	G5830.2	G5830.3
Antimony	1.0 ug/g	< 1.0		< 1.0
Arsenic	1.0 ug/g	< 1.0		< 1.0
Barium	10 ug/g	100		60
Beryllium	0.50 ug/g	< 0.50		1.0
Cadmium	1.0 ug/g	< 1.0		< 1.0
Calcium	200 ug/g	11000		15000
Chromium	5.0 ug/g	25		10
Cobalt	5.0 ug/g	5.0		5.0
Copper	5.0 ug/g	15		10
Iron	200 ug/g	11000		7800
Lead	5.0 ug/g	35		25
Magnesium	200 ug/g	7400		5800
Molybdenum	1.0 ug/g	< 1.0		< 1.0
Nickel	5.0 ug/g	15		10
Selenium	1.0 ug/g	< 1.0		4.0
Silver	5.0 ug/g	< 5.0		< 5.0
Sodium	200 ug/g	400		< 200
Thallium	1.0 ug/g	< 1.0		< 1.0
Tin	5.0 ug/g	< 5.0		< 5.0
Vanadium	10 ug/g	30		20
Zinc	20 ug/g	40		40
Acenaphthene	0.017 ug/g	< 0.017	< 0.017	< 0.017
Acenaphthylene	0.017 ug/g	0.017	< 0.017	< 0.017
Anthracene	0.017 ug/g	0.017	< 0.017	< 0.017
Benzo[a]anthracene	0.017 ug/g	0.066	< 0.017	0.033
Benzo[a]pyrene	0.017 ug/g	0.099	< 0.017	0.017
Benzo[b]fluoranthene	0.017 ug/g	0.12	< 0.017	0.017
Benzo[ghi]perylene	0.017 ug/g	0.099	< 0.017	< 0.017
Benzo[k]fluoranthene	0.017 ug/g	0.12	< 0.017	0.017
Biphenyl	0.017 ug/g	< 0.017	< 0.017	< 0.017
Chrysene	0.017 ug/g	0.099	< 0.017	0.017
Dibenzo[a,h]anthracene	0.017 ug/g	0.033	< 0.017	< 0.017
Fluoranthene	0.017 ug/g	0.099	< 0.017	0.050
Fluorene	0.017 ug/g	< 0.017	< 0.017	< 0.017

		SS-44	SS-38	SS-49
		G5830.1	G5830.2	G5830.3
Indeno[1,2,3-cd]pyrene	0.017 ug/g	0.099	< 0.017	< 0.017
1-Methylnaphthalene	0.017 ug/g	0.033	< 0.017	< 0.017
2-Methylnaphthalene	0.017 ug/g	0.033	< 0.017	< 0.017
Naphthalene	0.017 ug/g	0.050	< 0.017	< 0.017
Phenanthrene	0.017 ug/g	0.066	< 0.017	0.033
Pyrene	0.017 ug/g	0.099	< 0.017	0.033
2-Fluorobiphenyl	surrogate	48%	52%	51%
p-Terphenyl d-14	surrogate	76%	76%	67%

Paracel Laboratories Ltd.

Certificate of Analysis

Order #: G5830

Report Date: 11/01/01
Order Date: 10/22/01
Sample Date: 10/17/01

Client: **Duke Engineering & Services Inc.**

Client Ref:

Project: **01-242-1**

Matrix: Soil Parameter	MDL	PH-49 G5830.4	SS-7A G5830.5	SS-46 G5830.6
Antimony	1.0 ug/g			< 1.0
Arsenic	1.0 ug/g			< 1.0
Barium	10 ug/g			360
Beryllium	0.50 ug/g			< 0.50
Cadmium	1.0 ug/g			< 1.0
Calcium	200 ug/g			8400
Chromium	5.0 ug/g			75
Cobalt	5.0 ug/g			20
Copper	5.0 ug/g			40
Iron	200 ug/g			30000
Lead	5.0 ug/g			10
Magnesium	200 ug/g			15000
Molybdenum	1.0 ug/g			< 1.0
Nickel	5.0 ug/g			40
Selenium	1.0 ug/g			< 1.0
Silver	5.0 ug/g			< 5.0
Sodium	200 ug/g			1200
Thallium	1.0 ug/g			< 1.0
Tin	5.0 ug/g			< 5.0
Vanadium	10 ug/g			70
Zinc	20 ug/g			100
pH	0.050 pH units	7.8		
Acenaphthene	0.017 ug/g		< 0.017	< 0.017
Acenaphthylene	0.017 ug/g		0.017	< 0.017
Anthracene	0.017 ug/g		0.066	< 0.017
Benzo[a]anthracene	0.017 ug/g		0.21	< 0.017
Benzo[a]pyrene	0.017 ug/g		0.20	< 0.017
Benzo[b]fluoranthene	0.017 ug/g		0.17	0.017
Benzo[ghi]perylene	0.017 ug/g		0.13	< 0.017
Benzo[k]fluoranthene	0.017 ug/g		0.17	< 0.017
Biphenyl	0.017 ug/g		< 0.017	< 0.017
Chrysene	0.017 ug/g		0.21	< 0.017
Dibenzo[a,h]anthracene	0.017 ug/g		0.066	< 0.017
Fluoranthene	0.017 ug/g		0.46	0.017

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Certificate of Analysis

Order #: G5830

Report Date: 11/01/01
Order Date: 10/22/01
Sample Date: 10/17/01

Client: **Duke Engineering & Services Inc.**

Client Ref:

Project: **01-242-1**

		PH-49	SS-7A	SS-46
		G5830.4	G5830.5	G5830.6
Fluorene	0.017 ug/g		< 0.017	< 0.017
Indeno[1,2,3-cd]pyrene	0.017 ug/g		0.13	< 0.017
1-Methylnaphthalene	0.017 ug/g		< 0.017	< 0.017
2-Methylnaphthalene	0.017 ug/g		< 0.017	< 0.017
Naphthalene	0.017 ug/g		< 0.017	< 0.017
Phenanthrene	0.017 ug/g		0.33	0.017
Pyrene	0.017 ug/g		0.51	0.017
2-Fluorobiphenyl	surrogate		43%	55%
p-Terphenyl d-14	surrogate		61%	78%

Paracel Laboratories Ltd.

Certificate of Analysis

Order #: G5830

Report Date: 11/01/01
Order Date: 10/22/01
Sample Date: 10/17/01

Client: **Duke Engineering & Services Inc.**

Client Ref:

Project: **01-242-1**

Matrix: Soil		SS-3A	SS-7	PH-7
Parameter	MDL	G5830.7	G5830.8	G5830.9
Antimony	1.0 ug/g	< 1.0	< 1.0	
Arsenic	1.0 ug/g	< 1.0	1.0	
Barium	10 ug/g	460	50	
Beryllium	0.50 ug/g	< 0.50	1.0	
Cadmium	1.0 ug/g	< 1.0	< 1.0	
Calcium	200 ug/g	7200	12000	
Chromium	5.0 ug/g	85	10	
Cobalt	5.0 ug/g	20	< 5.0	
Copper	5.0 ug/g	35	10	
Iron	200 ug/g	30000	6600	
Lead	5.0 ug/g	10	25	
Magnesium	200 ug/g	15000	4600	
Molybdenum	1.0 ug/g	< 1.0	< 1.0	
Nickel	5.0 ug/g	45	5.0	
Selenium	1.0 ug/g	< 1.0	5.0	
Silver	5.0 ug/g	< 5.0	< 5.0	
Sodium	200 ug/g	1000	< 200	
Thallium	1.0 ug/g	< 1.0	< 1.0	
Tin	5.0 ug/g	< 5.0	< 5.0	
Vanadium	10 ug/g	70	20	
Zinc	20 ug/g	100	40	
pH	0.050 pH units			8.1
Acenaphthene	0.017 ug/g		< 0.017	
Acenaphthylene	0.017 ug/g		0.033	
Anthracene	0.017 ug/g		0.033	
Benzo[a]anthracene	0.017 ug/g		0.099	
Benzo[a]pyrene	0.017 ug/g		0.12	
Benzo[b]fluoranthene	0.017 ug/g		0.12	
Benzo[ghi]perylene	0.017 ug/g		0.15	
Benzo[k]fluoranthene	0.017 ug/g		0.12	
Biphenyl	0.017 ug/g		< 0.017	
Chrysene	0.017 ug/g		0.099	
Dibenzo[a,h]anthracene	0.017 ug/g		0.066	
Fluoranthene	0.017 ug/g		0.15	

		SS-3A	SS-7	PH-7
		G5830.7	G5830.8	G5830.9
Fluorene	0.017 ug/g		< 0.017	
Indeno[1,2,3-cd]pyrene	0.017 ug/g		0.13	
1-Methylnaphthalene	0.017 ug/g		< 0.017	
2-Methylnaphthalene	0.017 ug/g		< 0.017	
Naphthalene	0.017 ug/g		< 0.017	
Phenanthrene	0.017 ug/g		0.066	
Pyrene	0.017 ug/g		0.13	
2-Fluorobiphenyl	surrogate		70%	
p-Terphenyl d-14	surrogate		73%	

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Certificate of Analysis

Order #: G5830

Report Date: 11/01/01
Order Date: 10/22/01
Sample Date: 10/17/01

Client: **Duke Engineering & Services Inc.**

Client Ref:

Project: **01-242-1**

Matrix: Soil		SS-77	SS-6	SS-1
Parameter	MDL	G5830.10	G5830.11	G5830.12
Antimony	1.0 ug/g	1.0	< 1.0	< 1.0
Arsenic	1.0 ug/g	< 1.0	< 1.0	< 1.0
Barium	10 ug/g	50	20	40
Beryllium	0.50 ug/g	0.50	< 0.50	< 0.50
Cadmium	1.0 ug/g	< 1.0	< 1.0	< 1.0
Calcium	200 ug/g	12000	2600	5400
Chromium	5.0 ug/g	5.0	10	15
Cobalt	5.0 ug/g	< 5.0	< 5.0	< 5.0
Copper	5.0 ug/g	10	< 5.0	20
Iron	200 ug/g	5600	6000	7000
Lead	5.0 ug/g	45	5.0	20
Magnesium	200 ug/g	3200	1000	2200
Molybdenum	1.0 ug/g	< 1.0	< 1.0	< 1.0
Nickel	5.0 ug/g	5.0	< 5.0	5.0
Selenium	1.0 ug/g	< 1.0	< 1.0	< 1.0
Silver	5.0 ug/g	< 5.0	< 5.0	< 5.0
Sodium	200 ug/g	< 200	< 200	< 200
Thallium	1.0 ug/g	< 1.0	< 1.0	< 1.0
Tin	5.0 ug/g	< 5.0	< 5.0	< 5.0
Vanadium	10 ug/g	20	20	20
Zinc	20 ug/g	40	20	40

Matrix: Soil		SS-4	SS-14	SS-11
Parameter	MDL	G5830.13	G5830.14	G5830.15
Antimony	1.0 ug/g		< 1.0	
Arsenic	1.0 ug/g		< 1.0	
Barium	10 ug/g		250	
Beryllium	0.50 ug/g		< 0.50	
Cadmium	1.0 ug/g		< 1.0	
Calcium	200 ug/g		10000	
Chromium	5.0 ug/g		60	
Cobalt	5.0 ug/g		15	
Copper	5.0 ug/g		30	
Iron	200 ug/g		21000	
Lead	5.0 ug/g		20	
Magnesium	200 ug/g		11000	
Molybdenum	1.0 ug/g		< 1.0	
Nickel	5.0 ug/g		30	
Selenium	1.0 ug/g		< 1.0	
Silver	5.0 ug/g		< 5.0	
Sodium	200 ug/g		800	
Thallium	1.0 ug/g		< 1.0	
Tin	5.0 ug/g		< 5.0	
Vanadium	10 ug/g		50	
Zinc	20 ug/g		80	
Acenaphthene	0.017 ug/g	< 0.017	< 0.017	0.12
Acenaphthylene	0.017 ug/g	< 0.017	< 0.017	0.050
Anthracene	0.017 ug/g	< 0.017	0.017	0.41
Benzo[a]anthracene	0.017 ug/g	0.017	0.15	0.96
Benzo[a]pyrene	0.017 ug/g	< 0.017	0.12	0.89
Benzo[b]fluoranthene	0.017 ug/g	< 0.017	0.099	0.86
Benzo[ghi]perylene	0.017 ug/g	< 0.017	0.083	0.69
Benzo[k]fluoranthene	0.017 ug/g	< 0.017	0.12	0.86
Biphenyl	0.017 ug/g	< 0.017	< 0.017	< 0.017
Chrysene	0.017 ug/g	0.017	0.12	0.87
Dibenzo[a,h]anthracene	0.017 ug/g	< 0.017	0.050	0.40
Fluoranthene	0.017 ug/g	0.033	0.20	2.0
Fluorene	0.017 ug/g	< 0.017	< 0.017	0.13

		SS-4	SS-14	SS-11
		G5830.13	G5830.14	G5830.15
Indeno[1,2,3-cd]pyrene	0.017 ug/g	< 0.017	0.083	0.78
1-Methylnaphthalene	0.017 ug/g	< 0.017	< 0.017	0.017
2-Methylnaphthalene	0.017 ug/g	< 0.017	< 0.017	0.017
Naphthalene	0.017 ug/g	< 0.017	< 0.017	0.066
Phenanthrene	0.017 ug/g	< 0.017	0.066	1.6
Pyrene	0.017 ug/g	0.017	0.17	1.6
2-Fluorobiphenyl	surrogate	77%	42%	74%
p-Terphenyl d-14	surrogate	84%	72%	83%

Client: **Duke Engineering & Services Inc.**

Client Ref: Project: **01-242-1**

Matrix: Soil		SS-15	SS-20	PH-20
Parameter	MDL	G5830.16	G5830.17	G5830.18
Antimony	1.0 ug/g	< 1.0	< 1.0	
Arsenic	1.0 ug/g	< 1.0	< 1.0	
Barium	10 ug/g	100	130	
Beryllium	0.50 ug/g	< 0.50	< 0.50	
Cadmium	1.0 ug/g	< 1.0	< 1.0	
Calcium	200 ug/g	4200	6400	
Chromium	5.0 ug/g	25	25	
Cobalt	5.0 ug/g	5.0	10	
Copper	5.0 ug/g	15	15	
Iron	200 ug/g	10000	13000	
Lead	5.0 ug/g	10	15	
Magnesium	200 ug/g	4600	6000	
Molybdenum	1.0 ug/g	< 1.0	< 1.0	
Nickel	5.0 ug/g	15	15	
Selenium	1.0 ug/g	< 1.0	< 1.0	
Silver	5.0 ug/g	< 5.0	< 5.0	
Sodium	200 ug/g	400	600	
Thallium	1.0 ug/g	< 1.0	< 1.0	
Tin	5.0 ug/g	< 5.0	< 5.0	
Vanadium	10 ug/g	30	40	
Zinc	20 ug/g	60	60	
pH	0.050 pH units			8.0
Acenaphthene	0.017 ug/g	< 0.017	0.017	
Acenaphthylene	0.017 ug/g	< 0.017	0.017	
Anthracene	0.017 ug/g	< 0.017	0.083	
Benzo[a]anthracene	0.017 ug/g	0.050	0.31	
Benzo[a]pyrene	0.017 ug/g	0.033	0.28	
Benzo[b]fluoranthene	0.017 ug/g	0.033	0.28	
Benzo[ghi]perylene	0.017 ug/g	0.033	0.20	
Benzo[k]fluoranthene	0.017 ug/g	0.033	0.28	
Biphenyl	0.017 ug/g	< 0.017	< 0.017	
Chrysene	0.017 ug/g	0.033	0.30	
Dibenzo[a,h]anthracene	0.017 ug/g	< 0.017	0.13	
Fluoranthene	0.017 ug/g	0.083	0.59	

		SS-15	SS-20	PH-20
		G5830.16	G5830.17	G5830.18
Fluorene	0.017 ug/g	< 0.017	0.017	
Indeno[1,2,3-cd]pyrene	0.017 ug/g	0.033	0.23	
1-Methylnaphthalene	0.017 ug/g	< 0.017	< 0.017	
2-Methylnaphthalene	0.017 ug/g	< 0.017	< 0.017	
Naphthalene	0.017 ug/g	< 0.017	< 0.017	
Phenanthrene	0.017 ug/g	0.050	0.30	
Pyrene	0.017 ug/g	0.066	0.50	
2-Fluorobiphenyl	surrogate	52%	65%	
p-Terphenyl d-14	surrogate	67%	86%	

Matrix: Soil		SS-26	SS-29	SS-129
Parameter	MDL	G5830.19	G5830.20	G5830.21
Antimony	1.0 ug/g	< 1.0	< 1.0	
Arsenic	1.0 ug/g	< 1.0	< 1.0	
Barium	10 ug/g	150	200	
Beryllium	0.50 ug/g	< 0.50	< 0.50	
Cadmium	1.0 ug/g	< 1.0	< 1.0	
Calcium	200 ug/g	5200	6200	
Chromium	5.0 ug/g	30	50	
Cobalt	5.0 ug/g	10	10	
Copper	5.0 ug/g	15	25	
Iron	200 ug/g	14000	17000	
Lead	5.0 ug/g	15	15	
Magnesium	200 ug/g	5800	8800	
Molybdenum	1.0 ug/g	< 1.0	< 1.0	
Nickel	5.0 ug/g	15	25	
Selenium	1.0 ug/g	< 1.0	< 1.0	
Silver	5.0 ug/g	< 5.0	< 5.0	
Sodium	200 ug/g	400	600	
Thallium	1.0 ug/g	< 1.0	< 1.0	
Tin	5.0 ug/g	< 5.0	< 5.0	
Vanadium	10 ug/g	40	50	
Zinc	20 ug/g	60	80	
Acenaphthene	0.017 ug/g		< 0.017	< 0.017
Acenaphthylene	0.017 ug/g		< 0.017	< 0.017
Anthracene	0.017 ug/g		< 0.017	< 0.017
Benzo[a]anthracene	0.017 ug/g		0.033	0.050
Benzo[a]pyrene	0.017 ug/g		0.033	0.033
Benzo[b]fluoranthene	0.017 ug/g		0.033	0.050
Benzo[ghi]perylene	0.017 ug/g		0.033	0.033
Benzo[k]fluoranthene	0.017 ug/g		0.033	0.050
Biphenyl	0.017 ug/g		< 0.017	< 0.017
Chrysene	0.017 ug/g		0.033	0.050
Dibenzo[a,h]anthracene	0.017 ug/g		0.017	< 0.017
Fluoranthene	0.017 ug/g		0.066	0.083
Fluorene	0.017 ug/g		< 0.017	< 0.017

		SS-26	SS-29	SS-129
		G5830.19	G5830.20	G5830.21
Indeno[1,2,3-cd]pyrene	0.017 ug/g		0.033	0.033
1-Methylnaphthalene	0.017 ug/g		< 0.017	< 0.017
2-Methylnaphthalene	0.017 ug/g		< 0.017	< 0.017
Naphthalene	0.017 ug/g		< 0.017	< 0.017
Phenanthrene	0.017 ug/g		0.033	0.033
Pyrene	0.017 ug/g		0.050	0.066
2-Fluorobiphenyl	surrogate		61%	56%
p-Terphenyl d-14	surrogate		71%	70%

Paracel Laboratories Ltd.

Certificate of Analysis

Order #: G5830

Report Date: 11/01/01
Order Date: 10/22/01
Sample Date: 10/17/01

Client: **Duke Engineering & Services Inc.**

Client Ref:

Project: **01-242-1**

Matrix: Soil Parameter	MDL	SS-36 G5830.22	SS-37 G5830.23	PH-37 G5830.24
Antimony	1.0 ug/g	< 1.0	< 1.0	
Arsenic	1.0 ug/g	< 1.0	< 1.0	
Barium	10 ug/g	190	240	
Beryllium	0.50 ug/g	< 0.50	< 0.50	
Cadmium	1.0 ug/g	< 1.0	< 1.0	
Calcium	200 ug/g	5200	6600	
Chromium	5.0 ug/g	40	50	
Cobalt	5.0 ug/g	10	15	
Copper	5.0 ug/g	20	25	
Iron	200 ug/g	14000	20000	
Lead	5.0 ug/g	15	25	
Magnesium	200 ug/g	7800	11000	
Molybdenum	1.0 ug/g	< 1.0	< 1.0	
Nickel	5.0 ug/g	25	30	
Selenium	1.0 ug/g	< 1.0	< 1.0	
Silver	5.0 ug/g	< 5.0	< 5.0	
Sodium	200 ug/g	600	800	
Thallium	1.0 ug/g	< 1.0	< 1.0	
Tin	5.0 ug/g	< 5.0	< 5.0	
Vanadium	10 ug/g	40	50	
Zinc	20 ug/g	60	80	
pH	0.050 pH units			8.0
Acenaphthene	0.017 ug/g	0.033		
Acenaphthylene	0.017 ug/g	0.066		
Anthracene	0.017 ug/g	0.13		
Benzo[a]anthracene	0.017 ug/g	0.41		
Benzo[a]pyrene	0.017 ug/g	0.48		
Benzo[b]fluoranthene	0.017 ug/g	0.45		
Benzo[ghi]perylene	0.017 ug/g	0.40		
Benzo[k]fluoranthene	0.017 ug/g	0.38		
Biphenyl	0.017 ug/g	< 0.017		
Chrysene	0.017 ug/g	0.41		
Dibenzo[a,h]anthracene	0.017 ug/g	0.20		
Fluoranthene	0.017 ug/g	0.86		

Paracel Laboratories Ltd.

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Client: **Duke Engineering & Services Inc.**

Client Ref:

Project: **01-242-1**

		SS-36	SS-37	PH-37
		G5830.22	G5830.23	G5830.24
Fluorene	0.017 ug/g	0.033		
Indeno[1,2,3-cd]pyrene	0.017 ug/g	0.43		
1-Methylnaphthalene	0.017 ug/g	< 0.017		
2-Methylnaphthalene	0.017 ug/g	< 0.017		
Naphthalene	0.017 ug/g	< 0.017		
Phenanthrene	0.017 ug/g	0.53		
Pyrene	0.017 ug/g	0.71		
2-Fluorobiphenyl	surrogate	54%		
p-Terphenyl d-14	surrogate	61%		

Matrix: Soil

Parameter	MDL	SS-28 G5830.25	SS-30 G5830.26	PH-30 G5830.27
Antimony	1.0 ug/g	1.0	< 1.0	
Arsenic	1.0 ug/g	2.0	< 1.0	
Barium	10 ug/g	120	290	
Beryllium	0.50 ug/g	1.5	< 0.50	
Cadmium	1.0 ug/g	< 1.0	< 1.0	
Calcium	200 ug/g	8200	1600	
Chromium	5.0 ug/g	15	65	
Cobalt	5.0 ug/g	< 5.0	20	
Copper	5.0 ug/g	15	35	
Iron	200 ug/g	11000	3800	
Lead	5.0 ug/g	90	20	
Magnesium	200 ug/g	2800	13000	
Molybdenum	1.0 ug/g	< 1.0	< 1.0	
Nickel	5.0 ug/g	10	40	
Selenium	1.0 ug/g	< 1.0	< 1.0	
Silver	5.0 ug/g	< 5.0	< 5.0	
Sodium	200 ug/g	< 200	< 200	
Thallium	1.0 ug/g	< 1.0	< 1.0	
Tin	5.0 ug/g	5.0	< 5.0	
Vanadium	10 ug/g	20	60	
Zinc	20 ug/g	180	80	
pH	0.050 pH units			7.9
Acenaphthene	0.017 ug/g	0.050	0.083	
Acenaphthylene	0.017 ug/g	0.17	0.017	
Anthracene	0.017 ug/g	0.41	0.31	
Benzo[a]anthracene	0.017 ug/g	1.4	0.68	
Benzo[a]pyrene	0.017 ug/g	1.2	0.61	
Benzo[b]fluoranthene	0.017 ug/g	1.2	0.53	
Benzo[ghi]perylene	0.017 ug/g	0.96	0.43	
Benzo[k]fluoranthene	0.017 ug/g	1.2	0.50	
Biphenyl	0.017 ug/g	< 0.017	< 0.017	
Chrysene	0.017 ug/g	1.6	0.64	
Dibenzo[a,h]anthracene	0.017 ug/g	0.56	0.23	
Fluoranthene	0.017 ug/g	3.1	1.7	

		SS-28	SS-30	PH-30
		G5830.25	G5830.26	G5830.27
Fluorene	0.017 ug/g	0.15	0.099	
Indeno[1,2,3-cd]pyrene	0.017 ug/g	1.1	0.51	
1-Methylnaphthalene	0.017 ug/g	0.050	< 0.017	
2-Methylnaphthalene	0.017 ug/g	0.050	< 0.017	
Naphthalene	0.017 ug/g	0.13	< 0.017	
Phenanthrene	0.017 ug/g	2.6	1.6	
Pyrene	0.017 ug/g	2.3	1.2	
2-Fluorobiphenyl	surrogate	72%	62%	
p-Terphenyl d-14	surrogate	80%	69%	

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Certificate of Analysis

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Report Date: 11/01/01
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Sample Date: 10/17/01

Client: **Duke Engineering & Services Inc.**

Client Ref:

Project: **01-242-1**

Matrix: Soil

Parameter	MDL	SS-31	SS-33	SS-40
		G5830.28	G5830.29	G5830.30
Antimony	1.0 ug/g	< 1.0		< 1.0
Arsenic	1.0 ug/g	< 1.0		< 1.0
Barium	10 ug/g	200		40
Beryllium	0.50 ug/g	< 0.50		1.0
Cadmium	1.0 ug/g	< 1.0		< 1.0
Calcium	200 ug/g	15000		7800
Chromium	5.0 ug/g	40		10
Cobalt	5.0 ug/g	10		< 5.0
Copper	5.0 ug/g	20		5.0
Iron	200 ug/g	17000		6800
Lead	5.0 ug/g	10		20
Magnesium	200 ug/g	13000		3400
Molybdenum	1.0 ug/g	< 1.0		< 1.0
Nickel	5.0 ug/g	25		5.0
Selenium	1.0 ug/g	9.0		4.0
Silver	5.0 ug/g	< 5.0		< 5.0
Sodium	200 ug/g	600		< 200
Thallium	1.0 ug/g	< 1.0		< 1.0
Tin	5.0 ug/g	< 5.0		< 5.0
Vanadium	10 ug/g	50		20
Zinc	20 ug/g	60		40
Acenaphthene	0.017 ug/g		< 0.017	< 0.017
Acenaphthylene	0.017 ug/g		< 0.017	< 0.017
Anthracene	0.017 ug/g		< 0.017	< 0.017
Benzo[a]anthracene	0.017 ug/g		0.050	< 0.017
Benzo[a]pyrene	0.017 ug/g		0.050	< 0.017
Benzo[b]fluoranthene	0.017 ug/g		0.050	0.017
Benzo[ghi]perylene	0.017 ug/g		0.050	< 0.017
Benzo[k]fluoranthene	0.017 ug/g		0.050	< 0.017
Biphenyl	0.017 ug/g		< 0.017	< 0.017
Chrysene	0.017 ug/g		0.050	< 0.017
Dibenzo[a,h]anthracene	0.017 ug/g		0.017	< 0.017
Fluoranthene	0.017 ug/g		0.083	< 0.017
Fluorene	0.017 ug/g		< 0.017	< 0.017

		SS-31	SS-33	SS-40
		G5830.28	G5830.29	G5830.30
Indeno[1,2,3-cd]pyrene	0.017 ug/g		0.050	< 0.017
1-Methylnaphthalene	0.017 ug/g		< 0.017	< 0.017
2-Methylnaphthalene	0.017 ug/g		< 0.017	< 0.017
Naphthalene	0.017 ug/g		< 0.017	< 0.017
Phenanthrene	0.017 ug/g		0.050	< 0.017
Pyrene	0.017 ug/g		0.066	< 0.017
2-Fluorobiphenyl	surrogate		43%	55%
p-Terphenyl d-14	surrogate		46%	58%

Matrix: Soil		SS-39
Parameter	MDL	G5830.31
Antimony	1.0 ug/g	< 1.0
Arsenic	1.0 ug/g	< 1.0
Barium	10 ug/g	40
Beryllium	0.50 ug/g	< 0.50
Cadmium	1.0 ug/g	< 1.0
Calcium	200 ug/g	13000
Chromium	5.0 ug/g	10
Cobalt	5.0 ug/g	< 5.0
Copper	5.0 ug/g	5.0
Iron	200 ug/g	7400
Lead	5.0 ug/g	10
Magnesium	200 ug/g	5600
Molybdenum	1.0 ug/g	< 1.0
Nickel	5.0 ug/g	5.0
Selenium	1.0 ug/g	< 1.0
Silver	5.0 ug/g	< 5.0
Sodium	200 ug/g	< 200
Thallium	1.0 ug/g	< 1.0
Tin	5.0 ug/g	< 5.0
Vanadium	10 ug/g	20
Zinc	20 ug/g	40
Acenaphthene	0.017 ug/g	< 0.017
Acenaphthylene	0.017 ug/g	< 0.017
Anthracene	0.017 ug/g	< 0.017
Benzo[a]anthracene	0.017 ug/g	0.033
Benzo[a]pyrene	0.017 ug/g	0.033
Benzo[b]fluoranthene	0.017 ug/g	0.017
Benzo[ghi]perylene	0.017 ug/g	0.033
Benzo[k]fluoranthene	0.017 ug/g	0.017
Biphenyl	0.017 ug/g	< 0.017
Chrysene	0.017 ug/g	0.033
Dibenzo[a,h]anthracene	0.017 ug/g	< 0.017
Fluoranthene	0.017 ug/g	0.050
Fluorene	0.017 ug/g	< 0.017

		SS-39
		G5830.31
Indeno[1,2,3-cd]pyrene	0.017 ug/g	0.017
1-Methylnaphthalene	0.017 ug/g	< 0.017
2-Methylnaphthalene	0.017 ug/g	< 0.017
Naphthalene	0.017 ug/g	< 0.017
Phenanthrene	0.017 ug/g	0.033
Pyrene	0.017 ug/g	0.033
2-Fluorobiphenyl	surrogate	68%
p-Terphenyl d-14	surrogate	80%

Paracel Laboratories Ltd.

Certificate of Analysis - QA/QC Data

Date: 11/01/01

Order #: G5830

Client: **Duke Engineering & Services Inc.**

Client Ref:

Project: **01-242-1**

Blank QC Results - Matrix: Soil

Parameter	Method	DL	Measured
Antimony	EPA 6020	1.0 ug/g	< 1.0
Arsenic	EPA 6020	1.0 ug/g	< 1.0
Barium	EPA 6020	10 ug/g	< 10
Beryllium	EPA 6020	0.50 ug/g	< 0.50
Cadmium	EPA 6020	1.0 ug/g	< 1.0
Chromium	EPA 6020	5.0 ug/g	< 5.0
Cobalt	EPA 6020	5.0 ug/g	< 5.0
Copper	EPA 6020	5.0 ug/g	< 5.0
Lead	EPA 6020	5.0 ug/g	< 5.0
Molybdenum	EPA 6020	1.0 ug/g	< 1.0
Nickel	EPA 6020	5.0 ug/g	< 5.0
Selenium	EPA 6020	1.0 ug/g	< 1.0
Silver	EPA 6020	5.0 ug/g	< 5.0
Thallium	EPA 6020	1.0 ug/g	< 1.0
Tin	EPA 6020	5.0 ug/g	< 5.0
Vanadium	EPA 6020	10 ug/g	< 10
Zinc	EPA 6020	20 ug/g	< 20
Acenaphthene	Modified SW-846 Method 8270	0.017 ug/g	< 0.017
Acenaphthylene	Modified SW-846 Method 8270	0.017 ug/g	< 0.017
Anthracene	Modified SW-846 Method 8270	0.017 ug/g	< 0.017
Benzo[a]anthracene	Modified SW-846 Method 8270	0.017 ug/g	< 0.017
Benzo[a]pyrene	Modified SW-846 Method 8270	0.017 ug/g	< 0.017
Benzo[b]fluoranthene	Modified SW-846 Method 8270	0.017 ug/g	< 0.017
Benzo[ghi]perylene	Modified SW-846 Method 8270	0.017 ug/g	< 0.017
Benzo[k]fluoranthene	Modified SW-846 Method 8270	0.017 ug/g	< 0.017
Biphenyl	Modified SW-846 Method 8270	0.017 ug/g	< 0.017
Chrysene	Modified SW-846 Method 8270	0.017 ug/g	< 0.017
Dibenzo[a,h]anthracene	Modified SW-846 Method 8270	0.017 ug/g	< 0.017
Fluoranthene	Modified SW-846 Method 8270	0.017 ug/g	< 0.017
Fluorene	Modified SW-846 Method 8270	0.017 ug/g	< 0.017
Indeno[1,2,3-cd]pyrene	Modified SW-846 Method 8270	0.017 ug/g	< 0.017
1-Methylnaphthalene	Modified SW-846 Method 8270	0.017 ug/g	< 0.017
2-Methylnaphthalene	Modified SW-846 Method 8270	0.017 ug/g	< 0.017
Naphthalene	Modified SW-846 Method 8270	0.017 ug/g	< 0.017
Phenanthrene	Modified SW-846 Method 8270	0.017 ug/g	< 0.017
Pyrene	Modified SW-846 Method 8270	0.017 ug/g	< 0.017
2-Fluorobiphenyl (surrogate)	Modified SW-846 Method 8270	n/a	62%
p-Terphenyl d-14 (surrogate)	Modified SW-846 Method 8270	n/a	85%

Client: **Duke Engineering & Services Inc.**

Client Ref:

Project: **01-242-1**

Reference Standard QC Results - Matrix: Soil

Parameter	Expected	LLA - ULA	Recovery
Antimony	125 ug/g	80% - 120%	90%
Antimony	125 ug/g	80% - 120%	83%
Arsenic	125 ug/g	80% - 120%	91%
Arsenic	125 ug/g	80% - 120%	88%
Barium	125 ug/g	80% - 120%	107%
Barium	125 ug/g	80% - 120%	108%
Beryllium	125 ug/g	80% - 120%	98%
Beryllium	125 ug/g	80% - 120%	94%
Cadmium	125 ug/g	80% - 120%	91%
Cadmium	125 ug/g	80% - 120%	88%
Chromium	125 ug/g	80% - 120%	95%
Chromium	125 ug/g	80% - 120%	95%
Cobalt	125 ug/g	80% - 120%	97%
Cobalt	125 ug/g	80% - 120%	93%
Copper	125 ug/g	80% - 120%	97%
Copper	125 ug/g	80% - 120%	92%
Lead	125 ug/g	80% - 120%	88%
Lead	125 ug/g	80% - 120%	92%
Molybdenum	125 ug/g	80% - 120%	89%
Molybdenum	125 ug/g	80% - 120%	86%
Nickel	125 ug/g	80% - 120%	93%
Nickel	125 ug/g	80% - 120%	93%
Selenium	125 ug/g	80% - 120%	92%
Selenium	125 ug/g	80% - 120%	88%
Silver	125 ug/g	80% - 120%	107%
Silver	125 ug/g	80% - 120%	100%
Thallium	125 ug/g	80% - 120%	89%
Thallium	125 ug/g	80% - 120%	99%
Tin	125 ug/g	80% - 120%	103%
Tin	125 ug/g	80% - 120%	95%
Vanadium	125 ug/g	80% - 120%	92%
Vanadium	125 ug/g	80% - 120%	92%
Zinc	125 ug/g	80% - 120%	99%
Zinc	125 ug/g	80% - 120%	93%
pH	7.0 pH units	98% - 102%	100%
Acenaphthene	0.33 ug/g	47% - 145%	91%
Acenaphthylene	0.33 ug/g	33% - 145%	95%
Anthracene	0.33 ug/g	27% - 133%	105%
Benzo[a]anthracene	0.33 ug/g	33% - 143%	100%
Benzo[a]pyrene	0.33 ug/g	17% - 163%	96%
Benzo[b]fluoranthene	0.33 ug/g	11% - 162%	103%
Benzo[ghi]perylene	0.33 ug/g	1% - 219%	105%
Benzo[k]fluoranthene	0.33 ug/g	11% - 162%	99%
Biphenyl	0.33 ug/g	35% - 114%	85%
Chrysene	0.33 ug/g	17% - 168%	95%
Dibenzo[a,h]anthracene	0.33 ug/g	1% - 227%	100%
Fluoranthene	0.33 ug/g	26% - 137%	107%
Fluorene	0.33 ug/g	59% - 121%	95%
Indeno[1,2,3-cd]pyrene	0.33 ug/g	1% - 171%	108%
1-Methylnaphthalene	0.33 ug/g	35% - 114%	106%
2-Methylnaphthalene	0.33 ug/g	35% - 114%	81%

Naphthalene		0.33 ug/g	21% - 133%	98%
Phenanthrene		0.33 ug/g	54% - 120%	104%
Pyrene		0.33 ug/g	52% - 115%	110%
2-Fluorobiphenyl	(surrogate)	100%	43% - 116%	119%
p-Terphenyl d-14	(surrogate)	100%	33% - 141%	108%

Spike QC Results - Matrix: Soil

Parameter	Expected	Measured	ULA - LLA	Meas./Expt.
Antimony	125 ug/g	100	70% - 130%	80%
Arsenic	126 ug/g	101	70% - 130%	80%
Barium	226 ug/g	220	70% - 130%	97%
Beryllium	125 ug/g	116	70% - 130%	92%
Cadmium	125 ug/g	101	70% - 130%	80%
Chromium	148 ug/g	133	70% - 130%	90%
Cobalt	132 ug/g	115	70% - 130%	87%
Copper	140 ug/g	120	70% - 130%	86%
Lead	158 ug/g	132	70% - 130%	84%
Molybdenum	125 ug/g	99	70% - 130%	79%
Nickel	140 ug/g	123	70% - 130%	88%
Selenium	125 ug/g	104	70% - 130%	83%
Silver	125 ug/g	114	70% - 130%	91%
Thallium	125 ug/g	111	70% - 130%	88%
Tin	126 ug/g	112	70% - 130%	89%
Vanadium	158 ug/g	124	70% - 130%	79%
Zinc	167 ug/g	152	70% - 130%	91%
Acenaphthene	0.33 ug/g	0.19	47% - 147%	57%
Acenaphthylene	0.33 ug/g	0.20	33% - 145%	59%
Anthracene	0.33 ug/g	0.23	27% - 133%	69%
Benzo[a]anthracene	0.33 ug/g	0.23	33% - 143%	69%
Benzo[a]pyrene	0.33 ug/g	0.23	17% - 163%	69%
Benzo[b]fluoranthene	0.33 ug/g	0.24	11% - 162%	73%
Benzo[ghi]perylene	0.33 ug/g	0.24	1% - 219%	72%
Benzo[k]fluoranthene	0.33 ug/g	0.24	11% - 162%	74%
Biphenyl	0.33 ug/g	0.16	23% - 120%	49%
Chrysene	0.33 ug/g	0.22	17% - 168%	66%
Dibenzo[a,h]anthracene	0.33 ug/g	0.25	1% - 227%	76%
Fluoranthene	0.33 ug/g	0.23	26% - 137%	70%
Fluorene	0.33 ug/g	0.21	59% - 121%	63%
Indeno[1,2,3-cd]pyrene	0.33 ug/g	0.25	1% - 171%	77%
1-Methylnaphthalene	0.33 ug/g	0.20	23% - 120%	59%
2-Methylnaphthalene	0.33 ug/g	0.15	23% - 120%	46%
Naphthalene	0.33 ug/g	0.18	21% - 133%	54%
Phenanthrene	0.33 ug/g	0.23	54% - 120%	70%
Pyrene	0.33 ug/g	0.24	52% - 115%	73%
2-Fluorobiphenyl (surrogate)	100 %	67	30% - 115%	67%
p-Terphenyl d-14 (surrogate)	100 %	77	18% - 137%	77%

Paracel Laboratories Ltd.

Certificate of Analysis - QA/QC Data

Date: 11/01/01
Order #: G5830

Client: **Duke Engineering & Services Inc.**

Client Ref:

Project: **01-242-1**

Duplicate QA Results - Matrix: Soil

Parameter	units	Detection Limit	Sample Result	Duplicate Result
Antimony	ug/g	1.0	< 1.0	< 1.0
Arsenic	ug/g	1.0	< 1.0	< 1.0
Barium	ug/g	10	100	100
Beryllium	ug/g	0.50	< 0.50	< 0.50
Cadmium	ug/g	1.0	< 1.0	< 1.0
Chromium	ug/g	5.0	25	25
Cobalt	ug/g	5.0	5.0	10
Copper	ug/g	5.0	15	15
Lead	ug/g	5.0	35	35
Molybdenum	ug/g	1.0	< 1.0	< 1.0
Nickel	ug/g	5.0	15	15
Selenium	ug/g	1.0	< 1.0	< 1.0
Silver	ug/g	5.0	< 5.0	< 5.0
Thallium	ug/g	1.0	< 1.0	< 1.0
Tin	ug/g	5.0	< 5.0	< 5.0
Vanadium	ug/g	10	30	30
Zinc	ug/g	20	40	40
pH	pH units	0.050	7.8	7.8
Acenaphthene	ug/g	0.017	< 0.017	< 0.017
Acenaphthylene	ug/g	0.017	0.017	0.033
Anthracene	ug/g	0.017	0.017	0.050
Benzo[a]anthracene	ug/g	0.017	0.066	0.12
Benzo[a]pyrene	ug/g	0.017	0.099	0.17
Benzo[b]fluoranthene	ug/g	0.017	0.12	0.20
Benzo[ghi]perylene	ug/g	0.017	0.099	0.20
Benzo[k]fluoranthene	ug/g	0.017	0.12	0.20
Biphenyl	ug/g	0.017	< 0.017	< 0.017
Chrysene	ug/g	0.017	0.099	0.17
Dibenzo[a,h]anthracene	ug/g	0.017	0.033	0.099
Fluoranthene	ug/g	0.017	0.099	0.13
Fluorene	ug/g	0.017	< 0.017	< 0.017
Indeno[1,2,3-cd]pyrene	ug/g	0.017	0.099	0.18
1-Methylnaphthalene	ug/g	0.017	0.033	0.21
2-Methylnaphthalene	ug/g	0.017	0.033	0.21
Naphthalene	ug/g	0.017	0.050	0.17
Phenanthrene	ug/g	0.017	0.066	0.18
Pyrene	ug/g	0.017	0.099	0.15
2-Fluorobiphenyl (surrogate)	percent	n/a	48%	59%
p-Terphenyl d-14 (surrogate)	percent	n/a	76%	73%

Paracel Laboratories Ltd.

Date: **11/01/01**

Glossary of Terms

MDL	The laboratory Detection Limit. The value is based on instrument response and is the lowest level that can be quantitated with confidence
n/a	Not applicable to this particular analysis.
NV	No Value, typically used for calculated results when the divisor is zero.
Surrogate Data	Surrogates are 'not naturally occuring' compounds which are added to the sample prior to analysis in order to monitor method performance. The results of the surrogate recoveries are reported in percent.
Blank	The results from the analysis of a matrix blank in the same run.
Duplicate Data	The results from an intralaboratory split sample that has been processed identically to that of the primary sample. Result for split sample are listed together with the results from the primary sample.
Reference Standard	Results from the analysis of a Reference Standard. A Reference Standard is a standard that contains the parameters of interest and is procured from a source secondary to the Calibration standard. EXPECTED: The actual concentration of the analyte in the Reference Standard. RECOVERY - Recovery of the spiked material reported in percent.
Spike Data	The results obtained from a sample fortified at a known level. The recovery of the spike is dependent on the level of the analyte found in the sample and spike. EXPECTED - Calculated value of the sample results + fortification amount which yield 100 % Recovery MEASURED - Results from the analysis of the fortified sample RECOVERY - Recovery of the spiked material reported in percent.
LLA	Lower Limit of Acceptability for QC recovery data.
ULA	Upper Limit of Acceptability for QC recovery data.

Your Project #: 316461.TT.HA LEMREUS ISLAND FO
Site: OTTAWA
Your C.O.C. #: 359347

Attention: Kevin Allin
CH2M Hill Canada Limited
North York Head Office
255 Consumers Rd
Toronto, ON
M2J 5B6

Report Date: 2005/10/25

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: A5A3629
Received: 2005/10/17, 14:58

Sample Matrix: Soil
Samples Received: 7

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Petroleum Hydro. CCME FI & BTEX in Soil	3	2005/10/21	2005/10/21	Ont SOP-0816	CCME CWS
Petroleum Hydrocarbons F2-F4 in Soil	3	2005/10/21	2005/10/21	Ont SOP-0817	CCME CWS
Mercury in Soil by CVAA	5	2005/10/24	2005/10/24	Ont SOP 0112	EPA 7470
Total Metals in Soil by Axial ICP-AES	6	2005/10/24	2005/10/24	SOP ING-101	EPA SW846-M6010B
MOISTURE	7	N/A	2005/10/21	Ont SOP-0114	MOE HANDBOOK(1983)
PAH Compounds in Soil by GC/MS (SIM)	5	2005/10/21	2005/10/21	EPA 8270	GC/MS
Polychlorinated Biphenyl in Soil	1	2005/10/20	2005/10/21	Ont SOP 0127	SW 846 3rd Edition
pH CaCl2 EXTRACT	6	N/A	2005/10/24	IN-206	SM 4500 H
Volatile Organic Compounds in Soil	5	N/A	2005/10/21	Ont SOP-0806	EPA 8260 modified

Sample Matrix: Water
Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Petroleum Hydro. CCME FI & BTEX in Water	2	N/A	2005/10/22	Ont SOP 0816	CCME CWS
Petroleum Hydrocarbons F2 F4 in Water	2	2005/10/21	2005/10/21	Ont SOP 0817	CCME Hydrocarbons
Mercury	3	2005/10/21	2005/10/21	Ont SOP 0112	EPA 7470
Dissolved Metals by ICPMS	4	N/A	2005/10/21	Ont SOP 0624	EPA 6020
PAH Compounds in Water by GC/MS (SIM)	3	2005/10/21	2005/10/21	EPA 8270	GC/MS
pH	3	N/A	2005/10/21	Ont SOP 0067	APHA 4500H
Volatile Organic Compounds in Water	3	N/A	2005/10/21	Ont SOP 0806	EPA 8260 modified

MAXXAM ANALYTICS INC.

BRAD NEWMAN
Scientific Services

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encl.

Total cover pages: 1
This document is in electronic format, hard copy is available on request.

Maxxam Job #: A5A3629
Report Date: 2005/10/25

CH2M Hill Canada Limited
Client Project #: 316461.TT.HA LEMREUS ISLAND FO
Project name: OTTAWA
Sampler Initials:

OREG 153 PETROLEUM HYDROCARBONS (WATER)

Maxxam ID		I80797	I80798		
Sampling Date		2005/10/15 15:00	2005/10/15 10:00		
COC Number		359347	359347		
	Units	**CH2M-MW-1**	**CH2M-MW-2**	**RDL**	**QC Batch**
F1 PHC and BTEX					
F1 (C6-C10)	ug/L	ND	ND	100	848007
F1 (C6-C10) - BTEX	ug/L	ND	ND	100	848007
F2-F4 PHC					
F2 (C10-C16 Hydrocarbons)	ug/L	ND	ND	100	848247
F3 (C16-C34 Hydrocarbons)	ug/L	ND	ND	100	848247
F4 (C34-C50 Hydrocarbons)	ug/L	ND	ND	100	848247
Reached Baseline at C50	ug/L	YES	YES		848247
Surrogate Recovery (%)					
1,4-Difluorobenzene	%	98	98		848007
4-Bromofluorobenzene	%	106	105		848007
D10-Ethylbenzene	%	102	100		848007
D4-1,2-Dichloroethane	%	109	108		848007
o-Terphenyl	%	100	101		848247

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel: 905-817-5700 Toll free:800-563-6266 Fax: 905-817-5777

Maxxam Job #: A5A3629
Report Date: 2005/10/25

CH2M Hill Canada Limited
Client Project #: 316461.TT.HA LEMREUS ISLAND FO
Project name: OTTAWA
Sampler Initials:

O'REG 153 METALS PACKAGE (SOIL)

Maxxam ID		I80790	I80791	I80793	I80794		
Sampling Date		2005/10/12 10:40	2005/10/12 14:20	2005/10/14 09:00	2005/10/14 09:30		
COC Number		359347	359347	359347	359347		
	Units	**CH2M-MW-2(2 1/2 - 3 1/2)**	**CH2M-MW-1(2 1/2 - 4 1/2)**	**CH2M-TP5 (2-4)**	**CH2M-TP4 (2-3)**	**RDL**	**QC Batch**
INORGANICS							
Moisture	%	9.7	6.6	39	11	0.2	848359
METALS							
Total Antimony (Sb)	ug/g	ND	ND	3	1	1	848599
Total Arsenic (As)	ug/g	3	2	7	5	1	848599
Total Barium (Ba)	ug/g	83	200	310	140	0.5	848599
Total Beryllium (Be)	ug/g	0.6	ND	ND	ND	0.5	848599
Total Cadmium (Cd)	ug/g	ND	ND	1.5	0.9	0.3	848599
Total Chromium (Cr)	ug/g	32	13	14	15	0.5	848599
Total Cobalt (Co)	ug/g	9.7	4.4	4.1	6.3	0.5	848599
Total Copper (Cu)	ug/g	24	18	73	120	0.5	848599
Total Lead (Pb)	ug/g	16	210	970	97	1	848599
Acid Extractable Mercury (Hg)	ug/g	ND	0.19	0.46	0.17	0.05	848579
Total Molybdenum (Mo)	ug/g	1.4	0.6	0.8	1.2	0.5	848599
Total Nickel (Ni)	ug/g	21	8.5	9.4	14	0.5	848599
Total Selenium (Se)	ug/g	ND	ND	ND	ND	1	848599
Total Silver (Ag)	ug/g	ND	ND	ND	1.1	0.3	848599
Total Thallium (Tl)	ug/g	ND	ND	ND	ND	1	848599
Total Vanadium (V)	ug/g	44	20	20	20	0.5	848599
Total Zinc (Zn)	ug/g	53	75	1700	150	3	848599

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel: 905-817-5700 Toll free:800-563-6266 Fax: 905-817-5777

Maxxam Job #: A5A3629
Report Date: 2005/10/25

CH2M Hill Canada Limited
Client Project #: 316461.TT.HA LEMREUS ISLAND FO
Project name: OTTAWA
Sampler Initials:

O'REG 153 METALS PACKAGE (SOIL)

Maxxam ID		I80795	I80796		
Sampling Date		2005/10/14 10:00	2005/10/12		
COC Number		359347	359347		
	Units	**CH2M-TP3 (2-3)**	**SOIL-DUP-1**	**RDL**	**QC Batch**
INORGANICS					
Moisture	%	41	45	0.2	848359
METALS					
Total Antimony (Sb)	ug/g	ND	2	1	848578
Total Arsenic (As)	ug/g	8	5	1	848578
Total Barium (Ba)	ug/g	260	180	0.5	848578
Total Beryllium (Be)	ug/g	1.1	ND	0.5	848578
Total Cadmium (Cd)	ug/g	1.0	0.9	0.3	848578
Total Chromium (Cr)	ug/g	27	13	0.5	848578
Total Cobalt (Co)	ug/g	8.8	3.8	0.5	848578
Total Copper (Cu)	ug/g	43	61	0.5	848578
Total Lead (Pb)	ug/g	39	670	1	848578
Acid Extractable Mercury (Hg)	ug/g	0.09		0.05	848579
Total Molybdenum (Mo)	ug/g	2.0	ND	0.5	848578
Total Nickel (Ni)	ug/g	18	8.2	0.5	848578
Total Selenium (Se)	ug/g	2	ND	1	848578
Total Silver (Ag)	ug/g	ND	ND	0.3	848578
Total Thallium (Tl)	ug/g	ND	ND	1	848578
Total Vanadium (V)	ug/g	29	18	0.5	848578
Total Zinc (Zn)	ug/g	100	980	3	848578

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel: 905-817-5700 Toll free:800-563-6266 Fax: 905-817-5777

Maxxam Job #: A5A3629
Report Date: 2005/10/25

CH2M Hill Canada Limited
Client Project #: 316461.TT.HA LEMREUS ISLAND FO
Project name: OTTAWA
Sampler Initials:

O'REG 153 ICPMS DISSOLVED METALS (WATER)

Maxxam ID		I80797		I80798		I80799		
Sampling Date		2005/10/15 15:00		2005/10/15 10:00		2005/10/15		
COC Number		359347		359347		359347		
	Units	**CH2M-MW-1**	**QC Batch**	**CH2M-MW-2**	**QC Batch**	**GW-DUP-1**	**RDL**	**QC Batch**
METALS								
Dissolved Antimony (Sb)	ug/L	ND	847602	ND	847598	ND	1	847602
Dissolved Arsenic (As)	ug/L	ND	847602	ND	847598	ND	1	847602
Dissolved Barium (Ba)	ug/L	84	847602	62	847598	72	5	847602
Dissolved Beryllium (Be)	ug/L	ND	847602	ND	847598	ND	0.5	847602
Dissolved Boron (B)	ug/L	94	847602	98	847598	110	10	847602
Dissolved Cadmium (Cd)	ug/L	ND	847602	ND	847598	ND	0.1	847602
Dissolved Chromium (Cr)	ug/L	ND	847602	ND	847598	ND	5	847602
Dissolved Cobalt (Co)	ug/L	0.6	847602	0.6	847598	0.7	0.5	847602
Dissolved Copper (Cu)	ug/L	3	847602	3	847598	2	1	847602
Dissolved Lead (Pb)	ug/L	ND	847602	ND	847598	ND	0.5	847602
Dissolved Molybdenum (Mo)	ug/L	6	847602	5	847598	5	1	847602
Dissolved Nickel (Ni)	ug/L	3	847602	1	847598	2	1	847602
Dissolved Selenium (Se)	ug/L	ND	847602	ND	847598	ND	2	847602
Dissolved Silver (Ag)	ug/L	ND	847602	ND	847598	ND	0.5	847602
Dissolved Sodium (Na)	ug/L	290000	847602	25000	847598	28000	100	847602
Dissolved Tellurium	ug/L	ND	847602	ND	847598	ND	1	847602
Dissolved Thallium (Tl)	ug/L	ND	847602	ND	847598	ND	0.05	847602
Dissolved Thorium (Th)	ug/L	ND	847602	ND	847598	ND	1	847602
Dissolved Vanadium (V)	ug/L	ND	847602	ND	847598	ND	1	847602
Dissolved Zinc (Zn)	ug/L	15	847602	8	847598	18	5	847602

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Maxxam Job #: A5A3629
Report Date: 2005/10/25

CH2M Hill Canada Limited
Client Project #: 316461.TT.HA LEMREUS ISLAND FO
Project name: OTTAWA
Sampler Initials:

O'REG 153 ICPMS DISSOLVED METALS (WATER)

Maxxam ID		I80800		
Sampling Date		2005/10/15		
COC Number		359347		
	Units	**DRUM**	**RDL**	**QC Batch**
METALS				
Dissolved Antimony (Sb)	ug/L	ND	1	847602
Dissolved Arsenic (As)	ug/L	ND	1	847602
Dissolved Barium (Ba)	ug/L	140	5	847602
Dissolved Beryllium (Be)	ug/L	ND	0.5	847602
Dissolved Boron (B)	ug/L	88	10	847602
Dissolved Cadmium (Cd)	ug/L	ND	0.1	847602
Dissolved Chromium (Cr)	ug/L	5	5	847602
Dissolved Cobalt (Co)	ug/L	1.1	0.5	847602
Dissolved Copper (Cu)	ug/L	4	1	847602
Dissolved Lead (Pb)	ug/L	ND	0.5	847602
Dissolved Molybdenum (Mo)	ug/L	7	1	847602
Dissolved Nickel (Ni)	ug/L	4	1	847602
Dissolved Selenium (Se)	ug/L	ND	2	847602
Dissolved Silver (Ag)	ug/L	ND	0.5	847602
Dissolved Sodium (Na)	ug/L	290000	100	847602
Dissolved Tellurium	ug/L	ND	1	847602
Dissolved Thallium (Tl)	ug/L	ND	0.05	847602
Dissolved Thorium (Th)	ug/L	ND	1	847602
Dissolved Vanadium (V)	ug/L	1	1	847602
Dissolved Zinc (Zn)	ug/L	16	5	847602

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QC Batch = Quality Control Batch

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Maxxam Job #: A5A3629
Report Date: 2005/10/25

CH2M Hill Canada Limited
Client Project #: 316461.TT.HA LEMREUS ISLAND FO
Project name: OTTAWA
Sampler Initials:

RESULTS OF ANALYSES OF SOIL

Maxxam ID		I80790	I80791	I80792	I80793	I80794		
Sampling Date		2005/10/12 10:40	2005/10/12 14:20	2005/10/12 15:50	2005/10/14 09:00	2005/10/14 09:30		
COC Number		359347	359347	359347	359347	359347		
	Units	**CH2M-MW-2(2 1/2 - 3 1/2)**	**CH2M-MW-1(2 1/2 - 4 1/2)**	**CH2M-MW-1(5-7)**	**CH2M-TP5 (2-4)**	**CH2M-TP4 (2-3)**	**RDL**	**QC Batch**
INORGANICS								
Moisture	%			9.2			0.2	848359
pH	pH	7.46	7.46	7.51	6.93	7.39	N/A	848577

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		I80795		
Sampling Date		2005/10/14 10:00		
COC Number		359347		
	Units	**CH2M-TP3 (2-3)**	**RDL**	**QC Batch**
INORGANICS				
pH	pH	7.03	N/A	848577

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel. 905-817-5700 Toll free:800-563-6266 Fax: 905-817-5777

Maxxam Job #: A5A3629
Report Date: 2005/10/25

CH2M Hill Canada Limited
Client Project #: 316461.TT.HA LEMREUS ISLAND FO
Project name: OTTAWA
Sampler Initials:

SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		I80790		I80791	I80793		
Sampling Date		2005/10/12 10:40		2005/10/12 14:20	2005/10/14 09:00		
COC Number		359347		359347	359347		
	Units	**CH2M-MW-2(2 1/2 - 3 1/2)**	**RDL**	**CH2M-MW-1(2 1/2 - 4 1/2)**	**CH2M-TP5 (2-4)**	**RDL**	**QC Batch**
PAHs							
Acenaphthene	ug/g	ND	0.1	0.02	0.01	0.01	847325
Acenaphthylene	ug/g	ND	0.05	0.029	0.076	0.005	847325
Anthracene	ug/g	ND	0.05	0.136	0.147	0.005	847325
Benzo(a)anthracene	ug/g	0.2	0.1	0.44	1.29	0.01	847325
Benzo(a)pyrene	ug/g	ND	0.05	0.367	1.13	0.005	847325
Benzo(b/j)fluoranthene	ug/g	0.07	0.05	0.453	1.50	0.005	847325
Benzo(g,h,i)perylene	ug/g	ND	0.2	0.20	0.75	0.02	847325
Benzo(k)fluoranthene	ug/g	ND	0.1	0.22	0.67	0.01	847325
Chrysene	ug/g	ND	0.1	0.36	1.19	0.01	847325
Dibenzo(a,h)anthracene	ug/g	ND	0.2	0.05	0.20	0.02	847325
Fluoranthene	ug/g	0.12	0.05	0.904	2.40	0.005	847325
Fluorene	ug/g	ND	0.05	0.041	0.032	0.005	847325
Indeno(1,2,3-cd)pyrene	ug/g	ND	0.2	0.22	0.87	0.02	847325
1-Methylnaphthalene	ug/g	ND	0.05	0.025	0.015	0.005	847325
2-Methylnaphthalene	ug/g	ND	0.05	0.012	0.008	0.005	847325
Naphthalene	ug/g	ND	0.05	0.015	0.020	0.005	847325
Phenanthrene	ug/g	0.10	0.05	0.566	1.12	0.005	847325
Pyrene	ug/g	0.10	0.05	0.750	2.05	0.005	847325
Surrogate Recovery (%)							
D10-Anthracene	%	126		76	72		847325
D14-Terphenyl (FS)	%	NS		NS	NS		847325
D7-Quinoline	%	70		39	45		847325
D8-Acenaphthylene	%	NS		NS	NS		847325

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6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel: 905-817-5700 Toll free:800-563-6266 Fax: 905-817-5777

Maxxam Job #: A5A3629
Report Date: 2005/10/25

CH2M Hill Canada Limited
Client Project #: 316461.TT.HA LEMREUS ISLAND FO
Project name: OTTAWA
Sampler Initials:

SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		I80794	I80795		
Sampling Date		2005/10/14 09:30	2005/10/14 10:00		
COC Number		359347	359347		
	Units	**CH2M-TP4 (2-3)**	**CH2M-TP3 (2-3)**	**RDL**	**QC Batch**
PAHs					
Acenaphthene	ug/g	ND	ND	0.01	847325
Acenaphthylene	ug/g	ND	ND	0.005	847325
Anthracene	ug/g	0.008	0.019	0.005	847325
Benzo(a)anthracene	ug/g	0.04	0.08	0.01	847325
Benzo(a)pyrene	ug/g	0.027	0.057	0.005	847325
Benzo(b/j)fluoranthene	ug/g	0.037	0.080	0.005	847325
Benzo(g,h,i)perylene	ug/g	0.02	0.05	0.02	847325
Benzo(k)fluoranthene	ug/g	0.02	0.03	0.01	847325
Chrysene	ug/g	0.03	0.06	0.01	847325
Dibenzo(a,h)anthracene	ug/g	ND	ND	0.02	847325
Fluoranthene	ug/g	0.061	0.128	0.005	847325
Fluorene	ug/g	ND	ND	0.005	847325
Indeno(1,2,3-cd)pyrene	ug/g	0.02	0.05	0.02	847325
1-Methylnaphthalene	ug/g	ND	0.010	0.005	847325
2-Methylnaphthalene	ug/g	ND	0.007	0.005	847325
Naphthalene	ug/g	ND	ND	0.005	847325
Phenanthrene	ug/g	0.029	0.062	0.005	847325
Pyrene	ug/g	0.053	0.111	0.005	847325
Surrogate Recovery (%)					
D10-Anthracene	%	79	82		847325
D14-Terphenyl (FS)	%	NS	NS		847325
D7-Quinoline	%	43	65		847325
D8-Acenaphthylene	%	NS	NS		847325

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Maxxam Job #: A5A3629
Report Date: 2005/10/25

CH2M Hill Canada Limited
Client Project #: 316461.TT.HA LEMREUS ISLAND FO
Project name: OTTAWA
Sampler Initials:

VOLATILE ORGANICS BY GC/MS (SOIL)

Maxxam ID		I80790	I80792	I80793		
Sampling Date		2005/10/12 10:40	2005/10/12 15:50	2005/10/14 09:00		
COC Number		359347	359347	359347		
	Units	**CH2M-MW-2(2 1/2 - 3 1/2)**	**CH2M-MW-1(5-7)**	**CH2M-TP5 (2-4)**	**RDL**	**QC Batch**
VOLATILES						
Acetone	ug/g	ND	ND	ND	0.1	847487
Benzene	ug/g	0.002	0.003	0.006	0.002	847487
Bromodichloromethane	ug/g	ND	ND	ND	0.002	847487
Bromoform	ug/g	ND	ND	ND	0.002	847487
Bromomethane	ug/g	ND	ND	ND	0.003	847487
Carbon Tetrachloride	ug/g	ND	ND	ND	0.002	847487
Chlorobenzene	ug/g	ND	ND	ND	0.002	847487
Chloroform	ug/g	ND	ND	ND	0.002	847487
Dibromochloromethane	ug/g	ND	ND	ND	0.002	847487
1,2-Dichlorobenzene	ug/g	ND	ND	ND	0.002	847487
1,3-Dichlorobenzene	ug/g	ND	ND	ND	0.002	847487
1,4-Dichlorobenzene	ug/g	ND	ND	ND	0.002	847487
1,1-Dichloroethane	ug/g	ND	ND	ND	0.002	847487
1,2-Dichloroethane	ug/g	ND	ND	ND	0.002	847487
1,1-Dichloroethylene	ug/g	ND	ND	ND	0.002	847487
cis-1,2-Dichloroethylene	ug/g	ND	ND	ND	0.002	847487
trans-1,2-Dichloroethylene	ug/g	ND	ND	ND	0.002	847487
1,2-Dichloropropane	ug/g	ND	ND	ND	0.002	847487
cis-1,3-Dichloropropene	ug/g	ND	ND	ND	0.002	847487
trans-1,3-Dichloropropene	ug/g	ND	ND	ND	0.002	847487
Ethylbenzene	ug/g	ND	ND	ND	0.002	847487
Ethylene Dibromide	ug/g	ND	ND	ND	0.002	847487
Methylene Chloride(Dichloromethane)	ug/g	ND	ND	ND	0.003	847487
Methyl Isobutyl Ketone	ug/g	ND	ND	ND	0.025	847487
Methyl Ethyl Ketone	ug/g	ND	ND	ND	0.025	847487
Methyl t-butyl ether (MTBE)	ug/g	ND	ND	ND	0.002	847487
Styrene	ug/g	ND	ND	ND	0.002	847487
1,1,1,2-Tetrachloroethane	ug/g	ND	ND	ND	0.002	847487
1,1,2,2-Tetrachloroethane	ug/g	ND	ND	ND	0.002	847487
Tetrachloroethylene	ug/g	ND	ND	ND	0.002	847487

ND = Not detected
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Maxxam Job #: A5A3629
Report Date: 2005/10/25

CH2M Hill Canada Limited
Client Project #: 316461.TT.HA LEMREUS ISLAND FO
Project name: OTTAWA
Sampler Initials:

VOLATILE ORGANICS BY GC/MS (SOIL)

Maxxam ID		I80790	I80792	I80793		
Sampling Date		2005/10/12 10:40	2005/10/12 15:50	2005/10/14 09:00		
COC Number		359347	359347	359347		
	Units	**CH2M-MW-2(2 1/2 - 3 1/2)**	**CH2M-MW-1(5-7)**	**CH2M-TP5 (2-4)**	**RDL**	**QC Batch**
Toluene	ug/g	0.007	0.010	0.005	0.002	847487
1,1,1-Trichloroethane	ug/g	ND	ND	ND	0.002	847487
1,1,2-Trichloroethane	ug/g	ND	ND	ND	0.002	847487
Trichloroethylene	ug/g	ND	ND	ND	0.002	847487
Vinyl Chloride	ug/g	ND	ND	ND	0.002	847487
p+m-Xylene	ug/g	0.007	0.008	ND	0.002	847487
o-Xylene	ug/g	ND	ND	ND	0.002	847487
Xylene (Total)	ug/g	0.007	0.008	ND	0.003	847487
Surrogate Recovery (%)						
4-Bromofluorobenzene	%	75	80	75		847487
D4-1,2-Dichloroethane	%	93	79	97		847487
D8-Toluene	%	119	120	131		847487

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Maxxam Job #: A5A3629
Report Date: 2005/10/25

CH2M Hill Canada Limited
Client Project #: 316461.TT.HA LEMREUS ISLAND FO
Project name: OTTAWA
Sampler Initials:

VOLATILE ORGANICS BY GC/MS (SOIL)

Maxxam ID		I80794	I80795		
Sampling Date		2005/10/14 09:30	2005/10/14 10:00		
COC Number		359347	359347		
	Units	**CH2M-TP4 (2-3)**	**CH2M-TP3 (2-3)**	**RDL**	**QC Batch**
VOLATILES					
Acetone	ug/g	ND	ND	0.1	847487
Benzene	ug/g	0.003	0.008	0.002	847487
Bromodichloromethane	ug/g	ND	ND	0.002	847487
Bromoform	ug/g	ND	ND	0.002	847487
Bromomethane	ug/g	ND	ND	0.003	847487
Carbon Tetrachloride	ug/g	ND	ND	0.002	847487
Chlorobenzene	ug/g	ND	ND	0.002	847487
Chloroform	ug/g	ND	ND	0.002	847487
Dibromochloromethane	ug/g	ND	ND	0.002	847487
1,2-Dichlorobenzene	ug/g	ND	ND	0.002	847487
1,3-Dichlorobenzene	ug/g	ND	ND	0.002	847487
1,4-Dichlorobenzene	ug/g	ND	ND	0.002	847487
1,1-Dichloroethane	ug/g	ND	ND	0.002	847487
1,2-Dichloroethane	ug/g	ND	ND	0.002	847487
1,1-Dichloroethylene	ug/g	ND	ND	0.002	847487
cis-1,2-Dichloroethylene	ug/g	ND	ND	0.002	847487
trans-1,2-Dichloroethylene	ug/g	ND	ND	0.002	847487
1,2-Dichloropropane	ug/g	ND	ND	0.002	847487
cis-1,3-Dichloropropene	ug/g	ND	ND	0.002	847487
trans-1,3-Dichloropropene	ug/g	ND	ND	0.002	847487
Ethylbenzene	ug/g	ND	ND	0.002	847487
Ethylene Dibromide	ug/g	ND	ND	0.002	847487
Methylene Chloride(Dichloromethane)	ug/g	ND	ND	0.003	847487
Methyl Isobutyl Ketone	ug/g	ND	ND	0.025	847487
Methyl Ethyl Ketone	ug/g	ND	ND	0.025	847487
Methyl t-butyl ether (MTBE)	ug/g	ND	ND	0.002	847487
Styrene	ug/g	ND	ND	0.002	847487
1,1,1,2-Tetrachloroethane	ug/g	ND	ND	0.002	847487
1,1,2,2-Tetrachloroethane	ug/g	ND	ND	0.002	847487
Tetrachloroethylene	ug/g	ND	ND	0.002	847487
Toluene	ug/g	0.005	0.091	0.002	847487

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Maxxam Job #: A5A3629
Report Date: 2005/10/25

CH2M Hill Canada Limited
Client Project #: 316461.TT.HA LEMREUS ISLAND FO
Project name: OTTAWA
Sampler Initials:

VOLATILE ORGANICS BY GC/MS (SOIL)

Maxxam ID		I80794	I80795		
Sampling Date		2005/10/14 09:30	2005/10/14 10:00		
COC Number		359347	359347		
	Units	**CH2M-TP4 (2-3)**	**CH2M-TP3 (2-3)**	**RDL**	**QC Batch**
1,1,1-Trichloroethane	ug/g	ND	ND	0.002	847487
1,1,2-Trichloroethane	ug/g	ND	ND	0.002	847487
Trichloroethylene	ug/g	ND	ND	0.002	847487
Vinyl Chloride	ug/g	ND	ND	0.002	847487
p+m-Xylene	ug/g	ND	ND	0.002	847487
o-Xylene	ug/g	ND	ND	0.002	847487
Xylene (Total)	ug/g	ND	ND	0.003	847487
Surrogate Recovery (%)					
4-Bromofluorobenzene	%	68	71		847487
D4-1,2-Dichloroethane	%	93	94		847487
D8-Toluene	%	132	128		847487

ND = Not detected
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QC Batch = Quality Control Batch

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Maxxam Job #: A5A3629
Report Date: 2005/10/25

CH2M Hill Canada Limited
Client Project #: 316461.TT.HA LEMREUS ISLAND FO
Project name: OTTAWA
Sampler Initials:

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		I80793	I80794	I80795		
Sampling Date		2005/10/14 09:00	2005/10/14 09:30	2005/10/14 10:00		
COC Number		359347	359347	359347		
	Units	**CH2M-TP5 (2-4)**	**CH2M-TP4 (2-3)**	**CH2M-TP3 (2-3)**	**RDL**	**QC Batch**
F1 PHC and BTEX						
F1 (C6-C10)	ug/g	19	ND	ND	10	847560
F1 (C6-C10) - BTEX	ug/g	19	ND	ND	10	847560
F2-F4 PHC						
F2 (C10-C16 Hydrocarbons)	ug/g	ND	ND	ND	10	848296
F3 (C16-C34 Hydrocarbons)	ug/g	ND	12	42	10	848296
F4 (C34-C50 Hydrocarbons)	ug/g	ND	ND	ND	10	848296
Reached Baseline at C50	ug/g	YES	YES	YES		848296
Surrogate Recovery (%)						
1,4-Difluorobenzene	%	105	106	105		847560
4-Bromofluorobenzene	%	98	98	98		847560
D10-Ethylbenzene	%	104	95	97		847560
D4-1,2-Dichloroethane	%	99	96	97		847560
o-Terphenyl	%	88	85	86		848296

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel: 905-817-5700 Toll free:800-563-6266 Fax: 905-817-5777

Maxxam Job #: A5A3629
Report Date: 2005/10/25

CH2M Hill Canada Limited
Client Project #: 316461.TT.HA LEMREUS ISLAND FO
Project name: OTTAWA
Sampler Initials:

POLYCHLORINATED BIPHENYLS BY GC-ECD (SOIL)

Maxxam ID		I80794		
Sampling Date		2005/10/14 09:30		
COC Number		359347		
	Units	**CH2M-TP4 (2-3)**	**RDL**	**QC Batch**
PCBs				
Aroclor 1262	ug/g	ND	0.01	847267
Aroclor 1016	ug/g	ND	0.01	847267
Aroclor 1221	ug/g	ND	0.02	847267
Aroclor 1232	ug/g	ND	0.01	847267
Aroclor 1242	ug/g	ND	0.02	847267
Aroclor 1248	ug/g	ND	0.01	847267
Aroclor 1254	ug/g	0.01	0.01	847267
Aroclor 1260	ug/g	ND	0.01	847267
Aroclor 1268	ug/g	ND	0.01	847267
Total PCB	ug/g	ND	0.02	847267
Surrogate Recovery (%)				
2,4,5,6-Tetrachloro-m-xylene	%	73		847267
Decachlorobiphenyl	%	72		847267

ND = Not detected
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QC Batch = Quality Control Batch

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CH2M Hill Canada Limited
Client Project #: 316461.TT.HA LEMREUS ISLAND FO
Project name: OTTAWA
Sampler Initials:

RESULTS OF ANALYSES OF WATER

Maxxam ID		I80797	I80798	I80800		
Sampling Date		2005/10/15 15:00	2005/10/15 10:00	2005/10/15		
COC Number		359347	359347	359347		
	Units	**CH2M-MW-1**	**CH2M-MW-2**	**DRUM**	**RDL**	**QC Batch**
INORGANICS						
pH	pH	7.83	7.88	7.92	0.01	847416

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: A5A3629
Report Date: 2005/10/25

CH2M Hill Canada Limited
Client Project #: 316461.TT.HA LEMREUS ISLAND FO
Project name: OTTAWA
Sampler Initials:

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		I80797	I80798	I80800		
Sampling Date		2005/10/15 15:00	2005/10/15 10:00	2005/10/15		
COC Number		359347	359347	359347		
	Units	**CH2M-MW-1**	**CH2M-MW-2**	**DRUM**	**RDL**	**QC Batch**
METALS						
Mercury (Hg)	ug/L	ND	ND	ND	0.1	847647

ND = Not detected
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Maxxam Job #: A5A3629
Report Date: 2005/10/25

CH2M Hill Canada Limited
Client Project #: 316461.TT.HA LEMREUS ISLAND FO
Project name: OTTAWA
Sampler Initials:

SEMI-VOLATILE ORGANICS BY GC-MS (WATER)

Maxxam ID		I80797		I80798		I80800		
Sampling Date		2005/10/15 15:00		2005/10/15 10:00		2005/10/15		
COC Number		359347		359347		359347		
	Units	**CH2M-MW-1**	**RDL**	**CH2M-MW-2**	**RDL**	**DRUM**	**RDL**	**QC Batch**
PAHs								
Acenaphthene	ug/L	ND	0.05	ND	0.25	ND	0.05	847343
Acenaphthylene	ug/L	ND	0.05	ND	0.25	0.09	0.05	847343
Anthracene	ug/L	ND	0.05	ND	0.25	0.08	0.05	847343
Benzo(a)anthracene	ug/L	ND	0.05	ND	0.25	0.12	0.05	847343
Benzo(a)pyrene	ug/L	0.01	0.01	ND	0.05	0.06	0.01	847343
Benzo(b/j)fluoranthene	ug/L	ND	0.05	ND	0.25	0.07	0.05	847343
Benzo(g,h,i)perylene	ug/L	ND	0.1	ND	0.5	ND	0.1	847343
Benzo(k)fluoranthene	ug/L	ND	0.05	ND	0.25	ND	0.05	847343
Chrysene	ug/L	ND	0.05	ND	0.25	0.12	0.05	847343
Dibenzo(a,h)anthracene	ug/L	ND	0.1	ND	0.5	ND	0.1	847343
Fluoranthene	ug/L	ND	0.05	ND	0.25	0.29	0.05	847343
Fluorene	ug/L	ND	0.05	ND	0.25	ND	0.05	847343
Indeno(1,2,3-cd)pyrene	ug/L	ND	0.1	ND	0.5	ND	0.1	847343
1-Methylnaphthalene	ug/L	ND	0.05	ND	0.25	ND	0.05	847343
2-Methylnaphthalene	ug/L	ND	0.05	ND	0.25	ND	0.05	847343
Naphthalene	ug/L	ND	0.05	ND	0.25	0.09	0.05	847343
Phenanthrene	ug/L	ND	0.05	ND	0.25	0.38	0.05	847343
Pyrene	ug/L	ND	0.05	ND	0.25	0.42	0.05	847343
Surrogate Recovery (%)								
D10-Anthracene	%	68		96		68		847343
D14-Terphenyl (FS)	%	NS		NS		NS		847343
D7-Quinoline	%	73		83		71		847343
D8-Acenaphthylene	%	NS		NS		NS		847343

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Maxxam Job #: A5A3629
Report Date: 2005/10/25

CH2M Hill Canada Limited
Client Project #: 316461.TT.HA LEMREUS ISLAND FO
Project name: OTTAWA
Sampler Initials:

VOLATILE ORGANICS BY GC/MS (WATER)

Maxxam ID		I80797	I80798	I80800		
Sampling Date		2005/10/15 15:00	2005/10/15 10:00	2005/10/15		
COC Number		359347	359347	359347		
	Units	**CH2M-MW-1**	**CH2M-MW-2**	**DRUM**	**RDL**	**QC Batch**
VOLATILES						
Acetone	ug/L	ND	ND	ND	10	846864
Benzene	ug/L	ND	0.1	ND	0.1	846864
Bromodichloromethane	ug/L	ND	ND	ND	0.1	846864
Bromoform	ug/L	ND	ND	ND	0.2	846864
Bromomethane	ug/L	ND	ND	ND	0.5	846864
Carbon Tetrachloride	ug/L	ND	ND	ND	0.1	846864
Chlorobenzene	ug/L	ND	ND	ND	0.1	846864
Chloroform	ug/L	ND	ND	ND	0.1	846864
Dibromochloromethane	ug/L	ND	ND	ND	0.2	846864
1,2-Dichlorobenzene	ug/L	ND	ND	ND	0.1	846864
1,3-Dichlorobenzene	ug/L	ND	ND	ND	0.1	846864
1,4-Dichlorobenzene	ug/L	ND	ND	ND	0.1	846864
1,1-Dichloroethane	ug/L	ND	ND	ND	0.1	846864
1,2-Dichloroethane	ug/L	ND	ND	ND	0.1	846864
1,1-Dichloroethylene	ug/L	ND	ND	ND	0.1	846864
cis-1,2-Dichloroethylene	ug/L	ND	ND	ND	0.1	846864
trans-1,2-Dichloroethylene	ug/L	ND	ND	ND	0.1	846864
1,2-Dichloropropane	ug/L	ND	ND	ND	0.1	846864
cis-1,3-Dichloropropene	ug/L	ND	ND	ND	0.2	846864
trans-1,3-Dichloropropene	ug/L	ND	ND	ND	0.2	846864
Ethylbenzene	ug/L	ND	ND	ND	0.1	846864
Ethylene Dibromide	ug/L	ND	ND	ND	0.2	846864
Methylene Chloride(Dichloromethane)	ug/L	ND	ND	ND	0.5	846864
Methyl Isobutyl Ketone	ug/L	ND	ND	ND	5	846864
Methyl Ethyl Ketone	ug/L	ND	ND	ND	5	846864
Methyl t-butyl ether (MTBE)	ug/L	ND	ND	ND	0.2	846864
Styrene	ug/L	ND	ND	ND	0.1	846864
1,1,1,2-Tetrachloroethane	ug/L	ND	ND	ND	0.1	846864
1,1,2,2-Tetrachloroethane	ug/L	ND	ND	ND	0.1	846864
Tetrachloroethylene	ug/L	ND	ND	ND	0.1	846864
Toluene	ug/L	0.3	0.3	0.4	0.2	846864

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Maxxam Job #: A5A3629
Report Date: 2005/10/25

CH2M Hill Canada Limited
Client Project #: 316461.TT.HA LEMREUS ISLAND FO
Project name: OTTAWA
Sampler Initials:

VOLATILE ORGANICS BY GC/MS (WATER)

Maxxam ID		I80797	I80798	I80800		
Sampling Date		2005/10/15 15:00	2005/10/15 10:00	2005/10/15		
COC Number		359347	359347	359347		
	Units	**CH2M-MW-1**	**CH2M-MW-2**	**DRUM**	**RDL**	**QC Batch**
1,1,1-Trichloroethane	ug/L	ND	ND	ND	0.1	846864
1,1,2-Trichloroethane	ug/L	ND	ND	ND	0.2	846864
Trichloroethylene	ug/L	ND	ND	ND	0.1	846864
Vinyl Chloride	ug/L	ND	ND	ND	0.2	846864
p+m-Xylene	ug/L	0.1	0.1	0.1	0.1	846864
o-Xylene	ug/L	ND	ND	ND	0.1	846864
Xylene (Total)	ug/L	0.1	0.1	0.1	0.1	846864
Surrogate Recovery (%)						
4-Bromofluorobenzene	%	84	84	86		846864
D4-1,2-Dichloroethane	%	108	108	111		846864
D8-Toluene	%	104	105	103		846864

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Maxxam Job #: A5A3629
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CH2M Hill Canada Limited
Client Project #: 316461.TT.HA LEMREUS ISLAND FO
Project name: OTTAWA
Sampler Initials:

GENERAL COMMENTS

Sample I80790-01: PAH:
The sample was diluted due to background interference. MDLs were adjusted accordingly.

Sample I80793-01: F1-BTEX analysis:
The BTEX results used for the F1-BTEX calculation were obtained from Headspace-GC analysis.

SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

PAH Compounds in Soil by GC/MS (SIM): PAH:
NS: Surrrogate could not be reported because it was not spiked..

Results relate only to the items tested.

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CH2M Hill Canada Limited www.maxxamanalytics.com
Attention: Kevin Allin
Client Project #: 316461.TT.HA LEMREUS ISLAND FO
P.O. #:
Project name: OTTAWA

Quality Assurance Report

Maxxam Job Number: MA5A3629

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
846864 DKI	MATRIX SPIKE						
	[I80797-07]	4-Bromofluorobenzene	2005/10/21		100	%	70 - 130
		D4-1,2-Dichloroethane	2005/10/21		102	%	70 - 130
		D8-Toluene	2005/10/21		99	%	70 - 130
		Acetone	2005/10/21		122	%	60 - 140
		Benzene	2005/10/21		106	%	70 - 130
		Bromodichloromethane	2005/10/21		108	%	70 - 130
		Bromoform	2005/10/21		104	%	70 - 130
		Bromomethane	2005/10/21		92	%	60 - 140
		Carbon Tetrachloride	2005/10/21		99	%	70 - 130
		Chlorobenzene	2005/10/21		98	%	70 - 130
		Chloroform	2005/10/21		99	%	70 - 130
		Dibromochloromethane	2005/10/21		104	%	70 - 130
		1,2-Dichlorobenzene	2005/10/21		97	%	70 - 130
		1,3-Dichlorobenzene	2005/10/21		102	%	70 - 130
		1,4-Dichlorobenzene	2005/10/21		106	%	70 - 130
		1,1-Dichloroethane	2005/10/21		101	%	70 - 130
		1,2-Dichloroethane	2005/10/21		100	%	70 - 130
		1,1-Dichloroethylene	2005/10/21		101	%	70 - 130
		cis-1,2-Dichloroethylene	2005/10/21		104	%	70 - 130
		trans-1,2-Dichloroethylene	2005/10/21		101	%	70 - 130
		1,2-Dichloropropane	2005/10/21		104	%	70 - 130
		cis-1,3-Dichloropropene	2005/10/21		111	%	70 - 130
		trans-1,3-Dichloropropene	2005/10/21		90	%	70 - 130
		Ethylbenzene	2005/10/21		93	%	70 - 130
		Ethylene Dibromide	2005/10/21		103	%	70 - 130
		Methylene Chloride(Dichloromethane)	2005/10/21		98	%	70 - 130
		Methyl Isobutyl Ketone	2005/10/21		122	%	60 - 140
		Methyl Ethyl Ketone	2005/10/21		108	%	60 - 140
		Methyl t-butyl ether (MTBE)	2005/10/21		108	%	70 - 130
		Styrene	2005/10/21		90	%	70 - 130
		1,1,1,2-Tetrachloroethane	2005/10/21		102	%	70 - 130
		1,1,2,2-Tetrachloroethane	2005/10/21		105	%	70 - 130
		Tetrachloroethylene	2005/10/21		94	%	70 - 130
		Toluene	2005/10/21		100	%	70 - 130
		1,1,1-Trichloroethane	2005/10/21		100	%	70 - 130
		1,1,2-Trichloroethane	2005/10/21		102	%	70 - 130
		Trichloroethylene	2005/10/21		100	%	70 - 130
		Vinyl Chloride	2005/10/21		85	%	60 - 140
		p+m-Xylene	2005/10/21		114	%	70 - 130
		o-Xylene	2005/10/21		113	%	70 - 130
	Spiked Blank	4-Bromofluorobenzene	2005/10/21		99	%	70 - 130
		D4-1,2-Dichloroethane	2005/10/21		101	%	70 - 130
		D8-Toluene	2005/10/21		100	%	70 - 130
		Acetone	2005/10/21		108	%	60 - 140
		Benzene	2005/10/21		104	%	70 - 130
		Bromodichloromethane	2005/10/21		108	%	70 - 130
		Bromoform	2005/10/21		103	%	70 - 130
		Bromomethane	2005/10/21		94	%	60 - 140
		Carbon Tetrachloride	2005/10/21		102	%	70 - 130
		Chlorobenzene	2005/10/21		98	%	70 - 130
		Chloroform	2005/10/21		101	%	70 - 130
		Dibromochloromethane	2005/10/21		104	%	70 - 130
		1,2-Dichlorobenzene	2005/10/21		99	%	70 - 130
		1,3-Dichlorobenzene	2005/10/21		105	%	70 - 130
		1,4-Dichlorobenzene	2005/10/21		110	%	70 - 130

CH2M Hill Canada Limited
Attention: Kevin Allin
Client Project #: 316461.TT.HA LEMREUS ISLAND FO
P.O. #:
Project name: OTTAWA

Quality Assurance Report (Continued)

Maxxam Job Number: MA5A3629

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
846864 DKI	Spiked Blank	1,1-Dichloroethane	2005/10/21		103	%	70 - 130
		1,2-Dichloroethane	2005/10/21		100	%	70 - 130
		1,1-Dichloroethylene	2005/10/21		103	%	70 - 130
		cis-1,2-Dichloroethylene	2005/10/21		105	%	70 - 130
		trans-1,2-Dichloroethylene	2005/10/21		101	%	70 - 130
		1,2-Dichloropropane	2005/10/21		105	%	70 - 130
		cis-1,3-Dichloropropene	2005/10/21		109	%	70 - 130
		trans-1,3-Dichloropropene	2005/10/21		90	%	70 - 130
		Ethylbenzene	2005/10/21		93	%	70 - 130
		Ethylene Dibromide	2005/10/21		101	%	70 - 130
		Methylene Chloride(Dichloromethane)	2005/10/21		99	%	70 - 130
		Methyl Isobutyl Ketone	2005/10/21		117	%	60 - 140
		Methyl Ethyl Ketone	2005/10/21		103	%	60 - 140
		Methyl t-butyl ether (MTBE)	2005/10/21		105	%	70 - 130
		Styrene	2005/10/21		91	%	70 - 130
		1,1,1,2-Tetrachloroethane	2005/10/21		102	%	70 - 130
		1,1,2,2-Tetrachloroethane	2005/10/21		104	%	70 - 130
		Tetrachloroethylene	2005/10/21		97	%	70 - 130
		Toluene	2005/10/21		100	%	70 - 130
		1,1,1-Trichloroethane	2005/10/21		102	%	70 - 130
		1,1,2-Trichloroethane	2005/10/21		101	%	70 - 130
		Trichloroethylene	2005/10/21		102	%	70 - 130
		Vinyl Chloride	2005/10/21		90	%	60 - 140
		p+m-Xylene	2005/10/21		112	%	70 - 130
		o-Xylene	2005/10/21		112	%	70 - 130
	Method Blank	4-Bromofluorobenzene	2005/10/21		80	%	70 - 130
		D4-1,2-Dichloroethane	2005/10/21		114	%	70 - 130
		D8-Toluene	2005/10/21		103	%	70 - 130
		Acetone	2005/10/21	ND, DL=10		ug/L	
		Benzene	2005/10/21	ND, DL=0.1		ug/L	
		Bromodichloromethane	2005/10/21	ND, DL=0.1		ug/L	
		Bromoform	2005/10/21	ND, DL=0.2		ug/L	
		Bromomethane	2005/10/21	ND, DL=0.5		ug/L	
		Carbon Tetrachloride	2005/10/21	ND, DL=0.1		ug/L	
		Chlorobenzene	2005/10/21	ND, DL=0.1		ug/L	
		Chloroform	2005/10/21	ND, DL=0.1		ug/L	
		Dibromochloromethane	2005/10/21	ND, DL=0.2		ug/L	
		1,2-Dichlorobenzene	2005/10/21	ND, DL=0.1		ug/L	
		1,3-Dichlorobenzene	2005/10/21	ND, DL=0.1		ug/L	
		1,4-Dichlorobenzene	2005/10/21	ND, DL=0.1		ug/L	
		1,1-Dichloroethane	2005/10/21	ND, DL=0.1		ug/L	
		1,2-Dichloroethane	2005/10/21	ND, DL=0.1		ug/L	
		1,1-Dichloroethylene	2005/10/21	ND, DL=0.1		ug/L	
		cis-1,2-Dichloroethylene	2005/10/21	ND, DL=0.1		ug/L	
		trans-1,2-Dichloroethylene	2005/10/21	ND, DL=0.1		ug/L	
		1,2-Dichloropropane	2005/10/21	ND, DL=0.1		ug/L	
		cis-1,3-Dichloropropene	2005/10/21	ND, DL=0.2		ug/L	
		trans-1,3-Dichloropropene	2005/10/21	ND, DL=0.2		ug/L	
		Ethylbenzene	2005/10/21	ND, DL=0.1		ug/L	
		Ethylene Dibromide	2005/10/21	ND, DL=0.2		ug/L	
		Methylene Chloride(Dichloromethane)	2005/10/21	ND, DL=0.5		ug/L	
		Methyl Isobutyl Ketone	2005/10/21	ND, DL=5		ug/L	
		Methyl Ethyl Ketone	2005/10/21	ND, DL=5		ug/L	
		Methyl t-butyl ether (MTBE)	2005/10/21	ND, DL=0.2		ug/L	
		Styrene	2005/10/21	ND, DL=0.1		ug/L	
		1,1,1,2-Tetrachloroethane	2005/10/21	ND, DL=0.1		ug/L	

CH2M Hill Canada Limited
Attention: Kevin Allin
Client Project #: 316461.TT.HA LEMREUS ISLAND FO
P.O. #:
Project name: OTTAWA

Quality Assurance Report (Continued)

Maxxam Job Number: MA5A3629

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
846864 DKI	Method Blank	1,1,2,2-Tetrachloroethane	2005/10/21	ND, DL=0.1		ug/L	
		Tetrachloroethylene	2005/10/21	ND, DL=0.1		ug/L	
		Toluene	2005/10/21	ND, DL=0.2		ug/L	
		1,1,1-Trichloroethane	2005/10/21	ND, DL=0.1		ug/L	
		1,1,2-Trichloroethane	2005/10/21	ND, DL=0.2		ug/L	
		Trichloroethylene	2005/10/21	ND, DL=0.1		ug/L	
		Vinyl Chloride	2005/10/21	ND, DL=0.2		ug/L	
		p+m-Xylene	2005/10/21	ND, DL=0.1		ug/L	
		o-Xylene	2005/10/21	ND, DL=0.1		ug/L	
		Xylene (Total)	2005/10/21	ND, DL=0.1		ug/L	
	RPD [I80800-06]	Acetone	2005/10/21	NC		%	40
		Benzene	2005/10/21	NC		%	40
		Bromodichloromethane	2005/10/21	NC		%	40
		Bromoform	2005/10/21	NC		%	40
		Bromomethane	2005/10/21	NC		%	40
		Carbon Tetrachloride	2005/10/21	NC		%	40
		Chlorobenzene	2005/10/21	NC		%	40
		Chloroform	2005/10/21	NC		%	40
		Dibromochloromethane	2005/10/21	NC		%	40
		1,2-Dichlorobenzene	2005/10/21	NC		%	40
		1,3-Dichlorobenzene	2005/10/21	NC		%	40
		1,4-Dichlorobenzene	2005/10/21	NC		%	40
		1,1-Dichloroethane	2005/10/21	NC		%	40
		1,2-Dichloroethane	2005/10/21	NC		%	40
		1,1-Dichloroethylene	2005/10/21	NC		%	40
		cis-1,2-Dichloroethylene	2005/10/21	NC		%	40
		trans-1,2-Dichloroethylene	2005/10/21	NC		%	40
		1,2-Dichloropropane	2005/10/21	NC		%	40
		cis-1,3-Dichloropropene	2005/10/21	NC		%	40
		trans-1,3-Dichloropropene	2005/10/21	NC		%	40
		Ethylbenzene	2005/10/21	NC		%	40
		Ethylene Dibromide	2005/10/21	NC		%	40
		Methylene Chloride(Dichloromethane)	2005/10/21	NC		%	40
		Methyl Isobutyl Ketone	2005/10/21	NC		%	40
		Methyl Ethyl Ketone	2005/10/21	NC		%	40
		Methyl t-butyl ether (MTBE)	2005/10/21	NC		%	40
		Styrene	2005/10/21	NC		%	40
		1,1,1,2-Tetrachloroethane	2005/10/21	NC		%	40
		1,1,2,2-Tetrachloroethane	2005/10/21	NC		%	40
		Tetrachloroethylene	2005/10/21	NC		%	40
		Toluene	2005/10/21	NC		%	40
		1,1,1-Trichloroethane	2005/10/21	NC		%	40
		1,1,2-Trichloroethane	2005/10/21	NC		%	40
		Trichloroethylene	2005/10/21	NC		%	40
		Vinyl Chloride	2005/10/21	NC		%	40
		p+m-Xylene	2005/10/21	NC		%	40
		o-Xylene	2005/10/21	NC		%	40
		Xylene (Total)	2005/10/21	NC		%	40
847267 ANL	MATRIX SPIKE [I80794-03]	2,4,5,6-Tetrachloro-m-xylene	2005/10/21		70	%	40 - 130
		Decachlorobiphenyl	2005/10/21		77	%	40 - 130
		Aroclor 1260	2005/10/21		74	%	8 - 127
	Spiked Blank	2,4,5,6-Tetrachloro-m-xylene	2005/10/21		76	%	40 - 130
		Decachlorobiphenyl	2005/10/21		72	%	40 - 130
		Aroclor 1260	2005/10/21		69	%	53 - 135
	Method Blank	2,4,5,6-Tetrachloro-m-xylene	2005/10/21		85	%	40 - 130

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QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
847267 ANL	Method Blank	Decachlorobiphenyl	2005/10/21		82	%	40 - 130
		Aroclor 1262	2005/10/21	ND, DL=0.01		ug/g	
		Aroclor 1016	2005/10/21	ND, DL=0.01		ug/g	
		Aroclor 1221	2005/10/21	ND, DL=0.02		ug/g	
		Aroclor 1232	2005/10/21	ND, DL=0.01		ug/g	
		Aroclor 1242	2005/10/21	ND, DL=0.02		ug/g	
		Aroclor 1248	2005/10/21	ND, DL=0.01		ug/g	
		Aroclor 1254	2005/10/21	ND, DL=0.01		ug/g	
		Aroclor 1260	2005/10/21	ND, DL=0.01		ug/g	
		Aroclor 1268	2005/10/21	ND, DL=0.01		ug/g	
		Total PCB	2005/10/21	ND, DL=0.02		ug/g	
	RPD [I80794-03]	Aroclor 1262	2005/10/21	NC		%	50
		Aroclor 1016	2005/10/21	NC		%	50
		Aroclor 1221	2005/10/21	NC		%	50
		Aroclor 1232	2005/10/21	NC		%	50
		Aroclor 1242	2005/10/21	NC		%	50
		Aroclor 1248	2005/10/21	NC		%	50
		Aroclor 1254	2005/10/21	NC		%	50
		Aroclor 1260	2005/10/21	NC		%	50
		Aroclor 1268	2005/10/21	NC		%	50
		Total PCB	2005/10/21	NC		%	50
847325 NMO	Spiked Blank	D10-Anthracene	2005/10/21		70	%	30 - 130
		D14-Terphenyl (FS)	2005/10/21		NS	%	30 - 130
		D7-Quinoline	2005/10/21		51	%	30 - 130
		D8-Acenaphthylene	2005/10/21		NS	%	30 - 130
		Acenaphthene	2005/10/21		99	%	30 - 130
	RPD	Acenaphthene	2005/10/21	1.5		%	50
	Spiked Blank	Acenaphthylene	2005/10/21		92	%	30 - 130
	RPD	Acenaphthylene	2005/10/21	2.0		%	50
	Spiked Blank	Anthracene	2005/10/21		101	%	30 - 130
	RPD	Anthracene	2005/10/21	0.4		%	50
	Spiked Blank	Benzo(a)anthracene	2005/10/21		120	%	30 - 130
	RPD	Benzo(a)anthracene	2005/10/21	3.1		%	50
	Spiked Blank	Benzo(a)pyrene	2005/10/21		122	%	30 - 130
	RPD	Benzo(a)pyrene	2005/10/21	7.3		%	50
	Spiked Blank	Benzo(b/j)fluoranthene	2005/10/21		119	%	30 - 130
	RPD	Benzo(b/j)fluoranthene	2005/10/21	4.2		%	50
	Spiked Blank	Benzo(g,h,i)perylene	2005/10/21		107	%	30 - 130
	RPD	Benzo(g,h,i)perylene	2005/10/21	9.1		%	50
	Spiked Blank	Benzo(k)fluoranthene	2005/10/21		120	%	30 - 130
	RPD	Benzo(k)fluoranthene	2005/10/21	0.9		%	50
	Spiked Blank	Chrysene	2005/10/21		119	%	30 - 130
	RPD	Chrysene	2005/10/21	0.6		%	50
	Spiked Blank	Dibenzo(a,h)anthracene	2005/10/21		110	%	30 - 130
	RPD	Dibenzo(a,h)anthracene	2005/10/21	7.9		%	50
	Spiked Blank	Fluoranthene	2005/10/21		116	%	30 - 130
	RPD	Fluoranthene	2005/10/21	1.3		%	50
	Spiked Blank	Fluorene	2005/10/21		110	%	30 - 130
	RPD	Fluorene	2005/10/21	2.7		%	50
	Spiked Blank	Indeno(1,2,3-cd)pyrene	2005/10/21		104	%	30 - 130
	RPD	Indeno(1,2,3-cd)pyrene	2005/10/21	6.4		%	50
	Spiked Blank	1-Methylnaphthalene	2005/10/21		110	%	30 - 130
	RPD	1-Methylnaphthalene	2005/10/21	3.9		%	50
	Spiked Blank	2-Methylnaphthalene	2005/10/21		94	%	30 - 130
	RPD	2-Methylnaphthalene	2005/10/21	2.0		%	50
	Spiked Blank	Naphthalene	2005/10/21		94	%	30 - 130

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847325 NMO	RPD	Naphthalene	2005/10/21	3.6		%	50
	Spiked Blank	Phenanthrene	2005/10/21		109	%	30 - 130
	RPD	Phenanthrene	2005/10/21	1.9		%	50
	Spiked Blank	Pyrene	2005/10/21		118	%	30 - 130
	RPD	Pyrene	2005/10/21	1.6		%	50
	Method Blank	D10-Anthracene	2005/10/21		73	%	30 - 130
		D14-Terphenyl (FS)	2005/10/21		NS	%	30 - 130
		D7-Quinoline	2005/10/21		32	%	30 - 130
		D8-Acenaphthylene	2005/10/21		NS	%	30 - 130
		Acenaphthene	2005/10/21	ND, DL=0.01		ug/g	
		Acenaphthylene	2005/10/21	ND, DL=0.005		ug/g	
		Anthracene	2005/10/21	ND, DL=0.005		ug/g	
		Benzo(a)anthracene	2005/10/21	ND, DL=0.01		ug/g	
		Benzo(a)pyrene	2005/10/21	ND, DL=0.005		ug/g	
		Benzo(b/j)fluoranthene	2005/10/21	ND, DL=0.005		ug/g	
		Benzo(g,h,i)perylene	2005/10/21	ND, DL=0.02		ug/g	
		Benzo(k)fluoranthene	2005/10/21	ND, DL=0.01		ug/g	
		Chrysene	2005/10/21	ND, DL=0.01		ug/g	
		Dibenzo(a,h)anthracene	2005/10/21	ND, DL=0.02		ug/g	
		Fluoranthene	2005/10/21	ND, DL=0.005		ug/g	
		Fluorene	2005/10/21	ND, DL=0.005		ug/g	
		Indeno(1,2,3-cd)pyrene	2005/10/21	ND, DL=0.02		ug/g	
		1-Methylnaphthalene	2005/10/21	ND, DL=0.005		ug/g	
		2-Methylnaphthalene	2005/10/21	ND, DL=0.005		ug/g	
		Naphthalene	2005/10/21	ND, DL=0.005		ug/g	
		Phenanthrene	2005/10/21	ND, DL=0.005		ug/g	
		Pyrene	2005/10/21	ND, DL=0.005		ug/g	
847343 NMO	MATRIX SPIKE	D10-Anthracene	2005/10/21		76	%	30 - 130
		D14-Terphenyl (FS)	2005/10/21		NS	%	30 - 130
		D7-Quinoline	2005/10/21		61	%	30 - 130
		D8-Acenaphthylene	2005/10/21		NS	%	30 - 130
		Acenaphthene	2005/10/21		88	%	30 - 130
		Acenaphthylene	2005/10/21		84	%	30 - 130
		Anthracene	2005/10/21		82	%	30 - 130
		Benzo(a)anthracene	2005/10/21		93	%	30 - 130
		Benzo(a)pyrene	2005/10/21		90	%	30 - 130
		Benzo(b/j)fluoranthene	2005/10/21		95	%	30 - 130
		Benzo(g,h,i)perylene	2005/10/21		100	%	30 - 130
		Benzo(k)fluoranthene	2005/10/21		94	%	30 - 130
		Chrysene	2005/10/21		95	%	30 - 130
		Dibenzo(a,h)anthracene	2005/10/21		102	%	30 - 130
		Fluoranthene	2005/10/21		89	%	30 - 130
		Fluorene	2005/10/21		91	%	30 - 130
		Indeno(1,2,3-cd)pyrene	2005/10/21		105	%	30 - 130
		1-Methylnaphthalene	2005/10/21		78	%	30 - 130
		2-Methylnaphthalene	2005/10/21		87	%	30 - 130
		Naphthalene	2005/10/21		73	%	30 - 130
		Phenanthrene	2005/10/21		84	%	30 - 130
		Pyrene	2005/10/21		94	%	30 - 130
	Spiked Blank	D10-Anthracene	2005/10/21		76	%	30 - 130
		D14-Terphenyl (FS)	2005/10/21		NS	%	30 - 130
		D7-Quinoline	2005/10/21		62	%	30 - 130
		D8-Acenaphthylene	2005/10/21		NS	%	30 - 130
		Acenaphthene	2005/10/21		85	%	30 - 130
		Acenaphthylene	2005/10/21		88	%	30 - 130
		Anthracene	2005/10/21		82	%	30 - 130

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QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
847343 NMO	Spiked Blank	Benzo(a)anthracene	2005/10/21		95	%	30 - 130
		Benzo(a)pyrene	2005/10/21		93	%	30 - 130
		Benzo(b/j)fluoranthene	2005/10/21		100	%	30 - 130
		Benzo(g,h,i)perylene	2005/10/21		111	%	30 - 130
		Benzo(k)fluoranthene	2005/10/21		95	%	30 - 130
		Chrysene	2005/10/21		97	%	30 - 130
		Dibenzo(a,h)anthracene	2005/10/21		112	%	30 - 130
		Fluoranthene	2005/10/21		89	%	30 - 130
		Fluorene	2005/10/21		88	%	30 - 130
		Indeno(1,2,3-cd)pyrene	2005/10/21		115	%	30 - 130
		1-Methylnaphthalene	2005/10/21		70	%	30 - 130
		2-Methylnaphthalene	2005/10/21		81	%	30 - 130
		Naphthalene	2005/10/21		68	%	30 - 130
		Phenanthrene	2005/10/21		83	%	30 - 130
		Pyrene	2005/10/21		94	%	30 - 130
	Method Blank	D10-Anthracene	2005/10/21		60	%	30 - 130
		D14-Terphenyl (FS)	2005/10/21		NS	%	30 - 130
		D7-Quinoline	2005/10/21		57	%	30 - 130
		D8-Acenaphthylene	2005/10/21		NS	%	30 - 130
		Acenaphthene	2005/10/21	ND, DL=0.05		ug/L	
		Acenaphthylene	2005/10/21	ND, DL=0.05		ug/L	
		Anthracene	2005/10/21	ND, DL=0.05		ug/L	
		Benzo(a)anthracene	2005/10/21	ND, DL=0.05		ug/L	
		Benzo(a)pyrene	2005/10/21	ND, DL=0.01		ug/L	
		Benzo(b/j)fluoranthene	2005/10/21	ND, DL=0.05		ug/L	
		Benzo(g,h,i)perylene	2005/10/21	ND, DL=0.1		ug/L	
		Benzo(k)fluoranthene	2005/10/21	ND, DL=0.05		ug/L	
		Chrysene	2005/10/21	ND, DL=0.05		ug/L	
		Dibenzo(a,h)anthracene	2005/10/21	ND, DL=0.1		ug/L	
		Fluoranthene	2005/10/21	ND, DL=0.05		ug/L	
		Fluorene	2005/10/21	ND, DL=0.05		ug/L	
		Indeno(1,2,3-cd)pyrene	2005/10/21	ND, DL=0.1		ug/L	
		1-Methylnaphthalene	2005/10/21	ND, DL=0.05		ug/L	
		2-Methylnaphthalene	2005/10/21	ND, DL=0.05		ug/L	
		Naphthalene	2005/10/21	ND, DL=0.05		ug/L	
		Phenanthrene	2005/10/21	ND, DL=0.05		ug/L	
		Pyrene	2005/10/21	ND, DL=0.05		ug/L	
	RPD	D14-Terphenyl (FS)	2005/10/21	NC		%	N/A
		Acenaphthene	2005/10/21	NC		%	40
		Acenaphthylene	2005/10/21	NC		%	40
		Anthracene	2005/10/21	NC		%	40
		Benzo(a)anthracene	2005/10/21	NC		%	40
		Benzo(a)pyrene	2005/10/21	NC		%	40
		Benzo(b/j)fluoranthene	2005/10/21	NC		%	40
		Benzo(g,h,i)perylene	2005/10/21	NC		%	40
		Benzo(k)fluoranthene	2005/10/21	NC		%	40
		Chrysene	2005/10/21	NC		%	40
		Dibenzo(a,h)anthracene	2005/10/21	NC		%	40
		Fluoranthene	2005/10/21	NC		%	40
		Fluorene	2005/10/21	NC		%	40
		Indeno(1,2,3-cd)pyrene	2005/10/21	NC		%	40
		1-Methylnaphthalene	2005/10/21	NC		%	40
		2-Methylnaphthalene	2005/10/21	NC		%	40
		Naphthalene	2005/10/21	NC		%	40
		Phenanthrene	2005/10/21	NC		%	40
		Pyrene	2005/10/21	NC		%	40

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QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
847487 SRY	Spiked Blank	4-Bromofluorobenzene	2005/10/21		99	%	60 - 140
		D4-1,2-Dichloroethane	2005/10/21		103	%	60 - 140
		D8-Toluene	2005/10/21		101	%	60 - 140
		Acetone	2005/10/21		104	%	50 - 140
		Benzene	2005/10/21		109	%	60 - 140
		Bromodichloromethane	2005/10/21		113	%	60 - 140
		Bromoform	2005/10/21		111	%	60 - 140
		Bromomethane	2005/10/21		62	%	60 - 140
		Carbon Tetrachloride	2005/10/21		105	%	60 - 140
		Chlorobenzene	2005/10/21		111	%	60 - 140
		Chloroform	2005/10/21		107	%	60 - 140
		Dibromochloromethane	2005/10/21		111	%	60 - 140
		1,2-Dichlorobenzene	2005/10/21		115	%	60 - 140
		1,3-Dichlorobenzene	2005/10/21		119	%	60 - 140
		1,4-Dichlorobenzene	2005/10/21		119	%	60 - 140
		1,1-Dichloroethane	2005/10/21		105	%	60 - 140
		1,2-Dichloroethane	2005/10/21		105	%	60 - 140
		1,1-Dichloroethylene	2005/10/21		105	%	60 - 140
		cis-1,2-Dichloroethylene	2005/10/21		106	%	60 - 140
		trans-1,2-Dichloroethylene	2005/10/21		112	%	60 - 140
		1,2-Dichloropropane	2005/10/21		107	%	60 - 140
		cis-1,3-Dichloropropene	2005/10/21		116	%	60 - 140
		trans-1,3-Dichloropropene	2005/10/21		112	%	60 - 140
		Ethylbenzene	2005/10/21		119	%	60 - 140
		Ethylene Dibromide	2005/10/21		108	%	60 - 140
		Methylene Chloride(Dichloromethane)	2005/10/21		101	%	60 - 140
		Methyl Isobutyl Ketone	2005/10/21		112	%	60 - 140
		Methyl Ethyl Ketone	2005/10/21		110	%	60 - 140
		Methyl t-butyl ether (MTBE)	2005/10/21		110	%	60 - 140
		Styrene	2005/10/21		104	%	60 - 140
		1,1,1,2-Tetrachloroethane	2005/10/21		108	%	60 - 140
		1,1,2,2-Tetrachloroethane	2005/10/21		109	%	60 - 140
		Tetrachloroethylene	2005/10/21		115	%	60 - 140
		Toluene	2005/10/21		109	%	60 - 140
		1,1,1-Trichloroethane	2005/10/21		105	%	60 - 140
		1,1,2-Trichloroethane	2005/10/21		110	%	60 - 140
		Trichloroethylene	2005/10/21		110	%	60 - 140
		Vinyl Chloride	2005/10/21		96	%	60 - 140
		p+m-Xylene	2005/10/21		122	%	60 - 140
		o-Xylene	2005/10/21		118	%	60 - 140
	Method Blank	4-Bromofluorobenzene	2005/10/21		95	%	60 - 140
		D4-1,2-Dichloroethane	2005/10/21		98	%	60 - 140
		D8-Toluene	2005/10/21		100	%	60 - 140
		Acetone	2005/10/21	ND, DL=0.1		ug/g	
		Benzene	2005/10/21	ND, DL=0.002		ug/g	
		Bromodichloromethane	2005/10/21	ND, DL=0.002		ug/g	
		Bromoform	2005/10/21	ND, DL=0.002		ug/g	
		Bromomethane	2005/10/21	ND, DL=0.003		ug/g	
		Carbon Tetrachloride	2005/10/21	ND, DL=0.002		ug/g	
		Chlorobenzene	2005/10/21	ND, DL=0.002		ug/g	
		Chloroform	2005/10/21	ND, DL=0.002		ug/g	
		Dibromochloromethane	2005/10/21	ND, DL=0.002		ug/g	
		1,2-Dichlorobenzene	2005/10/21	ND, DL=0.002		ug/g	
		1,3-Dichlorobenzene	2005/10/21	ND, DL=0.002		ug/g	
		1,4-Dichlorobenzene	2005/10/21	ND, DL=0.002		ug/g	
		1,1-Dichloroethane	2005/10/21	ND, DL=0.002		ug/g	

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847487 SRY	Method Blank	1,2-Dichloroethane	2005/10/21	ND, DL=0.002		ug/g	
		1,1-Dichloroethylene	2005/10/21	ND, DL=0.002		ug/g	
		cis-1,2-Dichloroethylene	2005/10/21	ND, DL=0.002		ug/g	
		trans-1,2-Dichloroethylene	2005/10/21	ND, DL=0.002		ug/g	
		1,2-Dichloropropane	2005/10/21	ND, DL=0.002		ug/g	
		cis-1,3-Dichloropropene	2005/10/21	ND, DL=0.002		ug/g	
		trans-1,3-Dichloropropene	2005/10/21	ND, DL=0.002		ug/g	
		Ethylbenzene	2005/10/21	ND, DL=0.002		ug/g	
		Ethylene Dibromide	2005/10/21	ND, DL=0.002		ug/g	
		Methylene Chloride(Dichloromethane)	2005/10/21	ND, DL=0.003		ug/g	
		Methyl Isobutyl Ketone	2005/10/21	ND, DL=0.025		ug/g	
		Methyl Ethyl Ketone	2005/10/21	ND, DL=0.025		ug/g	
		Methyl t-butyl ether (MTBE)	2005/10/21	ND, DL=0.002		ug/g	
		Styrene	2005/10/21	ND, DL=0.002		ug/g	
		1,1,1,2-Tetrachloroethane	2005/10/21	ND, DL=0.002		ug/g	
		1,1,2,2-Tetrachloroethane	2005/10/21	ND, DL=0.002		ug/g	
		Tetrachloroethylene	2005/10/21	ND, DL=0.002		ug/g	
		Toluene	2005/10/21	ND, DL=0.002		ug/g	
		1,1,1-Trichloroethane	2005/10/21	ND, DL=0.002		ug/g	
		1,1,2-Trichloroethane	2005/10/21	ND, DL=0.002		ug/g	
		Trichloroethylene	2005/10/21	ND, DL=0.002		ug/g	
		Vinyl Chloride	2005/10/21	ND, DL=0.002		ug/g	
		p+m-Xylene	2005/10/21	ND, DL=0.002		ug/g	
		o-Xylene	2005/10/21	ND, DL=0.002		ug/g	
		Xylene (Total)	2005/10/21	ND, DL=0.003		ug/g	
847560 SPV	MATRIX SPIKE	1,4-Difluorobenzene	2005/10/21		104	%	60 - 140
		4-Bromofluorobenzene	2005/10/21		98	%	60 - 140
		D10-Ethylbenzene	2005/10/21		101	%	30 - 130
		D4-1,2-Dichloroethane	2005/10/21		96	%	60 - 140
		F1 (C6-C10)	2005/10/21		107	%	60 - 140
	Spiked Blank	1,4-Difluorobenzene	2005/10/21		105	%	60 - 140
		4-Bromofluorobenzene	2005/10/21		97	%	60 - 140
		D10-Ethylbenzene	2005/10/21		100	%	30 - 130
		D4-1,2-Dichloroethane	2005/10/21		99	%	60 - 140
		F1 (C6-C10)	2005/10/21		118	%	60 - 140
	Method Blank	1,4-Difluorobenzene	2005/10/21		105	%	60 - 140
		4-Bromofluorobenzene	2005/10/21		96	%	60 - 140
		D10-Ethylbenzene	2005/10/21		100	%	30 - 130
		D4-1,2-Dichloroethane	2005/10/21		84	%	60 - 140
		F1 (C6-C10)	2005/10/21	ND, DL=10		ug/g	
		F1 (C6-C10) - BTEX	2005/10/21	ND, DL=10		ug/g	
	RPD	F1 (C6-C10)	2005/10/21	NC		%	50
		F1 (C6-C10) - BTEX	2005/10/21	NC		%	50
847598 AHE	MATRIX SPIKE	Dissolved Antimony (Sb)	2005/10/21		94	%	75 - 125
		Dissolved Arsenic (As)	2005/10/21		97	%	75 - 125
		Dissolved Barium (Ba)	2005/10/21		94	%	75 - 125
		Dissolved Beryllium (Be)	2005/10/21		98	%	75 - 125
		Dissolved Boron (B)	2005/10/21		100	%	75 - 125
		Dissolved Cadmium (Cd)	2005/10/21		96	%	75 - 125
		Dissolved Chromium (Cr)	2005/10/21		90	%	75 - 125
		Dissolved Cobalt (Co)	2005/10/21		86	%	75 - 125
		Dissolved Copper (Cu)	2005/10/21		88	%	75 - 125
		Dissolved Lead (Pb)	2005/10/21		88	%	75 - 125
		Dissolved Molybdenum (Mo)	2005/10/21		95	%	75 - 125
		Dissolved Nickel (Ni)	2005/10/21		89	%	75 - 125
		Dissolved Selenium (Se)	2005/10/21		93	%	75 - 125

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QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
847598 AHE	MATRIX SPIKE	Dissolved Silver (Ag)	2005/10/21		82	%	75 - 125
		Dissolved Sodium (Na)	2005/10/21		93	%	75 - 125
		Dissolved Tellurium	2005/10/21		96	%	75 - 125
		Dissolved Thallium (Tl)	2005/10/21		87	%	75 - 125
		Dissolved Thorium (Th)	2005/10/21		91	%	75 - 125
		Dissolved Vanadium (V)	2005/10/21		88	%	75 - 125
		Dissolved Zinc (Zn)	2005/10/21		93	%	75 - 125
	Spiked Blank	Dissolved Antimony (Sb)	2005/10/21		99	%	85 - 115
		Dissolved Arsenic (As)	2005/10/21		100	%	85 - 115
		Dissolved Barium (Ba)	2005/10/21		100	%	85 - 115
		Dissolved Beryllium (Be)	2005/10/21		104	%	85 - 115
		Dissolved Boron (B)	2005/10/21		108	%	85 - 115
		Dissolved Cadmium (Cd)	2005/10/21		103	%	85 - 115
		Dissolved Chromium (Cr)	2005/10/21		97	%	85 - 115
		Dissolved Cobalt (Co)	2005/10/21		93	%	85 - 115
		Dissolved Copper (Cu)	2005/10/21		94	%	85 - 115
		Dissolved Lead (Pb)	2005/10/21		97	%	85 - 115
		Dissolved Molybdenum (Mo)	2005/10/21		102	%	85 - 115
		Dissolved Nickel (Ni)	2005/10/21		96	%	85 - 115
		Dissolved Selenium (Se)	2005/10/21		98	%	85 - 115
		Dissolved Silver (Ag)	2005/10/21		100	%	85 - 115
		Dissolved Sodium (Na)	2005/10/21		98	%	85 - 115
		Dissolved Tellurium	2005/10/21		101	%	85 - 115
		Dissolved Thallium (Tl)	2005/10/21		94	%	85 - 115
		Dissolved Thorium (Th)	2005/10/21		99	%	85 - 115
		Dissolved Vanadium (V)	2005/10/21		93	%	85 - 115
		Dissolved Zinc (Zn)	2005/10/21		97	%	85 - 115
	Method Blank	Dissolved Antimony (Sb)	2005/10/21	ND, DL=1		ug/L	
		Dissolved Arsenic (As)	2005/10/21	ND, DL=1		ug/L	
		Dissolved Barium (Ba)	2005/10/21	ND, DL=5		ug/L	
		Dissolved Beryllium (Be)	2005/10/21	ND, DL=0.5		ug/L	
		Dissolved Boron (B)	2005/10/21	ND, DL=10		ug/L	
		Dissolved Cadmium (Cd)	2005/10/21	ND, DL=0.1		ug/L	
		Dissolved Chromium (Cr)	2005/10/21	ND, DL=5		ug/L	
		Dissolved Cobalt (Co)	2005/10/21	ND, DL=0.5		ug/L	
		Dissolved Copper (Cu)	2005/10/21	ND, DL=1		ug/L	
		Dissolved Lead (Pb)	2005/10/21	ND, DL=0.5		ug/L	
		Dissolved Molybdenum (Mo)	2005/10/21	ND, DL=1		ug/L	
		Dissolved Nickel (Ni)	2005/10/21	ND, DL=1		ug/L	
		Dissolved Selenium (Se)	2005/10/21	ND, DL=2		ug/L	
		Dissolved Silver (Ag)	2005/10/21	ND, DL=0.5		ug/L	
		Dissolved Sodium (Na)	2005/10/21	ND, DL=100		ug/L	
		Dissolved Tellurium	2005/10/21	ND, DL=1		ug/L	
		Dissolved Thallium (Tl)	2005/10/21	ND, DL=0.05		ug/L	
		Dissolved Thorium (Th)	2005/10/21	ND, DL=1		ug/L	
		Dissolved Vanadium (V)	2005/10/21	ND, DL=1		ug/L	
		Dissolved Zinc (Zn)	2005/10/21	ND, DL=5		ug/L	
	RPD	Dissolved Lead (Pb)	2005/10/21	NC		%	25
847602 VIV	MATRIX SPIKE	Dissolved Antimony (Sb)	2005/10/21		102	%	75 - 125
		Dissolved Arsenic (As)	2005/10/21		103	%	75 - 125
		Dissolved Barium (Ba)	2005/10/21		99	%	75 - 125
		Dissolved Beryllium (Be)	2005/10/21		99	%	75 - 125
		Dissolved Boron (B)	2005/10/21		107	%	75 - 125
		Dissolved Cadmium (Cd)	2005/10/21		106	%	75 - 125
		Dissolved Chromium (Cr)	2005/10/21		104	%	75 - 125
		Dissolved Cobalt (Co)	2005/10/21		103	%	75 - 125

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QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
847602 VIV	MATRIX SPIKE	Dissolved Copper (Cu)	2005/10/21		101	%	75 - 125
		Dissolved Lead (Pb)	2005/10/21		98	%	75 - 125
		Dissolved Molybdenum (Mo)	2005/10/21		105	%	75 - 125
		Dissolved Nickel (Ni)	2005/10/21		102	%	75 - 125
		Dissolved Selenium (Se)	2005/10/21		104	%	75 - 125
		Dissolved Silver (Ag)	2005/10/21		99	%	75 - 125
		Dissolved Sodium (Na)	2005/10/21		99	%	75 - 125
		Dissolved Tellurium	2005/10/21		102	%	75 - 125
		Dissolved Thallium (Tl)	2005/10/21		101	%	75 - 125
		Dissolved Thorium (Th)	2005/10/21		99	%	75 - 125
		Dissolved Vanadium (V)	2005/10/21		104	%	75 - 125
		Dissolved Zinc (Zn)	2005/10/21		103	%	75 - 125
	Spiked Blank	Dissolved Antimony (Sb)	2005/10/21		95	%	85 - 115
		Dissolved Arsenic (As)	2005/10/21		99	%	85 - 115
		Dissolved Barium (Ba)	2005/10/21		102	%	85 - 115
		Dissolved Beryllium (Be)	2005/10/21		104	%	85 - 115
		Dissolved Boron (B)	2005/10/21		108	%	85 - 115
		Dissolved Cadmium (Cd)	2005/10/21		103	%	85 - 115
		Dissolved Chromium (Cr)	2005/10/21		102	%	85 - 115
		Dissolved Cobalt (Co)	2005/10/21		101	%	85 - 115
		Dissolved Copper (Cu)	2005/10/21		100	%	85 - 115
		Dissolved Lead (Pb)	2005/10/21		102	%	85 - 115
		Dissolved Molybdenum (Mo)	2005/10/21		99	%	85 - 115
		Dissolved Nickel (Ni)	2005/10/21		101	%	85 - 115
		Dissolved Selenium (Se)	2005/10/21		100	%	85 - 115
		Dissolved Silver (Ag)	2005/10/21		98	%	85 - 115
		Dissolved Sodium (Na)	2005/10/21		104	%	85 - 115
		Dissolved Tellurium	2005/10/21		96	%	85 - 115
		Dissolved Thallium (Tl)	2005/10/21		105	%	85 - 115
		Dissolved Thorium (Th)	2005/10/21		106	%	85 - 115
		Dissolved Vanadium (V)	2005/10/21		102	%	85 - 115
		Dissolved Zinc (Zn)	2005/10/21		101	%	85 - 115
	Method Blank	Dissolved Antimony (Sb)	2005/10/21	ND, DL=1		ug/L	
		Dissolved Arsenic (As)	2005/10/21	ND, DL=1		ug/L	
		Dissolved Barium (Ba)	2005/10/21	ND, DL=5		ug/L	
		Dissolved Beryllium (Be)	2005/10/21	ND, DL=0.5		ug/L	
		Dissolved Boron (B)	2005/10/21	ND, DL=10		ug/L	
		Dissolved Cadmium (Cd)	2005/10/21	ND, DL=0.1		ug/L	
		Dissolved Chromium (Cr)	2005/10/21	ND, DL=5		ug/L	
		Dissolved Cobalt (Co)	2005/10/21	ND, DL=0.5		ug/L	
		Dissolved Copper (Cu)	2005/10/21	ND, DL=1		ug/L	
		Dissolved Lead (Pb)	2005/10/21	ND, DL=0.5		ug/L	
		Dissolved Molybdenum (Mo)	2005/10/21	ND, DL=1		ug/L	
		Dissolved Nickel (Ni)	2005/10/21	ND, DL=1		ug/L	
		Dissolved Selenium (Se)	2005/10/21	ND, DL=2		ug/L	
		Dissolved Silver (Ag)	2005/10/21	ND, DL=0.5		ug/L	
		Dissolved Sodium (Na)	2005/10/21	ND, DL=100		ug/L	
		Dissolved Tellurium	2005/10/21	ND, DL=1		ug/L	
		Dissolved Thallium (Tl)	2005/10/21	ND, DL=0.05		ug/L	
		Dissolved Thorium (Th)	2005/10/21	ND, DL=1		ug/L	
		Dissolved Vanadium (V)	2005/10/21	ND, DL=1		ug/L	
		Dissolved Zinc (Zn)	2005/10/21	ND, DL=5		ug/L	
	RPD	Dissolved Antimony (Sb)	2005/10/21	NC		%	25
		Dissolved Arsenic (As)	2005/10/21	NC		%	25
		Dissolved Barium (Ba)	2005/10/21	0.6		%	25
		Dissolved Beryllium (Be)	2005/10/21	NC		%	25

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847602 VIV	RPD	Dissolved Boron (B)	2005/10/21	NC		%	25
		Dissolved Cadmium (Cd)	2005/10/21	NC		%	25
		Dissolved Chromium (Cr)	2005/10/21	NC		%	25
		Dissolved Cobalt (Co)	2005/10/21	NC		%	25
		Dissolved Lead (Pb)	2005/10/21	NC		%	25
		Dissolved Molybdenum (Mo)	2005/10/21	NC		%	25
		Dissolved Nickel (Ni)	2005/10/21	NC		%	25
		Dissolved Selenium (Se)	2005/10/21	NC		%	25
		Dissolved Silver (Ag)	2005/10/21	NC		%	25
		Dissolved Thallium (Tl)	2005/10/21	NC		%	25
		Dissolved Vanadium (V)	2005/10/21	NC		%	25
847647 KCO	MATRIX SPIKE [I80797-06]	Mercury (Hg)	2005/10/21		95	%	75 - 125
	QC STANDARD	Mercury (Hg)	2005/10/21		95	%	75 - 125
	Spiked Blank	Mercury (Hg)	2005/10/21		96	%	84 - 113
	Method Blank	Mercury (Hg)	2005/10/21	ND, DL=0.1		ug/L	
	RPD [I80797-06]	Mercury (Hg)	2005/10/21	NC		%	25
848007 KJI	MATRIX SPIKE	1,4-Difluorobenzene	2005/10/22		101	%	70 - 130
		4-Bromofluorobenzene	2005/10/22		106	%	70 - 130
		D10-Ethylbenzene	2005/10/22		103	%	30 - 130
		D4-1,2-Dichloroethane	2005/10/22		108	%	70 - 130
		F1 (C6-C10)	2005/10/22		84	%	70 - 130
	Spiked Blank	1,4-Difluorobenzene	2005/10/22		101	%	70 - 130
		4-Bromofluorobenzene	2005/10/22		105	%	70 - 130
		D10-Ethylbenzene	2005/10/22		99	%	30 - 130
		D4-1,2-Dichloroethane	2005/10/22		116	%	70 - 130
		F1 (C6-C10)	2005/10/22		84	%	70 - 130
	Method Blank	1,4-Difluorobenzene	2005/10/22		101	%	70 - 130
		4-Bromofluorobenzene	2005/10/22		105	%	70 - 130
		D10-Ethylbenzene	2005/10/22		104	%	30 - 130
		D4-1,2-Dichloroethane	2005/10/22		108	%	70 - 130
		F1 (C6-C10)	2005/10/22	ND, DL=100		ug/L	
		F1 (C6-C10) - BTEX	2005/10/22	ND, DL=100		ug/L	
	RPD	F1 (C6-C10)	2005/10/22	NC		%	40
		F1 (C6-C10) - BTEX	2005/10/22	NC		%	40
848247 STE	MATRIX SPIKE	o-Terphenyl	2005/10/21		117	%	30 - 130
		F2 (C10-C16 Hydrocarbons)	2005/10/21		114	%	60 - 130
		F3 (C16-C34 Hydrocarbons)	2005/10/21		114	%	60 - 130
		F4 (C34-C50 Hydrocarbons)	2005/10/21		114	%	60 - 130
	Spiked Blank	o-Terphenyl	2005/10/21		106	%	30 - 130
		F2 (C10-C16 Hydrocarbons)	2005/10/21		105	%	60 - 130
		F3 (C16-C34 Hydrocarbons)	2005/10/21		105	%	60 - 130
		F4 (C34-C50 Hydrocarbons)	2005/10/21		105	%	60 - 130
	Method Blank	o-Terphenyl	2005/10/21		100	%	30 - 130
		F2 (C10-C16 Hydrocarbons)	2005/10/21	ND, DL=100		ug/L	
		F3 (C16-C34 Hydrocarbons)	2005/10/21	ND, DL=100		ug/L	
		F4 (C34-C50 Hydrocarbons)	2005/10/21	ND, DL=100		ug/L	
	RPD	F2 (C10-C16 Hydrocarbons)	2005/10/21	3.7		%	50
		F3 (C16-C34 Hydrocarbons)	2005/10/21	NC		%	50
		F4 (C34-C50 Hydrocarbons)	2005/10/21	NC		%	50
848296 DCA	MATRIX SPIKE	o-Terphenyl	2005/10/21		90	%	30 - 130
		F2 (C10-C16 Hydrocarbons)	2005/10/21		71	%	60 - 130
		F3 (C16-C34 Hydrocarbons)	2005/10/21		71	%	60 - 130
		F4 (C34-C50 Hydrocarbons)	2005/10/21		71	%	60 - 130
	Spiked Blank	o-Terphenyl	2005/10/21		93	%	30 - 130
		F2 (C10-C16 Hydrocarbons)	2005/10/21		72	%	60 - 130

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848296 DCA	Spiked Blank	F3 (C16-C34 Hydrocarbons)	2005/10/21		72	%	60 - 130
		F4 (C34-C50 Hydrocarbons)	2005/10/21		72	%	60 - 130
	Method Blank	o-Terphenyl	2005/10/21		88	%	30 - 130
		F2 (C10-C16 Hydrocarbons)	2005/10/21	ND, DL=10		ug/g	
		F3 (C16-C34 Hydrocarbons)	2005/10/21	ND, DL=10		ug/g	
		F4 (C34-C50 Hydrocarbons)	2005/10/21	ND, DL=10		ug/g	
	RPD	F2 (C10-C16 Hydrocarbons)	2005/10/21	NC		%	50
		F3 (C16-C34 Hydrocarbons)	2005/10/21	NC		%	50
		F4 (C34-C50 Hydrocarbons)	2005/10/21	NC		%	50
848359 SPU	RPD	Moisture	2005/10/21	8.8		%	50
848578 APT	MATRIX SPIKE	Total Antimony (Sb)	2005/10/24		93	%	75 - 125
		Total Arsenic (As)	2005/10/24		95	%	75 - 125
		Total Barium (Ba)	2005/10/24		90	%	75 - 125
		Total Beryllium (Be)	2005/10/24		98	%	75 - 125
		Total Cadmium (Cd)	2005/10/24		94	%	75 - 125
		Total Chromium (Cr)	2005/10/24		96	%	75 - 125
		Total Cobalt (Co)	2005/10/24		95	%	75 - 125
		Total Copper (Cu)	2005/10/24		95	%	75 - 125
		Total Lead (Pb)	2005/10/24		93	%	75 - 125
		Total Molybdenum (Mo)	2005/10/24		96	%	75 - 125
		Total Nickel (Ni)	2005/10/24		94	%	75 - 125
		Total Selenium (Se)	2005/10/24		93	%	75 - 125
		Total Silver (Ag)	2005/10/24		99	%	75 - 125
		Total Thallium (Tl)	2005/10/24		94	%	75 - 125
		Total Vanadium (V)	2005/10/24		95	%	75 - 125
		Total Zinc (Zn)	2005/10/24		90	%	75 - 125
	QC STANDARD	Total Arsenic (As)	2005/10/24		116	%	30 - 170
		Total Barium (Ba)	2005/10/24		106	%	70 - 130
		Total Chromium (Cr)	2005/10/24		93	%	40 - 160
		Total Cobalt (Co)	2005/10/24		103	%	75 - 125
		Total Copper (Cu)	2005/10/24		102	%	73 - 127
		Total Lead (Pb)	2005/10/24		99	%	54 - 146
		Total Nickel (Ni)	2005/10/24		100	%	61 - 139
		Total Vanadium (V)	2005/10/24		112	%	50 - 150
		Total Zinc (Zn)	2005/10/24		101	%	72 - 128
	Method Blank	Total Antimony (Sb)	2005/10/24	ND, DL=1		ug/g	
		Total Arsenic (As)	2005/10/24	ND, DL=1		ug/g	
		Total Barium (Ba)	2005/10/24	ND, DL=0.5		ug/g	
		Total Beryllium (Be)	2005/10/24	ND, DL=0.5		ug/g	
		Total Cadmium (Cd)	2005/10/24	ND, DL=0.3		ug/g	
		Total Chromium (Cr)	2005/10/24	ND, DL=0.5		ug/g	
		Total Cobalt (Co)	2005/10/24	ND, DL=0.5		ug/g	
		Total Copper (Cu)	2005/10/24	ND, DL=0.5		ug/g	
		Total Lead (Pb)	2005/10/24	ND, DL=1		ug/g	
		Total Molybdenum (Mo)	2005/10/24	ND, DL=0.5		ug/g	
		Total Nickel (Ni)	2005/10/24	ND, DL=0.5		ug/g	
		Total Selenium (Se)	2005/10/24	ND, DL=1		ug/g	
		Total Silver (Ag)	2005/10/24	ND, DL=0.3		ug/g	
		Total Thallium (Tl)	2005/10/24	ND, DL=1		ug/g	
		Total Vanadium (V)	2005/10/24	ND, DL=0.5		ug/g	
		Total Zinc (Zn)	2005/10/24	ND, DL=3		ug/g	
	RPD	Total Antimony (Sb)	2005/10/24	NC		%	20
		Total Arsenic (As)	2005/10/24	NC		%	20
		Total Barium (Ba)	2005/10/24	2.8		%	20
		Total Beryllium (Be)	2005/10/24	NC		%	20
		Total Cadmium (Cd)	2005/10/24	NC		%	20

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QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
848578 APT	RPD	Total Chromium (Cr)	2005/10/24	4.1		%	20
		Total Cobalt (Co)	2005/10/24	0.6		%	20
		Total Copper (Cu)	2005/10/24	2.0		%	20
		Total Lead (Pb)	2005/10/24	2.1		%	20
		Total Molybdenum (Mo)	2005/10/24	NC		%	20
		Total Nickel (Ni)	2005/10/24	3.3		%	20
		Total Selenium (Se)	2005/10/24	NC		%	20
		Total Silver (Ag)	2005/10/24	NC		%	20
		Total Thallium (Tl)	2005/10/24	NC		%	20
		Total Vanadium (V)	2005/10/24	3.3		%	20
		Total Zinc (Zn)	2005/10/24	0.7		%	20
848579 LCH	MATRIX SPIKE	Acid Extractable Mercury (Hg)	2005/10/24		95	%	75 - 125
	QC STANDARD	Acid Extractable Mercury (Hg)	2005/10/24		93	%	85 - 115
	Spiked Blank	Acid Extractable Mercury (Hg)	2005/10/24		102	%	75 - 125
	Method Blank	Acid Extractable Mercury (Hg)	2005/10/24	ND, DL=0.05		ug/g	
	RPD	Acid Extractable Mercury (Hg)	2005/10/24	NC		%	35
848599 MME	MATRIX SPIKE						
	[I80790-01]	Total Antimony (Sb)	2005/10/24		101	%	75 - 125
		Total Arsenic (As)	2005/10/24		101	%	75 - 125
		Total Barium (Ba)	2005/10/24		100	%	75 - 125
		Total Beryllium (Be)	2005/10/24		101	%	75 - 125
		Total Cadmium (Cd)	2005/10/24		96	%	75 - 125
		Total Chromium (Cr)	2005/10/24		104	%	75 - 125
		Total Cobalt (Co)	2005/10/24		97	%	75 - 125
		Total Copper (Cu)	2005/10/24		99	%	75 - 125
		Total Lead (Pb)	2005/10/24		97	%	75 - 125
		Total Molybdenum (Mo)	2005/10/24		101	%	75 - 125
		Total Nickel (Ni)	2005/10/24		98	%	75 - 125
		Total Selenium (Se)	2005/10/24		96	%	75 - 125
		Total Silver (Ag)	2005/10/24		103	%	75 - 125
		Total Thallium (Tl)	2005/10/24		96	%	75 - 125
		Total Vanadium (V)	2005/10/24		104	%	75 - 125
		Total Zinc (Zn)	2005/10/24		94	%	75 - 125
	QC STANDARD	Total Arsenic (As)	2005/10/24		113	%	30 - 170
		Total Barium (Ba)	2005/10/24		106	%	70 - 130
		Total Chromium (Cr)	2005/10/24		93	%	40 - 160
		Total Cobalt (Co)	2005/10/24		105	%	75 - 125
		Total Copper (Cu)	2005/10/24		104	%	73 - 127
		Total Lead (Pb)	2005/10/24		103	%	54 - 146
		Total Nickel (Ni)	2005/10/24		104	%	61 - 139
		Total Vanadium (V)	2005/10/24		112	%	50 - 150
		Total Zinc (Zn)	2005/10/24		104	%	72 - 128
	Method Blank	Total Antimony (Sb)	2005/10/24	ND, DL=1		ug/g	
		Total Arsenic (As)	2005/10/24	ND, DL=1		ug/g	
		Total Barium (Ba)	2005/10/24	ND, DL=0.5		ug/g	
		Total Beryllium (Be)	2005/10/24	ND, DL=0.5		ug/g	
		Total Cadmium (Cd)	2005/10/24	ND, DL=0.3		ug/g	
		Total Chromium (Cr)	2005/10/24	ND, DL=0.5		ug/g	
		Total Cobalt (Co)	2005/10/24	ND, DL=0.5		ug/g	
		Total Copper (Cu)	2005/10/24	ND, DL=0.5		ug/g	
		Total Lead (Pb)	2005/10/24	ND, DL=1		ug/g	
		Total Molybdenum (Mo)	2005/10/24	0.8, DL=0.5		ug/g	
		Total Nickel (Ni)	2005/10/24	ND, DL=0.5		ug/g	
		Total Selenium (Se)	2005/10/24	ND, DL=1		ug/g	
		Total Silver (Ag)	2005/10/24	ND, DL=0.3		ug/g	
		Total Thallium (Tl)	2005/10/24	ND, DL=1		ug/g	

CH2M Hill Canada Limited
Attention: Kevin Allin
Client Project #: 316461.TT.HA LEMREUS ISLAND FO
P.O. #:
Project name: OTTAWA

Quality Assurance Report (Continued)

Maxxam Job Number: MA5A3629

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
848599 MME	Method Blank	Total Vanadium (V)	2005/10/24	ND, DL=0.5		ug/g	
		Total Zinc (Zn)	2005/10/24	ND, DL=3		ug/g	
	RPD [I80790-01]	Total Antimony (Sb)	2005/10/24	NC		%	20
		Total Arsenic (As)	2005/10/24	NC		%	20
		Total Barium (Ba)	2005/10/24	1.1		%	20
		Total Beryllium (Be)	2005/10/24	NC		%	20
		Total Cadmium (Cd)	2005/10/24	NC		%	20
		Total Chromium (Cr)	2005/10/24	1.9		%	20
		Total Cobalt (Co)	2005/10/24	1.1		%	20
		Total Copper (Cu)	2005/10/24	3.4		%	20
		Total Lead (Pb)	2005/10/24	2.4		%	20
		Total Molybdenum (Mo)	2005/10/24	NC		%	20
		Total Nickel (Ni)	2005/10/24	2.9		%	20
		Total Selenium (Se)	2005/10/24	NC		%	20
		Total Silver (Ag)	2005/10/24	NC		%	20
		Total Thallium (Tl)	2005/10/24	NC		%	20
		Total Vanadium (V)	2005/10/24	3.0		%	20
		Total Zinc (Zn)	2005/10/24	4.0		%	20

ND = Not detected
N/A = Not Applicable
NC = Non-calculable
RPD = Relative Percent Difference
QC Standard = Quality Control Standard
SPIKE = Fortified sample

6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel: 905-817-5700 Toll free:800-563-6266 Fax: 905-817-5777

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Certificate of Analysis

Trow Associates Inc. (Ottawa)
154 Colonnade Rd. S
Ottawa, ON K2E 7J5
Attn: Mark McCalla

Phone: (613) 225-9940
Fax: (613) 225-7337

Client PO:
Project: OTEN00020038C
Custody: 54717

Report Date: 10-Nov-2009
Order Date: 3-Nov-2009
Order #: 0945145

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
0945145-01	S1
0945145-02	S2
0945145-03	S3
0945145-04	S4
0945145-05	S5
0945145-06	S6
0945145-07	S7
0945145-08	S8
0945145-09	S9
0945145-10	S10
0945145-11	S70

Approved By: Mark Foto

Mark Foto, M.Sc. For Dale Robertson, BSc
Laboratory Director

PARACEL LABORATORIES LTD.

Order #: 0945145

Certificate of Analysis

Report Date: 10-Nov-2009
Order Date:3-Nov-2009

Client: **Trow Associates Inc. (Ottawa)**
Client PO: Project Description: OTEN00020038C

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Metals	EPA 6020 - Digestion - ICP-MS	9-Nov-09	9-Nov-09
PAHs by GC-MS, standard scan	EPA 8270 - GC-MS, extraction	6-Nov-09	6-Nov-09
Solids, %	Gravimetric, calculation	5-Nov-09	5-Nov-09

PARACEL LABORATORIES LTD.

Order #: 0945145

Certificate of Analysis

Report Date: 10-Nov-2009
Order Date:3-Nov-2009

Client: **Trow Associates Inc. (Ottawa)**
Client PO:

Project Description: OTEN00020038C

	Client ID:	S1	S2	S3	S4
	Sample Date:	03-Nov-09	03-Nov-09	03-Nov-09	03-Nov-09
	Sample ID:	0945145-01	0945145-02	0945145-03	0945145-04
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	80.1	84.9	74.1	76.7
Metals					
Antimony	1 ug/g dry	<1	<1	<1	<1
Arsenic	1 ug/g dry	1	1	1	1
Barium	10 ug/g dry	58	62	404	348
Beryllium	0.5 ug/g dry	<0.5	<0.5	0.6	0.6
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	5 ug/g dry	17	16	90	73
Cobalt	1 ug/g dry	3	5	18	15
Copper	5 ug/g dry	7	11	39	35
Lead	1 ug/g dry	14	20	24	24
Molybdenum	1 ug/g dry	<1	<1	<1	<1
Nickel	5 ug/g dry	8	9	49	41
Selenium	1 ug/g dry	<1	<1	<1	<1
Silver	0.3 ug/g dry	<0.3	<0.3	<0.3	<0.3
Thallium	1 ug/g dry	<1	<1	<1	<1
Vanadium	10 ug/g dry	23	27	76	64
Zinc	20 ug/g dry	27	34	85	81
Semi-Volatiles					
Acenaphthene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Acenaphthylene	0.02 ug/g dry	<0.02	<0.02	<0.02	0.05
Anthracene	0.02 ug/g dry	<0.02	0.02	<0.02	0.08
Benzo[a]anthracene	0.02 ug/g dry	0.03	0.05	0.03	0.12
Benzo[a]pyrene	0.02 ug/g dry	0.03	0.04	0.03	0.12
Benzo[b]fluoranthene	0.02 ug/g dry	0.04	0.07	0.05	0.17
Benzo[g,h,i]perylene	0.02 ug/g dry	0.02	0.03	0.02	0.09
Benzo[k]fluoranthene	0.02 ug/g dry	0.02	0.03	0.03	0.12
Biphenyl	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Chrysene	0.02 ug/g dry	0.04	0.05	0.04	0.15
Dibenzo[a,h]anthracene	0.02 ug/g dry	<0.02	<0.02	<0.02	0.02
Fluoranthene	0.02 ug/g dry	0.07	0.12	0.07	0.28

PARACEL LABORATORIES LTD.

Order #: 0945145

Certificate of Analysis

Report Date: 10-Nov-2009
Order Date:3-Nov-2009

Client: **Trow Associates Inc. (Ottawa)**
Client PO: Project Description: OTEN00020038C

	Client ID:	S1	S2	S3	S4
	Sample Date:	03-Nov-09	03-Nov-09	03-Nov-09	03-Nov-09
	Sample ID:	0945145-01	0945145-02	0945145-03	0945145-04
	MDL/Units	Soil	Soil	Soil	Soil
Fluorene	0.02 ug/g dry	<0.02	<0.02	<0.02	0.02
Indeno[1,2,3-cd]pyrene	0.02 ug/g dry	0.02	0.03	0.02	0.08
1-Methylnaphthalene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
2-Methylnaphthalene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Naphthalene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Phenanthrene	0.02 ug/g dry	0.03	0.05	0.03	0.13
Pyrene	0.02 ug/g dry	0.06	0.09	0.05	0.23
2-Fluorobiphenyl	Surrogate	112%	88.3%	88.8%	93.0%
Terphenyl-d14	Surrogate	120%	103%	105%	102%

PARACEL LABORATORIES LTD.

Order #: 0945145

Certificate of Analysis

Report Date: 10-Nov-2009
Order Date:3-Nov-2009

Client: **Trow Associates Inc. (Ottawa)**
Client PO:

Project Description: OTEN00020038C

	Client ID:	S5	S6	S7	S8
	Sample Date:	03-Nov-09	03-Nov-09	03-Nov-09	03-Nov-09
	Sample ID:	0945145-05	0945145-06	0945145-07	0945145-08
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	81.0	85.0	81.6	88.8
Metals					
Antimony	1 ug/g dry	<1	<1	<1	<1
Arsenic	1 ug/g dry	1	<1	1	<1
Barium	10 ug/g dry	420	144	34	74
Beryllium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	5 ug/g dry	82	31	8	20
Cobalt	1 ug/g dry	17	8	2	6
Copper	5 ug/g dry	38	17	<5	13
Lead	1 ug/g dry	21	9	9	15
Molybdenum	1 ug/g dry	<1	<1	<1	<1
Nickel	5 ug/g dry	45	17	<5	10
Selenium	1 ug/g dry	<1	<1	<1	<1
Silver	0.3 ug/g dry	<0.3	<0.3	<0.3	<0.3
Thallium	1 ug/g dry	<1	<1	<1	<1
Vanadium	10 ug/g dry	73	43	17	29
Zinc	20 ug/g dry	88	42	22	29
Semi-Volatiles					
Acenaphthene	0.02 ug/g dry	<0.02	<0.02	0.02	<0.02
Acenaphthylene	0.02 ug/g dry	0.02	<0.02	0.04	0.02
Anthracene	0.02 ug/g dry	0.02	<0.02	0.11	0.07
Benzo[a]anthracene	0.02 ug/g dry	0.03	0.04	0.20	0.17
Benzo[a]pyrene	0.02 ug/g dry	0.03	0.03	0.17	0.15
Benzo[b]fluoranthene	0.02 ug/g dry	0.05	0.05	0.26	0.25
Benzo[g,h,i]perylene	0.02 ug/g dry	0.03	0.02	0.11	0.10
Benzo[k]fluoranthene	0.02 ug/g dry	0.03	0.03	0.15	0.15
Biphenyl	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Chrysene	0.02 ug/g dry	0.04	0.04	0.21	0.19
Dibenzo[a,h]anthracene	0.02 ug/g dry	<0.02	<0.02	0.03	0.03
Fluoranthene	0.02 ug/g dry	0.06	0.09	0.46	0.37
Fluorene	0.02 ug/g dry	<0.02	<0.02	0.03	<0.02

Certificate of Analysis

Report Date: 10-Nov-2009
Order Date:3-Nov-2009

Client: **Trow Associates Inc. (Ottawa)**
Client PO: Project Description: OTEN00020038C

	Client ID:	S5	S6	S7	S8
	Sample Date:	03-Nov-09	03-Nov-09	03-Nov-09	03-Nov-09
	Sample ID:	0945145-05	0945145-06	0945145-07	0945145-08
	MDL/Units	Soil	Soil	Soil	Soil
Indeno[1,2,3-cd]pyrene	0.02 ug/g dry	0.02	0.02	0.10	0.10
1-Methylnaphthalene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
2-Methylnaphthalene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Naphthalene	0.02 ug/g dry	<0.02	<0.02	0.02	<0.02
Phenanthrene	0.02 ug/g dry	0.02	0.04	0.26	0.15
Pyrene	0.02 ug/g dry	0.05	0.07	0.38	0.31
2-Fluorobiphenyl	Surrogate	90.7%	86.7%	106%	105%
Terphenyl-d14	Surrogate	110%	108%	108%	107%

PARACEL LABORATORIES LTD.

Order #: 0945145

Certificate of Analysis

Report Date: 10-Nov-2009
Order Date:3-Nov-2009

Client: **Trow Associates Inc. (Ottawa)**

Client PO: Project Description: OTEN00020038C

	Client ID:	S9	S10	S70	-
	Sample Date:	03-Nov-09	03-Nov-09	03-Nov-09	-
	Sample ID:	0945145-09	0945145-10	0945145-11	-
	MDL/Units	Soil	Soil	Soil	-
Physical Characteristics					
% Solids	0.1 % by Wt.	87.2	85.1	82.1	-
Metals					
Antimony	1 ug/g dry	<1	<1	<1	-
Arsenic	1 ug/g dry	<1	<1	1	-
Barium	10 ug/g dry	48	40	40	-
Beryllium	0.5 ug/g dry	<0.5	<0.5	<0.5	-
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	-
Chromium	5 ug/g dry	15	10	10	-
Cobalt	1 ug/g dry	4	4	3	-
Copper	5 ug/g dry	11	9	5	-
Lead	1 ug/g dry	20	6	11	-
Molybdenum	1 ug/g dry	<1	<1	<1	-
Nickel	5 ug/g dry	8	6	5	-
Selenium	1 ug/g dry	<1	<1	<1	-
Silver	0.3 ug/g dry	<0.3	<0.3	<0.3	-
Thallium	1 ug/g dry	<1	<1	<1	-
Vanadium	10 ug/g dry	21	15	20	-
Zinc	20 ug/g dry	30	<20	25	-
Semi-Volatiles					
Acenaphthene	0.02 ug/g dry	<0.02	<0.02	<0.02	-
Acenaphthylene	0.02 ug/g dry	<0.02	<0.02	0.02	-
Anthracene	0.02 ug/g dry	0.03	<0.02	0.04	-
Benzo[a]anthracene	0.02 ug/g dry	0.06	0.02	0.10	-
Benzo[a]pyrene	0.02 ug/g dry	0.05	<0.02	0.09	-
Benzo[b]fluoranthene	0.02 ug/g dry	0.07	0.02	0.14	-
Benzo[g,h,i]perylene	0.02 ug/g dry	0.04	<0.02	0.06	-
Benzo[k]fluoranthene	0.02 ug/g dry	0.03	<0.02	0.09	-
Biphenyl	0.02 ug/g dry	<0.02	<0.02	<0.02	-
Chrysene	0.02 ug/g dry	0.06	0.02	0.11	-
Dibenzo[a,h]anthracene	0.02 ug/g dry	<0.02	<0.02	<0.02	-
Fluoranthene	0.02 ug/g dry	0.14	0.03	0.22	-
Fluorene	0.02 ug/g dry	<0.02	<0.02	<0.02	-

Certificate of Analysis

Report Date: 10-Nov-2009
Order Date:3-Nov-2009

Client: **Trow Associates Inc. (Ottawa)**
Client PO:

Project Description: OTEN00020038C

	Client ID:	S9	S10	S70	-
	Sample Date:	03-Nov-09	03-Nov-09	03-Nov-09	-
	Sample ID:	0945145-09	0945145-10	0945145-11	-
	MDL/Units	Soil	Soil	Soil	-
Indeno[1,2,3-cd]pyrene	0.02 ug/g dry	0.03	<0.02	0.06	-
1-Methylnaphthalene	0.02 ug/g dry	<0.02	<0.02	<0.02	-
2-Methylnaphthalene	0.02 ug/g dry	<0.02	<0.02	<0.02	-
Naphthalene	0.02 ug/g dry	<0.02	<0.02	<0.02	-
Phenanthrene	0.02 ug/g dry	0.06	<0.02	0.10	-
Pyrene	0.02 ug/g dry	0.11	0.02	0.18	-
2-Fluorobiphenyl	Surrogate	104%	89.2%	107%	-
Terphenyl-d14	Surrogate	107%	91.2%	108%	-

Certificate of Analysis

Report Date: 10-Nov-2009
Order Date:3-Nov-2009

Client: **Trow Associates Inc. (Ottawa)**
Client PO:

Project Description: OTEN00020038C

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Metals									
Antimony	1.0	1	ug/g						
Arsenic	ND	1	ug/g						
Barium	ND	10	ug/g						
Beryllium	ND	0.5	ug/g						
Cadmium	ND	0.5	ug/g						
Chromium	ND	5	ug/g						
Cobalt	ND	1	ug/g						
Copper	ND	5	ug/g						
Lead	ND	1	ug/g						
Molybdenum	ND	1	ug/g						
Nickel	ND	5	ug/g						
Selenium	ND	1	ug/g						
Silver	ND	0.3	ug/g						
Thallium	ND	1	ug/g						
Vanadium	ND	10	ug/g						
Zinc	ND	20	ug/g						
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g						
Acenaphthylene	ND	0.02	ug/g						
Anthracene	ND	0.02	ug/g						
Benzo[a]anthracene	ND	0.02	ug/g						
Benzo[a]pyrene	ND	0.02	ug/g						
Benzo[b]fluoranthene	ND	0.02	ug/g						
Benzo[g,h,i]perylene	ND	0.02	ug/g						
Benzo[k]fluoranthene	ND	0.02	ug/g						
Biphenyl	ND	0.02	ug/g						
Chrysene	ND	0.02	ug/g						
Dibenzo[a,h]anthracene	ND	0.02	ug/g						
Fluoranthene	ND	0.02	ug/g						
Fluorene	ND	0.02	ug/g						
Indeno[1,2,3-cd]pyrene	ND	0.02	ug/g						
1-Methylnaphthalene	ND	0.02	ug/g						
2-Methylnaphthalene	ND	0.02	ug/g						
Naphthalene	ND	0.02	ug/g						
Phenanthrene	ND	0.02	ug/g						
Pyrene	ND	0.02	ug/g						
Surrogate: 2-Fluorobiphenyl	*1.57*	*0.01*	*ug/g*		*117*	*32-156*			
Surrogate: Terphenyl-d14	*1.47*	*0.01*	*ug/g*		*111*	*39-146*			

Certificate of Analysis

Report Date: 10-Nov-2009
Order Date:3-Nov-2009

Client: **Trow Associates Inc. (Ottawa)**
Client PO:

Project Description: OTEN00020038C

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Metals									
Antimony	ND	1	ug/g dry	1.1			200.0	26	
Arsenic	1.7	1	ug/g dry	1.8			6.7	35	
Barium	37.3	10	ug/g dry	38.0			1.9	34	
Beryllium	ND	0.5	ug/g dry	ND				25	
Cadmium	0.56	0.5	ug/g dry	0.65			15.3	33	
Chromium	7.1	5	ug/g dry	6.9			2.2	32	
Cobalt	2.0	1	ug/g dry	2.0			1.6	32	
Copper	19.6	5	ug/g dry	20.9			6.7	32	
Lead	16.9	1	ug/g dry	15.8			6.8	44	
Molybdenum	1.1	1	ug/g dry	1.2			11.6	29	
Nickel	5.7	5	ug/g dry	5.9			4.2	29	
Selenium	ND	1	ug/g dry	ND				28	
Silver	ND	0.3	ug/g dry	ND				28	
Thallium	ND	1	ug/g dry	ND				27	
Vanadium	ND	10	ug/g dry	ND				27	
Zinc	361	20	ug/g dry	333			8.1	27	
Physical Characteristics									
% Solids	40.4	0.1	% by Wt.	40.5			0.2	25	
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g dry	ND				50	
Acenaphthylene	ND	0.02	ug/g dry	ND				50	
Anthracene	ND	0.02	ug/g dry	ND				50	
Benzo[a]anthracene	ND	0.02	ug/g dry	ND				50	
Benzo[a]pyrene	ND	0.02	ug/g dry	ND				50	
Benzo[b]fluoranthene	ND	0.02	ug/g dry	ND				50	
Benzo[g,h,i]perylene	ND	0.02	ug/g dry	ND				50	
Benzo[k]fluoranthene	ND	0.02	ug/g dry	ND				50	
Biphenyl	ND	0.02	ug/g dry	ND				50	
Chrysene	ND	0.02	ug/g dry	ND				50	
Dibenzo[a,h]anthracene	ND	0.02	ug/g dry	ND				50	
Fluoranthene	ND	0.02	ug/g dry	ND				50	
Fluorene	ND	0.02	ug/g dry	ND				50	
Indeno[1,2,3-cd]pyrene	ND	0.02	ug/g dry	ND				50	
1-Methylnaphthalene	ND	0.02	ug/g dry	ND				50	
2-Methylnaphthalene	ND	0.02	ug/g dry	ND				50	
Naphthalene	ND	0.02	ug/g dry	ND				50	
Phenanthrene	ND	0.02	ug/g dry	ND				50	
Pyrene	ND	0.02	ug/g dry	ND				50	
Surrogate: 2-Fluorobiphenyl	*0.943*	*0.01*	*ug/g dry*	*ND*	*66.6*	*32-156*			
Surrogate: Terphenyl-d14	*0.886*	*0.01*	*ug/g dry*	*ND*	*62.5*	*39-146*			

Certificate of Analysis

Report Date: 10-Nov-2009
Order Date:3-Nov-2009

Client: **Trow Associates Inc. (Ottawa)**
Client PO: Project Description: OTEN00020038C

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Semi-Volatiles									
Acenaphthene	0.148	0.02	ug/g	ND	88.5	31-121			
Acenaphthylene	0.141	0.02	ug/g	ND	84.4	26-124			
Anthracene	0.157	0.02	ug/g	ND	94.3	29-128			
Benzo[a]anthracene	0.121	0.02	ug/g	ND	72.8	29-129			
Benzo[a]pyrene	0.155	0.02	ug/g	ND	93.0	29-111			
Benzo[b]fluoranthene	0.128	0.02	ug/g	ND	76.7	26-111			
Benzo[g,h,i]perylene	0.123	0.02	ug/g	ND	73.9	23-128			
Benzo[k]fluoranthene	0.171	0.02	ug/g	ND	103	23-135			
Biphenyl	0.143	0.02	ug/g	ND	85.6	31-107			
Chrysene	0.171	0.02	ug/g	ND	103	28-136			
Dibenzo[a,h]anthracene	0.110	0.02	ug/g	ND	66.2	20-131			
Fluoranthene	0.163	0.02	ug/g	ND	97.6	24-131			
Fluorene	0.180	0.02	ug/g	ND	108	28-123			
Indeno[1,2,3-cd]pyrene	0.114	0.02	ug/g	ND	68.7	20-128			
1-Methylnaphthalene	0.156	0.02	ug/g	ND	93.6	24-127			
2-Methylnaphthalene	0.101	0.02	ug/g	ND	60.3	21-127			
Naphthalene	0.120	0.02	ug/g	ND	71.7	29-118			
Phenanthrene	0.123	0.02	ug/g	ND	73.9	34-108			
Pyrene	0.163	0.02	ug/g	ND	98.1	29-131			
Surrogate: 2-Fluorobiphenyl	*1.46*	0.01	*ug/g*		*110*	*32-156*			
Surrogate: Terphenyl-d14	*1.41*	0.01	*ug/g*		*105*	*39-146*			

Certificate of Analysis

Report Date: 10-Nov-2009
Order Date:3-Nov-2009

Client: **Trow Associates Inc. (Ottawa)**
Client PO: Project Description: OTEN00020038C

Sample Data Revisions

None

Work Order Revisions/Comments:

None

Other Report Notes:

n/a: not applicable
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.
Soil results are reported on a dry weight basis when the units are denoted with 'dry'.
Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.

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Chain of Custody Record

Nº 68764

Pg. 1 of 2

Company Name: Trow
Contact Name: Mark McCalla/Kristin Leonard
Address:
Tel: Cell:
Email:

Project Ref: OTENCC02C0385
PO#:
Quote #: ☐Not Quoted
Preservative to be added by Paracel? ☐Yes ☐No

Date Required:
Turn Around Time: 1 Day / 2 Day / X Regular
Regulation/Guideline Requirements:

Matrix Types: S-Soil/Sed GW-Ground Water SW-Surface Water SS-Storm/Sanitary Sewer A-Air O-Other RDW-Regulated Drinking Water

Paracel Order #: 0945145

	Sample Identification	Matrix	Air Volume	# Containers	Date Sampled dd/mm/yy	PAH	Metals												Hazardous? (Y/N)
1	S1	S		1	Nov 3/09	X	X								280				
2	S2	↓		↓	↓	↓	↓												
3	S3																		
4	S4																		
5	S5																		
6	S6																		
7	S7																		
8	S8																		
9	S9																		
10	S10																		

Comments: LH for regulation guideline
[illegible] report to [illegible] Kristin

Relinquished By: [signature]	Received at Depot:	Received at Lab: [illegible]	Verified By: [illegible]
Date: Nov 3/09 Time: 3:50	Date: Time:	Date: Nov 3/09 Time: 15:57	Date: Nov 5/09 Time: 11:35

Please refer to the back page for Locations and Sample Preservation, Container and Hold Time Requirements.

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Chain of Custody Record

Nº 68763

Pg 2 of 2

Company Name: Trow
Contact Name: Mark McColla/Kristina [illegible]
Address:
Tel: Cell:
Email:

Project Ref: OTE [illegible]385
PO#:
Quote #: ☐Not Quoted
Preservative to be added by Paracel? ☐Yes ☐No

Date Required:
Turn Around Time: [ ] 1 day [ ] 2 day [ ] 3 day [X] Regular
Regulatory Guideline Requirements:

Matrix Types: S-Soil/Sed GW-Ground Water SW-Surface Water SS-Storm/Sanitary Sewer A-Air O-Other RDW-Regulated Drinking Water

Paracel Order #: 0945145

	Sample Identification	Matrix	Air Volume	# Containers	Date Sampled dd/mm/yy	PAH	Metals													Hazardous? (Y/N)
1	S-7-C	S		1	Ca 3/09	+	+								250					
2																				
3																				
4																				
5																				
6																				
7																				
8																				
9																				
10																				

Comments: [illegible] Kristina [illegible]

Relinquished By: [signature]	Received at Depot:	Received at Lab: [illegible]	Verified By: [illegible]
Date: Nov 5/09 Time: 3:50	Date: Time:	Date: Nov 3/09 Time: 15:51	Date: Nov 5/09 Time: 11:35

Please refer to the back page for Locations and Sample Preservation, Container and Hold Time Requirements.

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Certificate of Analysis

Trow Associates Inc. (Ottawa)
154 Colonnade Rd. S
Ottawa, ON K2E 7J5
Attn: Mark McCalla

Phone: (613) 225-9940
Fax: (613) 225-7337

Client PO:
Project: OTEN00020038S
Custody: 54717

Report Date: 17-Nov-2009
Order Date: 11-Nov-2009
Order #: 0946156

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
0946156-01	S1
0946156-02	S2
0946156-03	S3
0946156-04	S4
0946156-05	S5
0946156-06	S6
0946156-07	S7
0946156-08	S8
0946156-09	S9
0946156-10	S10
0946156-11	S70

Approved By: Mark Foto

Mark Foto, M.Sc. For Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Report Date: 17-Nov-2009
Order Date:11-Nov-2009

Client: **Trow Associates Inc. (Ottawa)**
Client PO: Project Description: OTEN00020038S

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Chromium, hexavalent	MOE E3056 - Extraction, colourimetric	12-Nov-09	16-Nov-09
Mercury	EPA 7471A - CVAA, digestion	16-Nov-09	16-Nov-09
Solids, %	Gravimetric, calculation	13-Nov-09	13-Nov-09

PARACEL LABORATORIES LTD.

Order #: 0946156

Certificate of Analysis

Report Date: 17-Nov-2009
Order Date:11-Nov-2009

Client: **Trow Associates Inc. (Ottawa)**

Client PO: Project Description: OTEN00020038S

	Client ID:	S1	S2	S3	S4
	Sample Date:	03-Nov-09	03-Nov-09	03-Nov-09	03-Nov-09
	Sample ID:	0946156-01	0946156-02	0946156-03	0946156-04
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	80.1	84.9	74.1	76.7
Metals					
Chromium (VI)	0.4 ug/g dry	<0.4	<0.4	<0.4	<0.4
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	<0.1

	Client ID:	S5	S6	S7	S8
	Sample Date:	03-Nov-09	03-Nov-09	03-Nov-09	03-Nov-09
	Sample ID:	0946156-05	0946156-06	0946156-07	0946156-08
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	81.0	85.0	81.6	88.6
Metals					
Chromium (VI)	0.4 ug/g dry	<0.4	<0.4	<0.4	<0.4
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	<0.1

	Client ID:	S9	S10	S70	-
	Sample Date:	03-Nov-09	03-Nov-09	03-Nov-09	-
	Sample ID:	0946156-09	0946156-10	0946156-11	-
	MDL/Units	Soil	Soil	Soil	-
Physical Characteristics					
% Solids	0.1 % by Wt.	87.2	85.1	82.1	-
Metals					
Chromium (VI)	0.4 ug/g dry	<0.4	<0.4	<0.4	-
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	-

Certificate of Analysis

Report Date: 17-Nov-2009
Order Date:11-Nov-2009

Client: **Trow Associates Inc. (Ottawa)**

Client PO: Project Description: OTEN00020038S

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Metals									
Chromium (VI)	ND	0.4	ug/g						
Mercury	ND	0.1	ug/g						

Certificate of Analysis

Report Date: 17-Nov-2009
Order Date:11-Nov-2009

Client: **Trow Associates Inc. (Ottawa)**
Client PO: Project Description: OTEN00020038S

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Metals									
Chromium (VI)	ND	0.4	ug/g dry	ND				35	
Mercury	1.10	0.1	ug/g dry	1.22			10.3	35	
Physical Characteristics									
% Solids	83.7	0.1	% by Wt.	80.7			3.7	25	

Certificate of Analysis

Report Date: 17-Nov-2009
Order Date:11-Nov-2009

Client: **Trow Associates Inc. (Ottawa)**
Client PO:

Project Description: OTEN00020038S

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Metals									
Chromium (VI)	5.2	0.4	ug/g	ND	104	89-123			
Mercury	1.48	0.1	ug/g	ND	98.5	72-128			

Certificate of Analysis

Report Date: 17-Nov-2009
Order Date:11-Nov-2009

Client: **Trow Associates Inc. (Ottawa)**
Client PO: Project Description: OTEN00020038S

Sample Data Revisions

None

Work Order Revisions/Comments:

None

Other Report Notes:

n/a: not applicable
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.
Soil results are reported on a dry weight basis when the units are denoted with 'dry'.
Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.

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Chain of Custody Record

Nº 68764

Pg 1 of 2

Company Name: T...	Project Ref: OTE00022003835
Contact Name: Mark McCalla/Kristina Lewand...	PO:
Address:	Quote #: ☐Not Quoted
Tel: Cell:	
Email:	Preservative to be added by Paracel? ☐Yes ☐No

Matrix Types: S-Soil/Sed GW-Ground Water SW-Surface Water SS-Storm/Sanitary Sewer A-Air O-Other RDW-Regulated Drinking Water

Sample Information / **Analysis Required**

Paracel Order: 0946156 / 0945145 — Vince Nov 12/09 12:06

#	Sample Identification	Matrix	Air Volume	# Containers	Date Sampled dd/mm/yy	Metals	PAH
1	S1	S		1	Nov 3/09	X	X
2	S2	↓		↓	↓	↓	↓
3	S3						
4	S4						
5	S5						
6	S6						
7	S7						
8	S8						
9	S9						
10	S10	↓		↓	↓	↓	↓

Comments: Analyze for Cr6 & Hg as per Kristina

LH with Mark for TAT Nov 12/09

Relinquished by: Nov 3/09 3:56 | Received by Driver: | Received at Lab: Nov 3/09 13:52 | Verified by: Nov 3/09 14:55

Please refer to the back page for Locations and Sample Preservation, Container and Hold Time Requirement.

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Chain of Custody Record

Nº 68763

Pg 2 of 2

Company Name: [illegible]
Contact Name: [illegible]
Address:
Tel: Cell:
Email:

Project Ref: [illegible]
PO:
Quote #: ☐ Not Quoted

Preservative to be added by Paracel? ☐ Yes ☐ No

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) A (Air) O (Other) RDW (Regulated Drinking Water)

0941615[illegible] [illegible]
0945145 Nov 12/09 12:06

	Sample Identification	Matrix	Air Volume	# Containers	Date Sampled	PAH	Metals												
1	S 7 C	S		1	Nov 3/09	+	+								250				
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			

Comments: [illegible]

Relinquished By	Received at Lab	Received By	Verified By
Nov 5/09 3:20	Date: Time:	Nov 5/09	Nov 5/09 11:35

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Certificate of Analysis

SNC-Lavalin Inc. (Ottawa)
20 Colonnade Road Suite 110
Ottawa, ON K2E 7M6
Attn: Melanie Siewert

Phone: (613) 226-2456
Fax: (613) 226-5529

Client PO: NCC Burnside
Project: 12-316
Custody: 4877

Report Date: 14-Nov-2012
Order Date: 8-Nov-2012
Order #: 1245252

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1245252-01	MW-1
1245252-02	MW-2
1245252-03	MW-3
1245252-04	MW-4
1245252-05	MW-5
1245252-06	CH2M MW-1
1245252-07	MW-99
1245252-08	Field Blank
1245252-09	Trip Blank

Approved By:

Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Report Date: 14-Nov-2012

Client: **SNC-Lavalin Inc. (Ottawa)**

Order Date:8-Nov-2012

Client PO: NCC Burnside

Project Description: 12-316

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
CCME PHC F1	CWS Tier 1 - P&T GC-FID	9-Nov-12	10-Nov-12
CCME PHC F2 - F4	CWS Tier 1 - GC-FID, extraction	9-Nov-12	9-Nov-12
Chromium, hexavalent	MOE E3056 - colourimetric	9-Nov-12	9-Nov-12
Mercury	EPA 245.1 - Cold Vapour AA	9-Nov-12	9-Nov-12
Metals, low level	EPA 200.8 - ICP-MS	9-Nov-12	9-Nov-12
PAHs by GC-MS, standard scan	EPA 625 - GC-MS, extraction	9-Nov-12	10-Nov-12
VOCs	EPA 624 - P&T GC-MS	9-Nov-12	10-Nov-12

PARACEL LABORATORIES LTD

Order #: 1245252

Certificate of Analysis

Report Date: 14-Nov-2012
Order Date:8-Nov-2012

Client: **SNC-Lavalin Inc. (Ottawa)**

Client PO: NCC Burnside

Project Description: 12-316

	Client ID:	MW-1	MW-2	MW-3	MW-4
	Sample Date:	07-Nov-12	07-Nov-12	07-Nov-12	07-Nov-12
	Sample ID:	1245252-01	1245252-02	1245252-03	1245252-04
	MDL/Units	Water	Water	Water	Water
Metals					
Mercury	0.1 ug/L	<0.1	<0.1	<0.1	<0.1
Antimony	0.5 ug/L	<0.5	<0.5	1.7	25.6
Arsenic	1 ug/L	<1	<1	5	<1
Barium	1 ug/L	456	384	118	124
Beryllium	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Boron	10 ug/L	219	221	174	66
Cadmium	0.1 ug/L	<0.1	<0.1	<0.1	<0.1
Chromium	1 ug/L	5	5	<1	<1
Chromium (VI)	10 ug/L	<10	<10	<10	<10
Cobalt	0.5 ug/L	<0.5	<0.5	<0.5	0.6
Copper	0.5 ug/L	<0.5	<0.5	<0.5	0.7
Lead	0.1 ug/L	<0.1	<0.1	<0.1	<0.1
Molybdenum	0.5 ug/L	0.5	<0.5	2.4	1.3
Nickel	1 ug/L	5	3	4	6
Selenium	1 ug/L	<1	<1	<1	3
Silver	0.1 ug/L	<0.1	<0.1	<0.1	<0.1
Sodium	200 ug/L	281000	247000	48400	39400
Thallium	0.1 ug/L	<0.1	<0.1	<0.1	<0.1
Uranium	0.1 ug/L	0.9	<0.1	8.3	1.8
Vanadium	0.5 ug/L	6.5	5.5	3.7	7.8
Zinc	5 ug/L	<5	<5	<5	<5
Volatiles					
Acetone	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Benzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Bromoform	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Bromomethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	0.2 ug/L	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Chloroethane	1.0 ug/L	<1.0	<1.0	<1.0	<1.0
Chloroform	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Chloromethane	3.0 ug/L	<3.0	<3.0	<3.0	<3.0
Dibromochloromethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5

PARACEL LABORATORIES LTD.

Order #: 1245252

Certificate of Analysis

Report Date: 14-Nov-2012
Order Date:8-Nov-2012

Client: **SNC-Lavalin Inc. (Ottawa)**

Client PO: NCC Burnside

Project Description: 12-316

	Client ID:	MW-1	MW-2	MW-3	MW-4
	Sample Date:	07-Nov-12	07-Nov-12	07-Nov-12	07-Nov-12
	Sample ID:	1245252-01	1245252-02	1245252-03	1245252-04
	MDL/Units	Water	Water	Water	Water
Dichlorodifluoromethane	1.0 ug/L	<1.0	<1.0	<1.0	<1.0
1,2-Dibromoethane	0.2 ug/L	<0.2	<0.2	<0.2	<0.2
1,2-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
cis-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
trans-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethylene, total	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
cis-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
trans-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene, total	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Hexane	1.0 ug/L	<1.0	<1.0	<1.0	<1.0
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Methyl Butyl Ketone (2-Hexanone)	10.0 ug/L	<10.0	<10.0	<10.0	<10.0
Methyl Isobutyl Ketone	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Methyl tert-butyl ether	2.0 ug/L	<2.0	<2.0	<2.0	<2.0
Methylene Chloride	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Styrene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Toluene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,2,4-Trichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	1.0 ug/L	<1.0	<1.0	<1.0	<1.0
1,3,5-Trimethylbenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Vinyl chloride	0.5 ug/L	<0.5	<0.5	<0.5	<0.5

Certificate of Analysis

Report Date: 14-Nov-2012
Order Date:8-Nov-2012

Client: **SNC-Lavalin Inc. (Ottawa)**
Client PO: NCC Burnside
Project Description: 12-316

	Client ID:	MW-1	MW-2	MW-3	MW-4
	Sample Date:	07-Nov-12	07-Nov-12	07-Nov-12	07-Nov-12
	Sample ID:	1245252-01	1245252-02	1245252-03	1245252-04
	MDL/Units	Water	Water	Water	Water
m,p-Xylenes	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
o-Xylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Xylenes, total	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
4-Bromofluorobenzene	Surrogate	101%	104%	101%	103%
Dibromofluoromethane	Surrogate	100%	100%	103%	101%
Toluene-d8	Surrogate	98.7%	98.4%	97.9%	97.8%
Hydrocarbons					
F1 PHCs (C6-C10)	25 ug/L	<25	<25	<25	<25
F2 PHCs (C10-C16)	100 ug/L	<100	<100	<100	<100
F3 PHCs (C16-C34)	100 ug/L	<100	<100	<100	<100
F4 PHCs (C34-C50)	100 ug/L	<100	<100	<100	<100
Semi-Volatiles					
Acenaphthene	0.05 ug/L	0.16	0.31	<0.05	<0.05
Acenaphthylene	0.05 ug/L	0.19	0.08	<0.05	<0.05
Anthracene	0.01 ug/L	0.04	0.08	<0.01	<0.01
Benzo [a] anthracene	0.01 ug/L	0.17	0.17	<0.01	<0.01
Benzo [a] pyrene	0.01 ug/L	0.12	0.11	<0.01	<0.01
Benzo [b] fluoranthene	0.05 ug/L	0.11	0.10	<0.05	<0.05
Benzo [g,h,i] perylene	0.05 ug/L	0.10	0.09	<0.05	<0.05
Benzo [k] fluoranthene	0.05 ug/L	0.06	0.05	<0.05	<0.05
Biphenyl	0.05 ug/L	<0.05	<0.05	0.16	<0.05
Chrysene	0.05 ug/L	0.15	0.15	<0.05	<0.05
Dibenzo [a,h] anthracene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
Fluoranthene	0.01 ug/L	0.29	0.37	<0.01	<0.01
Fluorene	0.05 ug/L	0.06	<0.05	<0.05	<0.05
Indeno [1,2,3-cd] pyrene	0.05 ug/L	0.07	0.07	<0.05	<0.05
1-Methylnaphthalene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
2-Methylnaphthalene	0.05 ug/L	0.06	<0.05	0.06	<0.05
Methylnaphthalene (1&2)	0.10 ug/L	<0.10	<0.10	<0.10	<0.10
Naphthalene	0.05 ug/L	0.20	0.13	0.23	<0.05
Phenanthrene	0.05 ug/L	0.15	0.15	0.08	<0.05
Pyrene	0.01 ug/L	0.32	0.39	<0.01	<0.01
2-Fluorobiphenyl	Surrogate	64.7%	68.5%	63.4%	65.6%
Terphenyl-d14	Surrogate	52.4%	63.1%	68.7%	77.4%

PARACEL LABORATORIES LTD

Order #: 1245252

Certificate of Analysis

Report Date: 14-Nov-2012
Order Date:8-Nov-2012

Client: **SNC-Lavalin Inc. (Ottawa)**

Client PO: NCC Burnside

Project Description: 12-316

	Client ID:	MW-5	CH2M MW-1	MW-99	Field Blank
	Sample Date:	07-Nov-12	07-Nov-12	07-Nov-12	08-Nov-12
	Sample ID:	1245252-05	1245252-06	1245252-07	1245252-08
	MDL/Units	Water	Water	Water	Water
Metals					
Mercury	0.1 ug/L	<0.1	<0.1	<0.1	<0.1
Antimony	0.5 ug/L	0.6	0.6	<0.5	<0.5
Arsenic	1 ug/L	<1	<1	<1	<1
Barium	1 ug/L	160	43	385	<1
Beryllium	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Boron	10 ug/L	112	58	142	<10
Cadmium	0.1 ug/L	<0.1	<0.1	<0.1	<0.1
Chromium	1 ug/L	14	<1	6	<1
Chromium (VI)	10 ug/L	<10	<10	<10	<10
Cobalt	0.5 ug/L	1.7	4.2	<0.5	<0.5
Copper	0.5 ug/L	3.9	<0.5	0.6	<0.5
Lead	0.1 ug/L	<0.1	<0.1	<0.1	<0.1
Molybdenum	0.5 ug/L	1.3	3.3	0.6	<0.5
Nickel	1 ug/L	8	6	5	<1
Selenium	1 ug/L	<1	<1	<1	<1
Silver	0.1 ug/L	<0.1	<0.1	<0.1	<0.1
Sodium	200 ug/L	1080000	53900	278000	381
Thallium	0.1 ug/L	<0.1	<0.1	<0.1	<0.1
Uranium	0.1 ug/L	1.8	1.9	0.8	<0.1
Vanadium	0.5 ug/L	3.4	2.9	8.1	<0.5
Zinc	5 ug/L	<5	5	<5	<5
Volatiles					
Acetone	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Benzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Bromoform	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Bromomethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	0.2 ug/L	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Chloroethane	1.0 ug/L	<1.0	<1.0	<1.0	<1.0
Chloroform	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Chloromethane	3.0 ug/L	<3.0	<3.0	<3.0	<3.0
Dibromochloromethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5

PARACEL LABORATORIES LTD.

Order #: 1245252

Certificate of Analysis

Report Date: 14-Nov-2012
Order Date:8-Nov-2012

Client: **SNC-Lavalin Inc. (Ottawa)**

Client PO: NCC Burnside

Project Description: 12-316

	Client ID:	MW-5	CH2M MW-1	MW-99	Field Blank
	Sample Date:	07-Nov-12	07-Nov-12	07-Nov-12	08-Nov-12
	Sample ID:	1245252-05	1245252-06	1245252-07	1245252-08
	MDL/Units	Water	Water	Water	Water
Dichlorodifluoromethane	1.0 ug/L	<1.0	<1.0	<1.0	<1.0
1,2-Dibromoethane	0.2 ug/L	<0.2	<0.2	<0.2	<0.2
1,2-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
cis-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
trans-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethylene, total	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
cis-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
trans-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene, total	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Hexane	1.0 ug/L	<1.0	<1.0	<1.0	<1.0
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Methyl Butyl Ketone (2-Hexanone	10.0 ug/L	<10.0	<10.0	<10.0	<10.0
Methyl Isobutyl Ketone	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Methyl tert-butyl ether	2.0 ug/L	<2.0	<2.0	<2.0	<2.0
Methylene Chloride	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Styrene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Toluene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,2,4-Trichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	1.0 ug/L	<1.0	<1.0	<1.0	<1.0
1,3,5-Trimethylbenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5

PARACEL LABORATORIES LTD

Order #: 1245252

Certificate of Analysis

Client: **SNC-Lavalin Inc. (Ottawa)**

Client PO: NCC Burnside

Report Date: 14-Nov-2012
Order Date:8-Nov-2012

Project Description: 12-316

	Client ID:	MW-5	CH2M MW-1	MW-99	Field Blank
	Sample Date:	07-Nov-12	07-Nov-12	07-Nov-12	08-Nov-12
	Sample ID:	1245252-05	1245252-06	1245252-07	1245252-08
	MDL/Units	Water	Water	Water	Water
Vinyl chloride	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
m,p-Xylenes	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
o-Xylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Xylenes, total	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
4-Bromofluorobenzene	Surrogate	102%	104%	103%	99.4%
Dibromofluoromethane	Surrogate	104%	101%	104%	108%
Toluene-d8	Surrogate	97.2%	98.2%	96.8%	95.4%
Hydrocarbons					
F1 PHCs (C6-C10)	25 ug/L	<25	<25	<25	<25
F2 PHCs (C10-C16)	100 ug/L	<100	<100	<100	<100
F3 PHCs (C16-C34)	100 ug/L	<100	<100	<100	<100
F4 PHCs (C34-C50)	100 ug/L	<100	<100	<100	<100
Semi-Volatiles					
Acenaphthene	0.05 ug/L	<0.05	<0.05	0.14	<0.05
Acenaphthylene	0.05 ug/L	0.24	0.83	0.56	<0.05
Anthracene	0.01 ug/L	0.04	<0.01	0.15	<0.01
Benzo [a] anthracene	0.01 ug/L	<0.01	<0.01	0.20	<0.01
Benzo [a] pyrene	0.01 ug/L	<0.01	<0.01	0.11	<0.01
Benzo [b] fluoranthene	0.05 ug/L	<0.05	<0.05	0.12	<0.05
Benzo [g,h,i] perylene	0.05 ug/L	<0.05	<0.05	0.07	<0.05
Benzo [k] fluoranthene	0.05 ug/L	<0.05	<0.05	0.12	<0.05
Biphenyl	0.05 ug/L	<0.05	0.07	<0.05	<0.05
Chrysene	0.05 ug/L	<0.05	<0.05	0.25	<0.05
Dibenzo [a,h] anthracene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
Fluoranthene	0.01 ug/L	<0.01	<0.01	0.40	<0.01
Fluorene	0.05 ug/L	<0.05	<0.05	0.07	<0.05
Indeno [1,2,3-cd] pyrene	0.05 ug/L	<0.05	<0.05	0.08	<0.05
1-Methylnaphthalene	0.05 ug/L	0.07	<0.05	0.05	<0.05
2-Methylnaphthalene	0.05 ug/L	0.06	<0.05	0.05	<0.05
Methylnaphthalene (1&2)	0.10 ug/L	0.12	<0.10	0.10	<0.10
Naphthalene	0.05 ug/L	0.20	0.50	0.32	<0.05
Phenanthrene	0.05 ug/L	0.10	0.06	0.24	<0.05
Pyrene	0.01 ug/L	<0.01	<0.01	0.41	<0.01
2-Fluorobiphenyl	Surrogate	77.8%	76.6%	76.6%	72.0%

Certificate of Analysis

Client: **SNC-Lavalin Inc. (Ottawa)**

Client PO: NCC Burnside

Report Date: 14-Nov-2012
Order Date:8-Nov-2012

Project Description: 12-316

	Client ID:	MW-5	CH2M MW-1	MW-99	Field Blank
	Sample Date:	07-Nov-12	07-Nov-12	07-Nov-12	08-Nov-12
	Sample ID:	1245252-05	1245252-06	1245252-07	1245252-08
	MDL/Units	Water	Water	Water	Water
Terphenyl-d14	Surrogate	89.0%	83.6%	84.3%	86.0%

Certificate of Analysis

Client: **SNC-Lavalin Inc. (Ottawa)**

Client PO: NCC Burnside

Report Date: 14-Nov-2012
Order Date:8-Nov-2012

Project Description: 12-316

	Client ID:	Trip Blank	-	-	-
	Sample Date:	08-Nov-12	-	-	-
	Sample ID:	1245252-09	-	-	-
	MDL/Units	Water	-	-	-
Volatiles					
Acetone	5.0 ug/L	<5.0	-	-	-
Benzene	0.5 ug/L	<0.5	-	-	-
Bromodichloromethane	0.5 ug/L	<0.5	-	-	-
Bromoform	0.5 ug/L	<0.5	-	-	-
Bromomethane	0.5 ug/L	<0.5	-	-	-
Carbon Tetrachloride	0.2 ug/L	<0.2	-	-	-
Chlorobenzene	0.5 ug/L	<0.5	-	-	-
Chloroethane	1.0 ug/L	<1.0	-	-	-
Chloroform	0.5 ug/L	<0.5	-	-	-
Chloromethane	3.0 ug/L	<3.0	-	-	-
Dibromochloromethane	0.5 ug/L	<0.5	-	-	-
Dichlorodifluoromethane	1.0 ug/L	<1.0	-	-	-
1,2-Dibromoethane	0.2 ug/L	<0.2	-	-	-
1,2-Dichlorobenzene	0.5 ug/L	<0.5	-	-	-
1,3-Dichlorobenzene	0.5 ug/L	<0.5	-	-	-
1,4-Dichlorobenzene	0.5 ug/L	<0.5	-	-	-
1,1-Dichloroethane	0.5 ug/L	<0.5	-	-	-
1,2-Dichloroethane	0.5 ug/L	<0.5	-	-	-
1,1-Dichloroethylene	0.5 ug/L	<0.5	-	-	-
cis-1,2-Dichloroethylene	0.5 ug/L	<0.5	-	-	-
trans-1,2-Dichloroethylene	0.5 ug/L	<0.5	-	-	-
1,2-Dichloroethylene, total	0.5 ug/L	<0.5	-	-	-
1,2-Dichloropropane	0.5 ug/L	<0.5	-	-	-
cis-1,3-Dichloropropylene	0.5 ug/L	<0.5	-	-	-
trans-1,3-Dichloropropylene	0.5 ug/L	<0.5	-	-	-
1,3-Dichloropropene, total	0.5 ug/L	<0.5	-	-	-
Ethylbenzene	0.5 ug/L	<0.5	-	-	-
Hexane	1.0 ug/L	<1.0	-	-	-
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	<5.0	-	-	-
Methyl Butyl Ketone (2-Hexanone	10.0 ug/L	<10.0	-	-	-
Methyl Isobutyl Ketone	5.0 ug/L	<5.0	-	-	-
Methyl tert-butyl ether	2.0 ug/L	<2.0	-	-	-
Methylene Chloride	5.0 ug/L	<5.0	-	-	-

Certificate of Analysis

Client: **SNC-Lavalin Inc. (Ottawa)**

Client PO: NCC Burnside

Report Date: 14-Nov-2012
Order Date:8-Nov-2012

Project Description: 12-316

	Client ID:	Trip Blank	-	-	-
	Sample Date:	08-Nov-12	-	-	-
	Sample ID:	1245252-09	-	-	-
	MDL/Units	Water	-	-	-
Styrene	0.5 ug/L	<0.5	-	-	-
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	-	-	-
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5	-	-	-
Tetrachloroethylene	0.5 ug/L	<0.5	-	-	-
Toluene	0.5 ug/L	<0.5	-	-	-
1,2,4-Trichlorobenzene	0.5 ug/L	<0.5	-	-	-
1,1,1-Trichloroethane	0.5 ug/L	<0.5	-	-	-
1,1,2-Trichloroethane	0.5 ug/L	<0.5	-	-	-
Trichloroethylene	0.5 ug/L	<0.5	-	-	-
Trichlorofluoromethane	1.0 ug/L	<1.0	-	-	-
1,3,5-Trimethylbenzene	0.5 ug/L	<0.5	-	-	-
Vinyl chloride	0.5 ug/L	<0.5	-	-	-
m,p-Xylenes	0.5 ug/L	<0.5	-	-	-
o-Xylene	0.5 ug/L	<0.5	-	-	-
Xylenes, total	0.5 ug/L	<0.5	-	-	-
4-Bromofluorobenzene	Surrogate	102%	-	-	-
Dibromofluoromethane	Surrogate	105%	-	-	-
Toluene-d8	Surrogate	96.7%	-	-	-

Certificate of Analysis

Client: **SNC-Lavalin Inc. (Ottawa)**

Client PO: NCC Burnside

Project Description: 12-316

Report Date: 14-Nov-2012

Order Date:8-Nov-2012

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L						
F2 PHCs (C10-C16)	ND	100	ug/L						
F3 PHCs (C16-C34)	ND	100	ug/L						
F4 PHCs (C34-C50)	ND	100	ug/L						
Metals									
Mercury	ND	0.1	ug/L						
Antimony	ND	0.5	ug/L						
Arsenic	ND	1	ug/L						
Barium	ND	1	ug/L						
Beryllium	ND	0.5	ug/L						
Boron	ND	10	ug/L						
Cadmium	ND	0.1	ug/L						
Chromium (VI)	ND	10	ug/L						
Chromium	ND	1	ug/L						
Cobalt	ND	0.5	ug/L						
Copper	ND	0.5	ug/L						
Lead	ND	0.1	ug/L						
Molybdenum	ND	0.5	ug/L						
Nickel	ND	1	ug/L						
Selenium	ND	1	ug/L						
Silver	ND	0.1	ug/L						
Sodium	ND	200	ug/L						
Thallium	ND	0.1	ug/L						
Uranium	ND	0.1	ug/L						
Vanadium	ND	0.5	ug/L						
Zinc	ND	5	ug/L						
Semi-Volatiles									
Acenaphthene	ND	0.05	ug/L						
Acenaphthylene	ND	0.05	ug/L						
Anthracene	ND	0.01	ug/L						
Benzo [a] anthracene	ND	0.01	ug/L						
Benzo [a] pyrene	ND	0.01	ug/L						
Benzo [b] fluoranthene	ND	0.05	ug/L						
Benzo [g,h,i] perylene	ND	0.05	ug/L						
Benzo [k] fluoranthene	ND	0.05	ug/L						
Biphenyl	ND	0.05	ug/L						
Chrysene	ND	0.05	ug/L						
Dibenzo [a,h] anthracene	ND	0.05	ug/L						
Fluoranthene	ND	0.01	ug/L						
Fluorene	ND	0.05	ug/L						
Indeno [1,2,3-cd] pyrene	ND	0.05	ug/L						
1-Methylnaphthalene	ND	0.05	ug/L						
2-Methylnaphthalene	ND	0.05	ug/L						
Methylnaphthalene (1&2)	ND	0.10	ug/L						
Naphthalene	ND	0.05	ug/L						
Phenanthrene	ND	0.05	ug/L						
Pyrene	ND	0.01	ug/L						
Surrogate: 2-Fluorobiphenyl	*12.9*		*ug/L*		*64.4*	*50-140*			
Surrogate: Terphenyl-d14	*14.0*		*ug/L*		*69.8*	*50-140*			
Volatiles									
Acetone	ND	5.0	ug/L						
Benzene	ND	0.5	ug/L						
Bromodichloromethane	ND	0.5	ug/L						
Bromoform	ND	0.5	ug/L						
Bromomethane	ND	0.5	ug/L						

Certificate of Analysis

Report Date: 14-Nov-2012
Order Date:8-Nov-2012

Client: **SNC-Lavalin Inc. (Ottawa)**

Client PO: NCC Burnside

Project Description: 12-316

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Carbon Tetrachloride	ND	0.2	ug/L						
Chlorobenzene	ND	0.5	ug/L						
Chloroethane	ND	1.0	ug/L						
Chloroform	ND	0.5	ug/L						
Chloromethane	ND	3.0	ug/L						
Dibromochloromethane	ND	0.5	ug/L						
Dichlorodifluoromethane	ND	1.0	ug/L						
1,2-Dibromoethane	ND	0.2	ug/L						
1,2-Dichlorobenzene	ND	0.5	ug/L						
1,3-Dichlorobenzene	ND	0.5	ug/L						
1,4-Dichlorobenzene	ND	0.5	ug/L						
1,1-Dichloroethane	ND	0.5	ug/L						
1,2-Dichloroethane	ND	0.5	ug/L						
1,1-Dichloroethylene	ND	0.5	ug/L						
cis-1,2-Dichloroethylene	ND	0.5	ug/L						
trans-1,2-Dichloroethylene	ND	0.5	ug/L						
1,2-Dichloroethylene, total	ND	0.5	ug/L						
1,2-Dichloropropane	ND	0.5	ug/L						
cis-1,3-Dichloropropylene	ND	0.5	ug/L						
trans-1,3-Dichloropropylene	ND	0.5	ug/L						
1,3-Dichloropropene, total	ND	0.5	ug/L						
Ethylbenzene	ND	0.5	ug/L						
Hexane	ND	1.0	ug/L						
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L						
Methyl Butyl Ketone (2-Hexanone)	ND	10.0	ug/L						
Methyl Isobutyl Ketone	ND	5.0	ug/L						
Methyl tert-butyl ether	ND	2.0	ug/L						
Methylene Chloride	ND	5.0	ug/L						
Styrene	ND	0.5	ug/L						
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L						
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L						
Tetrachloroethylene	ND	0.5	ug/L						
Toluene	ND	0.5	ug/L						
1,2,4-Trichlorobenzene	ND	0.5	ug/L						
1,1,1-Trichloroethane	ND	0.5	ug/L						
1,1,2-Trichloroethane	ND	0.5	ug/L						
Trichloroethylene	ND	0.5	ug/L						
Trichlorofluoromethane	ND	1.0	ug/L						
1,3,5-Trimethylbenzene	ND	0.5	ug/L						
Vinyl chloride	ND	0.5	ug/L						
m,p-Xylenes	ND	0.5	ug/L						
o-Xylene	ND	0.5	ug/L						
Xylenes, total	ND	0.5	ug/L						
Surrogate: 4-Bromofluorobenzene	*32.5*		*ug/L*		*102*	*50-140*			
Surrogate: Dibromofluoromethane	*29.7*		*ug/L*		*92.8*	*50-140*			
Surrogate: Toluene-d8	*32.1*		*ug/L*		*100*	*50-140*			

Certificate of Analysis

Client: **SNC-Lavalin Inc. (Ottawa)**

Client PO: NCC Burnside

Project Description: 12-316

Report Date: 14-Nov-2012

Order Date:8-Nov-2012

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L	ND				30	
Metals									
Mercury	ND	0.1	ug/L	ND			0.0	20	
Antimony	ND	0.5	ug/L	ND			0.0	20	
Arsenic	2.1	1	ug/L	2.2			6.1	20	
Barium	495	1	ug/L	552			10.8	20	
Beryllium	ND	0.5	ug/L	ND			0.0	20	
Boron	986	100	ug/L	941			4.7	20	
Cadmium	ND	0.1	ug/L	ND			0.0	20	
Chromium (VI)	ND	10	ug/L	ND				13	
Chromium	4.9	1	ug/L	5.3			7.7	20	
Cobalt	1.80	0.5	ug/L	1.76			2.1	20	
Copper	1.45	0.5	ug/L	1.39			4.2	20	
Lead	0.17	0.1	ug/L	0.11			48.2	20	QR-01
Molybdenum	3.37	0.5	ug/L	3.76			10.8	20	
Nickel	12.2	1	ug/L	12.1			1.2	20	
Selenium	2.4	1	ug/L	2.5			7.8	20	
Silver	ND	0.1	ug/L	ND			0.0	20	
Sodium	219000	2000	ug/L	229000			4.5	20	
Thallium	ND	0.1	ug/L	ND			0.0	20	
Uranium	2.7	0.1	ug/L	2.7			2.7	20	
Vanadium	7.01	0.5	ug/L	6.68			4.8	20	
Zinc	8	5	ug/L	ND			0.0	20	
Volatiles									
Acetone	ND	5.0	ug/L	ND				30	
Benzene	ND	0.5	ug/L	ND				30	
Bromodichloromethane	ND	0.5	ug/L	ND				30	
Bromoform	ND	0.5	ug/L	ND				30	
Bromomethane	ND	0.5	ug/L	ND				30	
Carbon Tetrachloride	ND	0.2	ug/L	ND				30	
Chlorobenzene	ND	0.5	ug/L	ND				30	
Chloroethane	ND	1.0	ug/L	ND				30	
Chloroform	ND	0.5	ug/L	ND				30	
Chloromethane	ND	3.0	ug/L	ND				30	
Dibromochloromethane	ND	0.5	ug/L	ND				30	
Dichlorodifluoromethane	ND	1.0	ug/L	ND				30	
1,2-Dibromoethane	ND	0.2	ug/L	ND				30	
1,2-Dichlorobenzene	ND	0.5	ug/L	ND				30	
1,3-Dichlorobenzene	ND	0.5	ug/L	ND				30	
1,4-Dichlorobenzene	ND	0.5	ug/L	ND				30	
1,1-Dichloroethane	ND	0.5	ug/L	ND				30	
1,2-Dichloroethane	ND	0.5	ug/L	ND				30	
1,1-Dichloroethylene	ND	0.5	ug/L	ND				30	
cis-1,2-Dichloroethylene	ND	0.5	ug/L	ND				30	
trans-1,2-Dichloroethylene	ND	0.5	ug/L	ND				30	
1,2-Dichloropropane	ND	0.5	ug/L	ND				30	
cis-1,3-Dichloropropylene	ND	0.5	ug/L	ND				30	
trans-1,3-Dichloropropylene	ND	0.5	ug/L	ND				30	
Ethylbenzene	ND	0.5	ug/L	ND				30	
Hexane	ND	1.0	ug/L	ND				30	
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L	ND				30	
Methyl Butyl Ketone (2-Hexanone)	ND	10.0	ug/L	ND				30	
Methyl Isobutyl Ketone	ND	5.0	ug/L	ND				30	
Methyl tert-butyl ether	ND	2.0	ug/L	ND				30	
Methylene Chloride	ND	5.0	ug/L	ND				30	

Certificate of Analysis

Client: **SNC-Lavalin Inc. (Ottawa)**

Client PO: NCC Burnside

Project Description: 12-316

Report Date: 14-Nov-2012

Order Date:8-Nov-2012

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Styrene	ND	0.5	ug/L	ND				30	
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L	ND				30	
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L	ND				30	
Tetrachloroethylene	ND	0.5	ug/L	ND				30	
Toluene	ND	0.5	ug/L	ND				30	
1,2,4-Trichlorobenzene	ND	0.5	ug/L	ND				30	
1,1,1-Trichloroethane	ND	0.5	ug/L	ND				30	
1,1,2-Trichloroethane	ND	0.5	ug/L	ND				30	
Trichloroethylene	ND	0.5	ug/L	ND				30	
Trichlorofluoromethane	ND	1.0	ug/L	ND				30	
1,3,5-Trimethylbenzene	ND	0.5	ug/L	ND				30	
Vinyl chloride	ND	0.5	ug/L	ND				30	
m,p-Xylenes	ND	0.5	ug/L	ND				30	
o-Xylene	ND	0.5	ug/L	ND				30	
Surrogate: 4-Bromofluorobenzene	*31.7*		*ug/L*	*ND*	*99.1*	*50-140*			
Surrogate: Dibromofluoromethane	*31.2*		*ug/L*	*ND*	*97.5*	*50-140*			
Surrogate: Toluene-d8	*32.4*		*ug/L*	*ND*	*101*	*50-140*			

Certificate of Analysis

Client: **SNC-Lavalin Inc. (Ottawa)**

Client PO: NCC Burnside

Project Description: 12-316

Report Date: 14-Nov-2012

Order Date:8-Nov-2012

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	1970	25	ug/L	ND	98.6	68-117			
F2 PHCs (C10-C16)	1440	100	ug/L	ND	90.0	60-140			
F3 PHCs (C16-C34)	3800	100	ug/L	ND	95.0	60-140			
F4 PHCs (C34-C50)	2720	100	ug/L	ND	113	60-140			
Metals									
Mercury	3.42	0.1	ug/L	ND	114	78-137			
Antimony	48.2		ug/L	0.07	96.3	80-120			
Arsenic	44.9		ug/L	0.2	89.5	80-120			
Barium	44.7		ug/L	0.6	88.1	80-120			
Beryllium	43.8		ug/L	0.02	87.5	80-120			
Boron	42		ug/L	2	80.9	80-120			
Cadmium	44.5		ug/L	ND	89.0	80-120			
Chromium (VI)	166	10	ug/L	ND	83.0	75-120			QM-05
Chromium	44.2		ug/L	0.5	87.3	80-120			
Cobalt	44.1		ug/L	0.003	88.2	80-120			
Copper	44.2		ug/L	ND	88.6	80-120			
Lead	42.8		ug/L	ND	85.8	80-120			
Molybdenum	38.2		ug/L	0.08	76.1	80-120			QS-02
Nickel	44.9		ug/L	0.03	89.8	80-120			
Selenium	45.4		ug/L	0.1	90.7	80-120			
Silver	43.0		ug/L	ND	86.2	80-120			
Sodium	1160		ug/L	381	77.9	80-120			QS-02
Thallium	44.7		ug/L	ND	89.4	80-120			
Uranium	41.7		ug/L	ND	83.4	80-120			
Vanadium	44.1		ug/L	0.10	87.9	80-120			
Zinc	44		ug/L	0.9	85.3	80-120			
Semi-Volatiles									
Acenaphthene	4.57	0.05	ug/L	ND	91.4	50-140			
Acenaphthylene	2.75	0.05	ug/L	ND	55.0	50-140			
Anthracene	5.18	0.01	ug/L	ND	104	50-140			
Benzo [a] anthracene	6.18	0.01	ug/L	ND	124	50-140			
Benzo [a] pyrene	6.02	0.01	ug/L	ND	120	50-140			
Benzo [b] fluoranthene	4.15	0.05	ug/L	ND	83.0	50-140			
Benzo [g,h,i] perylene	6.10	0.05	ug/L	ND	122	50-140			
Benzo [k] fluoranthene	4.07	0.05	ug/L	ND	81.4	50-140			
Biphenyl	5.64	0.05	ug/L	ND	113	50-140			
Chrysene	5.61	0.05	ug/L	ND	112	50-140			
Dibenzo [a,h] anthracene	6.04	0.05	ug/L	ND	121	50-140			
Fluoranthene	5.52	0.01	ug/L	ND	110	50-140			
Fluorene	5.06	0.05	ug/L	ND	101	50-140			
Indeno [1,2,3-cd] pyrene	6.14	0.05	ug/L	ND	123	50-140			
1-Methylnaphthalene	4.15	0.05	ug/L	ND	83.1	50-140			
2-Methylnaphthalene	4.33	0.05	ug/L	ND	86.5	50-140			
Naphthalene	4.04	0.05	ug/L	ND	80.8	50-140			
Phenanthrene	6.25	0.05	ug/L	ND	125	50-140			
Pyrene	6.77	0.01	ug/L	ND	135	50-140			
Surrogate: 2-Fluorobiphenyl	*12.9*		*ug/L*		*64.3*	*50-140*			
Volatiles									

Certificate of Analysis

Report Date: 14-Nov-2012
Order Date:8-Nov-2012

Client: **SNC-Lavalin Inc. (Ottawa)**

Client PO: NCC Burnside

Project Description: 12-316

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Acetone	92.9	5.0	ug/L	ND	92.9	50-140			
Benzene	43.4	0.5	ug/L	ND	109	60-130			
Bromodichloromethane	40.2	0.5	ug/L	ND	101	60-130			
Bromoform	50.4	0.5	ug/L	ND	126	60-130			
Bromomethane	6.66	0.5	ug/L	ND	16.6	50-140			
Carbon Tetrachloride	39.4	0.2	ug/L	ND	98.5	60-130			
Chlorobenzene	40.7	0.5	ug/L	ND	102	60-130			
Chloroethane	36.1	1.0	ug/L	ND	90.2	50-140			
Chloroform	39.2	0.5	ug/L	ND	98.0	60-130			
Chloromethane	25.0	3.0	ug/L	ND	62.4	50-140			
Dibromochloromethane	34.7	0.5	ug/L	ND	86.7	60-130			
Dichlorodifluoromethane	26.6	1.0	ug/L	ND	66.6	50-140			
1,2-Dibromoethane	37.5	0.2	ug/L	ND	93.8	60-130			
1,2-Dichlorobenzene	42.5	0.5	ug/L	ND	106	60-130			
1,3-Dichlorobenzene	30.1	0.5	ug/L	ND	75.2	60-130			
1,4-Dichlorobenzene	41.6	0.5	ug/L	ND	104	60-130			
1,1-Dichloroethane	41.2	0.5	ug/L	ND	103	60-130			
1,2-Dichloroethane	37.1	0.5	ug/L	ND	92.8	60-130			
1,1-Dichloroethylene	42.4	0.5	ug/L	ND	106	60-130			
cis-1,2-Dichloroethylene	44.3	0.5	ug/L	ND	111	60-130			
trans-1,2-Dichloroethylene	44.1	0.5	ug/L	ND	110	60-130			
1,2-Dichloropropane	43.9	0.5	ug/L	ND	110	60-130			
cis-1,3-Dichloropropylene	41.7	0.5	ug/L	ND	104	60-130			
trans-1,3-Dichloropropylene	39.8	0.5	ug/L	ND	99.4	60-130			
Ethylbenzene	43.0	0.5	ug/L	ND	107	60-130			
Hexane	42.8	1.0	ug/L	ND	107	60-130			
Methyl Ethyl Ketone (2-Butanone)	88.0	5.0	ug/L	ND	88.0	50-140			
Methyl Butyl Ketone (2-Hexanone)	134	10.0	ug/L	ND	134	50-140			
Methyl Isobutyl Ketone	83.9	5.0	ug/L	ND	83.9	50-140			
Methyl tert-butyl ether	102	2.0	ug/L	ND	102	50-140			
Methylene Chloride	45.2	5.0	ug/L	ND	113	60-130			
Styrene	46.6	0.5	ug/L	ND	116	60-130			
1,1,1,2-Tetrachloroethane	34.8	0.5	ug/L	ND	86.9	60-130			
1,1,2,2-Tetrachloroethane	49.2	0.5	ug/L	ND	123	60-130			
Tetrachloroethylene	38.0	0.5	ug/L	ND	95.0	60-130			
Toluene	45.2	0.5	ug/L	ND	113	60-130			
1,2,4-Trichlorobenzene	39.6	0.5	ug/L	ND	99.0	60-130			
1,1,1-Trichloroethane	40.3	0.5	ug/L	ND	101	60-130			
1,1,2-Trichloroethane	41.9	0.5	ug/L	ND	105	60-130			
Trichloroethylene	39.3	0.5	ug/L	ND	98.3	60-130			
Trichlorofluoromethane	35.6	1.0	ug/L	ND	89.0	60-130			
1,3,5-Trimethylbenzene	33.9	0.5	ug/L	ND	84.8	60-130			
Vinyl chloride	27.5	0.5	ug/L	ND	68.8	50-140			
m,p-Xylenes	82.6	0.5	ug/L	ND	103	60-130			
o-Xylene	41.8	0.5	ug/L	ND	105	60-130			

Certificate of Analysis

Client: **SNC-Lavalin Inc. (Ottawa)**

Client PO: NCC Burnside

Project Description: 12-316

Report Date: 14-Nov-2012

Order Date:8-Nov-2012

Qualifier Notes:

QC Qualifiers :

QM-05 : The spike recovery was outside acceptance limits for the matrix spike due to matrix interference.

QR-01 : Duplicate RPD is high, however, the sample result is less than 10x the MDL.

QS-02 : Spike level outside of control limits. Analysis batch accepted based on other QC included in the batch.

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.

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Nº 4877

Page 1 of 1

Client Name: SNC-Lavalin Environment	Project Reference: 12-316 (NCC Binnerside)
Contact Name: Melanie Siewert	Quote #
Address: 110 – 20 Colonnade Rd Ottawa Ont K2E 7M6	PO #
Telephone: 613-226-2456	Email Address: melanie.siewert@snclavalin.com

TAT: [N] Regular [ ] 3 Day [ ] 2 Day [ ] 1 Day
Date Required: _____

Criteria: [ ] O. Reg 153/04 Table _ [N] O. Reg 153/11 (Current) Table 3 [ ] RSC Filing [ ] O. Reg 558/00 [ ] PWQO [ ] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality: _____ [N] Other: EMOE

Matrix Type: S (Soil/Sed.) (GW) (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Paracel Order Number: 1245252

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	VOC's	F1-F4 PHC	(incl. F1)	PAHs							
1	MW-1	GW	—	7	Nov 7/12	14:15	✓	✓	✓	✓							✓
2	MW-2	GW	—	7	Nov 7/12	14:30	✓	✓	✓	✓							✓
3	MW-3	GW	—	7	Nov 7/12	15:30	✓	✓	✓	✓							✓
4	MW-4	GW	—	7	Nov 7/12	15:40	✓	✓	✓	✓							✓
5	MW-5	GW	—	7	Nov 7/12	15:05	✓	✓	✓	✓							✓
6	CH2M MW-1	GW	—	7	Nov 7/12	15:15	✓	✓	✓	✓							✓
7	MW-99	GW	—	7	Nov 7/12	14:15	✓	✓	✓	✓							✓
8	Field Blank	W	—	7	Nov 8/12	10.15	✓	✓	✓	✓							✓
9	Trip ~~Blank~~ Blank	W	—	1	Nov 8/12	10.15	✓										✓
10																	

Required Analyses

Comments: - metals (incl. Cr VI & Hg) are field-filtered.

Method of Delivery: Walk-in

Relinquished By (Print & Sign): Emily Vingerhoeds Emily Vingerhoeds	Received by Driver/Depot:	Received at Lab: MC	Verified By: MC
Date/Time: Nov 8/12 11:10 am	Date/Time:	Date/Time: Nov 8/12 11:25	Date/Time: Nov 8/12 12:31
	Temperature: ____ °C	Temperature: 8.1 °C	pH Verified [ ] By: MC

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Your P.O. #: 16300R-20
Your Project #: 122510993
Site Location: BAYVIEW/BURNSIDE
Your C.O.C. #: 489367-02-01

Attention:Chris Bowie

Stantec Consulting Ltd
1331 Clyde Avenue
Suite 400
Ottawa, ON
K2C 3G4

Report Date: 2014/10/27
Report #: R3201080
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B4J4887
Received: 2014/10/17, 17:25

Sample Matrix: Water
Samples Received: 10

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
1,3-Dichloropropene Sum	10	N/A	2014/10/23	CAM SOP-00226	EPA 8260
Chromium (VI) in Water	8	N/A	2014/10/22	CAM SOP-00436	EPA 7199 m
Petroleum Hydro. CCME F1 & BTEX in Water	8	N/A	2014/10/23	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water	8	2014/10/23	2014/10/24	CAM SOP-00316	CCME PHC-CWS m
Mercury (low level)	8	2014/10/23	2014/10/23	CAM SOP-00453	EPA 7470 m
PAH Compounds in Water by GC/MS (SIM)	8	2014/10/20	2014/10/21	CAM SOP-00318	EPA 8270 m
Volatile Organic Compounds in Water	8	N/A	2014/10/22	CAM SOP-00226	EPA 8260 m
Volatile Organic Compounds in Water	2	N/A	2014/10/23	CAM SOP-00226	EPA 8260 m

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act.

The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following the 'Alberta Environment Draft Addenda to the CWS-PHC, Appendix 6, Validation of Alternate Methods'. Documentation is available upon request. Maxxam has made the following improvements to the CWS-PHC reference benchmark method: (i) Headspace for F1; and, (ii) Mechanical extraction for F2-F4. Note: F4G cannot be added to the C6 to C50 hydrocarbons. The extraction date for samples field preserved with methanol for F1 and Volatile Organic Compounds is considered to be the date sampled.

Maxxam Analytics is accredited for all specific parameters as required by Ontario Regulation 153/04. Maxxam Analytics is limited in liability to the actual cost of analysis unless otherwise agreed in writing. There is no other warranty expressed or implied. Samples will be retained at Maxxam Analytics for three weeks from receipt of data or as per contract.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Your P.O. #: 16300R-20
Your Project #: 122510993
Site Location: BAYVIEW/BURNSIDE
Your C.O.C. #: 489367-02-01

Attention:Chris Bowie
Stantec Consulting Ltd
1331 Clyde Avenue
Suite 400
Ottawa, ON
K2C 3G4

Report Date: 2014/10/27
Report #: R3201080
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B4J4887
Received: 2014/10/17, 17:25

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Parnian Baber, Project Manager
Email: pbaber@maxxam.ca
Phone# (905) 817-5700

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B4J4887
Report Date: 2014/10/27

Stantec Consulting Ltd
Client Project #: 122510993
Site Location: BAYVIEW/BURNSIDE
Your P.O. #: 16300R-20
Sampler Initials: AH

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		YB3205	YB3205	YB3206	YB3207	YB3208	YB3209		
Sampling Date		2014/10/17 09:00	2014/10/17 09:00	2014/10/17 09:30	2014/10/17 10:00	2014/10/17 10:30	2014/10/17 13:30		
COC Number		489367-02-01	489367-02-01	489367-02-01	489367-02-01	489367-02-01	489367-02-01		
	Units	MW-1	MW-1 Lab-Dup	MW-2	MW14-54	MW-3	CH2M MW-1	RDL	QC Batch
Metals									
Chromium (VI)	ug/L	ND		ND	ND	ND	ND	0.50	3791658
Mercury (Hg)	ug/L	ND	ND	ND	ND	0.02	ND	0.01	3795649

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
ND = Not detected

Maxxam ID		YB3210	YB3211	YB3212		
Sampling Date		2014/10/17 14:30	2014/10/17 15:30	2014/10/17 16:30		
COC Number		489367-02-01	489367-02-01	489367-02-01		
	Units	CH2M MW-2	MW-5	MW-4	RDL	QC Batch
Metals						
Chromium (VI)	ug/L	ND	ND	ND	0.50	3791658
Mercury (Hg)	ug/L	ND	ND	ND	0.01	3795649

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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Maxxam Job #: B4J4887
Report Date: 2014/10/27

Stantec Consulting Ltd
Client Project #: 122510993
Site Location: BAYVIEW/BURNSIDE
Your P.O. #: 16300R-20
Sampler Initials: AH

SEMI-VOLATILE ORGANICS BY GC-MS (WATER)

Maxxam ID		YB3205	YB3206	YB3206	YB3207	YB3208	YB3209		
Sampling Date		2014/10/17 09:00	2014/10/17 09:30	2014/10/17 09:30	2014/10/17 10:00	2014/10/17 10:30	2014/10/17 13:30		
COC Number		489367-02-01	489367-02-01	489367-02-01	489367-02-01	489367-02-01	489367-02-01		
	Units	MW-1	MW-2	MW-2 Lab-Dup	MW14-54	MW-3	CH2M MW-1	RDL	QC Batch
Polyaromatic Hydrocarbons									
Benzo(e)pyrene	ug/L	0.012	ND	ND	ND	ND	ND	0.010	3791976
Biphenyl	ug/L	ND	ND	ND	ND	ND	ND	0.010	3791976
Perylene	ug/L	ND	ND	ND	ND	ND	ND	0.010	3791976
Acenaphthene	ug/L	0.13	0.28	0.32	0.30	ND	ND	0.010	3791976
Acenaphthylene	ug/L	ND	ND	ND	ND	ND	ND	0.010	3791976
Anthracene	ug/L	ND	0.011	0.014	0.012	ND	ND	0.010	3791976
Benzo(a)anthracene	ug/L	0.017	ND	ND	ND	ND	ND	0.010	3791976
Benzo(a)pyrene	ug/L	0.015	ND	ND	ND	ND	ND	0.010	3791976
Benzo(b/j)fluoranthene	ug/L	0.021	ND	ND	ND	ND	ND	0.010	3791976
Benzo(g,h,i)perylene	ug/L	ND	ND	ND	ND	ND	ND	0.010	3791976
Benzo(k)fluoranthene	ug/L	ND	ND	ND	ND	ND	ND	0.010	3791976
Chrysene	ug/L	0.016	ND	ND	ND	ND	ND	0.010	3791976
Dibenz(a,h)anthracene	ug/L	ND	ND	ND	ND	ND	ND	0.010	3791976
Fluoranthene	ug/L	0.066	0.068	0.066	0.064	ND	ND	0.010	3791976
Fluorene	ug/L	0.023	ND	ND	ND	ND	ND	0.010	3791976
Indeno(1,2,3-cd)pyrene	ug/L	ND	ND	ND	ND	ND	ND	0.010	3791976
1-Methylnaphthalene	ug/L	ND	ND	ND	ND	ND	ND	0.010	3791976
2-Methylnaphthalene	ug/L	ND	ND	ND	ND	ND	ND	0.010	3791976
Naphthalene	ug/L	0.019	ND	ND	ND	ND	ND	0.010	3791976
Phenanthrene	ug/L	0.027	0.014	0.011	ND	ND	ND	0.010	3791976
Pyrene	ug/L	0.047	0.049	0.046	0.045	ND	ND	0.010	3791976
Surrogate Recovery (%)									
D10-Anthracene	%	72	84	83	87	89	83		3791976
D14-Terphenyl (FS)	%	75	88	90	94	95	80		3791976
D8-Acenaphthylene	%	70	83	85	87	88	83		3791976

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
ND = Not detected

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Maxxam Job #: B4J4887
Report Date: 2014/10/27

Stantec Consulting Ltd
Client Project #: 122510993
Site Location: BAYVIEW/BURNSIDE
Your P.O. #: 16300R-20
Sampler Initials: AH

SEMI-VOLATILE ORGANICS BY GC-MS (WATER)

Maxxam ID		YB3210	YB3211	YB3212		
Sampling Date		2014/10/17 14:30	2014/10/17 15:30	2014/10/17 16:30		
COC Number		489367-02-01	489367-02-01	489367-02-01		
	Units	CH2M MW-2	MW-5	MW-4	RDL	QC Batch
Polyaromatic Hydrocarbons						
Benzo(e)pyrene	ug/L	ND	ND	ND	0.010	3791976
Biphenyl	ug/L	ND	ND	ND	0.010	3791976
Perylene	ug/L	ND	ND	ND	0.010	3791976
Acenaphthene	ug/L	ND	ND	ND	0.010	3791976
Acenaphthylene	ug/L	ND	ND	ND	0.010	3791976
Anthracene	ug/L	ND	ND	ND	0.010	3791976
Benzo(a)anthracene	ug/L	ND	ND	ND	0.010	3791976
Benzo(a)pyrene	ug/L	ND	ND	ND	0.010	3791976
Benzo(b/j)fluoranthene	ug/L	ND	ND	ND	0.010	3791976
Benzo(g,h,i)perylene	ug/L	ND	ND	ND	0.010	3791976
Benzo(k)fluoranthene	ug/L	ND	ND	ND	0.010	3791976
Chrysene	ug/L	ND	ND	ND	0.010	3791976
Dibenz(a,h)anthracene	ug/L	ND	ND	ND	0.010	3791976
Fluoranthene	ug/L	ND	ND	ND	0.010	3791976
Fluorene	ug/L	ND	ND	ND	0.010	3791976
Indeno(1,2,3-cd)pyrene	ug/L	ND	ND	ND	0.010	3791976
1-Methylnaphthalene	ug/L	ND	ND	ND	0.010	3791976
2-Methylnaphthalene	ug/L	ND	ND	ND	0.010	3791976
Naphthalene	ug/L	ND	ND	ND	0.010	3791976
Phenanthrene	ug/L	ND	ND	ND	0.010	3791976
Pyrene	ug/L	ND	ND	ND	0.010	3791976
Surrogate Recovery (%)						
D10-Anthracene	%	90	85	85		3791976
D14-Terphenyl (FS)	%	96	92	87		3791976
D8-Acenaphthylene	%	88	84	82		3791976

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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Maxxam Job #: B4J4887
Report Date: 2014/10/27

Stantec Consulting Ltd
Client Project #: 122510993
Site Location: BAYVIEW/BURNSIDE
Your P.O. #: 16300R-20
Sampler Initials: AH

O.REG 153 PETROLEUM HYDROCARBONS (WATER)

Maxxam ID		YB3205	YB3206	YB3207	YB3208	YB3209	YB3210		
Sampling Date		2014/10/17 09:00	2014/10/17 09:30	2014/10/17 10:00	2014/10/17 10:30	2014/10/17 13:30	2014/10/17 14:30		
COC Number		489367-02-01	489367-02-01	489367-02-01	489367-02-01	489367-02-01	489367-02-01		
	Units	MW-1	MW-2	MW14-54	MW-3	CH2M MW-1	CH2M MW-2	RDL	QC Batch
BTEX & F1 Hydrocarbons									
F1 (C6-C10)	ug/L	ND	ND	ND	ND	ND	ND	25	3795796
F1 (C6-C10) - BTEX	ug/L	ND	ND	ND	ND	ND	ND	25	3795796
F2-F4 Hydrocarbons									
F2 (C10-C16 Hydrocarbons)	ug/L	ND	ND	ND	ND	ND	ND	100	3795646
F3 (C16-C34 Hydrocarbons)	ug/L	ND	ND	ND	ND	ND	ND	200	3795646
F4 (C34-C50 Hydrocarbons)	ug/L	ND	ND	ND	ND	ND	ND	200	3795646
Reached Baseline at C50	ug/L	Yes	Yes	Yes	Yes	Yes	Yes		3795646
Surrogate Recovery (%)									
1,4-Difluorobenzene	%	105	102	104	100	103	103		3795796
4-Bromofluorobenzene	%	98	94	97	95	96	94		3795796
D10-Ethylbenzene	%	122	117	124	122	121	120		3795796
D4-1,2-Dichloroethane	%	104	102	105	102	102	100		3795796
o-Terphenyl	%	98	97	97	97	99	98		3795646

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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Maxxam Job #: B4J4887
Report Date: 2014/10/27

Stantec Consulting Ltd
Client Project #: 122510993
Site Location: BAYVIEW/BURNSIDE
Your P.O. #: 16300R-20
Sampler Initials: AH

O.REG 153 PETROLEUM HYDROCARBONS (WATER)

Maxxam ID		YB3211	YB3212		
Sampling Date		2014/10/17 15:30	2014/10/17 16:30		
COC Number		489367-02-01	489367-02-01		
	Units	MW-5	MW-4	RDL	QC Batch
BTEX & F1 Hydrocarbons					
F1 (C6-C10)	ug/L	ND	ND	25	3795796
F1 (C6-C10) - BTEX	ug/L	ND	ND	25	3795796
F2-F4 Hydrocarbons					
F2 (C10-C16 Hydrocarbons)	ug/L	ND	ND	100	3795646
F3 (C16-C34 Hydrocarbons)	ug/L	ND	ND	200	3795646
F4 (C34-C50 Hydrocarbons)	ug/L	ND	ND	200	3795646
Reached Baseline at C50	ug/L	Yes	Yes		3795646
Surrogate Recovery (%)					
1,4-Difluorobenzene	%	105	102		3795796
4-Bromofluorobenzene	%	96	94		3795796
D10-Ethylbenzene	%	123	119		3795796
D4-1,2-Dichloroethane	%	102	101		3795796
o-Terphenyl	%	98	101		3795646

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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Maxxam Job #: B4J4887
Report Date: 2014/10/27

Stantec Consulting Ltd
Client Project #: 122510993
Site Location: BAYVIEW/BURNSIDE
Your P.O. #: 16300R-20
Sampler Initials: AH

O.REG 153 VOLATILE ORGANICS (WATER)

Maxxam ID		YB3203	YB3204	YB3205	YB3206	YB3206		
Sampling Date		2014/10/17	2014/10/17	2014/10/17 09:00	2014/10/17 09:30	2014/10/17 09:30		
COC Number		489367-02-01	489367-02-01	489367-02-01	489367-02-01	489367-02-01		
	Units	TRIP BLANK	FIELD BLANK	MW-1	MW-2	MW-2 Lab-Dup	RDL	QC Batch
Calculated Parameters								
1,3-Dichloropropene (cis+trans)	ug/L	ND	ND	ND	ND		0.28	3791295
Volatile Organics								
Acetone (2-Propanone)	ug/L	ND	ND	ND	ND	ND	10	3792231
Benzene	ug/L	ND	ND	ND	ND	ND	0.10	3792231
Bromodichloromethane	ug/L	ND	ND	ND	ND	ND	0.10	3792231
Bromoform	ug/L	ND	ND	ND	ND	ND	0.20	3792231
Bromomethane	ug/L	ND	ND	ND	ND	ND	0.50	3792231
Carbon Tetrachloride	ug/L	ND	ND	ND	ND	ND	0.10	3792231
Chlorobenzene	ug/L	ND	ND	ND	ND	ND	0.10	3792231
Chloroform	ug/L	ND	ND	ND	ND	ND	0.10	3792231
Dibromochloromethane	ug/L	ND	ND	ND	ND	ND	0.20	3792231
1,2-Dichlorobenzene	ug/L	ND	ND	ND	ND	ND	0.20	3792231
1,3-Dichlorobenzene	ug/L	ND	ND	ND	ND	ND	0.20	3792231
1,4-Dichlorobenzene	ug/L	ND	ND	ND	ND	ND	0.20	3792231
Dichlorodifluoromethane (FREON 12)	ug/L	ND	ND	ND	ND	ND	0.50	3792231
1,1-Dichloroethane	ug/L	ND	ND	ND	ND	ND	0.10	3792231
1,2-Dichloroethane	ug/L	ND	ND	ND	ND	ND	0.20	3792231
1,1-Dichloroethylene	ug/L	ND	ND	ND	ND	ND	0.10	3792231
cis-1,2-Dichloroethylene	ug/L	ND	ND	ND	ND	ND	0.10	3792231
trans-1,2-Dichloroethylene	ug/L	ND	ND	ND	ND	ND	0.10	3792231
1,2-Dichloropropane	ug/L	ND	ND	ND	ND	ND	0.10	3792231
cis-1,3-Dichloropropene	ug/L	ND	ND	ND	ND	ND	0.20	3792231
trans-1,3-Dichloropropene	ug/L	ND	ND	ND	ND	ND	0.20	3792231
Ethylbenzene	ug/L	ND	ND	ND	ND	ND	0.10	3792231
Ethylene Dibromide	ug/L	ND	ND	ND	ND	ND	0.20	3792231
Hexane	ug/L	ND	ND	ND	ND	ND	0.50	3792231
Methylene Chloride(Dichloromethane)	ug/L	ND	ND	ND	ND	ND	0.50	3792231
Methyl Isobutyl Ketone	ug/L	ND	ND	ND	ND	ND	5.0	3792231
Methyl Ethyl Ketone (2-Butanone)	ug/L	ND	ND	ND	ND	ND	5.0	3792231
Methyl t-butyl ether (MTBE)	ug/L	ND	ND	ND	ND	ND	0.20	3792231
Styrene	ug/L	ND	ND	ND	ND	ND	0.20	3792231

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
ND = Not detected

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Maxxam Job #: B4J4887
Report Date: 2014/10/27

Stantec Consulting Ltd
Client Project #: 122510993
Site Location: BAYVIEW/BURNSIDE
Your P.O. #: 16300R-20
Sampler Initials: AH

O.REG 153 VOLATILE ORGANICS (WATER)

Maxxam ID		YB3203	YB3204	YB3205	YB3206	YB3206		
Sampling Date		2014/10/17	2014/10/17	2014/10/17 09:00	2014/10/17 09:30	2014/10/17 09:30		
COC Number		489367-02-01	489367-02-01	489367-02-01	489367-02-01	489367-02-01		
	Units	TRIP BLANK	FIELD BLANK	MW-1	MW-2	MW-2 Lab-Dup	RDL	QC Batch
1,1,1,2-Tetrachloroethane	ug/L	ND	ND	ND	ND	ND	0.20	3792231
1,1,2,2-Tetrachloroethane	ug/L	ND	ND	ND	ND	ND	0.20	3792231
Tetrachloroethylene	ug/L	ND	ND	ND	ND	ND	0.10	3792231
Toluene	ug/L	ND	ND	ND	ND	ND	0.20	3792231
1,1,1-Trichloroethane	ug/L	ND	ND	ND	ND	ND	0.10	3792231
1,1,2-Trichloroethane	ug/L	ND	ND	ND	ND	ND	0.20	3792231
Trichloroethylene	ug/L	ND	ND	ND	ND	ND	0.10	3792231
Vinyl Chloride	ug/L	ND	ND	ND	ND	ND	0.20	3792231
p+m-Xylene	ug/L	ND	ND	ND	ND	ND	0.10	3792231
o-Xylene	ug/L	ND	ND	ND	ND	ND	0.10	3792231
Xylene (Total)	ug/L	ND	ND	ND	ND	ND	0.10	3792231
Trichlorofluoromethane (FREON 11)	ug/L	ND	ND	ND	ND	ND	0.20	3792231
Surrogate Recovery (%)								
4-Bromofluorobenzene	%	95	95	96	97	98		3792231
D4-1,2-Dichloroethane	%	101	101	102	101	103		3792231
D8-Toluene	%	97	99	98	98	98		3792231

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
ND = Not detected

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario. L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B4J4887
Report Date: 2014/10/27

Stantec Consulting Ltd
Client Project #: 122510993
Site Location: BAYVIEW/BURNSIDE
Your P.O. #: 16300R-20
Sampler Initials: AH

O.REG 153 VOLATILE ORGANICS (WATER)

Maxxam ID		YB3207	YB3208	YB3209	YB3210	YB3211		
Sampling Date		2014/10/17 10:00	2014/10/17 10:30	2014/10/17 13:30	2014/10/17 14:30	2014/10/17 15:30		
COC Number		489367-02-01	489367-02-01	489367-02-01	489367-02-01	489367-02-01		
	Units	MW14-54	MW-3	CH2M MW-1	CH2M MW-2	MW-5	RDL	QC Batch
Calculated Parameters								
1,3-Dichloropropene (cis+trans)	ug/L	ND	ND	ND	ND	ND	0.28	3791295
Volatile Organics								
Acetone (2-Propanone)	ug/L	ND	ND	ND	ND	ND	10	3792231
Benzene	ug/L	ND	ND	ND	ND	ND	0.10	3792231
Bromodichloromethane	ug/L	ND	ND	ND	ND	ND	0.10	3792231
Bromoform	ug/L	ND	ND	ND	ND	ND	0.20	3792231
Bromomethane	ug/L	ND	ND	ND	ND	ND	0.50	3792231
Carbon Tetrachloride	ug/L	ND	ND	ND	ND	ND	0.10	3792231
Chlorobenzene	ug/L	ND	ND	ND	ND	ND	0.10	3792231
Chloroform	ug/L	ND	ND	ND	ND	ND	0.10	3792231
Dibromochloromethane	ug/L	ND	ND	ND	ND	ND	0.20	3792231
1,2-Dichlorobenzene	ug/L	ND	ND	ND	ND	ND	0.20	3792231
1,3-Dichlorobenzene	ug/L	ND	ND	ND	ND	ND	0.20	3792231
1,4-Dichlorobenzene	ug/L	ND	ND	ND	ND	ND	0.20	3792231
Dichlorodifluoromethane (FREON 12)	ug/L	ND	ND	ND	ND	ND	0.50	3792231
1,1-Dichloroethane	ug/L	ND	0.59	ND	ND	0.40	0.10	3792231
1,2-Dichloroethane	ug/L	ND	ND	ND	ND	ND	0.20	3792231
1,1-Dichloroethylene	ug/L	ND	ND	ND	ND	ND	0.10	3792231
cis-1,2-Dichloroethylene	ug/L	ND	ND	ND	ND	1.2	0.10	3792231
trans-1,2-Dichloroethylene	ug/L	ND	ND	ND	ND	0.11	0.10	3792231
1,2-Dichloropropane	ug/L	ND	ND	ND	ND	ND	0.10	3792231
cis-1,3-Dichloropropene	ug/L	ND	ND	ND	ND	ND	0.20	3792231
trans-1,3-Dichloropropene	ug/L	ND	ND	ND	ND	ND	0.20	3792231
Ethylbenzene	ug/L	ND	ND	ND	ND	ND	0.10	3792231
Ethylene Dibromide	ug/L	ND	ND	ND	ND	ND	0.20	3792231
Hexane	ug/L	ND	ND	ND	ND	ND	0.50	3792231
Methylene Chloride(Dichloromethane)	ug/L	ND	ND	ND	ND	ND	0.50	3792231
Methyl Isobutyl Ketone	ug/L	ND	ND	ND	ND	ND	5.0	3792231
Methyl Ethyl Ketone (2-Butanone)	ug/L	ND	ND	6.0	ND	ND	5.0	3792231
Methyl t-butyl ether (MTBE)	ug/L	ND	ND	ND	ND	ND	0.20	3792231
Styrene	ug/L	ND	ND	ND	ND	ND	0.20	3792231
1,1,1,2-Tetrachloroethane	ug/L	ND	ND	ND	ND	ND	0.20	3792231

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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Maxxam Job #: B4J4887
Report Date: 2014/10/27

Stantec Consulting Ltd
Client Project #: 122510993
Site Location: BAYVIEW/BURNSIDE
Your P.O. #: 16300R-20
Sampler Initials: AH

O.REG 153 VOLATILE ORGANICS (WATER)

Maxxam ID		YB3207	YB3208	YB3209	YB3210	YB3211		
Sampling Date		2014/10/17 10:00	2014/10/17 10:30	2014/10/17 13:30	2014/10/17 14:30	2014/10/17 15:30		
COC Number		489367-02-01	489367-02-01	489367-02-01	489367-02-01	489367-02-01		
	Units	MW14-54	MW-3	CH2M MW-1	CH2M MW-2	MW-5	RDL	QC Batch
1,1,2,2-Tetrachloroethane	ug/L	ND	ND	ND	ND	ND	0.20	3792231
Tetrachloroethylene	ug/L	ND	ND	ND	ND	ND	0.10	3792231
Toluene	ug/L	ND	ND	ND	ND	ND	0.20	3792231
1,1,1-Trichloroethane	ug/L	ND	ND	ND	ND	ND	0.10	3792231
1,1,2-Trichloroethane	ug/L	ND	ND	ND	ND	ND	0.20	3792231
Trichloroethylene	ug/L	ND	ND	ND	ND	ND	0.10	3792231
Vinyl Chloride	ug/L	ND	ND	ND	ND	ND	0.20	3792231
p+m-Xylene	ug/L	ND	ND	ND	ND	ND	0.10	3792231
o-Xylene	ug/L	ND	ND	ND	ND	ND	0.10	3792231
Xylene (Total)	ug/L	ND	ND	ND	ND	ND	0.10	3792231
Trichlorofluoromethane (FREON 11)	ug/L	ND	ND	ND	ND	ND	0.20	3792231
Surrogate Recovery (%)								
4-Bromofluorobenzene	%	97	95	96	96	96		3792231
D4-1,2-Dichloroethane	%	102	103	102	102	102		3792231
D8-Toluene	%	99	98	98	98	98		3792231

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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Sampler Initials: AH

O.REG 153 VOLATILE ORGANICS (WATER)

Maxxam ID		YB3212		
Sampling Date		2014/10/17 16:30		
COC Number		489367-02-01		
	Units	MW-4	RDL	QC Batch
Calculated Parameters				
1,3-Dichloropropene (cis+trans)	ug/L	ND	0.28	3791295
Volatile Organics				
Acetone (2-Propanone)	ug/L	ND	10	3792231
Benzene	ug/L	ND	0.10	3792231
Bromodichloromethane	ug/L	ND	0.10	3792231
Bromoform	ug/L	ND	0.20	3792231
Bromomethane	ug/L	ND	0.50	3792231
Carbon Tetrachloride	ug/L	ND	0.10	3792231
Chlorobenzene	ug/L	ND	0.10	3792231
Chloroform	ug/L	ND	0.10	3792231
Dibromochloromethane	ug/L	ND	0.20	3792231
1,2-Dichlorobenzene	ug/L	ND	0.20	3792231
1,3-Dichlorobenzene	ug/L	ND	0.20	3792231
1,4-Dichlorobenzene	ug/L	ND	0.20	3792231
Dichlorodifluoromethane (FREON 12)	ug/L	ND	0.50	3792231
1,1-Dichloroethane	ug/L	ND	0.10	3792231
1,2-Dichloroethane	ug/L	ND	0.20	3792231
1,1-Dichloroethylene	ug/L	ND	0.10	3792231
cis-1,2-Dichloroethylene	ug/L	ND	0.10	3792231
trans-1,2-Dichloroethylene	ug/L	ND	0.10	3792231
1,2-Dichloropropane	ug/L	ND	0.10	3792231
cis-1,3-Dichloropropene	ug/L	ND	0.20	3792231
trans-1,3-Dichloropropene	ug/L	ND	0.20	3792231
Ethylbenzene	ug/L	ND	0.10	3792231
Ethylene Dibromide	ug/L	ND	0.20	3792231
Hexane	ug/L	ND	0.50	3792231
Methylene Chloride(Dichloromethane)	ug/L	ND	0.50	3792231
Methyl Isobutyl Ketone	ug/L	ND	5.0	3792231
Methyl Ethyl Ketone (2-Butanone)	ug/L	ND	5.0	3792231
Methyl t-butyl ether (MTBE)	ug/L	ND	0.20	3792231
Styrene	ug/L	ND	0.20	3792231
1,1,1,2-Tetrachloroethane	ug/L	ND	0.20	3792231

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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Maxxam Job #: B4J4887
Report Date: 2014/10/27

Stantec Consulting Ltd
Client Project #: 122510993
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Sampler Initials: AH

O.REG 153 VOLATILE ORGANICS (WATER)

Maxxam ID		YB3212		
Sampling Date		2014/10/17 16:30		
COC Number		489367-02-01		
	Units	MW-4	RDL	QC Batch
1,1,2,2-Tetrachloroethane	ug/L	ND	0.20	3792231
Tetrachloroethylene	ug/L	ND	0.10	3792231
Toluene	ug/L	ND	0.20	3792231
1,1,1-Trichloroethane	ug/L	ND	0.10	3792231
1,1,2-Trichloroethane	ug/L	ND	0.20	3792231
Trichloroethylene	ug/L	ND	0.10	3792231
Vinyl Chloride	ug/L	ND	0.20	3792231
p+m-Xylene	ug/L	ND	0.10	3792231
o-Xylene	ug/L	ND	0.10	3792231
Xylene (Total)	ug/L	ND	0.10	3792231
Trichlorofluoromethane (FREON 11)	ug/L	ND	0.20	3792231
Surrogate Recovery (%)				
4-Bromofluorobenzene	%	95		3792231
D4-1,2-Dichloroethane	%	103		3792231
D8-Toluene	%	99		3792231

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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Sampler Initials: AH

TEST SUMMARY

Maxxam ID: YB3203 **Collected:** 2014/10/17
Sample ID: TRIP BLANK **Shipped:**
Matrix: Water **Received:** 2014/10/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	3791295	N/A	2014/10/23	Automated Statchk
Volatile Organic Compounds in Water	P&T/MS	3792231	N/A	2014/10/22	Sarah Lam

Maxxam ID: YB3204 **Collected:** 2014/10/17
Sample ID: FIELD BLANK **Shipped:**
Matrix: Water **Received:** 2014/10/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	3791295	N/A	2014/10/23	Automated Statchk
Volatile Organic Compounds in Water	P&T/MS	3792231	N/A	2014/10/22	Sarah Lam

Maxxam ID: YB3205 **Collected:** 2014/10/17
Sample ID: MW-1 **Shipped:**
Matrix: Water **Received:** 2014/10/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	3791295	N/A	2014/10/23	Automated Statchk
Chromium (VI) in Water	IC	3791658	N/A	2014/10/22	Lang Le
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	3795796	N/A	2014/10/23	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	3795646	2014/10/23	2014/10/24	Biljana Lazovic
Mercury (low level)	CVAA	3795649	2014/10/23	2014/10/23	Magdalena Carlos
PAH Compounds in Water by GC/MS (SIM)	GC/MS	3791976	2014/10/20	2014/10/21	Lingyun Feng
Volatile Organic Compounds in Water	P&T/MS	3792231	N/A	2014/10/22	Sarah Lam

Maxxam ID: YB3205 Dup **Collected:** 2014/10/17
Sample ID: MW-1 **Shipped:**
Matrix: Water **Received:** 2014/10/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury (low level)	CVAA	3795649	2014/10/23	2014/10/23	Magdalena Carlos

Maxxam ID: YB3206 **Collected:** 2014/10/17
Sample ID: MW-2 **Shipped:**
Matrix: Water **Received:** 2014/10/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	3791295	N/A	2014/10/23	Automated Statchk
Chromium (VI) in Water	IC	3791658	N/A	2014/10/22	Lang Le
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	3795796	N/A	2014/10/23	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	3795646	2014/10/23	2014/10/24	Biljana Lazovic
Mercury (low level)	CVAA	3795649	2014/10/23	2014/10/23	Magdalena Carlos
PAH Compounds in Water by GC/MS (SIM)	GC/MS	3791976	2014/10/20	2014/10/21	Lingyun Feng
Volatile Organic Compounds in Water	P&T/MS	3792231	N/A	2014/10/22	Sarah Lam

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Maxxam Job #: B4J4887
Report Date: 2014/10/27

Stantec Consulting Ltd
Client Project #: 122510993
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Sampler Initials: AH

TEST SUMMARY

Maxxam ID: YB3206 Dup
Sample ID: MW-2
Matrix: Water

Collected: 2014/10/17
Shipped:
Received: 2014/10/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PAH Compounds in Water by GC/MS (SIM)	GC/MS	3791976	2014/10/20	2014/10/21	Lingyun Feng
Volatile Organic Compounds in Water	P&T/MS	3792231	N/A	2014/10/22	Sarah Lam

Maxxam ID: YB3207
Sample ID: MW14-54
Matrix: Water

Collected: 2014/10/17
Shipped:
Received: 2014/10/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	3791295	N/A	2014/10/23	Automated Statchk
Chromium (VI) in Water	IC	3791658	N/A	2014/10/22	Lang Le
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	3795796	N/A	2014/10/23	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	3795646	2014/10/23	2014/10/24	Biljana Lazovic
Mercury (low level)	CVAA	3795649	2014/10/23	2014/10/23	Magdalena Carlos
PAH Compounds in Water by GC/MS (SIM)	GC/MS	3791976	2014/10/20	2014/10/21	Lingyun Feng
Volatile Organic Compounds in Water	P&T/MS	3792231	N/A	2014/10/22	Sarah Lam

Maxxam ID: YB3208
Sample ID: MW-3
Matrix: Water

Collected: 2014/10/17
Shipped:
Received: 2014/10/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	3791295	N/A	2014/10/23	Automated Statchk
Chromium (VI) in Water	IC	3791658	N/A	2014/10/22	Lang Le
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	3795796	N/A	2014/10/23	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	3795646	2014/10/23	2014/10/24	Biljana Lazovic
Mercury (low level)	CVAA	3795649	2014/10/23	2014/10/23	Magdalena Carlos
PAH Compounds in Water by GC/MS (SIM)	GC/MS	3791976	2014/10/20	2014/10/21	Lingyun Feng
Volatile Organic Compounds in Water	P&T/MS	3792231	N/A	2014/10/22	Sarah Lam

Maxxam ID: YB3209
Sample ID: CH2M MW-1
Matrix: Water

Collected: 2014/10/17
Shipped:
Received: 2014/10/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	3791295	N/A	2014/10/23	Automated Statchk
Chromium (VI) in Water	IC	3791658	N/A	2014/10/22	Lang Le
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	3795796	N/A	2014/10/23	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	3795646	2014/10/23	2014/10/24	Biljana Lazovic
Mercury (low level)	CVAA	3795649	2014/10/23	2014/10/23	Magdalena Carlos
PAH Compounds in Water by GC/MS (SIM)	GC/MS	3791976	2014/10/20	2014/10/21	Lingyun Feng
Volatile Organic Compounds in Water	P&T/MS	3792231	N/A	2014/10/22	Sarah Lam

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Maxxam Job #: B4J4887
Report Date: 2014/10/27

Stantec Consulting Ltd
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TEST SUMMARY

Maxxam ID: YB3210
Sample ID: CH2M MW-2
Matrix: Water

Collected: 2014/10/17
Shipped:
Received: 2014/10/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	3791295	N/A	2014/10/23	Automated Statchk
Chromium (VI) in Water	IC	3791658	N/A	2014/10/22	Lang Le
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	3795796	N/A	2014/10/23	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	3795646	2014/10/23	2014/10/24	Biljana Lazovic
Mercury (low level)	CVAA	3795649	2014/10/23	2014/10/23	Magdalena Carlos
PAH Compounds in Water by GC/MS (SIM)	GC/MS	3791976	2014/10/20	2014/10/21	Lingyun Feng
Volatile Organic Compounds in Water	P&T/MS	3792231	N/A	2014/10/22	Sarah Lam

Maxxam ID: YB3211
Sample ID: MW-5
Matrix: Water

Collected: 2014/10/17
Shipped:
Received: 2014/10/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	3791295	N/A	2014/10/23	Automated Statchk
Chromium (VI) in Water	IC	3791658	N/A	2014/10/22	Lang Le
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	3795796	N/A	2014/10/23	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	3795646	2014/10/23	2014/10/24	Biljana Lazovic
Mercury (low level)	CVAA	3795649	2014/10/23	2014/10/23	Magdalena Carlos
PAH Compounds in Water by GC/MS (SIM)	GC/MS	3791976	2014/10/20	2014/10/21	Lingyun Feng
Volatile Organic Compounds in Water	P&T/MS	3792231	N/A	2014/10/23	Sarah Lam

Maxxam ID: YB3212
Sample ID: MW-4
Matrix: Water

Collected: 2014/10/17
Shipped:
Received: 2014/10/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	3791295	N/A	2014/10/23	Automated Statchk
Chromium (VI) in Water	IC	3791658	N/A	2014/10/22	Lang Le
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	3795796	N/A	2014/10/23	Lincoln Ramdahin
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	3795646	2014/10/23	2014/10/24	Biljana Lazovic
Mercury (low level)	CVAA	3795649	2014/10/23	2014/10/23	Magdalena Carlos
PAH Compounds in Water by GC/MS (SIM)	GC/MS	3791976	2014/10/20	2014/10/21	Lingyun Feng
Volatile Organic Compounds in Water	P&T/MS	3792231	N/A	2014/10/23	Sarah Lam

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Maxxam Job #: B4J4887
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Stantec Consulting Ltd
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GENERAL COMMENTS

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

Package 1	12.0°C
Package 2	12.0°C

Results relate only to the items tested.

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Sampler Initials: AH

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
3791658	LLE	Matrix Spike	Chromium (VI)	2014/10/22		92	%	80 - 120
3791658	LLE	Spiked Blank	Chromium (VI)	2014/10/22		92	%	80 - 120
3791658	LLE	Method Blank	Chromium (VI)	2014/10/22	ND , RDL=0.50		ug/L	
3791658	LLE	RPD	Chromium (VI)	2014/10/22	NC		%	20
3791976	LFE	Matrix Spike [YB3205-01]	Benzo(e)pyrene	2014/10/21		105	%	50 - 130
			Biphenyl	2014/10/21		97	%	50 - 130
			D10-Anthracene	2014/10/21		83	%	50 - 130
			D14-Terphenyl (FS)	2014/10/21		90	%	50 - 130
			D8-Acenaphthylene	2014/10/21		84	%	50 - 130
			Perylene	2014/10/21		98	%	50 - 130
			Acenaphthene	2014/10/21		103	%	50 - 130
			Acenaphthylene	2014/10/21		98	%	50 - 130
			Anthracene	2014/10/21		94	%	50 - 130
			Benzo(a)anthracene	2014/10/21		103	%	50 - 130
			Benzo(a)pyrene	2014/10/21		100	%	50 - 130
			Benzo(b/j)fluoranthene	2014/10/21		101	%	50 - 130
			Benzo(g,h,i)perylene	2014/10/21		75	%	50 - 130
			Benzo(k)fluoranthene	2014/10/21		110	%	50 - 130
			Chrysene	2014/10/21		103	%	50 - 130
			Dibenz(a,h)anthracene	2014/10/21		74	%	50 - 130
			Fluoranthene	2014/10/21		105	%	50 - 130
			Fluorene	2014/10/21		100	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2014/10/21		79	%	50 - 130
			1-Methylnaphthalene	2014/10/21		98	%	50 - 130
			2-Methylnaphthalene	2014/10/21		94	%	50 - 130
			Naphthalene	2014/10/21		96	%	50 - 130
			Phenanthrene	2014/10/21		103	%	50 - 130
			Pyrene	2014/10/21		104	%	50 - 130
3791976	LFE	Spiked Blank	Benzo(e)pyrene	2014/10/21		105	%	50 - 130
			Biphenyl	2014/10/21		95	%	50 - 130
			D10-Anthracene	2014/10/21		86	%	50 - 130
			D14-Terphenyl (FS)	2014/10/21		91	%	50 - 130
			D8-Acenaphthylene	2014/10/21		87	%	50 - 130
			Perylene	2014/10/21		102	%	50 - 130
			Acenaphthene	2014/10/21		98	%	50 - 130
			Acenaphthylene	2014/10/21		98	%	50 - 130
			Anthracene	2014/10/21		95	%	50 - 130
			Benzo(a)anthracene	2014/10/21		101	%	50 - 130
			Benzo(a)pyrene	2014/10/21		102	%	50 - 130
			Benzo(b/j)fluoranthene	2014/10/21		106	%	50 - 130
			Benzo(g,h,i)perylene	2014/10/21		82	%	50 - 130
			Benzo(k)fluoranthene	2014/10/21		105	%	50 - 130
			Chrysene	2014/10/21		104	%	50 - 130
			Dibenz(a,h)anthracene	2014/10/21		82	%	50 - 130
			Fluoranthene	2014/10/21		101	%	50 - 130
			Fluorene	2014/10/21		99	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2014/10/21		84	%	50 - 130
			1-Methylnaphthalene	2014/10/21		95	%	50 - 130
			2-Methylnaphthalene	2014/10/21		91	%	50 - 130
			Naphthalene	2014/10/21		93	%	50 - 130

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Stantec Consulting Ltd
Client Project #: 122510993
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Sampler Initials: AH

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			Phenanthrene	2014/10/21		101	%	50 - 130
			Pyrene	2014/10/21		102	%	50 - 130
3791976	LFE	Method Blank	Benzo(e)pyrene	2014/10/21	ND, RDL=0.010		ug/L	
			Biphenyl	2014/10/21	ND, RDL=0.010		ug/L	
			D10-Anthracene	2014/10/21		90	%	50 - 130
			D14-Terphenyl (FS)	2014/10/21		95	%	50 - 130
			D8-Acenaphthylene	2014/10/21		90	%	50 - 130
			Perylene	2014/10/21	ND, RDL=0.010		ug/L	
			Acenaphthene	2014/10/21	ND, RDL=0.010		ug/L	
			Acenaphthylene	2014/10/21	ND, RDL=0.010		ug/L	
			Anthracene	2014/10/21	ND, RDL=0.010		ug/L	
			Benzo(a)anthracene	2014/10/21	ND, RDL=0.010		ug/L	
			Benzo(a)pyrene	2014/10/21	ND, RDL=0.010		ug/L	
			Benzo(b/j)fluoranthene	2014/10/21	ND, RDL=0.010		ug/L	
			Benzo(g,h,i)perylene	2014/10/21	ND, RDL=0.010		ug/L	
			Benzo(k)fluoranthene	2014/10/21	ND, RDL=0.010		ug/L	
			Chrysene	2014/10/21	ND, RDL=0.010		ug/L	
			Dibenz(a,h)anthracene	2014/10/21	ND, RDL=0.010		ug/L	
			Fluoranthene	2014/10/21	ND, RDL=0.010		ug/L	
			Fluorene	2014/10/21	ND, RDL=0.010		ug/L	
			Indeno(1,2,3-cd)pyrene	2014/10/21	ND, RDL=0.010		ug/L	
			1-Methylnaphthalene	2014/10/21	ND, RDL=0.010		ug/L	
			2-Methylnaphthalene	2014/10/21	ND, RDL=0.010		ug/L	
			Naphthalene	2014/10/21	ND, RDL=0.010		ug/L	
			Phenanthrene	2014/10/21	ND, RDL=0.010		ug/L	
			Pyrene	2014/10/21	ND, RDL=0.010		ug/L	
3791976	LFE	RPD [YB3206-01]	Benzo(e)pyrene	2014/10/21	NC		%	30
			Biphenyl	2014/10/21	NC		%	30

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Maxxam Job #: B4J4887
Report Date: 2014/10/27

Stantec Consulting Ltd
Client Project #: 122510993
Site Location: BAYVIEW/BURNSIDE
Your P.O. #: 16300R-20
Sampler Initials: AH

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			Perylene	2014/10/21	NC		%	40
			Acenaphthene	2014/10/21	13		%	30
			Acenaphthylene	2014/10/21	NC		%	30
			Anthracene	2014/10/21	NC		%	30
			Benzo(a)anthracene	2014/10/21	NC		%	30
			Benzo(a)pyrene	2014/10/21	NC		%	30
			Benzo(b/j)fluoranthene	2014/10/21	NC		%	30
			Benzo(g,h,i)perylene	2014/10/21	NC		%	30
			Benzo(k)fluoranthene	2014/10/21	NC		%	30
			Chrysene	2014/10/21	NC		%	30
			Dibenz(a,h)anthracene	2014/10/21	NC		%	30
			Fluoranthene	2014/10/21	3.0		%	30
			Fluorene	2014/10/21	NC		%	30
			Indeno(1,2,3-cd)pyrene	2014/10/21	NC		%	30
			1-Methylnaphthalene	2014/10/21	NC		%	30
			2-Methylnaphthalene	2014/10/21	NC		%	30
			Naphthalene	2014/10/21	NC		%	30
			Phenanthrene	2014/10/21	NC		%	30
			Pyrene	2014/10/21	NC		%	30
3792231	SLM	Matrix Spike [YB3205-07]	4-Bromofluorobenzene	2014/10/22		99	%	70 - 130
			D4-1,2-Dichloroethane	2014/10/22		98	%	70 - 130
			D8-Toluene	2014/10/22		99	%	70 - 130
			Acetone (2-Propanone)	2014/10/22		95	%	60 - 140
			Benzene	2014/10/22		97	%	70 - 130
			Bromodichloromethane	2014/10/22		107	%	70 - 130
			Bromoform	2014/10/22		114	%	70 - 130
			Bromomethane	2014/10/22		88	%	60 - 140
			Carbon Tetrachloride	2014/10/22		103	%	70 - 130
			Chlorobenzene	2014/10/22		108	%	70 - 130
			Chloroform	2014/10/22		101	%	70 - 130
			Dibromochloromethane	2014/10/22		113	%	70 - 130
			1,2-Dichlorobenzene	2014/10/22		113	%	70 - 130
			1,3-Dichlorobenzene	2014/10/22		110	%	70 - 130
			1,4-Dichlorobenzene	2014/10/22		108	%	70 - 130
			Dichlorodifluoromethane (FREON 12)	2014/10/22		79	%	60 - 140
			1,1-Dichloroethane	2014/10/22		95	%	70 - 130
			1,2-Dichloroethane	2014/10/22		99	%	70 - 130
			1,1-Dichloroethylene	2014/10/22		97	%	70 - 130
			cis-1,2-Dichloroethylene	2014/10/22		97	%	70 - 130
			trans-1,2-Dichloroethylene	2014/10/22		95	%	70 - 130
			1,2-Dichloropropane	2014/10/22		102	%	70 - 130
			cis-1,3-Dichloropropene	2014/10/22		103	%	70 - 130
			trans-1,3-Dichloropropene	2014/10/22		112	%	70 - 130
			Ethylbenzene	2014/10/22		106	%	70 - 130
			Ethylene Dibromide	2014/10/22		106	%	70 - 130
			Hexane	2014/10/22		88	%	70 - 130
			Methylene Chloride(Dichloromethane)	2014/10/22		95	%	70 - 130
			Methyl Isobutyl Ketone	2014/10/22		111	%	70 - 130
			Methyl Ethyl Ketone (2-Butanone)	2014/10/22		102	%	60 - 140
			Methyl t-butyl ether (MTBE)	2014/10/22		95	%	70 - 130
			Styrene	2014/10/22		113	%	70 - 130

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Maxxam Job #: B4J4887
Report Date: 2014/10/27

Stantec Consulting Ltd
Client Project #: 122510993
Site Location: BAYVIEW/BURNSIDE
Your P.O. #: 16300R-20
Sampler Initials: AH

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			1,1,1,2-Tetrachloroethane	2014/10/22		113	%	70 - 130
			1,1,2,2-Tetrachloroethane	2014/10/22		114	%	70 - 130
			Tetrachloroethylene	2014/10/22		105	%	70 - 130
			Toluene	2014/10/22		100	%	70 - 130
			1,1,1-Trichloroethane	2014/10/22		99	%	70 - 130
			1,1,2-Trichloroethane	2014/10/22		106	%	70 - 130
			Trichloroethylene	2014/10/22		101	%	70 - 130
			Vinyl Chloride	2014/10/22		82	%	70 - 130
			p+m-Xylene	2014/10/22		107	%	70 - 130
			o-Xylene	2014/10/22		107	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2014/10/22		85	%	70 - 130
3792231	SLM	Spiked Blank	4-Bromofluorobenzene	2014/10/22		99	%	70 - 130
			D4-1,2-Dichloroethane	2014/10/22		97	%	70 - 130
			D8-Toluene	2014/10/22		101	%	70 - 130
			Acetone (2-Propanone)	2014/10/22		95	%	60 - 140
			Benzene	2014/10/22		100	%	70 - 130
			Bromodichloromethane	2014/10/22		104	%	70 - 130
			Bromoform	2014/10/22		111	%	70 - 130
			Bromomethane	2014/10/22		109	%	60 - 140
			Carbon Tetrachloride	2014/10/22		106	%	70 - 130
			Chlorobenzene	2014/10/22		105	%	70 - 130
			Chloroform	2014/10/22		100	%	70 - 130
			Dibromochloromethane	2014/10/22		111	%	70 - 130
			1,2-Dichlorobenzene	2014/10/22		108	%	70 - 130
			1,3-Dichlorobenzene	2014/10/22		108	%	70 - 130
			1,4-Dichlorobenzene	2014/10/22		104	%	70 - 130
			Dichlorodifluoromethane (FREON 12)	2014/10/22		101	%	60 - 140
			1,1-Dichloroethane	2014/10/22		100	%	70 - 130
			1,2-Dichloroethane	2014/10/22		100	%	70 - 130
			1,1-Dichloroethylene	2014/10/22		109	%	70 - 130
			cis-1,2-Dichloroethylene	2014/10/22		103	%	70 - 130
			trans-1,2-Dichloroethylene	2014/10/22		102	%	70 - 130
			1,2-Dichloropropane	2014/10/22		101	%	70 - 130
			cis-1,3-Dichloropropene	2014/10/22		101	%	70 - 130
			trans-1,3-Dichloropropene	2014/10/22		111	%	70 - 130
			Ethylbenzene	2014/10/22		104	%	70 - 130
			Ethylene Dibromide	2014/10/22		106	%	70 - 130
			Hexane	2014/10/22		99	%	70 - 130
			Methylene Chloride(Dichloromethane)	2014/10/22		102	%	70 - 130
			Methyl Isobutyl Ketone	2014/10/22		102	%	70 - 130
			Methyl Ethyl Ketone (2-Butanone)	2014/10/22		102	%	60 - 140
			Methyl t-butyl ether (MTBE)	2014/10/22		97	%	70 - 130
			Styrene	2014/10/22		112	%	70 - 130
			1,1,1,2-Tetrachloroethane	2014/10/22		109	%	70 - 130
			1,1,2,2-Tetrachloroethane	2014/10/22		110	%	70 - 130
			Tetrachloroethylene	2014/10/22		107	%	70 - 130
			Toluene	2014/10/22		100	%	70 - 130
			1,1,1-Trichloroethane	2014/10/22		103	%	70 - 130
			1,1,2-Trichloroethane	2014/10/22		104	%	70 - 130
			Trichloroethylene	2014/10/22		103	%	70 - 130
			Vinyl Chloride	2014/10/22		93	%	70 - 130

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			p+m-Xylene	2014/10/22		105	%	70 - 130
			o-Xylene	2014/10/22		105	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2014/10/22		96	%	70 - 130
3792231	SLM	Method Blank	4-Bromofluorobenzene	2014/10/22		95	%	70 - 130
			D4-1,2-Dichloroethane	2014/10/22		99	%	70 - 130
			D8-Toluene	2014/10/22		99	%	70 - 130
			Acetone (2-Propanone)	2014/10/22	ND, RDL=10		ug/L	
			Benzene	2014/10/22	ND, RDL=0.10		ug/L	
			Bromodichloromethane	2014/10/22	ND, RDL=0.10		ug/L	
			Bromoform	2014/10/22	ND, RDL=0.20		ug/L	
			Bromomethane	2014/10/22	ND, RDL=0.50		ug/L	
			Carbon Tetrachloride	2014/10/22	ND, RDL=0.10		ug/L	
			Chlorobenzene	2014/10/22	ND, RDL=0.10		ug/L	
			Chloroform	2014/10/22	ND, RDL=0.10		ug/L	
			Dibromochloromethane	2014/10/22	ND, RDL=0.20		ug/L	
			1,2-Dichlorobenzene	2014/10/22	ND, RDL=0.20		ug/L	
			1,3-Dichlorobenzene	2014/10/22	ND, RDL=0.20		ug/L	
			1,4-Dichlorobenzene	2014/10/22	ND, RDL=0.20		ug/L	
			Dichlorodifluoromethane (FREON 12)	2014/10/22	ND, RDL=0.50		ug/L	
			1,1-Dichloroethane	2014/10/22	ND, RDL=0.10		ug/L	
			1,2-Dichloroethane	2014/10/22	ND, RDL=0.20		ug/L	
			1,1-Dichloroethylene	2014/10/22	ND, RDL=0.10		ug/L	
			cis-1,2-Dichloroethylene	2014/10/22	ND, RDL=0.10		ug/L	
			trans-1,2-Dichloroethylene	2014/10/22	ND, RDL=0.10		ug/L	
			1,2-Dichloropropane	2014/10/22	ND, RDL=0.10		ug/L	
			cis-1,3-Dichloropropene	2014/10/22	ND, RDL=0.20		ug/L	
			trans-1,3-Dichloropropene	2014/10/22	ND, RDL=0.20		ug/L	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			Ethylbenzene	2014/10/22	ND, RDL=0.10		ug/L	
			Ethylene Dibromide	2014/10/22	ND, RDL=0.20		ug/L	
			Hexane	2014/10/22	ND, RDL=0.50		ug/L	
			Methylene Chloride(Dichloromethane)	2014/10/22	ND, RDL=0.50		ug/L	
			Methyl Isobutyl Ketone	2014/10/22	ND, RDL=5.0		ug/L	
			Methyl Ethyl Ketone (2-Butanone)	2014/10/22	ND, RDL=5.0		ug/L	
			Methyl t-butyl ether (MTBE)	2014/10/22	ND, RDL=0.20		ug/L	
			Styrene	2014/10/22	ND, RDL=0.20		ug/L	
			1,1,1,2-Tetrachloroethane	2014/10/22	ND, RDL=0.20		ug/L	
			1,1,2,2-Tetrachloroethane	2014/10/22	ND, RDL=0.20		ug/L	
			Tetrachloroethylene	2014/10/22	ND, RDL=0.10		ug/L	
			Toluene	2014/10/22	ND, RDL=0.20		ug/L	
			1,1,1-Trichloroethane	2014/10/22	ND, RDL=0.10		ug/L	
			1,1,2-Trichloroethane	2014/10/22	ND, RDL=0.20		ug/L	
			Trichloroethylene	2014/10/22	ND, RDL=0.10		ug/L	
			Vinyl Chloride	2014/10/22	ND, RDL=0.20		ug/L	
			p+m-Xylene	2014/10/22	ND, RDL=0.10		ug/L	
			o-Xylene	2014/10/22	ND, RDL=0.10		ug/L	
			Xylene (Total)	2014/10/22	ND, RDL=0.10		ug/L	
			Trichlorofluoromethane (FREON 11)	2014/10/22	ND, RDL=0.20		ug/L	
3792231	SLM	RPD [YB3206-07]	Acetone (2-Propanone)	2014/10/22	NC		%	30
			Benzene	2014/10/22	NC		%	30
			Bromodichloromethane	2014/10/22	NC		%	30
			Bromoform	2014/10/22	NC		%	30
			Bromomethane	2014/10/22	NC		%	30
			Carbon Tetrachloride	2014/10/22	NC		%	30
			Chlorobenzene	2014/10/22	NC		%	30
			Chloroform	2014/10/22	NC		%	30
			Dibromochloromethane	2014/10/22	NC		%	30

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			1,2-Dichlorobenzene	2014/10/22	NC		%	30
			1,3-Dichlorobenzene	2014/10/22	NC		%	30
			1,4-Dichlorobenzene	2014/10/22	NC		%	30
			Dichlorodifluoromethane (FREON 12)	2014/10/22	NC		%	30
			1,1-Dichloroethane	2014/10/22	NC		%	30
			1,2-Dichloroethane	2014/10/22	NC		%	30
			1,1-Dichloroethylene	2014/10/22	NC		%	30
			cis-1,2-Dichloroethylene	2014/10/22	NC		%	30
			trans-1,2-Dichloroethylene	2014/10/22	NC		%	30
			1,2-Dichloropropane	2014/10/22	NC		%	30
			cis-1,3-Dichloropropene	2014/10/22	NC		%	30
			trans-1,3-Dichloropropene	2014/10/22	NC		%	30
			Ethylbenzene	2014/10/22	NC		%	30
			Ethylene Dibromide	2014/10/22	NC		%	30
			Hexane	2014/10/22	NC		%	30
			Methylene Chloride(Dichloromethane)	2014/10/22	NC		%	30
			Methyl Isobutyl Ketone	2014/10/22	NC		%	30
			Methyl Ethyl Ketone (2-Butanone)	2014/10/22	NC		%	30
			Methyl t-butyl ether (MTBE)	2014/10/22	NC		%	30
			Styrene	2014/10/22	NC		%	30
			1,1,1,2-Tetrachloroethane	2014/10/22	NC		%	30
			1,1,2,2-Tetrachloroethane	2014/10/22	NC		%	30
			Tetrachloroethylene	2014/10/22	NC		%	30
			Toluene	2014/10/22	NC		%	30
			1,1,1-Trichloroethane	2014/10/22	NC		%	30
			1,1,2-Trichloroethane	2014/10/22	NC		%	30
			Trichloroethylene	2014/10/22	NC		%	30
			Vinyl Chloride	2014/10/22	NC		%	30
			p+m-Xylene	2014/10/22	NC		%	30
			o-Xylene	2014/10/22	NC		%	30
			Xylene (Total)	2014/10/22	NC		%	30
			Trichlorofluoromethane (FREON 11)	2014/10/22	NC		%	30
3795646	BLZ	Matrix Spike	o-Terphenyl	2014/10/24		102	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2014/10/24		113	%	50 - 130
			F3 (C16-C34 Hydrocarbons)	2014/10/24		112	%	50 - 130
			F4 (C34-C50 Hydrocarbons)	2014/10/24		113	%	50 - 130
3795646	BLZ	Spiked Blank	o-Terphenyl	2014/10/24		101	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2014/10/24		112	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2014/10/24		114	%	60 - 130
			F4 (C34-C50 Hydrocarbons)	2014/10/24		114	%	60 - 130
3795646	BLZ	Method Blank	o-Terphenyl	2014/10/24		100	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2014/10/24	ND , RDL=100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2014/10/24	ND , RDL=200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2014/10/24	ND , RDL=200		ug/L	
3795646	BLZ	RPD	F2 (C10-C16 Hydrocarbons)	2014/10/24	NC		%	30
			F3 (C16-C34 Hydrocarbons)	2014/10/24	NC		%	30
			F4 (C34-C50 Hydrocarbons)	2014/10/24	NC		%	30
3795649	MC	Matrix Spike [YB3205-04]	Mercury (Hg)	2014/10/23		109	%	75 - 125

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
3795649	MC	Spiked Blank	Mercury (Hg)	2014/10/23		108	%	80 - 120
3795649	MC	Method Blank	Mercury (Hg)	2014/10/23	ND, RDL=0.01		ug/L	
3795649	MC	RPD [YB3205-04]	Mercury (Hg)	2014/10/23	NC		%	20
3795796	LRA	Matrix Spike	1,4-Difluorobenzene	2014/10/24		99	%	70 - 130
			4-Bromofluorobenzene	2014/10/24		98	%	70 - 130
			D10-Ethylbenzene	2014/10/24		101	%	70 - 130
			D4-1,2-Dichloroethane	2014/10/24		103	%	70 - 130
			F1 (C6-C10)	2014/10/24		77	%	70 - 130
3795796	LRA	Spiked Blank	1,4-Difluorobenzene	2014/10/23		99	%	70 - 130
			4-Bromofluorobenzene	2014/10/23		97	%	70 - 130
			D10-Ethylbenzene	2014/10/23		107	%	70 - 130
			D4-1,2-Dichloroethane	2014/10/23		104	%	70 - 130
			F1 (C6-C10)	2014/10/23		95	%	70 - 130
3795796	LRA	Method Blank	1,4-Difluorobenzene	2014/10/23		100	%	70 - 130
			4-Bromofluorobenzene	2014/10/23		96	%	70 - 130
			D10-Ethylbenzene	2014/10/23		111	%	70 - 130
			D4-1,2-Dichloroethane	2014/10/23		102	%	70 - 130
			F1 (C6-C10)	2014/10/23	ND, RDL=25		ug/L	
			F1 (C6-C10) - BTEX	2014/10/23	ND, RDL=25		ug/L	
3795796	LRA	RPD	F1 (C6-C10)	2014/10/24	NC		%	30
			F1 (C6-C10) - BTEX	2014/10/24	NC		%	30

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L3 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B4J4887
Report Date: 2014/10/27

Stantec Consulting Ltd
Client Project #: 122510993
Site Location: BAYVIEW/BURNSIDE
Your P.O. #: 16300R-20
Sampler Initials: AH

VALIDATION SIGNATURE PAGE

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

Cristina Carriere

Cristina Carriere, Scientific Services

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam
A Bureau Veritas Group Company

Your Project #: MB4J4887
Your C.O.C. #: B4J4887

Attention: SUB CONTRACTOR
MAXXAM ANALYTICS
CAMPOBELLO
6740 CAMPOBELLO ROAD
MISSISSAUGA, ON
CANADA L5N 2L8

Report Date: 2014/10/24
Report #: R1671257
Version: 1

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B495316
Received: 2014/10/22, 08:40

Sample Matrix: Water
Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Cadmium - low level CCME - Dissolved	8	N/A	2014/10/24	AB SOP-00043	EPA 200.8 R5.4 m
Hardness	8	N/A	2014/10/24	AB WI-00065	SM 2340B
Elements by ICP - Dissolved	8	N/A	2014/10/24	AB SOP-00042	EPA 200.7 CFR 2012 m
Elements by ICPMS - Dissolved	8	N/A	2014/10/22	AB SOP-00043	EPA 200.8 R5.4 m

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Cynny Hagen, Project Manager Assistant
Email: CHagen@maxxam.ca
Phone# (403) 735-2273

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Total cover pages: 1

Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B495316
Report Date: 2014/10/24

MAXXAM ANALYTICS
Client Project #: MB4J4887

HARDNESS (WATER)

Maxxam ID		KX7555	KX7556	KX7557	KX7558		
Sampling Date		2014/10/17 09:00	2014/10/17 09:30	2014/10/17 10:00	2014/10/17 10:30		
COC Number		B4J4887	B4J4887	B4J4887	B4J4887		
	UNITS	**MW-1 (YB3205-05)**	**MW-2 (YB3206-05)**	**MW-14-54 (YB3207-05)**	**MW-3 (YB3208-05)**	**RDL**	**QC Batch**
Calculated Parameters							
Hardness (CaCO3)	mg/L	720	500	500	410	0.50	7688570

RDL = Reportable Detection Limit

Maxxam ID		KX7559	KX7560	KX7561	KX7562		
Sampling Date		2014/10/17 13:30	2014/10/17 14:30	2014/10/17 15:30	2014/10/17 16:30		
COC Number		B4J4887	B4J4887	B4J4887	B4J4887		
	UNITS	**CH2M MW-1 (YB3209-05)**	**CH2M MW-2 (YB3210-05)**	**MW-5 (YB3211-05)**	**MW-4 (YB3212-05)**	**RDL**	**QC Batch**
Calculated Parameters							
Hardness (CaCO3)	mg/L	340	600	540	360	0.50	7688570

RDL = Reportable Detection Limit

Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B495316
Report Date: 2014/10/24

MAXXAM ANALYTICS
Client Project #: MB4J4887

REGULATED METALS (CCME/AT1) - DISSOLVED

Maxxam ID		KX7555		KX7556	KX7557	KX7558		
Sampling Date		2014/10/17 09:00		2014/10/17 09:30	2014/10/17 10:00	2014/10/17 10:30		
COC Number		B4J4887		B4J4887	B4J4887	B4J4887		
	UNITS	**MW-1 (YB3205-05)**	**RDL**	**MW-2 (YB3206-05)**	**MW-14-54 (YB3207-05)**	**MW-3 (YB3208-05)**	**RDL**	**QC Batch**
Low Level Elements								
Dissolved Cadmium (Cd)	ug/L	<0.020	0.020	<0.020	<0.020	<0.020	0.020	7687766
Elements								
Dissolved Aluminum (Al)	mg/L	0.017	0.0030	0.015	0.016	0.012	0.0030	7688837
Dissolved Antimony (Sb)	mg/L	<0.00060	0.00060	<0.00060	<0.00060	<0.00060	0.00060	7688837
Dissolved Arsenic (As)	mg/L	<0.00020	0.00020	<0.00020	<0.00020	0.0010	0.00020	7688837
Dissolved Barium (Ba)	mg/L	0.46	0.010	0.36	0.36	0.12	0.010	7691698
Dissolved Beryllium (Be)	mg/L	<0.0010	0.0010	<0.0010	<0.0010	<0.0010	0.0010	7688837
Dissolved Boron (B)	mg/L	0.13	0.020	0.16	0.16	0.090	0.020	7691698
Dissolved Calcium (Ca)	mg/L	240	0.30	160	160	110	0.30	7691698
Dissolved Chromium (Cr)	mg/L	<0.0010	0.0010	<0.0010	<0.0010	<0.0010	0.0010	7688837
Dissolved Cobalt (Co)	mg/L	0.00033	0.00030	<0.00030	<0.00030	0.00030	0.00030	7688837
Dissolved Copper (Cu)	mg/L	<0.00020	0.00020	<0.00020	<0.00020	<0.00020	0.00020	7688837
Dissolved Iron (Fe)	mg/L	18	0.060	4.3	4.1	0.64	0.060	7691698
Dissolved Lead (Pb)	mg/L	<0.00020	0.00020	<0.00020	<0.00020	<0.00020	0.00020	7688837
Dissolved Lithium (Li)	mg/L	<0.020	0.020	<0.020	<0.020	<0.020	0.020	7691698
Dissolved Magnesium (Mg)	mg/L	33	0.20	24	24	29	0.20	7691698
Dissolved Manganese (Mn)	mg/L	1.3	0.0040	1.4	1.4	0.018	0.0040	7691698
Dissolved Molybdenum (Mo)	mg/L	<0.00020	0.00020	<0.00020	<0.00020	0.0017	0.00020	7688837
Dissolved Nickel (Ni)	mg/L	<0.00050	0.00050	<0.00050	<0.00050	0.0014	0.00050	7688837
Dissolved Phosphorus (P)	mg/L	0.58	0.10	0.38	0.39	<0.10	0.10	7691698
Dissolved Potassium (K)	mg/L	10	0.30	7.5	7.5	7.6	0.30	7691698
Dissolved Selenium (Se)	mg/L	0.00088	0.00020	0.00044	0.00049	<0.00020	0.00020	7688837
Dissolved Silicon (Si)	mg/L	9.4	0.10	6.5	6.5	4.1	0.10	7691698
Dissolved Silver (Ag)	mg/L	<0.00010	0.00010	<0.00010	<0.00010	<0.00010	0.00010	7688837
Dissolved Sodium (Na)	mg/L	140	0.50	170	170	37	0.50	7691698
Dissolved Strontium (Sr)	mg/L	3.9	0.020	6.6 (1)	6.6 (1)	7.2 (1)	0.10	7691698
Dissolved Sulphur (S)	mg/L	5.6	0.20	3.3	3.5	33	0.20	7691698
Dissolved Thallium (Tl)	mg/L	<0.00020	0.00020	<0.00020	<0.00020	<0.00020	0.00020	7688837
Dissolved Tin (Sn)	mg/L	<0.0010	0.0010	<0.0010	<0.0010	<0.0010	0.0010	7688837
Dissolved Titanium (Ti)	mg/L	0.0015	0.0010	<0.0010	0.0013	<0.0010	0.0010	7688837
Dissolved Uranium (U)	mg/L	0.00011	0.00010	0.00013	0.00016	0.0011	0.00010	7688837

RDL = Reportable Detection Limit
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

Maxxam Job #: B495316
Report Date: 2014/10/24

MAXXAM ANALYTICS
Client Project #: MB4J4887

REGULATED METALS (CCME/AT1) - DISSOLVED

Maxxam ID		KX7555		KX7556	KX7557	KX7558		
Sampling Date		2014/10/17 09:00		2014/10/17 09:30	2014/10/17 10:00	2014/10/17 10:30		
COC Number		B4J4887		B4J4887	B4J4887	B4J4887		
	UNITS	**MW-1 (YB3205-05)**	**RDL**	**MW-2 (YB3206-05)**	**MW-14-54 (YB3207-05)**	**MW-3 (YB3208-05)**	**RDL**	**QC Batch**
Dissolved Vanadium (V)	mg/L	<0.0010	0.0010	0.0011	0.0012	<0.0010	0.0010	7688837
Dissolved Zinc (Zn)	mg/L	<0.0030	0.0030	<0.0030	<0.0030	<0.0030	0.0030	7688837

RDL = Reportable Detection Limit

REGULATED METALS (CCME/AT1) - DISSOLVED

Maxxam ID		KX7559	KX7560		KX7561		
Sampling Date		2014/10/17 13:30	2014/10/17 14:30		2014/10/17 15:30		
COC Number		B4J4887	B4J4887		B4J4887		
	UNITS	**CH2M MW-1 (YB3209-05)**	**CH2M MW-2 (YB3210-05)**	**RDL**	**MW-5 (YB3211-05)**	**RDL**	**QC Batch**
Low Level Elements							
Dissolved Cadmium (Cd)	ug/L	<0.020	<0.020	0.020	0.087	0.020	7687766
Elements							
Dissolved Aluminum (Al)	mg/L	0.0070	0.012	0.0030	0.0057	0.0030	7688837
Dissolved Antimony (Sb)	mg/L	<0.00060	<0.00060	0.00060	<0.00060	0.00060	7688837
Dissolved Arsenic (As)	mg/L	0.00038	<0.00020	0.00020	<0.00020	0.00020	7688837
Dissolved Barium (Ba)	mg/L	0.033	0.082	0.010	0.19	0.010	7691698
Dissolved Beryllium (Be)	mg/L	<0.0010	<0.0010	0.0010	<0.0010	0.0010	7688837
Dissolved Boron (B)	mg/L	0.034	0.10	0.020	0.10	0.020	7691698
Dissolved Calcium (Ca)	mg/L	110	200	0.30	180	0.30	7691698
Dissolved Chromium (Cr)	mg/L	<0.0010	<0.0010	0.0010	<0.0010	0.0010	7688837
Dissolved Cobalt (Co)	mg/L	0.00043	0.00035	0.00030	0.0011	0.00030	7688837
Dissolved Copper (Cu)	mg/L	0.0050	0.0017	0.00020	0.0016	0.00020	7688837
Dissolved Iron (Fe)	mg/L	<0.060	<0.060	0.060	<0.060	0.060	7691698
Dissolved Lead (Pb)	mg/L	<0.00020	<0.00020	0.00020	<0.00020	0.00020	7688837
Dissolved Lithium (Li)	mg/L	<0.020	<0.020	0.020	<0.020	0.020	7691698
Dissolved Magnesium (Mg)	mg/L	16	24	0.20	26	0.20	7691698
Dissolved Manganese (Mn)	mg/L	<0.0040	0.013	0.0040	0.71	0.0040	7691698
Dissolved Molybdenum (Mo)	mg/L	0.0022	0.00054	0.00020	0.0022	0.00020	7688837
Dissolved Nickel (Ni)	mg/L	0.0032	0.0047	0.00050	0.0040	0.00050	7688837
Dissolved Phosphorus (P)	mg/L	0.13	<0.10	0.10	<0.10	0.10	7691698
Dissolved Potassium (K)	mg/L	11	8.5	0.30	12	0.30	7691698
Dissolved Selenium (Se)	mg/L	<0.00020	<0.00020	0.00020	<0.00020	0.00020	7688837
Dissolved Silicon (Si)	mg/L	4.4	3.9	0.10	5.1	0.10	7691698
Dissolved Silver (Ag)	mg/L	<0.00010	<0.00010	0.00010	<0.00010	0.00010	7688837
Dissolved Sodium (Na)	mg/L	28	70	0.50	860 (1)	2.5	7691698
Dissolved Strontium (Sr)	mg/L	1.5	3.9	0.020	5.5 (1)	0.10	7691698
Dissolved Sulphur (S)	mg/L	30	55	0.20	87	0.20	7691698
Dissolved Thallium (Tl)	mg/L	<0.00020	<0.00020	0.00020	<0.00020	0.00020	7688837
Dissolved Tin (Sn)	mg/L	<0.0010	<0.0010	0.0010	<0.0010	0.0010	7688837
Dissolved Titanium (Ti)	mg/L	<0.0010	<0.0010	0.0010	<0.0010	0.0010	7688837
Dissolved Uranium (U)	mg/L	0.0014	0.0014	0.00010	0.0022	0.00010	7688837

RDL = Reportable Detection Limit
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

REGULATED METALS (CCME/AT1) - DISSOLVED

Maxxam ID		KX7559	KX7560		KX7561		
Sampling Date		2014/10/17 13:30	2014/10/17 14:30		2014/10/17 15:30		
COC Number		B4J4887	B4J4887		B4J4887		
	UNITS	**CH2M MW-1 (YB3209-05)**	**CH2M MW-2 (YB3210-05)**	**RDL**	**MW-5 (YB3211-05)**	**RDL**	**QC Batch**
Dissolved Vanadium (V)	mg/L	<0.0010	<0.0010	0.0010	<0.0010	0.0010	7688837
Dissolved Zinc (Zn)	mg/L	0.0032	0.0035	0.0030	<0.0030	0.0030	7688837

RDL = Reportable Detection Limit

REGULATED METALS (CCME/AT1) - DISSOLVED

Maxxam ID		KX7562		
Sampling Date		2014/10/17 16:30		
COC Number		B4J4887		
	UNITS	**MW-4 (YB3212-05)**	**RDL**	**QC Batch**
Low Level Elements				
Dissolved Cadmium (Cd)	ug/L	<0.020	0.020	7687766
Elements				
Dissolved Aluminum (Al)	mg/L	<0.0030	0.0030	7688837
Dissolved Antimony (Sb)	mg/L	0.0024	0.00060	7688837
Dissolved Arsenic (As)	mg/L	0.00028	0.00020	7688837
Dissolved Barium (Ba)	mg/L	0.091	0.010	7691698
Dissolved Beryllium (Be)	mg/L	<0.0010	0.0010	7688837
Dissolved Boron (B)	mg/L	0.027	0.020	7691698
Dissolved Calcium (Ca)	mg/L	110	0.30	7691698
Dissolved Chromium (Cr)	mg/L	<0.0010	0.0010	7688837
Dissolved Cobalt (Co)	mg/L	0.00047	0.00030	7688837
Dissolved Copper (Cu)	mg/L	0.00031	0.00020	7688837
Dissolved Iron (Fe)	mg/L	<0.060	0.060	7691698
Dissolved Lead (Pb)	mg/L	<0.00020	0.00020	7688837
Dissolved Lithium (Li)	mg/L	<0.020	0.020	7691698
Dissolved Magnesium (Mg)	mg/L	19	0.20	7691698
Dissolved Manganese (Mn)	mg/L	<0.0040	0.0040	7691698
Dissolved Molybdenum (Mo)	mg/L	0.0016	0.00020	7688837
Dissolved Nickel (Ni)	mg/L	0.0015	0.00050	7688837
Dissolved Phosphorus (P)	mg/L	0.13	0.10	7691698
Dissolved Potassium (K)	mg/L	3.9	0.30	7691698
Dissolved Selenium (Se)	mg/L	<0.00020	0.00020	7688837
Dissolved Silicon (Si)	mg/L	4.3	0.10	7691698
Dissolved Silver (Ag)	mg/L	<0.00010	0.00010	7688837
Dissolved Sodium (Na)	mg/L	23	0.50	7691698
Dissolved Strontium (Sr)	mg/L	2.1	0.020	7691698
Dissolved Sulphur (S)	mg/L	19	0.20	7691698
Dissolved Thallium (Tl)	mg/L	<0.00020	0.00020	7688837
Dissolved Tin (Sn)	mg/L	<0.0010	0.0010	7688837
Dissolved Titanium (Ti)	mg/L	<0.0010	0.0010	7688837
Dissolved Uranium (U)	mg/L	0.00075	0.00010	7688837
Dissolved Vanadium (V)	mg/L	<0.0010	0.0010	7688837

RDL = Reportable Detection Limit

REGULATED METALS (CCME/AT1) - DISSOLVED

Maxxam ID		KX7562		
Sampling Date		2014/10/17 16:30		
COC Number		B4J4887		
	UNITS	**MW-4 (YB3212-05)**	**RDL**	**QC Batch**
Dissolved Zinc (Zn)	mg/L	<0.0030	0.0030	7688837
RDL = Reportable Detection Limit				

Maxxam Job #: B495316
Report Date: 2014/10/24

MAXXAM ANALYTICS
Client Project #: MB4J4887

Package 1	4.0°C

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

General Comments

Results relate only to the items tested.

MAXXAM ANALYTICS
Attention: SUB CONTRACTOR
Client Project #: MB4J4887
P.O. #:
Site Location:

Quality Assurance Report

Maxxam Job Number: CB495316

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	UNITS	QC Limits
7688837 TDB	Matrix Spike	Dissolved Aluminum (Al)	2014/10/23		119	%	80 - 120
		Dissolved Antimony (Sb)	2014/10/23		83	%	80 - 120
		Dissolved Arsenic (As)	2014/10/23		96	%	80 - 120
		Dissolved Beryllium (Be)	2014/10/23		92	%	80 - 120
		Dissolved Chromium (Cr)	2014/10/23		94	%	80 - 120
		Dissolved Cobalt (Co)	2014/10/23		92	%	80 - 120
		Dissolved Copper (Cu)	2014/10/23		92	%	80 - 120
		Dissolved Lead (Pb)	2014/10/23		91	%	80 - 120
		Dissolved Molybdenum (Mo)	2014/10/23		96	%	80 - 120
		Dissolved Nickel (Ni)	2014/10/23		92	%	80 - 120
		Dissolved Selenium (Se)	2014/10/23		95	%	80 - 120
		Dissolved Silver (Ag)	2014/10/23		95	%	80 - 120
		Dissolved Thallium (Tl)	2014/10/23		89	%	80 - 120
		Dissolved Tin (Sn)	2014/10/23		87	%	80 - 120
		Dissolved Titanium (Ti)	2014/10/23		97	%	80 - 120
		Dissolved Uranium (U)	2014/10/23		89	%	80 - 120
		Dissolved Vanadium (V)	2014/10/23		100	%	80 - 120
		Dissolved Zinc (Zn)	2014/10/23		97	%	80 - 120
	Spiked Blank	Dissolved Aluminum (Al)	2014/10/22		111	%	80 - 120
		Dissolved Antimony (Sb)	2014/10/22		95	%	80 - 120
		Dissolved Arsenic (As)	2014/10/22		98	%	80 - 120
		Dissolved Beryllium (Be)	2014/10/22		95	%	80 - 120
		Dissolved Chromium (Cr)	2014/10/22		99	%	80 - 120
		Dissolved Cobalt (Co)	2014/10/22		100	%	80 - 120
		Dissolved Copper (Cu)	2014/10/22		101	%	80 - 120
		Dissolved Lead (Pb)	2014/10/22		97	%	80 - 120
		Dissolved Molybdenum (Mo)	2014/10/22		96	%	80 - 120
		Dissolved Nickel (Ni)	2014/10/22		99	%	80 - 120
		Dissolved Selenium (Se)	2014/10/22		97	%	80 - 120
		Dissolved Silver (Ag)	2014/10/22		94	%	80 - 120
		Dissolved Thallium (Tl)	2014/10/22		95	%	80 - 120
		Dissolved Tin (Sn)	2014/10/22		91	%	80 - 120
		Dissolved Titanium (Ti)	2014/10/22		90	%	80 - 120
		Dissolved Uranium (U)	2014/10/22		91	%	80 - 120
		Dissolved Vanadium (V)	2014/10/22		100	%	80 - 120
		Dissolved Zinc (Zn)	2014/10/22		103	%	80 - 120
	Method Blank	Dissolved Aluminum (Al)	2014/10/22	<0.0030		mg/L	
		Dissolved Antimony (Sb)	2014/10/22	<0.00060		mg/L	
		Dissolved Arsenic (As)	2014/10/22	<0.00020		mg/L	
		Dissolved Beryllium (Be)	2014/10/22	<0.0010		mg/L	
		Dissolved Chromium (Cr)	2014/10/22	<0.0010		mg/L	
		Dissolved Cobalt (Co)	2014/10/22	<0.00030		mg/L	
		Dissolved Copper (Cu)	2014/10/22	<0.00020		mg/L	
		Dissolved Lead (Pb)	2014/10/22	<0.00020		mg/L	
		Dissolved Molybdenum (Mo)	2014/10/22	<0.00020		mg/L	
		Dissolved Nickel (Ni)	2014/10/22	<0.00050		mg/L	
		Dissolved Selenium (Se)	2014/10/22	<0.00020		mg/L	
		Dissolved Silver (Ag)	2014/10/22	<0.00010		mg/L	
		Dissolved Thallium (Tl)	2014/10/22	<0.00020		mg/L	
		Dissolved Tin (Sn)	2014/10/22	<0.0010		mg/L	
		Dissolved Titanium (Ti)	2014/10/22	<0.0010		mg/L	
		Dissolved Uranium (U)	2014/10/22	<0.00010		mg/L	
		Dissolved Vanadium (V)	2014/10/22	<0.0010		mg/L	
		Dissolved Zinc (Zn)	2014/10/22	<0.0030		mg/L	
	RPD	Dissolved Aluminum (Al)	2014/10/22	NC		%	20

MAXXAM ANALYTICS
Attention: SUB CONTRACTOR
Client Project #: MB4J4887
P.O. #:
Site Location:

Quality Assurance Report (Continued)

Maxxam Job Number: CB495316

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	UNITS	QC Limits
7688837 TDB	RPD	Dissolved Antimony (Sb)	2014/10/22	NC		%	20
		Dissolved Arsenic (As)	2014/10/22	NC		%	20
		Dissolved Beryllium (Be)	2014/10/22	NC		%	20
		Dissolved Chromium (Cr)	2014/10/22	NC		%	20
		Dissolved Cobalt (Co)	2014/10/22	NC		%	20
		Dissolved Copper (Cu)	2014/10/22	7.8		%	20
		Dissolved Lead (Pb)	2014/10/22	NC		%	20
		Dissolved Molybdenum (Mo)	2014/10/22	NC		%	20
		Dissolved Nickel (Ni)	2014/10/22	NC		%	20
		Dissolved Selenium (Se)	2014/10/22	NC		%	20
		Dissolved Silver (Ag)	2014/10/22	NC		%	20
		Dissolved Thallium (Tl)	2014/10/22	NC		%	20
		Dissolved Tin (Sn)	2014/10/22	NC		%	20
		Dissolved Titanium (Ti)	2014/10/22	NC		%	20
		Dissolved Uranium (U)	2014/10/22	NC		%	20
		Dissolved Vanadium (V)	2014/10/22	NC		%	20
		Dissolved Zinc (Zn)	2014/10/22	NC		%	20
7691698 SRT	Matrix Spike	Dissolved Barium (Ba)	2014/10/24		96	%	80 - 120
		Dissolved Boron (B)	2014/10/24		98	%	80 - 120
		Dissolved Calcium (Ca)	2014/10/24		NC	%	80 - 120
		Dissolved Iron (Fe)	2014/10/24		90	%	80 - 120
		Dissolved Lithium (Li)	2014/10/24		104	%	80 - 120
		Dissolved Magnesium (Mg)	2014/10/24		101	%	80 - 120
		Dissolved Manganese (Mn)	2014/10/24		94	%	80 - 120
		Dissolved Phosphorus (P)	2014/10/24		99	%	80 - 120
		Dissolved Potassium (K)	2014/10/24		113	%	80 - 120
		Dissolved Silicon (Si)	2014/10/24		90	%	80 - 120
		Dissolved Sodium (Na)	2014/10/24		102	%	80 - 120
		Dissolved Strontium (Sr)	2014/10/24		97	%	80 - 120
	Spiked Blank	Dissolved Barium (Ba)	2014/10/24		95	%	80 - 120
		Dissolved Boron (B)	2014/10/24		98	%	80 - 120
		Dissolved Calcium (Ca)	2014/10/24		95	%	80 - 120
		Dissolved Iron (Fe)	2014/10/24		90	%	80 - 120
		Dissolved Lithium (Li)	2014/10/24		102	%	80 - 120
		Dissolved Magnesium (Mg)	2014/10/24		103	%	80 - 120
		Dissolved Manganese (Mn)	2014/10/24		94	%	80 - 120
		Dissolved Phosphorus (P)	2014/10/24		96	%	80 - 120
		Dissolved Potassium (K)	2014/10/24		112	%	80 - 120
		Dissolved Silicon (Si)	2014/10/24		93	%	80 - 120
		Dissolved Sodium (Na)	2014/10/24		102	%	80 - 120
		Dissolved Strontium (Sr)	2014/10/24		95	%	80 - 120
	Method Blank	Dissolved Barium (Ba)	2014/10/24	<0.010		mg/L	
		Dissolved Boron (B)	2014/10/24	<0.020		mg/L	
		Dissolved Calcium (Ca)	2014/10/24	<0.30		mg/L	
		Dissolved Iron (Fe)	2014/10/24	<0.060		mg/L	
		Dissolved Lithium (Li)	2014/10/24	<0.020		mg/L	
		Dissolved Magnesium (Mg)	2014/10/24	<0.20		mg/L	
		Dissolved Manganese (Mn)	2014/10/24	<0.0040		mg/L	
		Dissolved Phosphorus (P)	2014/10/24	<0.10		mg/L	
		Dissolved Potassium (K)	2014/10/24	<0.30		mg/L	
		Dissolved Silicon (Si)	2014/10/24	<0.10		mg/L	
		Dissolved Sodium (Na)	2014/10/24	<0.50		mg/L	
		Dissolved Strontium (Sr)	2014/10/24	<0.020		mg/L	
		Dissolved Sulphur (S)	2014/10/24	<0.20		mg/L	
	RPD	Dissolved Barium (Ba)	2014/10/24	0.4		%	20

MAXXAM ANALYTICS
Attention: SUB CONTRACTOR
Client Project #: MB4J4887
P.O. #:
Site Location:

Quality Assurance Report (Continued)

Maxxam Job Number: CB495316

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	UNITS	QC Limits
7691698 SRT	RPD	Dissolved Boron (B)	2014/10/24	NC		%	20
		Dissolved Calcium (Ca)	2014/10/24	0.3		%	20
		Dissolved Iron (Fe)	2014/10/24	0.8		%	20
		Dissolved Lithium (Li)	2014/10/24	NC		%	20
		Dissolved Magnesium (Mg)	2014/10/24	0.5		%	20
		Dissolved Manganese (Mn)	2014/10/24	0.3		%	20
		Dissolved Phosphorus (P)	2014/10/24	NC		%	20
		Dissolved Potassium (K)	2014/10/24	NC		%	20
		Dissolved Silicon (Si)	2014/10/24	0.4		%	20
		Dissolved Sodium (Na)	2014/10/24	NC		%	20
		Dissolved Strontium (Sr)	2014/10/24	0.4		%	20
		Dissolved Sulphur (S)	2014/10/24	0.2		%	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).
NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

Validation Signature Page

Maxxam Job #: B495316

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

Ghayasuddin Khan, M.Sc., B.Ed., P.Chem, Scientific Specialist

Michelle Fritz Gatehouse, Senior Analyst

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Certificate of Analysis

Geofirma Engineering Ltd.

1 Raymond St.,Suite 200
Ottawa, ON K1R1A2
Attn: Tim Galt

Client PO: 182621-001
Project: 18-262-1
Custody:

Report Date: 31-May-2019
Order Date: 24-May-2019

Order #: 1921547

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1921547-01	BH19-01-1
1921547-02	BH19-02-1
1921547-03	BH19-02-3
1921547-04	BH19-03-1
1921547-05	BH19-04-1
1921547-06	BH19-05-1
1921547-07	BH19-06-1
1921547-08	BH19-07-1
1921547-09	BH19-08-1
1921547-10	BH19-09-1
1921547-11	BH19-10-1
1921547-12	BH19-D1

Approved By:

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis
Client: Geofirma Engineering Ltd.
Client PO: 182621-001

Report Date: 31-May-2019
Order Date: 24-May-2019
Project Description: 18-262-1

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Boron, available	MOE (HWE), EPA 200.7 - ICP-OES	29-May-19	29-May-19
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	28-May-19	30-May-19
Chromium, hexavalent - soil	MOE E3056 - Extraction, colourimetric	24-May-19	28-May-19
Conductivity	MOE E3138 - probe @25 °C, water ext	29-May-19	30-May-19
Cyanide, free	MOE E3015 - Auto Colour, water extraction	24-May-19	28-May-19
Mercury by CVAA	EPA 7471B - CVAA, digestion	29-May-19	29-May-19
pH, soil	EPA 150.1 - pH probe @ 25 °C, CaCl buffered ext.	28-May-19	28-May-19
PHC F1	CWS Tier 1 - P&T GC-FID	28-May-19	30-May-19
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	24-May-19	27-May-19
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	29-May-19	29-May-19
REG 153: PAHs by GC-MS	EPA 8270 - GC-MS, extraction	24-May-19	31-May-19
SAR	Calculated	29-May-19	29-May-19
Solids, %	Gravimetric, calculation	29-May-19	29-May-19

Certificate of Analysis
Client: Geofirma Engineering Ltd.
Client PO: 182621-001

Report Date: 31-May-2019
Order Date: 24-May-2019
Project Description: 18-262-1

	Client ID:	BH19-01-1	BH19-02-1	BH19-02-3	BH19-03-1
	Sample Date:	24-May-19 00:00	24-May-19 00:00	24-May-19 00:00	24-May-19 00:00
	Sample ID:	1921547-01	1921547-02	1921547-03	1921547-04
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	89.6	89.0	88.4	86.2
General Inorganics					
SAR	0.01 N/A	0.17	0.38	0.39	0.24
Conductivity	5 uS/cm	185	180	136	238
Cyanide, free	0.03 ug/g dry	<0.03	<0.03	<0.03	<0.03
pH	0.05 pH Units	7.74	7.79	7.86	7.74
Metals					
Antimony	1.0 ug/g dry	<1.0	1.3	<1.0	<1.0
Arsenic	1.0 ug/g dry	4.2	5.9	1.9	4.0
Barium	1.0 ug/g dry	158	269	73.0	286
Beryllium	0.5 ug/g dry	0.6	<0.5	<0.5	0.7
Boron	5.0 ug/g dry	10.2	14.4	7.0	10.2
Boron, available	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	5.0 ug/g dry	36.0	50.2	12.1	63.5
Chromium (VI)	0.2 ug/g dry	<0.2	<0.2	<0.2	<0.2
Cobalt	1.0 ug/g dry	10.8	13.6	5.3	14.8
Copper	5.0 ug/g dry	26.0	41.9	15.1	37.0
Lead	1.0 ug/g dry	46.3	92.5	5.3	56.4
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	<0.1
Molybdenum	1.0 ug/g dry	<1.0	1.1	<1.0	<1.0
Nickel	5.0 ug/g dry	23.0	32.7	10.8	38.6
Selenium	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Silver	0.3 ug/g dry	<0.3	<0.3	<0.3	<0.3
Thallium	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Uranium	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Vanadium	10.0 ug/g dry	45.7	55.9	26.6	64.5
Zinc	20.0 ug/g dry	80.9	130	27.2	107
Semi-Volatiles					
Acenaphthene	0.02 ug/g dry	0.10	0.04	<0.02	0.42
Acenaphthylene	0.02 ug/g dry	0.07	0.07	<0.02	0.47
Anthracene	0.02 ug/g dry	0.36	0.13	<0.02	2.01
Benzo [a] anthracene	0.02 ug/g dry	0.81	0.25	<0.02	3.43
Benzo [a] pyrene	0.02 ug/g dry	0.65	0.21	<0.02	2.14
Benzo [b] fluoranthene	0.02 ug/g dry	0.77	0.36	<0.02	3.13

Certificate of Analysis
Client: Geofirma Engineering Ltd.
Client PO: 182621-001

Report Date: 31-May-2019
Order Date: 24-May-2019
Project Description: 18-262-1

	Client ID:	BH19-01-1	BH19-02-1	BH19-02-3	BH19-03-1
	Sample Date:	24-May-19 00:00	24-May-19 00:00	24-May-19 00:00	24-May-19 00:00
	Sample ID:	1921547-01	1921547-02	1921547-03	1921547-04
	MDL/Units	Soil	Soil	Soil	Soil
Benzo [g,h,i] perylene	0.02 ug/g dry	0.48	0.14	<0.02	0.97
Benzo [k] fluoranthene	0.02 ug/g dry	0.36	0.26	<0.02	2.20
Chrysene	0.02 ug/g dry	0.82	0.30	<0.02	3.38
Dibenzo [a,h] anthracene	0.02 ug/g dry	0.12	0.04	<0.02	0.25
Fluoranthene	0.02 ug/g dry	1.60	0.55	<0.02	8.22
Fluorene	0.02 ug/g dry	0.12	0.05	<0.02	0.80
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry	0.40	0.12	<0.02	0.60
1-Methylnaphthalene	0.02 ug/g dry	0.03	0.02	<0.02	0.11
2-Methylnaphthalene	0.02 ug/g dry	0.04	0.03	<0.02	0.10
Methylnaphthalene (1&2)	0.04 ug/g dry	0.07	0.05	<0.04	0.21
Naphthalene	0.01 ug/g dry	0.07	0.04	<0.01	0.12
Phenanthrene	0.02 ug/g dry	1.23	0.36	<0.02	6.64
Pyrene	0.02 ug/g dry	1.30	0.46	<0.02	6.08
2-Fluorobiphenyl	Surrogate	81.6%	86.5%	69.7%	81.8%
Terphenyl-d14	Surrogate	92.6%	100%	103%	83.7%

Certificate of Analysis

Client: Geofirma Engineering Ltd.

Client PO: 182621-001

Report Date: 31-May-2019

Order Date: 24-May-2019

Project Description: 18-262-1

	Client ID:	BH19-04-1	BH19-05-1	BH19-06-1	BH19-07-1
	Sample Date:	24-May-19 00:00	24-May-19 00:00	24-May-19 00:00	24-May-19 00:00
	Sample ID:	1921547-05	1921547-06	1921547-07	1921547-08
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	89.9	84.5	89.5	82.4
General Inorganics					
SAR	0.01 N/A	0.12	0.12	-	-
Conductivity	5 uS/cm	160	197	-	-
Cyanide, free	0.03 ug/g dry	<0.03	<0.03	-	-
pH	0.05 pH Units	7.73	7.66	-	-
Metals					
Antimony	1.0 ug/g dry	<1.0	2.0	-	-
Arsenic	1.0 ug/g dry	3.9	5.8	-	-
Barium	1.0 ug/g dry	204	225	-	-
Beryllium	0.5 ug/g dry	0.6	0.6	-	-
Boron	5.0 ug/g dry	10.0	11.1	-	-
Boron, available	0.5 ug/g dry	<0.5	<0.5	-	-
Cadmium	0.5 ug/g dry	<0.5	0.5	-	-
Chromium	5.0 ug/g dry	41.0	39.5	-	-
Chromium (VI)	0.2 ug/g dry	2.5	<0.2	-	-
Cobalt	1.0 ug/g dry	11.1	10.3	-	-
Copper	5.0 ug/g dry	27.9	42.1	-	-
Lead	1.0 ug/g dry	52.0	176	-	-
Mercury	0.1 ug/g dry	<0.1	<0.1	-	-
Molybdenum	1.0 ug/g dry	1.4	1.8	-	-
Nickel	5.0 ug/g dry	25.4	27.0	-	-
Selenium	1.0 ug/g dry	<1.0	<1.0	-	-
Silver	0.3 ug/g dry	<0.3	<0.3	-	-
Thallium	1.0 ug/g dry	<1.0	<1.0	-	-
Uranium	1.0 ug/g dry	<1.0	<1.0	-	-
Vanadium	10.0 ug/g dry	44.4	41.9	-	-
Zinc	20.0 ug/g dry	83.5	153	-	-
Volatiles					
Benzene	0.02 ug/g dry	-	-	<0.02	<0.02
Ethylbenzene	0.05 ug/g dry	-	-	<0.05	<0.05
Toluene	0.05 ug/g dry	-	-	<0.05	<0.05
m,p-Xylenes	0.05 ug/g dry	-	-	<0.05	<0.05
o-Xylene	0.05 ug/g dry	-	-	<0.05	<0.05
Xylenes, total	0.05 ug/g dry	-	-	<0.05	<0.05

Certificate of Analysis
Client: Geofirma Engineering Ltd.
Client PO: 182621-001

Report Date: 31-May-2019
Order Date: 24-May-2019
Project Description: 18-262-1

	Client ID:	BH19-04-1	BH19-05-1	BH19-06-1	BH19-07-1
	Sample Date:	24-May-19 00:00	24-May-19 00:00	24-May-19 00:00	24-May-19 00:00
	Sample ID:	1921547-05	1921547-06	1921547-07	1921547-08
	MDL/Units	Soil	Soil	Soil	Soil
Toluene-d8	Surrogate	-	-	99.2%	98.4%
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	-	-	<7	<7
F2 PHCs (C10-C16)	4 ug/g dry	-	-	<4	<4
F3 PHCs (C16-C34)	8 ug/g dry	-	-	<8	71
F4 PHCs (C34-C50)	6 ug/g dry	-	-	<6	40
Semi-Volatiles					
Acenaphthene	0.02 ug/g dry	0.37	0.03	-	-
Acenaphthylene	0.02 ug/g dry	0.30	0.09	-	-
Anthracene	0.02 ug/g dry	1.25	0.11	-	-
Benzo [a] anthracene	0.02 ug/g dry	2.31	0.28	-	-
Benzo [a] pyrene	0.02 ug/g dry	1.59	0.24	-	-
Benzo [b] fluoranthene	0.02 ug/g dry	2.37	0.43	-	-
Benzo [g,h,i] perylene	0.02 ug/g dry	0.87	0.17	-	-
Benzo [k] fluoranthene	0.02 ug/g dry	1.85	0.26	-	-
Chrysene	0.02 ug/g dry	2.35	0.33	-	-
Dibenzo [a,h] anthracene	0.02 ug/g dry	0.23	0.04	-	-
Fluoranthene	0.02 ug/g dry	5.26	0.59	-	-
Fluorene	0.02 ug/g dry	0.53	0.03	-	-
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry	0.82	0.13	-	-
1-Methylnaphthalene	0.02 ug/g dry	0.10	<0.02	-	-
2-Methylnaphthalene	0.02 ug/g dry	0.12	<0.02	-	-
Methylnaphthalene (1&2)	0.04 ug/g dry	0.21	<0.04	-	-
Naphthalene	0.01 ug/g dry	0.21	0.02	-	-
Phenanthrene	0.02 ug/g dry	4.16	0.37	-	-
Pyrene	0.02 ug/g dry	4.06	0.49	-	-
2-Fluorobiphenyl	Surrogate	96.5%	92.3%	-	-
Terphenyl-d14	Surrogate	98.1%	100%	-	-

Certificate of Analysis

Client: Geofirma Engineering Ltd.

Client PO: 182621-001

Report Date: 31-May-2019

Order Date: 24-May-2019

Project Description: 18-262-1

	Client ID:	BH19-08-1	BH19-09-1	BH19-10-1	BH19-D1
	Sample Date:	24-May-19 00:00	24-May-19 00:00	24-May-19 00:00	24-May-19 00:00
	Sample ID:	1921547-09	1921547-10	1921547-11	1921547-12
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	83.8	93.9	93.9	89.8
General Inorganics					
SAR	0.01 N/A	0.37	-	-	0.39
Conductivity	5 uS/cm	235	-	-	183
Cyanide, free	0.03 ug/g dry	<0.03	-	-	<0.03
pH	0.05 pH Units	7.61	-	-	7.66
Metals					
Antimony	1.0 ug/g dry	1.1	-	-	<1.0
Arsenic	1.0 ug/g dry	4.9	-	-	4.5
Barium	1.0 ug/g dry	317	-	-	291
Beryllium	0.5 ug/g dry	0.9	-	-	0.7
Boron	5.0 ug/g dry	18.9	-	-	12.1
Boron, available	0.5 ug/g dry	0.6	-	-	<0.5
Cadmium	0.5 ug/g dry	<0.5	-	-	<0.5
Chromium	5.0 ug/g dry	55.8	-	-	41.1
Chromium (VI)	0.2 ug/g dry	<0.2	-	-	<0.2
Cobalt	1.0 ug/g dry	12.3	-	-	12.3
Copper	5.0 ug/g dry	36.6	-	-	29.7
Lead	1.0 ug/g dry	221	-	-	58.7
Mercury	0.1 ug/g dry	<0.1	-	-	<0.1
Molybdenum	1.0 ug/g dry	<1.0	-	-	<1.0
Nickel	5.0 ug/g dry	32.4	-	-	26.7
Selenium	1.0 ug/g dry	<1.0	-	-	<1.0
Silver	0.3 ug/g dry	<0.3	-	-	<0.3
Thallium	1.0 ug/g dry	<1.0	-	-	<1.0
Uranium	1.0 ug/g dry	<1.0	-	-	<1.0
Vanadium	10.0 ug/g dry	49.9	-	-	51.2
Zinc	20.0 ug/g dry	205	-	-	93.3
Volatiles					
Benzene	0.02 ug/g dry	-	<0.02	<0.02	-
Ethylbenzene	0.05 ug/g dry	-	<0.05	<0.05	-
Toluene	0.05 ug/g dry	-	<0.05	<0.05	-
m,p-Xylenes	0.05 ug/g dry	-	<0.05	<0.05	-
o-Xylene	0.05 ug/g dry	-	<0.05	<0.05	-
Xylenes, total	0.05 ug/g dry	-	<0.05	<0.05	-

Certificate of Analysis

Client: Geofirma Engineering Ltd.

Client PO: 182621-001

Report Date: 31-May-2019

Order Date: 24-May-2019

Project Description: 18-262-1

	Client ID:	BH19-08-1	BH19-09-1	BH19-10-1	BH19-D1
	Sample Date:	24-May-19 00:00	24-May-19 00:00	24-May-19 00:00	24-May-19 00:00
	Sample ID:	1921547-09	1921547-10	1921547-11	1921547-12
	MDL/Units	Soil	Soil	Soil	Soil
Toluene-d8	Surrogate	-	95.2%	95.4%	-
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	-	<7	<7	-
F2 PHCs (C10-C16)	4 ug/g dry	-	5	<4	-
F3 PHCs (C16-C34)	8 ug/g dry	-	33	45	-
F4 PHCs (C34-C50)	6 ug/g dry	-	11	30	-
Semi-Volatiles					
Acenaphthene	0.02 ug/g dry	0.19	-	-	0.08
Acenaphthylene	0.02 ug/g dry	0.11	-	-	0.09
Anthracene	0.02 ug/g dry	0.73	-	-	0.24
Benzo [a] anthracene	0.02 ug/g dry	1.81	-	-	0.50
Benzo [a] pyrene	0.02 ug/g dry	1.63	-	-	0.43
Benzo [b] fluoranthene	0.02 ug/g dry	2.45	-	-	0.57
Benzo [g,h,i] perylene	0.02 ug/g dry	1.07	-	-	0.42
Benzo [k] fluoranthene	0.02 ug/g dry	1.42	-	-	0.25
Chrysene	0.02 ug/g dry	1.92	-	-	0.56
Dibenzo [a,h] anthracene	0.02 ug/g dry	0.24	-	-	0.09
Fluoranthene	0.02 ug/g dry	4.04	-	-	1.11
Fluorene	0.02 ug/g dry	0.22	-	-	0.10
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry	1.00	-	-	0.30
1-Methylnaphthalene	0.02 ug/g dry	0.06	-	-	<0.02
2-Methylnaphthalene	0.02 ug/g dry	0.06	-	-	0.02
Methylnaphthalene (1&2)	0.04 ug/g dry	0.12	-	-	0.04
Naphthalene	0.01 ug/g dry	0.11	-	-	0.04
Phenanthrene	0.02 ug/g dry	2.27	-	-	0.71
Pyrene	0.02 ug/g dry	3.12	-	-	0.89
2-Fluorobiphenyl	Surrogate	91.2%	-	-	78.4%
Terphenyl-d14	Surrogate	94.5%	-	-	109%

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
Conductivity	ND	5	uS/cm						
Cyanide, free	ND	0.03	ug/g						
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g						
F2 PHCs (C10-C16)	ND	4	ug/g						
F3 PHCs (C16-C34)	ND	8	ug/g						
F4 PHCs (C34-C50)	ND	6	ug/g						
Metals									
Antimony	ND	1.0	ug/g						
Arsenic	ND	1.0	ug/g						
Barium	ND	1.0	ug/g						
Beryllium	ND	0.5	ug/g						
Boron, available	ND	0.5	ug/g						
Boron	ND	5.0	ug/g						
Cadmium	ND	0.5	ug/g						
Chromium (VI)	ND	0.2	ug/g						
Chromium	ND	5.0	ug/g						
Cobalt	ND	1.0	ug/g						
Copper	ND	5.0	ug/g						
Lead	ND	1.0	ug/g						
Mercury	ND	0.1	ug/g						
Molybdenum	ND	1.0	ug/g						
Nickel	ND	5.0	ug/g						
Selenium	ND	1.0	ug/g						
Silver	ND	0.3	ug/g						
Thallium	ND	1.0	ug/g						
Uranium	ND	1.0	ug/g						
Vanadium	ND	10.0	ug/g						
Zinc	ND	20.0	ug/g						
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g						
Acenaphthylene	ND	0.02	ug/g						
Anthracene	ND	0.02	ug/g						
Benzo [a] anthracene	ND	0.02	ug/g						
Benzo [a] pyrene	ND	0.02	ug/g						
Benzo [b] fluoranthene	ND	0.02	ug/g						
Benzo [g,h,i] perylene	ND	0.02	ug/g						
Benzo [k] fluoranthene	ND	0.02	ug/g						
Chrysene	ND	0.02	ug/g						
Dibenzo [a,h] anthracene	ND	0.02	ug/g						
Fluoranthene	ND	0.02	ug/g						
Fluorene	ND	0.02	ug/g						
Indeno [1,2,3-cd] pyrene	ND	0.02	ug/g						
1-Methylnaphthalene	ND	0.02	ug/g						
2-Methylnaphthalene	ND	0.02	ug/g						
Methylnaphthalene (1&2)	ND	0.04	ug/g						
Naphthalene	ND	0.01	ug/g						
Phenanthrene	ND	0.02	ug/g						
Pyrene	ND	0.02	ug/g						
Surrogate: 2-Fluorobiphenyl	*1.34*		*ug/g*		*101*	*50-140*			
Surrogate: Terphenyl-d14	*1.44*		*ug/g*		*108*	*50-140*			
Volatiles									
Benzene	ND	0.02	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						

Certificate of Analysis
Client: Geofirma Engineering Ltd.
Client PO: 182621-001

Report Date: 31-May-2019
Order Date: 24-May-2019
Project Description: 18-262-1

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Xylenes, total	ND	0.05	ug/g						
Surrogate: Toluene-d8	*8.04*		*ug/g*		*101*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
SAR	0.16	0.01	N/A	0.17			6.1	200	
Conductivity	183	5	uS/cm	185			1.3	5	
Cyanide, free	ND	0.03	ug/g dry	ND				35	
pH	6.82	0.05	pH Units	6.79			0.4	10	
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g dry	ND				40	
F2 PHCs (C10-C16)	ND	4	ug/g dry	ND				30	
F3 PHCs (C16-C34)	ND	8	ug/g dry	ND				30	
F4 PHCs (C34-C50)	ND	6	ug/g dry	ND				30	
Metals									
Antimony	1.4	1.0	ug/g dry	ND			0.0	30	
Arsenic	4.2	1.0	ug/g dry	4.2			0.3	30	
Barium	167	1.0	ug/g dry	158			5.6	30	
Beryllium	0.6	0.5	ug/g dry	0.6			1.8	30	
Boron, available	ND	0.5	ug/g dry	ND			0.0	35	
Boron	11.4	5.0	ug/g dry	10.2			11.0	30	
Cadmium	ND	0.5	ug/g dry	ND			0.0	30	
Chromium (VI)	ND	0.2	ug/g dry	ND				35	
Chromium	38.0	5.0	ug/g dry	36.0			5.4	30	
Cobalt	11.0	1.0	ug/g dry	10.8			2.3	30	
Copper	27.0	5.0	ug/g dry	26.0			3.9	30	
Lead	49.1	1.0	ug/g dry	46.3			5.9	30	
Mercury	ND	0.1	ug/g dry	ND			0.0	30	
Molybdenum	ND	1.0	ug/g dry	ND			0.0	30	
Nickel	24.3	5.0	ug/g dry	23.0			5.4	30	
Selenium	ND	1.0	ug/g dry	ND			0.0	30	
Silver	ND	0.3	ug/g dry	ND			0.0	30	
Thallium	ND	1.0	ug/g dry	ND			0.0	30	
Uranium	ND	1.0	ug/g dry	ND			0.0	30	
Vanadium	47.9	10.0	ug/g dry	45.7			4.8	30	
Zinc	89.6	20.0	ug/g dry	80.9			10.3	30	
Physical Characteristics									
% Solids	90.5	0.1	% by Wt.	90.2			0.3	25	
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g dry	ND				40	
Acenaphthylene	ND	0.02	ug/g dry	ND				40	
Anthracene	ND	0.02	ug/g dry	ND				40	
Benzo [a] anthracene	ND	0.02	ug/g dry	ND				40	
Benzo [a] pyrene	ND	0.02	ug/g dry	ND				40	
Benzo [b] fluoranthene	ND	0.02	ug/g dry	ND				40	
Benzo [g,h,i] perylene	ND	0.02	ug/g dry	ND				40	
Benzo [k] fluoranthene	ND	0.02	ug/g dry	ND				40	
Chrysene	ND	0.02	ug/g dry	ND				40	
Dibenzo [a,h] anthracene	ND	0.02	ug/g dry	ND				40	
Fluoranthene	ND	0.02	ug/g dry	ND				40	
Fluorene	ND	0.02	ug/g dry	ND				40	
Indeno [1,2,3-cd] pyrene	ND	0.02	ug/g dry	ND				40	
1-Methylnaphthalene	ND	0.02	ug/g dry	ND				40	
2-Methylnaphthalene	ND	0.02	ug/g dry	ND				40	
Naphthalene	ND	0.01	ug/g dry	ND				40	
Phenanthrene	ND	0.02	ug/g dry	ND				40	
Pyrene	ND	0.02	ug/g dry	ND				40	
Surrogate: 2-Fluorobiphenyl	*1.44*		*ug/g dry*		*84.9*	*50-140*			
Surrogate: Terphenyl-d14	*1.43*		*ug/g dry*		*84.3*	*50-140*			
Volatiles									
Benzene	ND	0.02	ug/g dry	ND				50	

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Ethylbenzene	ND	0.05	ug/g dry	ND				50	
Toluene	ND	0.05	ug/g dry	ND				50	
m,p-Xylenes	ND	0.05	ug/g dry	ND				50	
o-Xylene	ND	0.05	ug/g dry	ND				50	
Surrogate: Toluene-d8	*9.04*		*ug/g dry*		*51.1*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
Cyanide, free	0.313	0.03	ug/g	ND	92.1	70-130			
Hydrocarbons									
F1 PHCs (C6-C10)	219	7	ug/g		109	80-120			
F2 PHCs (C10-C16)	95	4	ug/g	ND	78.8	60-140			
F3 PHCs (C16-C34)	259	8	ug/g	ND	87.3	60-140			
F4 PHCs (C34-C50)	153	6	ug/g	ND	81.4	60-140			
Metals									
Antimony	43.7		ug/L	ND	86.9	70-130			
Arsenic	52.6		ug/L	1.7	102	70-130			
Barium	113		ug/L	63.2	100	70-130			
Beryllium	51.5		ug/L	ND	102	70-130			
Boron, available	4.79	0.5	ug/g	ND	95.8	70-122			
Boron	48.8		ug/L	ND	89.5	70-130			
Cadmium	47.7		ug/L	ND	95.2	70-130			
Chromium (VI)	4.3	0.2	ug/g	ND	74.0	70-130			
Chromium	67.7		ug/L	14.4	107	70-130			
Cobalt	54.8		ug/L	4.3	101	70-130			
Copper	60.0		ug/L	10.4	99.3	70-130			
Lead	68.0		ug/L	18.5	98.9	70-130			
Mercury	1.45	0.1	ug/g	ND	96.9	70-130			
Molybdenum	49.8		ug/L	ND	99.0	70-130			
Nickel	60.0		ug/L	9.2	102	70-130			
Selenium	51.2		ug/L	ND	102	70-130			
Silver	47.8		ug/L	ND	95.5	70-130			
Thallium	50.3		ug/L	ND	100	70-130			
Uranium	51.6		ug/L	ND	103	70-130			
Vanadium	71.0		ug/L	18.3	105	70-130			
Zinc	82.0		ug/L	32.3	99.3	70-130			
Semi-Volatiles									
Acenaphthene	0.166	0.02	ug/g	ND	78.6	50-140			
Acenaphthylene	0.157	0.02	ug/g	ND	74.3	50-140			
Anthracene	0.142	0.02	ug/g	ND	67.0	50-140			
Benzo [a] anthracene	0.132	0.02	ug/g	ND	62.3	50-140			
Benzo [a] pyrene	0.151	0.02	ug/g	ND	71.2	50-140			
Benzo [b] fluoranthene	0.166	0.02	ug/g	ND	78.7	50-140			
Benzo [g,h,i] perylene	0.146	0.02	ug/g	ND	69.2	50-140			
Benzo [k] fluoranthene	0.153	0.02	ug/g	ND	72.4	50-140			
Chrysene	0.147	0.02	ug/g	ND	69.4	50-140			
Dibenzo [a,h] anthracene	0.137	0.02	ug/g	ND	64.9	50-140			
Fluoranthene	0.133	0.02	ug/g	ND	63.0	50-140			
Fluorene	0.162	0.02	ug/g	ND	76.8	50-140			
Indeno [1,2,3-cd] pyrene	0.147	0.02	ug/g	ND	69.4	50-140			
1-Methylnaphthalene	0.232	0.02	ug/g	ND	110	50-140			
2-Methylnaphthalene	0.260	0.02	ug/g	ND	123	50-140			
Naphthalene	0.207	0.01	ug/g	ND	97.8	50-140			
Phenanthrene	0.131	0.02	ug/g	ND	62.0	50-140			
Pyrene	0.126	0.02	ug/g	ND	59.8	50-140			
Surrogate: 2-Fluorobiphenyl	*1.71*		*ug/g*		*101*	*50-140*			
Volatiles									
Benzene	3.71	0.02	ug/g		92.7	60-130			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Ethylbenzene	3.16	0.05	ug/g		79.0	60-130			
Toluene	3.19	0.05	ug/g		79.7	60-130			
m,p-Xylenes	6.42	0.05	ug/g		80.3	60-130			
o-Xylene	3.10	0.05	ug/g		77.4	60-130			

Qualifier Notes:

None

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.

Soil results are reported on a dry weight basis when the units are denoted with 'dry'.
Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.
- When reported, data for F4G has been processed using a silica gel cleanup.

Paracel ID: 1921547

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St. Laurent Blvd.
Ontario K1G 4J8
-749-1947
e: paracel@paracellabs.com

Chain of Custody
(Lab Use Only)

Page 1 of 2

Client Name: Geofirma Engineering		Project Reference: 18-262-1	**Turnaround Time:**
Contact Name: Tim Galt		Quote # 182621-001	☐1 Day ☐3 Day
Address: 200-1 Robinson Ave. Ottawa, ON		PO #	☐2 Day ☑Regular
Telephone: 673-232-2525		Email Address: tgalt@geofirma.com	Date Required:

Criteria: ☑O. Reg. 153/04 (As Amended) Table _ ☐RSC Filing ☐O. Reg. 558/00 ☐PWQO ☐CCME ☐SUB (Storm) ☐SUB (Sanitary) Municipality: _____ ☐Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

Paracel Order Number: 1921547

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	Inorganics
1	BH19-01-1	S		2	May 24, 2019	11:14	☐	☐	☑	☑	☑	☑	☑	☑
2	BH19-02-1	S		2	May 24, 2019	11:46	☐	☐	☑	☑	☑	☑	☑	☑
3	BH19-02-3	S		2	May 24, 2019	11:53	☐	☐	☑	☑	☑	☑	☑	☑
4	BH19-03-1	S		2	May 24, 2019	10:52	☐	☐	☑	☑	☑	☑	☑	☑
5	BH19-04-1	S		2	May 24, 2019	10:37	☐	☐	☑	☑	☑	☑	☑	☑
6	BH19-05-1	S		2	May 24, 2019	8:53	☐	☐	☑	☑	☑	☑	☑	☑
7	BH19-06-1	S		2	May 24, 2019	9:14	☑	☐	☐	☐	☐	☐	☐	☐
8	BH19-07-1	S		2	May 24, 2019	9:28	☑	☐	☐	☐	☐	☐	☐	☐
9	BH18-08-1	S		2	May 24, 2019	10:12	☐	☐	☑	☑	☑	☑	☑	☑
10	BH18-09-1	S		2	May 24, 2019	9:42	☑	☐	☐	☐	☐	☐	☐	☐

Comments: Full metals suite for O.Reg. 153/04, Inorganics (pH, conductivity, free Cn, SAR)

Method of Delivery: Walk in

Relinquished By (Sign):	Received by Driver/Depot:	Received at Lab: Ken Stewart	Verified By:
Relinquished By (Print): Tim Galt	Date/Time:	Date/Time: 24/May/19 16:33	Date/Time: May 24/19
Date/Time: 24-MAY-19 / 15:00	Temperature: _____ °C	Temperature: 19.8°C	pH Verified [ ] By: N/A

6:50pm

Paracel ID: 1921547

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Chain of Custody
(Lab Use Only)

Page 2 of 2

Client Name: Geofirma Engineering	Project Reference: 18-262-1	**Turnaround Time:**	
Contact Name: Tim Galt	Quote # 182621-001	☐ 1 Day	☐ 3 Day
Address: 200-1 Robinson Ave. Ottawa, ON	PO #	☐ 2 Day	☑ Regular
Telephone: 673-232-2525	Email Address: tgalt@geofirma.com	Date Required:	

Criteria: ☑ O. Reg. 153/04 (As Amended) Table __ ☐ RSC Filing ☐ O. Reg. 558/00 ☐ PWQO ☐ CCME ☐ SUB (Storm) ☐ SUB (Sanitary) Municipality: _____ ☐ Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

Paracel Order Number: 1921547

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	Inorganics						
1	BH19-10-1	S		2	May 24, 2019	9:55	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
2	BH19-D1	S		2	May 24, 2019		☐	☐	☑	☑	☑	☑	☑	☑	☐	☐	☐	☐	☐	☐
3		S		2			☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
4		S		2			☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
5		S		2			☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
6		S		2			☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
7		S		2			☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
8		S		2			☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
9		S		2			☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
10		S		2			☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Comments: Full metals suite for O.Reg. 153/04, Inorganics (pH, conductivity, free Cn, SAR)

Method of Delivery: Walk in

Relinquished By (Sign):	Received by Driver/Depot:	Received at Lab: Kim Stewart	Verified By:
Relinquished By (Print): Tim Galt	Date/Time:	Date/Time: 24/May/19 16:33	Date/Time: May 24/19 6:50p
Date/Time: 24/MAY-19 /15:48	Temperature: ____ °C	Temperature: 19.8 °C	pH Verified [ ] By: MA