

**Final Report – Supplemental
Soil and Groundwater
Sampling NCC Property Asset
97390, Parking Lot 19**

Lietrim Road between
Hawthorne Road and
Ramsayville Road, Ottawa,
Ontario.



Prepared for:
Siobhan Sutherland
Environmental Officer
National Capital Commission
Suite 202, 40 Elgin Street
Ottawa, Ontario
K1P 1C7

Prepared by:
Stantec Consulting Ltd.
1331 Clyde Ave., Suite 400
Ottawa, Ontario K2C 3G4

Project No. 122510780.200

October 24, 2013

Table of Contents

EXECUTIVE SUMMARY	III
1.0 INTRODUCTION	1.1
1.1 GENERAL	1.1
1.2 SITE DESCRIPTION	1.1
1.2.1 Subject Property and Surrounding Land Use	1.1
1.2.2 Site Services	1.1
1.2.3 Topography and Drainage	1.2
1.2.4 Regional Stratigraphy	1.2
1.2.5 Bedrock Stratigraphy	1.2
1.3 PREVIOUS REPORTS	1.2
1.4 REGULATORY FRAMEWORK	1.3
1.4.1 Canadian Council of Ministers of the Environment (CCME)	1.3
1.4.2 Ontario Ministry of the Environment (MOE)	1.4
1.5 SCOPE OF WORK	1.6
2.0 FIELD INVESTIGATION.....	2.1
2.1 METHODOLOGY	2.1
2.2 LABORATORY ANALYTICAL PROGRAM	2.2
3.0 RESULTS	3.1
3.1 SOIL	3.1
3.1.1 Stratigraphy	3.1
3.1.2 Combustible Soil Vapour Concentrations	3.1
3.1.3 Soil Analytical Results	3.1
3.2 GROUNDWATER	3.2
3.2.1 Groundwater Monitoring	3.2
3.2.2 Groundwater Analytical Results	3.3
3.3 QUALITY ASSURANCE/QUALITY CONTROL	3.4
4.0 CONCLUSIONS.....	4.1
5.0 RECOMMENDATIONS.....	5.1
6.0 LIMITATIONS	6.1
7.0 STANTEC QUALITY MANAGEMENT PROGRAM.....	7.1

**FINAL REPORT – SUPPLEMENTAL SOIL AND GROUNDWATER SAMPLING NCC PROPERTY
ASSET 97390, PARKING LOT 19**

LIST OF TABLES

Table 3.1 On-Site Monitoring Summary May 28, 1013	3.2
Table 3.2 Groundwater Exceedences.....	3.4
Table 1 - Soil Analytical Results - VOCs and pH	Appendix D
Table 2 - Groundwater Analytical Results - VOCs	Appendix D

LIST OF FIGURES

Drawing No. 1 – Key Plan	Appendix A
Drawing No. 2 – Site Plan.....	Appendix A
Drawing No. 3 – Groundwater Elevation and Contours - May 28, 2013.....	Appendix A
Drawing No. 4 – Groundwater Exceedences	Appendix A

LIST OF APPENDICES

APPENDIX A	FIGURES	A.1
APPENDIX B	FIELD METHODOLOGY	B.1
APPENDIX C	MONITORING WELL LOGS, GRAIN SIZE AND HYDROMETER ANALYSES..	C.1
APPENDIX D	SUMMARY ANALYTICAL TABLES	D.1
APPENDIX E	LABORATORY CERTIFICATES OF ANALYSIS	E.1

EXECUTIVE SUMMARY

Stantec Consulting Ltd. (Stantec) was retained by the National Capital Commission (NCC) to conduct a supplemental soil and groundwater sampling event at NCC Property Asset 97390 (Parking Lot 19) located between Hawthorne Road and Ramsayville Road, in Ottawa, Ontario, herein referred to as the “Site”. The Site is currently owned by the NCC, is located within the NCC Greenbelt and is used for recreational/parkland purposes. Previous investigations completed by others at the Site have revealed trichloroethylene (TCE), a dense non-aqueous phase liquid (DNAPL), exceedences in groundwater at the Site. Very limited soil sampling for TCE laboratory analysis has been conducted in the past on the Site.

The purpose of the supplemental program was to confirm delineation of TCE in groundwater along the southern property boundary adjacent to Leitrim Road. In addition Stantec conducted a limited soil sampling program along the southern boundary of the Site, and completed a groundwater monitoring and sampling program of all existing on-site wells to collect a current snapshot of on-site groundwater quality conditions with respect to volatile organic compounds (VOCs).

The Site is located between Hawthorne Road and Ramsayville Road, north of Leitrim Road, in Ottawa, Ontario. It is occupied by NCC Property Asset 97390, Greenbelt Parking Lot 19 and recreational trails. The Site is currently owned by the NCC, and was formerly leased by the Ministry of Natural Resources (MNR). Operations associated with a former MNR facility located at the Site are anticipated to be the cause of the groundwater impacts observed at the Site. This MNR facility has since been demolished and removed from the Site.

According to the City of Ottawa eMaps website, the Site and properties to the north, east, and west are zoned for agricultural and environmental protection use. Residential properties bound the Site to the south.

The scope of work for the supplemental sampling program consisted of advancing twelve boreholes to a maximum of 10 m below grade surface (bgs). Boreholes were advanced in clusters of two: six boreholes installed to a maximum depth of six m bgs, and six boreholes installed to a maximum depth of 10 m bgs. All of the boreholes were completed as groundwater monitoring wells.

In total, 11 soil samples were submitted for laboratory analysis of VOCs (including one field duplicate soil sample collected from MW13-34, SS12 (called MW13-84, SS12)), and two soil samples were submitted for pH analysis. Two representative soil samples were also collected from the coarse and fine-textured native soils for grain size analysis (including sieve and hydrometer, where applicable) to confirm the soil texture.

A full round of groundwater monitoring and sampling of all existing on-site monitoring wells was also completed during the supplemental assessment. In total, 40 groundwater samples were collected from the Site and submitted for laboratory analysis of VOCs (includes five field duplicate samples collected from MW10-11, MW10-25, MW13-30, MW13-31 and MW13-37 (called MW10-110, MW10-250, MW13-300, MW13-310, and MW13-370, respectively)). Two trip blanks were also requested from the laboratory that

FINAL REPORT – SUPPLEMENTAL SOIL AND GROUNDWATER SAMPLING NCC PROPERTY ASSET 97390, PARKING LOT 19

accompanied the groundwater samples to the lab, one for each submission. These trip blanks were also analyzed for VOCs.

The applicable criteria for the Site are as follows:

- the CCME *Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health*, residential/parkland land use with fine-grained soil;
- the *Federal Interim Groundwater Quality Guidelines*, Table 2 Generic Guidelines for Residential/Parkland use, fine-textured soil, Tier 2 - lowest value of all applicable exposure pathway guidelines: inhalation, soil organism direct contact, or freshwater aquatic life;
- the Health Canada *Guidelines for Canadian Drinking Water Quality*, updated August 2012; and
- the Ontario Table 2 Full Depth Generic Site Condition Standards, Potable Ground Water Condition, fine-textured soil, residential/parkland/institutional property use, *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act*, April 15, 2011.

Soil vapour concentrations ranged between 0 parts per million by volume (ppmv) in numerous soil samples to 15 ppmv in MW13-34 SS3.

The soil stratigraphy observed in the newly installed groundwater monitoring wells consisted of on average 1.6 metres of coarse-textured sand underlain by several metres of fine-textured silty clay.

Measured concentrations of VOCs in all the soil samples submitted for laboratory analysis were below the applicable guidelines/standards.

The soil pH in sample MW13-34 SS12 exceeded the CCME guideline of 6 to 8.

Shallow groundwater at the Site is generally trending southeast, with a small component of flow to the southwest based on the results of the groundwater monitoring completed during this supplemental program.

Groundwater vapour concentrations measured on May 28, 2013, ranged between 0 ppmv at numerous monitoring wells to 6 ppmv in MW13-37, and no measureable thickness of DNAPL was measured in any of the on-site monitoring wells.

The measured concentrations of the contaminants of concern were below the applicable guidelines/standards in all of the groundwater samples submitted during the supplemental sampling program, with the exception of the following exceedences:

**FINAL REPORT – SUPPLEMENTAL SOIL AND GROUNDWATER SAMPLING NCC PROPERTY
ASSET 97390, PARKING LOT 19**

MW09-8	-	Trichloroethylene
MW10-13	-	Trichloroethylene
MW10-17	-	Trichloroethylene
MW13-30	-	Chloroform
MW13-32	-	Chloroform
MW13-33	-	Chloroform

Concentrations of trichloroethylene and associated degradation by-products were all non-detect in the existing and newly installed groundwater monitoring wells installed along the southern property boundary.

The chloroform exceedences measured in MW13-30, MW13-32 and MW13-33 may be due to a leak in the municipal water supply line located along the southern property boundary, as chloroform is a by-product of drinking water disinfection with chlorine.

Based on the results of the supplemental soil and groundwater sampling program, Stantec makes the following recommendations:

- Resample the monitoring wells along the southern boundary of the Site to reconfirm the presence/absence of chloroform at these locations.
- Continue to monitor and sample the on-site monitoring wells for VOCs on a semi-annual basis to determine groundwater quality as some residents in the vicinity may still be using groundwater as a drinking water source down-gradient of the TCE impacted area.

The statements made in this Executive Summary text are subject to the limitations included in Section 6 and are to be read in conjunction with the remainder of this report.

FINAL REPORT – SUPPLEMENTAL SOIL AND GROUNDWATER SAMPLING NCC PROPERTY ASSET 97390, PARKING LOT 19

INTRODUCTION
October 24, 2013

1.0 INTRODUCTION

1.1 GENERAL

Stantec Consulting Ltd. (Stantec) was retained by the National Capital Commission (NCC) to conduct a supplemental soil and groundwater sampling event at NCC Property Asset 97390 (Parking Lot 19) located between Hawthorne Road and Ramsayville Road, in Ottawa, Ontario, herein referred to as the “Site”. The Site is currently owned by the NCC, is located within the NCC Greenbelt and is used for recreational/parkland purposes. Previous investigations completed by others at the Site have revealed trichloroethylene (TCE), a dense non-aqueous phase liquid (DNAPL), exceedences in groundwater at the Site. Very limited soil sampling for TCE has been conducted in the past on the Site. A key plan, illustrating the Site location, is provided on Figure No. 1, **Appendix A**.

The purpose of the supplemental program was to confirm delineation of TCE in groundwater along the southern property boundary adjacent to Leitrim Road. In addition, Stantec conducted a limited soil sampling program along the southern boundary of the Site, and completed a groundwater monitoring and sampling program of all existing on-site wells to collect a current snapshot of on-site groundwater quality conditions with respect to volatile organic compounds (VOCs).

1.2 SITE DESCRIPTION

1.2.1 Subject Property and Surrounding Land Use

The Site is located between Hawthorne Road and Ramsayville Road, north of Leitrim Road, in Ottawa, Ontario. It is occupied by NCC Property Asset 97390, Greenbelt Parking Lot 19 and recreational trails. The Site is currently owned by the NCC, and was formerly leased by the Ministry of Natural Resources (MNR). Operations associated with a former MNR facility located at the Site are anticipated to be the cause of the groundwater impacts observed at the Site. This MNR facility has since been demolished and removed from the Site.

According to the City of Ottawa eMaps website, the Site and properties to the north, east, and west are zoned for agricultural and environmental protection use. Residential properties bound the Site to the south.

A key plan, illustrating the Site location, is provided on Figure No. 1, **Appendix A**. A more detailed plan is provided on Figure No. 2, **Appendix A**.

1.2.2 Site Services

The Site was previously occupied by an MNR facility; however, the Site is currently undeveloped and used for recreational/parkland purposes. Based on the localized utility locates completed during this supplemental soil and groundwater sampling program, there are no private or public underground utilities crossing into the Site along its southern boundary, east of the access driveway. Marc Denis, an



FINAL REPORT – SUPPLEMENTAL SOIL AND GROUNDWATER SAMPLING NCC PROPERTY ASSET 97390, PARKING LOT 19

INTRODUCTION
October 24, 2013

NCC Greenbelt Officer and Site contact, indicated that the MNR facility was formerly serviced by a private water well. Mr. Denis indicated that it was his understanding that the private water well had not been decommissioned.

A search of the Ministry of the Environment's (MOE) water well records indicated that there are 10 private water wells within a 250 m radius of the Site: nine of which are used for domestic supply, one of which is used for commercial supply. The City of Ottawa installed a municipal water supply line along Leitrim Road in 1996; however, it is not known whether or not the private water wells in the vicinity of the Site are still in use.

1.2.3 Topography and Drainage

According to the Geological Survey of Canada's Map 31G/5 - Ottawa, scale 1:50,000, the topography of the Site and surrounding properties is generally flat. Unnamed branches of Ramsay Creek are located 300 metres north and south of the Site. The regional shallow groundwater flow direction is anticipated to be to the northeast, towards Ramsay Creek. It should be noted that the direction of the shallow groundwater flow in limited areas can also be influenced by the presence of underground utility corridors and is not necessarily a reflection of local groundwater flow or a replica of the Site topography.

Storm water runoff is anticipated to leave the Site via infiltration or overland flow.

1.2.4 Regional Stratigraphy

According to the Geological Survey of Canada's Map 1506A - Ottawa, scale 1:50,000, the Site and surrounding properties are underlain by offshore marine deposits consisting of clay, silty clay, and silts, which are locally overlain by thin sands. At depth, the clay is uniform and blue/grey in colour. According to the MOE's water well records, the stratigraphy encountered in the private water wells within 250 metres of the Site generally consisted of medium sands to a maximum depth of 3 metres below grade surface (m bgs), underlain by clays to depths ranging between 33 and 35 m bgs, and gravel. These private water wells were terminated in this gravel layer at total depths of approximately 38 m bgs. Bedrock was not encountered in these private water wells according to the MOE records.

1.2.5 Bedrock Stratigraphy

According to the Geological Survey of Canada's Map 1508A – Ottawa/Hull, scale 1:125,000, the bedrock geology of the Site and surrounding properties consists of Paleozoic, Ordovician, Carlsbad Formation grey shale and sandy shale with some dolomitic layers. The depth to bedrock is unknown, but as discussed above, it is anticipated to be at least 38 m bgs on-site and in the vicinity of the Site based on MOE well records.

1.3 PREVIOUS REPORTS

Two previous reports completed by others were provided to Stantec for the completion of the supplemental soil and groundwater sampling program.



FINAL REPORT – SUPPLEMENTAL SOIL AND GROUNDWATER SAMPLING NCC PROPERTY ASSET 97390, PARKING LOT 19

INTRODUCTION
October 24, 2013

Supplemental Groundwater Delineation Activities, NCC Property Asset No. 97390, Leitrim Road, Ottawa, Ontario, report dated March 16, 2011, completed by SNC Lavalin Environment.

SNC Lavalin Environment (SNC) was retained to complete a trichloroethylene delineation program in 2010/11. This assessment was completed in two stages on-site. The first stage (completed in August 2010) consisted of advancing and installing six new on-site monitoring wells, advancing and sampling groundwater from 12 temporary drive points, and sampling groundwater at eight on-site locations for analysis of VOCs. The second stage of the assessment (completed in September/October 2010) consisted of advancing and installing 10 new monitoring wells and sampling 14 on-site monitoring wells for analysis of VOCs. The inferred shallow groundwater flow direction was reported to be to the southeast based on these assessments. Based on the results of the supplemental groundwater delineation program, trichloroethylene impacts above the applicable guidelines/standards were measured in on-site groundwater; however, SNC concluded that VOC impacts were delineated on-site, and that there was no evidence of DNAPL beneath the Site. The trichloroethylene impacts were reported at the highest concentrations in the groundwater collected from the temporary drive points. Based on the observed on-site VOC impacts/exceedences, SNC recommended that a semi-annual groundwater sampling program be completed on-site for a period of two years to assess on-site groundwater quality conditions. SNC used guidelines/standards for coarse textured soil that were in effect at the time.

2011 Groundwater Monitoring Program, NCC Property Asset No. 97390, Leitrim Road, Ottawa, Ontario, report dated January 20, 2012, completed by SNC Lavalin Environment.

SNC completed groundwater monitoring and sampling activities in June and September of 2011 of 23 on-site monitoring wells. Groundwater samples were submitted for analysis of VOCs. VOC exceedences were reported in the groundwater from the Site during this investigation. SNC used the new Ontario standards for coarse textured soil that came into effect on July 1, 2011. Based on the results of this groundwater monitoring and sampling program, SNC concluded that the VOC impacts were delineated on-site, and that there was no evidence to suggest that there was DNAPL beneath the Site. The inferred shallow groundwater flow direction was reported to be to the southeast. SNC recommended that the semi-annual groundwater monitoring and sampling program continue into 2012 due to the presence of off-site private water wells that may still be in use.

1.4 REGULATORY FRAMEWORK

As the Site is currently federal property (owned by NCC) and will remain as federal property, the federal criteria would apply in evaluating the extent of impacted soil and groundwater. In addition, in the absence of federal guidelines, soil and groundwater concentration values were also compared to the applicable provincial standards.

1.4.1 Canadian Council of Ministers of the Environment (CCME)

The CCME Canadian Environmental Quality Guidelines provide limits for contaminants in soil, sediment, and surface water and are intended to maintain, improve, and/or protect environmental quality and



FINAL REPORT – SUPPLEMENTAL SOIL AND GROUNDWATER SAMPLING NCC PROPERTY ASSET 97390, PARKING LOT 19

INTRODUCTION
October 24, 2013

human health at contaminated sites in general. These criteria include numerical values for the assessment and remediation of soil and water in the context of agricultural, residential/parkland, commercial, and industrial land uses. Environmental soil and surface water quality guidelines are derived using toxicological data to determine the threshold level to key receptors.

The CCME criteria are intended for generic use and do not address site-specific conditions. They are considered generally protective of human and environmental health for specified uses of soil at contaminated sites.

Based on information presented in the monitoring well logs in **Appendix C**, 77% of the soil type (silty clay) encountered on-site during this investigation was assumed to be fine-textured based on field observations. A grain size and hydrometer analysis completed during the supplemental program of the predominant on-site soil type confirmed that the deep native soil is fine-textured. Native coarse-textured soils are also present on-site, but were only encountered at relatively shallow depths (at 1.6 m bgs on average in the 12 advanced boreholes). Results of the two sieve analyses collected during this assessment (one from the coarse and one from the fine-textured soils) are presented in **Appendix C**. Therefore, for the purposes of this investigation, all soil was assumed to be fine-textured. The fine-textured soil guidelines were also chosen based on the provincial guideline selection criteria outlined further in Section 1.4.2.

As the Site is currently used for recreational/parkland uses, the CCME, *Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health*, guidelines for a residential/parkland land use with fine-grained soil were used to assess on-site soil quality with respect to VOCs (on-line guideline summary table viewed on May 31, 2013).

Environment Canada has published the guidance document Federal Interim Groundwater Quality Guidelines for Federal Contaminated Sites (November 2012). Based on the Site conditions, the groundwater results were compared to the *Federal Interim Groundwater Quality Guidelines*, Table 2 Generic Guidelines for Residential/Parkland use, fine-textured soil, Tier 2 - lowest value of all applicable exposure pathway guidelines: inhalation, soil organism direct contact, or freshwater aquatic life, as the Site is within 500 metres of a water body (unnamed branches of Ramsay Creek).

Health Canada has published the *Guidelines for Canadian Drinking Water Quality*, updated August 2012, prepared by the Federal-Provincial-Territorial Committee on Drinking Water of the Federal-Provincial-Territorial Committee on Health and the Environment. In the absence of CCME potable groundwater guidelines, Health Canada's Expert Support under the Federal Contaminated Sites Action Plan references the Health Canada guidelines. Hence, the groundwater laboratory results have been compared to the *Guidelines for Canadian Drinking Water Quality*, updated August 2012.

1.4.2 Ontario Ministry of the Environment (MOE)

In Ontario, the roles and powers of the Ministry of the Environment (MOE) when dealing with contaminated sites are outlined primarily in the *Environmental Protection Act* (R.S.O. 1990). The MOE has a mandate to deal with situations where there is an adverse effect, or the likelihood of an adverse

FINAL REPORT – SUPPLEMENTAL SOIL AND GROUNDWATER SAMPLING NCC PROPERTY ASSET 97390, PARKING LOT 19

INTRODUCTION
October 24, 2013

effect, associated with the presence or discharge of a contaminant. *Ontario Regulation 153/04 – Records for Site Condition (O.Reg.153/04)*, effective October 1, 2004, provides advice and information to property owners and consultants to use when assessing the environmental condition of a property, when determining whether or not restoration is required and in determining the kind of restoration needed to allow continued use or reuse of the site. The Ontario Standards provides generic numerical standards for sediment, soil and groundwater quality presented as a function of land use, soil texture (medium to fine or coarse), groundwater usage (potable or non-potable), and remediation approach (full depth or stratified).

The Province of Ontario amended O.Reg. 153/04, under the Environmental Protection Act. The amendment specifies which values are acceptable in given settings for a suite of analytical parameters. These values are presented in Table 1 to Table 9 of the Provincial document *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act*, of O.Reg.153/04, as amended, April 15, 2011. The amendments to O.Reg. 153/04 came into effect on July 1, 2011.

Stantec completed a generic standards selection according to O.Reg. 153/04, as amended. The land use on-site is recreational/parkland, and there are private water wells within a 250 m radius of the Site. In addition, in Part IX, Section 42 of O.Reg. 153/04, as amended, it states that if at least 1/3 of the soil at the property, measured by volume, consists of coarse-textured soil, the coarse-textured soil standards shall apply to the Site. Coarse-textured soil is later defined in the regulation as soil that contains more than 50% by mass of particles that are 75 micrometres or larger in mean diameter. Based on field observations during the drilling of the 12 new boreholes during this supplemental program, approximately 23% of the on-site soils are coarse-grained and 77% are fine-grained. Again, a grain size and hydrometer analysis completed during the supplemental program of the predominant on-site soil type confirmed that the deep native soil is fine-textured.

Two soil samples were submitted for pH analysis during the completion of the supplemental program. The pH measured in these samples was within the acceptable limits for surficial (<1.5 m bgs) and sub-surface (>1.5 m bgs) soils of between 5-9 and 5-11 pH units, respectively. Therefore, the applicable standards for the Site are those found in Ontario Table 2 Full Depth Generic Site Condition Standards, Potable Ground Water Condition, Soil (other than sediment), fine-textured soil, residential/parkland/institutional property use, *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act*, April 15, 2011. These provincial standards were used in the determination of soil and groundwater quality to supplement the federal guidelines.

The use of fine-textured soil guidelines and standards is a departure from what was historically used on-site by others. This is due to the fact that during the historical investigations, the boreholes and probe holes terminated in coarse-textured soils, at the coarse/fine-textured soil interface. The new boreholes drilled during this investigation extended several metres into fine-textured soil. Therefore, in the historical investigations, the use of the coarse-textured soil guidelines and standards was applicable. Based on the new information obtained during this investigation, the use of the fine-textured soil guidelines and standards is appropriate.

FINAL REPORT – SUPPLEMENTAL SOIL AND GROUNDWATER SAMPLING NCC PROPERTY ASSET 97390, PARKING LOT 19

INTRODUCTION
October 24, 2013

1.5 SCOPE OF WORK

The following scope of work for the supplemental soil and groundwater sampling program was presented in Stantec's proposal no. 408359 to NCC dated December 4, 2012. The scope is generally based on the requirements of the Canadian Standards Association (CSA) *Phase II Environmental Site Assessment* (A National Standard of Canada (reaffirmed 2008)), CAN/CSA-Z769-00, March 2000. The program was completed also in accordance with the MOE *Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario* (December 1996).

The supplemental soil and groundwater sampling included the following scope of work:

- Meet with NCC and drilling contractor on-site prior to initiating drilling activities in order to determine the need to remove trees/brush to gain access to the Site.
- Complete private and public utility locates in the area of the proposed supplemental on-site drilling.
- Advance twelve boreholes to a maximum depth of 10 m below grade surface (bgs) to confirm the presence/absence of trichloroethylene delineation in the soil on the southern part of the Site adjacent to Leitrim Road. Boreholes were advanced in clusters of two: six boreholes installed to a maximum depth of six m bgs, and six boreholes installed to a maximum depth of 10 m bgs.
- Based on field observations and/or combustible vapour readings, submit select soil samples for laboratory analysis of VOCs.
- Submit one representative soil sample for grain size analysis including hydrometer (fine-textured soil), and one representative soil sample for grain size analysis (coarse-textured soil).
- Submit two soil samples for laboratory analysis of pH (surficial and sub-surface soil samples).
- Complete all twelve boreholes as monitoring wells (MW12-26 to MW12-37) to assess presence/absence of trichloroethylene impacts in the groundwater. A maximum screen length of 1.52 m (5 feet) was used to minimize groundwater mixing/dilution.
- Monitor the combustible vapour concentrations and depth to the groundwater table in:
 - All existing monitoring wells (23 in total: MW08-1 to MW08-5, MW09-8 to MW09-9, and MW10-10 to MW10-25);
 - All existing drive points (34 in total: DP08-1 to DP08-9, DP09-10 to DP09-22, DP10-23 to DP10-31 and DP10-33 to DP10-35) and;
 - *These drive points were determined to have been temporary installations during the completion of the supplemental sampling program. They were no longer accessible, and therefore were not sampled during the current program.*

FINAL REPORT – SUPPLEMENTAL SOIL AND GROUNDWATER SAMPLING NCC PROPERTY ASSET 97390, PARKING LOT 19

INTRODUCTION

October 24, 2013

- The 12 proposed monitoring wells (MW12-26 to MW12-37).
- Collect a groundwater sample from each of the above monitoring wells and drive points for laboratory analysis of VOCs. One trip blank (i.e., deionized water) was also analyzed for VOCs. A full round of groundwater sampling was proposed as recent groundwater quality data is not available for the Site, and previous investigations did not use low flow sampling techniques.
 - *Again, as stated above, the drive points that were previously installed on-site by others were temporary points. Access to these drive points is no longer possible as the casings were temporary and were removed. These locations were not sampled for VOC analyses.*
- Collect 10% blind duplicate samples for both soil and groundwater to be analyzed for VOCs.
- Drum purge water only (excess soil generated during drilling activities to remain on the Site) and remove for appropriate disposal.
- Survey elevations of the 12 newly-installed monitoring wells to tie into previous survey data to determine the local shallow ground water flow direction.
- Provide a written report summarizing the sampling work program undertaken, results obtained and conclusions / recommendations (this report).

FINAL REPORT – SUPPLEMENTAL SOIL AND GROUNDWATER SAMPLING NCC PROPERTY ASSET 97390, PARKING LOT 19

FIELD INVESTIGATION
October 24, 2013

2.0 FIELD INVESTIGATION

2.1 METHODOLOGY

Drilling of the 12 newly-installed monitoring wells was conducted using a Geoprobe Model 7822DT rubber track drill rig with casing supplied by Strata Soil Sampling Inc. (Strata). Soil samples were collected at approximately 0.6m intervals, and were split in half with one half placed directly into laboratory provided sample containers while the other half was screened for combustible vapours using a photoionization detector (PID) to measure VOCs. Based on soil vapour concentrations (combustible vapours), field observations and/or proximity to the water table, select soil samples were submitted for laboratory analysis of VOCs. The soil conditions at each sampling location were logged in the field.

Groundwater monitoring wells were installed at the newly-advanced locations using pre-packed 5 foot (1.52 m) well screens manufactured by GeoProbe and supplied by Strata to avoid cave-in of material during monitoring well installation. The screens were not installed to intersect the water table; instead they were placed at depths where the DNAPL was anticipated to be located, or at the maximum proposed installation depths. The groundwater wells were developed at the time of the installation in preparation for their sampling.

Prior to sampling, the existing and newly-installed wells were monitored for static groundwater level and thickness of DNAPL (if present) using an interface probe, and for total vapour concentrations using a PID. The groundwater samples from the existing and the newly-installed wells were collected using low flow peristaltic pump sampling techniques designed to limit volatilization of VOC parameters. Purge water collected from the on-site monitoring wells was monitored for physical parameters (temperature, conductivity, turbidity, pH, and redox potential) prior to sampling. A groundwater sample was obtained once the physical parameters stabilized at each monitoring well. The groundwater samples were then delivered directly into the laboratory-supplied sample bottles so that no headspace remained. Groundwater samples were collected from the existing and the newly-installed monitoring wells and submitted to the laboratory for analysis of VOCs. Both soil and groundwater samples were collected following approved methodologies

The soil and groundwater samples were collected in accordance with the protocols established by the Canadian Standards Association's Guideline Z769-00 *Phase II Environmental Site Assessments* and standard industry practices to ensure that all data collected is of high quality and is representative of site conditions.

The UTM co-ordinates of all sampling locations were obtained using a GPS unit accurate vertically and horizontally to 10 cm.

The soil and groundwater laboratory results were then compared against the applicable CCME soil guidelines, federal interim groundwater quality guidelines, the federal drinking water quality guidelines, and for information purposes, the 2011 Ontario Standards.

FINAL REPORT – SUPPLEMENTAL SOIL AND GROUNDWATER SAMPLING NCC PROPERTY ASSET 97390, PARKING LOT 19

FIELD INVESTIGATION
October 24, 2013

The method for this scope of work is further detailed in **Appendix B**.

2.2 LABORATORY ANALYTICAL PROGRAM

The soil and groundwater samples were submitted to Paracel Laboratories Ltd. (Paracel) in Ottawa, Ontario, for laboratory analysis on a regular 5 day turnaround time of the contaminants of potential concern identified above (VOCs). Paracel is accredited to ISO/IEC 17025, the International Quality Standard for laboratories for the required analytical methods, and employs in-house quality assurance and quality control (QA/QC) programs to govern sample analysis, including the analyses of method blanks, spiked blanks, and the analyses of duplicates (10%) for each sample batch.

In total, 11 soil samples were submitted for laboratory analysis of VOCs (includes one field duplicate soil sample collected from MW13-34, SS12 (called MW13-84, SS12)), and two soil samples were submitted for pH analysis. Two representative soil samples were also collected from the coarse and fine-textured native soils for grain size analysis (including sieve and hydrometer, where applicable).

In total, 40 groundwater samples were collected from the Site and submitted for laboratory analysis of VOCs (includes five field duplicate samples collected from MW10-11, MW10-25, MW13-30, MW13-31 and MW13-37 (called MW10-110, MW10-250, MW13-300, MW13-310, and MW13-370, respectively)). Two trip blanks were also requested from the laboratory that accompanied the groundwater samples to the lab, one for each submission. These trip blanks were also analyzed for VOCs.

Copies of the Laboratory Certificates of Analysis are provided in **Appendix E**.

FINAL REPORT – SUPPLEMENTAL SOIL AND GROUNDWATER SAMPLING NCC PROPERTY ASSET 97390, PARKING LOT 19

RESULTS

October 24, 2013

3.0 RESULTS

3.1 SOIL

3.1.1 Stratigraphy

Detailed descriptions of stratigraphy observed are provided on the Monitoring Well Logs in **Appendix C**.

The overburden at the Site generally consisted of a thin organic/peat layer underlain by coarse sand and gravel to depths ranging between 1.2 and 2.9 m bgs, underlain by silty clay to the final depths of the boreholes.

3.1.2 Combustible Soil Vapour Concentrations

Combustible soil vapour concentrations were measured in each of the soil samples collected during the supplemental sampling program using an RKI Eagle 2 equipped with a PID. The measured concentrations are provided on the Monitoring Well Logs in **Appendix C**.

Soil vapour concentrations ranged between 0 parts per million by volume (ppmv) in numerous soil samples to 15 ppmv in MW13-34 SS3.

There are no regulatory criteria for soil vapours; however, elevated vapour concentrations are generally indicative of the presence of volatile parameters. Concentrations vary with parameter type, concentration and age, and it should be noted that the readings are only intended to be used as a field screening tool to provide a qualitative measure of hydrocarbon levels within the subsurface. The readings do not provide a quantitative measure of analytical soil results.

3.1.3 Soil Analytical Results

The analytical results collected from the on-site soil samples submitted for laboratory analysis of VOCs were compared to the CCME, *Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health*, for a residential/parkland land use and fine-grained soil, (on-line summary table viewed on May 31, 2013) and the Ontario Table 2 Full Depth Generic Site Condition Standards, Potable Ground Water Condition, Soil (other than sediment), fine-textured soil, residential/parkland/institutional property use, *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act*, April 15, 2011. Summary analytical results are presented in Table 1 in **Appendix D**. Laboratory Certificates of Analysis are provided in **Appendix E**.

3.1.3.1 Volatile Organic Compounds (VOCs)

Measured concentrations of VOCs in all the soil samples submitted for laboratory analysis were non-detect and therefore below the applicable guideline/standard concentrations.

FINAL REPORT – SUPPLEMENTAL SOIL AND GROUNDWATER SAMPLING NCC PROPERTY ASSET 97390, PARKING LOT 19

RESULTS

October 24, 2013

3.1.3.2 pH

The soil pH in sample MW13-34 SS12 exceeded the CCME guideline of 6 to 8.

3.2 GROUNDWATER

3.2.1 Groundwater Monitoring

Depth to groundwater, vapour concentrations, and measurements of DNAPL, if applicable, were measured from the existing monitoring wells and the newly-installed on-site monitoring wells on May 28, 2013. Groundwater elevations were calculated in all on-site monitoring wells to determine the local shallow groundwater flow direction. Existing groundwater wells were not re-surveyed to determine groundwater elevations, as their historically measured elevations were used to tie in the newly-installed wells. Table 3.1 below summarizes the monitoring results

Table 3.1 On-Site Monitoring Summary May 28, 1013

Location	Top of casing elevation (m ASL)	Top of ground elevation (m ASL)	Groundwater Depth (m btoc)	Groundwater Depth (m bgs)	Groundwater Elevation (m ASL)	Combustible Vapour (ppmv)
MW08-1	100.64	99.78	1.62	0.76	99.02	0
MW08-2	100.70	99.66	1.70	0.66	99.00	0
MW08-3	100.38	99.51	1.43	0.56	98.95	0
MW08-4	100.47	99.63	1.48	0.64	98.99	0
MW08-5	100.90	99.63	1.80	0.53	99.10	0
MW09-8	100.34	99.26	1.73	0.65	98.87	0
MW09-9	100.34	99.47	1.40	0.53	98.94	0
MW10-10	100.45	99.29	1.77	0.61	98.68	0
MW10-11	100.32	99.22	1.50	0.40	98.82	0
MW10-12	100.20	99.07	1.37	0.24	98.83	1
MW10-13	100.79	99.69	2.18	1.08	98.61	1
MW10-14	100.93	99.86	2.17	1.10	98.76	0
MW10-15	100.86	99.83	2.14	1.11	98.72	0
MW10-16	100.60	99.40	2.10	0.90	98.50	1
MW10-17	100.94	99.87	2.55	1.48	98.39	0
MW10-18	100.67	99.56	2.36	1.25	98.31	0
MW10-19	100.74	99.67	2.27	1.20	98.47	1
MW10-20	100.88	99.75	2.40	1.27	98.48	1
MW10-21	99.83	98.66	1.97	0.80	97.88	1
MW10-22	99.17	98.02	1.50	0.35	97.67	1
MW10-23	99.56	98.38	1.81	0.62	97.75	1
MW10-24	101.22	99.95	3.08	1.81	98.14	1

FINAL REPORT – SUPPLEMENTAL SOIL AND GROUNDWATER SAMPLING NCC PROPERTY ASSET 97390, PARKING LOT 19

RESULTS

October 24, 2013

Location	Top of casing elevation (m ASL)	Top of ground elevation (m ASL)	Groundwater Depth (m btoc)	Groundwater Depth (m bgs)	Groundwater Elevation (m ASL)	Combustible Vapour (ppmv)
MW10-25	100.64	99.50	2.59	1.45	98.05	0
MW13-26	99.93	99.09	1.28	0.44	98.65	0
MW13-27	99.46	99.15	1.17	0.86	98.29	0
MW13-28	99.89	99.03	1.91	1.05	97.98	1
MW13-29	99.96	99.08	1.31	0.43	98.65	0
MW13-30	100.52	99.69	3.42	2.59	97.10	1
MW13-31	100.49	99.74	2.81	2.06	97.68	1
MW13-32	99.93	99.03	3.15	2.25	96.78	0
MW13-33	100.04	99.13	2.55	1.64	97.49	0
MW13-34	99.22	98.37	2.56	1.71	96.66	0
MW13-35	99.26	98.36	1.88	0.98	97.38	0
MW13-36	98.91	98.10	2.04	1.23	96.87	0
MW13-37	98.99	98.16	1.58	0.75	97.41	6

Notes:

- m ASL metres above sea level – measured to a local benchmark assigned with an elevation of 100.00 m ASL during previous investigations
- m btoc metres below top of casing
- m bgs metres below grade surface
- ppmv parts per million by volume

Shallow groundwater at the Site is generally trending to the southeast, with a small component of flow to the southwest. The inferred shallow groundwater flow direction is shown on Figure No.3 in **Appendix A**. The inferred direction only includes the elevations obtained from the on-site monitoring wells with screens installed at depths less than 6 m bgs, and does not include the groundwater elevation measured in MW13-26, MW13-28, MW13-30, MW13-32, MW13-34, or MW13-36. These wells had screens installed at greater depths (approximately 10 m bgs) and were therefore not included in the shallow groundwater flow determination.

Groundwater vapour concentrations measured on May 28, 2013, ranged between 0 ppmv at numerous monitoring wells to 6 ppmv in MW13-37, and no measureable thickness of DNAPL was measured in any of the on-site monitoring wells.

3.2.2 Groundwater Analytical Results

The analytical results collected from the on-site groundwater samples submitted for laboratory analysis of VOCs were compared to the *Federal Interim Groundwater Quality Guidelines*, November 2012, Table 2 Generic Guidelines for Residential/Parkland use, fine textured soil, Tier 2 (lowest value of all applicable exposure pathway guidelines: inhalation, soil organism direct contact, or freshwater aquatic life), the Health Canada *Guidelines for Canadian Drinking Water Quality*, updated August 2012, and the Ontario



FINAL REPORT – SUPPLEMENTAL SOIL AND GROUNDWATER SAMPLING NCC PROPERTY ASSET 97390, PARKING LOT 19

RESULTS

October 24, 2013

Table 2 Full Depth Generic Site Condition Standards, Potable Ground Water Condition, Soil (other than sediment), fine-textured soil, all types of property use, *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act*, April 15, 2011. Summary analytical results are presented in Table 2 in **Appendix D** and the Laboratory Certificates of Analysis are provided in **Appendix E**.

3.2.2.1 Volatile Organic Compounds (VOCs)

As indicated, the measured concentrations of the contaminants of concern were below the applicable guidelines/standards in all of the groundwater samples submitted during the supplemental sampling program, with the exception of the following:

Table 3.2 Groundwater Exceedences

Location	Parameter Exceeds Ontario Table 2	Parameter Exceeds FIGQG	Parameter Exceeds Health Canada
MW09-8	Trichloroethylene	None	Trichloroethylene
MW10-13	Trichloroethylene	None	Trichloroethylene
MW10-17	Trichloroethylene	None	Trichloroethylene
MW13-30	None	Chloroform	None
MW13-32	None	Chloroform	None
MW13-33	None	Chloroform	None

3.3 QUALITY ASSURANCE/QUALITY CONTROL

Blind duplicates are submitted for laboratory analysis to evaluate both laboratory precision and the implemented field sampling and handling procedures, in addition to the sample homogeneity. The relative percent difference (RPD) is defined as the absolute value of the variation between a sample and its duplicate, when compared to the average concentration of the original and the duplicate. It is used to assess the validity of the field and laboratory analytical procedures.

Soil

Based on the Maxxam QA/QC Interpretation Guide, a blind field duplicate has limited use for samples that cannot be homogenized (i.e., VOCs in soils). Also, the RPD calculation is only applicable when concentrations in the sample and its field duplicate are greater than five (5) times the laboratory reportable detection limit (RDL). Finally, the QA/QC Interpretation Guide specifies that the recommended RPD values for samples and their duplicates should be less than or equal to 100% RPD to ensure consistencies in laboratory and field procedures, and sample homogeneity.

A blind field duplicate soil sample was recovered from MW13-34, SS12 (called MW13-84, SS12) and submitted for laboratory analysis of VOCs. However, the RPD values could not be calculated between the original and duplicate samples listed above as both sample concentrations were below the laboratory RDL

FINAL REPORT – SUPPLEMENTAL SOIL AND GROUNDWATER SAMPLING NCC PROPERTY ASSET 97390, PARKING LOT 19

RESULTS

October 24, 2013

for all VOCs. In any case, the calculated RPDs for the soil sample and its duplicate does not suggest inconsistencies in the field collection, the laboratory analysis methods, or the sample homogeneity.

Groundwater

RPDs were calculated for the groundwater samples recovered from MW10-11 (MW10-110), MW10-25 (MW10-250), MW13-30 (MW13-300), MW13-31 (MW13-310) and MW13-37 (MW13-370). The samples were recovered simultaneously from each monitoring well. Several of the RPD values could not be calculated between the original and duplicate samples listed above as one or both concentrations were below the laboratory RDL for all VOCs.

All of the RPD values able to be calculated were within the acceptable limit for duplicate samples according to the Maxxam QA/QC Interpretation Guide (80% for groundwater). The RPD values calculated for these duplicate samples ranged between 0 and 22.5%. Therefore, the calculated RPDs for all of the groundwater samples and their duplicates do not suggest inconsistencies in the field collection, the laboratory analysis methods, or the sample homogeneity.

Groundwater Trip Blanks

Concentrations of VOCs were below the laboratory's reportable detection limit (RDL) in the two trip blank samples analyzed during this supplemental sampling program.

FINAL REPORT – SUPPLEMENTAL SOIL AND GROUNDWATER SAMPLING NCC PROPERTY ASSET 97390, PARKING LOT 19

CONCLUSIONS
October 24, 2013

4.0 CONCLUSIONS

Based on the results of the supplemental sampling program, Stantec makes the following conclusions:

- Six monitoring well clusters were advanced along the southern boundary of the Site. In total, 12 monitoring wells were installed during the completion of this supplemental sampling program. Supplemental soil sampling was completed in these 12 newly-installed monitoring wells. In total, 11 soil samples were submitted for laboratory analysis of VOCs (includes one field duplicate soil sample collected from MW13-34, SS12 (called MW13-84, SS12)), and two soil samples were submitted for pH analysis. Two representative soil samples were also collected from the coarse and fine-textured native soils for grain size analysis (including sieve and hydrometer, where applicable).
- A full round of monitoring and sampling of all existing on-site monitoring wells was also completed during the supplemental assessment. In total, 40 groundwater samples were collected from the Site and submitted for laboratory analysis of VOCs (includes five field duplicate samples collected from MW10-11, MW10-25, MW13-30, MW13-31 and MW13-37 (called MW10-110, MW10-250, MW13-300, MW13-310, and MW13-370, respectively)). Two trip blanks were also requested from the laboratory that accompanied the groundwater samples to the lab, one for each submission. These trip blanks were also analyzed for VOCs.
- The applicable criteria for the Site are as follows:
 - the CCME *Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health*, residential/parkland land use with fine-grained soil;
 - the *Federal Interim Groundwater Quality Guidelines*, Table 2 Generic Guidelines for Residential/Parkland use, fine textured soil, Tier 2 - lowest value of all applicable exposure pathway guidelines: inhalation, soil organism direct contact, or freshwater aquatic life;
 - the Health Canada *Guidelines for Canadian Drinking Water Quality*, updated August 2012; and
 - the Ontario Table 2 Full Depth Generic Site Condition Standards, Potable Ground Water Condition, fine-textured soil, residential/parkland/institutional property use, *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act*, April 15, 2011.
- Soil vapour concentrations ranged between 0 parts per million by volume (ppmv) in numerous soil samples to 15 ppmv in MW13-34 SS3.

FINAL REPORT – SUPPLEMENTAL SOIL AND GROUNDWATER SAMPLING NCC PROPERTY ASSET 97390, PARKING LOT 19

CONCLUSIONS

October 24, 2013

- Measured concentrations of VOCs in all the soil samples submitted for laboratory analysis were below the applicable guidelines/standards.
- Soil pH in sample MW13-34 SS12 exceeded the CCME guideline of 6 to 8.
- Shallow groundwater at the Site is generally trending southeast, with a small component of flow to the southwest based on the results of the groundwater monitoring completed during this supplemental program.
- Groundwater vapour concentrations measured on May 28, 2013, ranged between 0 ppmv at numerous monitoring wells to 6 ppmv in MW13-37, and no measureable thickness of DNAPL was measured in any of the on-site monitoring wells.
- The measured concentrations of the contaminants of concern were below the applicable guidelines/standards in all of the groundwater samples submitted during the supplemental sampling program, with the exception of the following exceedences:

MW09-8	-	Trichloroethylene
MW10-13	-	Trichloroethylene
MW10-17	-	Trichloroethylene
MW13-30	-	Chloroform
MW13-32	-	Chloroform
MW13-33	-	Chloroform
- Concentrations of trichloroethylene and associated degradation by-products were all non-detect in the existing and newly installed wells installed along the southern property boundary.
- The chloroform exceedences measured in MW13-30, MW13-32 and MW13-33 may be due to a leak in the municipal water supply line located along the southern property boundary, as chloroform is a by-product of drinking water disinfection with chlorine.

FINAL REPORT – SUPPLEMENTAL SOIL AND GROUNDWATER SAMPLING NCC PROPERTY ASSET 97390, PARKING LOT 19

RECOMMENDATIONS

October 24, 2013

5.0 RECOMMENDATIONS

Based on the results of the supplemental soil and groundwater sampling program, Stantec makes the following recommendations:

- Resample the monitoring wells along the southern boundary of the Site to reconfirm the presence/absence of chloroform at these locations.
- Continue to monitor and sample the on-site monitoring wells for VOCs on a semi-annual basis to determine groundwater quality as some residents in the vicinity may still be using groundwater as a drinking water source down-gradient of the TCE impacted area.

FINAL REPORT – SUPPLEMENTAL SOIL AND GROUNDWATER SAMPLING NCC PROPERTY ASSET 97390, PARKING LOT 19

LIMITATIONS
October 24, 2013

6.0 LIMITATIONS

This report documents work that was performed in accordance with generally accepted professional standards at the time and location in which the services were provided. No other representations, warranties or guarantees are made concerning the accuracy or completeness of the data or conclusions contained within this report, including no assurance that this work has uncovered all potential liabilities associated with the identified property.

This report provides an evaluation of selected environmental conditions associated with the identified portion of the property that was assessed at the time the work was conducted and is based on information obtained by and/or provided to Stantec at that time. There are no assurances regarding the accuracy and completeness of this information. All information received from the client or third parties in the preparation of this report has been assumed by Stantec to be correct. Stantec assumes no responsibility for any deficiency or inaccuracy in information received from others.

The opinions in this report can only be relied upon as they relate to the condition of the portion of the identified property that was assessed at the time the work was conducted. Activities at the property subsequent to Stantec's assessment may have significantly altered the property's condition. Stantec cannot comment on other areas of the property that were not assessed.

Conclusions made within this report consist of Stantec's professional opinion as of the time of the writing of this report, and are based solely on the scope of work described in the report, the limited data available and the results of the work. They are not a certification of the property's environmental condition. This report should not be construed as legal advice.

This report has been prepared for the exclusive use of the client identified herein and any use by any third party is prohibited. Stantec assumes no responsibility for losses, damages, liabilities or claims, howsoever arising, from third party use of this report.

This report is limited by the following:

1. Information received from NCC from work completed by others (Aqua Terre and SNC Lavalin Environment) concerning the Site.
2. Conditions observed on-site at the time of the 2013 soil sampling and groundwater monitoring/sampling events only.

The locations of any utilities, buildings and structures, and property boundaries illustrated in or described within this report, if any, including pole lines, conduits, water mains, sewers and other surface or sub-surface utilities and structures are not guaranteed. Before starting work, the exact location of all such utilities and structures should be confirmed and Stantec assumes no liability for damage to them.

FINAL REPORT – SUPPLEMENTAL SOIL AND GROUNDWATER SAMPLING NCC PROPERTY ASSET 97390, PARKING LOT 19

LIMITATIONS

October 24, 2013

The conclusions are based on the site conditions encountered by Stantec at the time the work was performed at the specific testing and/or sampling locations, and conditions may vary among sampling locations. Factors such as areas of potential concern identified in previous studies, site conditions (e.g., utilities) and cost may have constrained the sampling locations used in this assessment. In addition, analysis has been carried out for only a limited number of chemical parameters, and it should not be inferred that other chemical species are not present. Due to the nature of the investigation and the limited data available, Stantec does not warrant against undiscovered environmental liabilities nor that the sampling results are indicative of the condition of the entire site. As the purpose of this report is to identify site conditions which may pose an environmental risk; the identification of non-environmental risks to structures or people on the site is beyond the scope of this assessment.

Should additional information become available which differs significantly from our understanding of conditions presented in this report, Stantec specifically disclaims any responsibility to update the conclusions in this report.

FINAL REPORT – SUPPLEMENTAL SOIL AND GROUNDWATER SAMPLING NCC PROPERTY ASSET 97390, PARKING LOT 19

STANTEC QUALITY MANAGEMENT PROGRAM
October 24, 2013

7.0 STANTEC QUALITY MANAGEMENT PROGRAM

This report, entitled **Final Report Supplemental Soil and Groundwater Sampling NCC Property Asset 97390, Parking Lot 19**, prepared for Mrs. Siobhan Sutherland, dated October 24, 2013, was produced by Stantec Consulting Ltd.

This report was written by the following individual:

Sarah Montesano, P.Eng.
Environmental Engineer



Signature

This report was reviewed by the following individual:

Jane Yaraskavitch, M.Eng., P.Eng. (Ontario)
Senior Associate



Signature

Distribution: (1) Addressee (plus PDF on CD)

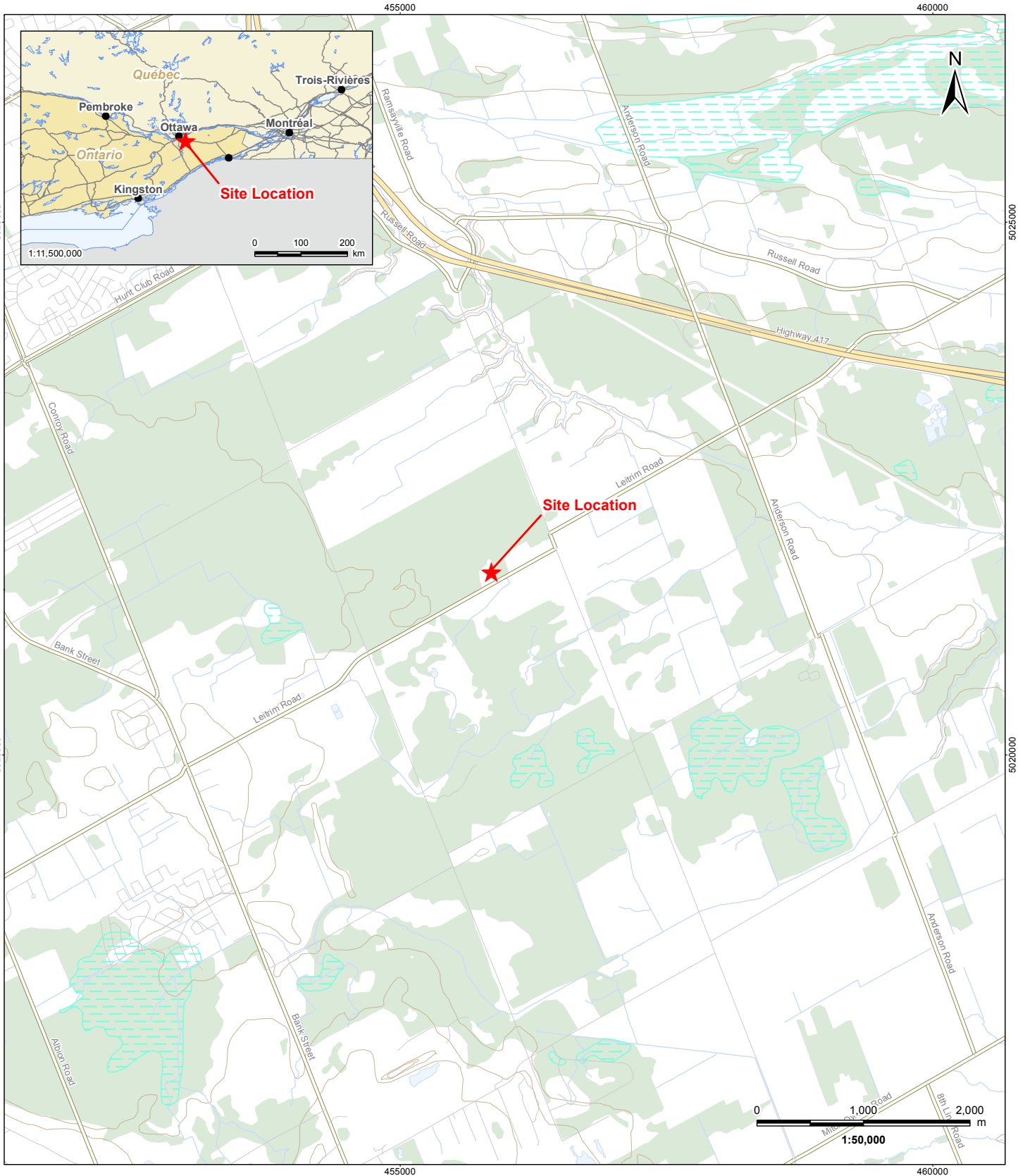
**FINAL REPORT – SUPPLEMENTAL SOIL AND GROUNDWATER SAMPLING NCC PROPERTY
ASSET 97390, PARKING LOT 19**

Appendix A
Figures
October 24, 2013

Appendix A

Figures

V:\01225\active\122510780\NCC_Leitrim_Supplemental\GIS\WDXD\122510780_Fig01_KeyPlan.mxd
Revised: 2013-07-18 By: zbartlett



July 2013
Project No.: 122510780



Stantec

Legend

★ Site Location

Notes

1. Coordinate System: NAD 1983 UTM Zone 18N
2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2010.
3. Inset map features provided by Esri.

Client/Project
National Capital Commission
Supplemental Soil and
Groundwater Sampling
Property Asset 97390, Leitrim Rd-P19

Figure No.

1

Title

Key Plan



V:\04225\active\1225107XX\122510780_NCC_Leitrim Supplemental\GIS\122510780_Fig02_SitePlan.mxd
Revised: 2013-07-22 By: zbartlett



Stantec

Legend

- Monitoring Well (Stantec)
- Monitoring Well (Other)
- Driveway
- Road shoulder
- Trail

Notes

- Coordinate System: NAD 1983 UTM Zone 18N
- Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2010.
- Orthoimagery © First Base Solutions, 2008.

Client/Project
National Capital Commission
Supplemental Soil and
Groundwater Sampling
Property Asset 97390, Leitrim Rd-P19

Figure No.
2

Title
Site Plan

July 2013
Project No.: 122510780



V:\0425\active\1225107X\122510780_NCC_Leitrim Supplemental\GIS\MD\122510780_Fig03_GWElw_20130528.mxd
Revised: 2013-07-22 By: zbartlett



Legend

- Monitoring Well (Stantec)
- Monitoring Well (Other)
- Groundwater Contour Elevation (m)
- Interpretted Groundwater Flow Direction
- Groundwater Elevation (m BGS)
- Driveway
- Road shoulder
- Trail

Notes

- Coordinate System: NAD 1983 UTM Zone 18N
- Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2010.
- Orthoimagery © First Base Solutions, 2008.
- Previous survey information collected by others used to tie in 2013 wells. Previous local survey datum was assigned an elevation of 100 m ASL.

Client/Project
National Capital Commission
Supplemental Soil and
Groundwater Sampling
Property Asset 97390, Leitrim Rd-P19

Figure No.
3

Title
**Groundwater Elevation
May 28, 2013**



Legend

- Monitoring Well (Stantec)
- Monitoring Well (Other)
- Driveway
- Road shoulder
- Trail

Notes

- Coordinate System: NAD 1983 UTM Zone 18N
- Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2010.
- Orthoimagery © First Base Solutions, 2008.
- Previous survey information collected by others used to tie in 2013 wells. Previous local survey datum was assigned an elevation of 100 m ASL.

Client/Project
National Capital Commission
Supplemental Soil and
Groundwater Sampling
Property Asset 97390, Leitrim Rd-P19

Figure No.
4

Title
Groundwater Exceedance

**FINAL REPORT – SUPPLEMENTAL SOIL AND GROUNDWATER SAMPLING NCC PROPERTY
ASSET 97390, PARKING LOT 19**

Appendix B
Field Methodology
October 24, 2013

Appendix B

Field Methodology

FINAL REPORT – SUPPLEMENTAL SOIL AND GROUNDWATER SAMPLING NCC PROPERTY ASSET 97390, PARKING LOT 19

Appendix B
Field Methodology
October 24, 2013

FIELD METHODOLOGY

1.0 PRE-DRILLING SITE INVESTIGATIONS

1.1 Service and Utility Locates

The locations of services and utilities were established prior to the drilling and sampling phase of the investigation. The sampling locations were cleared of underground utilities by a private utility locator.

2.0 DRILLING INVESTIGATION

2.1 Drilling

Twelve new boreholes were advanced to a maximum depth of 10 m below ground surface using a Geoprobe Model 7822DT rubber track drill rig with casing supplied by Strata Soil Sampling Inc. (Strata). Soil samples were collected continuously from each location with the use of disposable sleeves. Stantec personnel logged the characteristics of the materials and conducted field monitoring of petroleum hydrocarbon and volatile organic vapours.

2.2 Borehole Logging

Materials retrieved from the drilling operation were logged by Stantec personnel. The texture and composition of materials and the presence of combustible and volatile vapours or other indications of contamination were recorded.

2.3 Soil Sampling

Soil samples were collected continuously from the disposable sleeves. One half of the sample was field tested for vapours and the other half was placed in laboratory supplied containers for potential laboratory analyses.

2.4 Monitoring Wells

A 38-mm diameter PVC monitoring well was installed at each of the advanced boreholes. Bentonite sealant was placed around the top of the well to prevent vertical migration of water or contaminants from the surface, or between layers in the subsurface. The monitoring wells were fitted with caps and stick up well casings to protect them from accidental damage and accidental or intentional contamination. Completion details for the wells are included on the Monitoring Well Records provided in **Appendix C**.

3.0 BOREHOLE AND WELL SURVEY

3.1 Horizontal and Vertical Survey

FINAL REPORT – SUPPLEMENTAL SOIL AND GROUNDWATER SAMPLING NCC PROPERTY ASSET 97390, PARKING LOT 19

Appendix B
Field Methodology
October 24, 2013

Horizontal and vertical surveys of the monitoring well locations were completed using traditional survey methods. Vertical elevation control points of the monitoring wells were collected using an interface probe. Subsequent measurement of the elevation of water-air, water-product, and air-product interfaces (where applicable) were made in reference to these control points. Elevations are referenced to a local assumed benchmark. Top of casing and ground elevations of the newly-installed monitoring wells were tied into the existing wells as these were previously surveyed during on-site investigations completed by others.

3.2 Establish Static Elevations and Gradients

The elevations of water were determined under conditions where no pumping or other activity, which would influence water levels, was being conducted. These measurements are necessary for the establishment of potential gradients, which are used in establishing the pattern of contaminant migration.

Water levels were measured using an interface probe. The interface probe was rinsed between monitoring wells using distilled water.

4.0 Groundwater Sampling

Each monitoring well was developed using dedicated Waterra tubing. The purpose of well development is to remove drilling fluids, solids or other particulates that may have been introduced during drilling. Development restores the hydraulic conductivity of the aquifer material surrounding the well to as close to pre-boring conditions as possible. Where possible, at least five well volumes of water were removed from each well for development purposes.

All on-site monitoring wells were sampled using low-flow sampling techniques in order to reduce volatilization and obtain a representative groundwater sample.

5.0 QUALITY ASSURANCE/QUALITY CONTROL

All samples were collected following strict Stantec sampling procedures. Samples were uniquely labeled and control was maintained through use of chain of custody forms. All samples were collected in laboratory supplied containers and preserved in insulated coolers. Appropriate sampling QA/QC procedures were adhered to at all times.

**FINAL REPORT – SUPPLEMENTAL SOIL AND GROUNDWATER SAMPLING NCC PROPERTY
ASSET 97390, PARKING LOT 19**

Appendix C
Monitoring Well Logs, Grain Size and Hydrometer Analyses
October 24, 2013

Appendix C

Monitoring Well Logs, Grain Size and Hydrometer Analyses

SYMBOLS AND TERMS USED ON BOREHOLE AND TEST PIT RECORDS

SOIL DESCRIPTION

Terminology describing common soil genesis:

<i>Topsoil</i>	- mixture of soil and humus capable of supporting vegetative growth
<i>Peat</i>	- mixture of visible and invisible fragments of decayed organic matter
<i>Till</i>	- unstratified glacial deposit which may range from clay to boulders
<i>Fill</i>	- material below the surface identified as placed by humans (excluding buried services)

Terminology describing soil structure:

<i>Desiccated</i>	- having visible signs of weathering by oxidization of clay minerals, shrinkage cracks, etc.
<i>Fissured</i>	- having cracks, and hence a blocky structure
<i>Varved</i>	- composed of regular alternating layers of silt and clay
<i>Stratified</i>	- composed of alternating successions of different soil types, e.g. silt and sand
<i>Layer</i>	- > 75 mm in thickness
<i>Seam</i>	- 2 mm to 75 mm in thickness
<i>Parting</i>	- < 2 mm in thickness

Terminology describing soil types:

The classification of soil types is made on the basis of grain size. The classification excludes particles larger than 76 mm (3 inches).

Terminology describing cobbles, boulders, and non-matrix materials (organic matter or debris):

Terminology describing materials other than soil (e.g., particles larger than 76 mm, visible organic matter, construction debris) is based upon the proportion of these materials present:

<i>Trace, or occasional</i>	Less than 10%
<i>Some</i>	10-20%
<i>Frequent</i>	> 20%

Terminology describing compactness of cohesionless soils:

The standard terminology to describe cohesionless soils includes compactness (formerly "relative density"), as determined by the Standard Penetration Test N-Value (also known as N-Index). A relationship between compactness condition and N-Value is shown in the following table.

Compactness Condition	SPT N-Value
<i>Very Loose</i>	<4
<i>Loose</i>	4-10
<i>Compact</i>	10-30
<i>Dense</i>	30-50
<i>Very Dense</i>	>50

Terminology describing consistency of cohesive soils:

The standard terminology to describe cohesive soils includes the consistency, which is based on undrained shear strength as measured by *in situ* vane tests, penetrometer tests, or unconfined compression tests.

Consistency	Undrained Shear Strength	
	kips/sq.ft.	kPa
<i>Very Soft</i>	<0.25	<12.5
<i>Soft</i>	0.25 - 0.5	12.5 - 25
<i>Firm</i>	0.5 - 1.0	25 - 50
<i>Stiff</i>	1.0 - 2.0	50 - 100
<i>Very Stiff</i>	2.0 - 4.0	100 - 200
<i>Hard</i>	>4.0	>200



Stantec

ROCK DESCRIPTION

Terminology describing rock quality:

RQD	Rock Mass Quality
0-25	<i>Very Poor</i>
25-50	<i>Poor</i>
50-75	<i>Fair</i>
75-90	<i>Good</i>
90-100	<i>Excellent</i>

Rock quality classification is based on a modified core recovery percentage (RQD) in which all pieces of sound core over 100 mm long are counted as recovery. The smaller pieces are considered to be due to close shearing, jointing, faulting, or weathering in the rock mass and are not counted. RQD was originally intended to be done on NW core; however, it can be used on different core sizes if the bulk of the fractures caused by drilling stresses are easily distinguishable from *in situ* fractures. The terminology describing rock mass quality based on RQD is subjective and is underlain by the presumption that sound strong rock is of higher engineering value than fractured weak rock.

Terminology describing rock mass:

Spacing (mm)	Joint Classification	Bedding, Laminations, Bands
> 6000	<i>Extremely Wide</i>	-
2000-6000	<i>Very Wide</i>	<i>Very Thick</i>
600-2000	<i>Wide</i>	<i>Thick</i>
200-600	<i>Moderate</i>	<i>Medium</i>
60-200	<i>Close</i>	<i>Thin</i>
20-60	<i>Very Close</i>	<i>Very Thin</i>
<20	<i>Extremely Close</i>	<i>Laminated</i>
<6	-	<i>Thinly Laminated</i>

Terminology describing rock strength:

Strength Classification	Unconfined Compressive Strength (MPa)
<i>Extremely Weak</i>	< 1
<i>Very Weak</i>	1 – 5
<i>Weak</i>	5 – 25
<i>Medium Strong</i>	25 – 50
<i>Strong</i>	50 – 100
<i>Very Strong</i>	100 – 250
<i>Extremely Strong</i>	> 250

Terminology describing rock weathering:

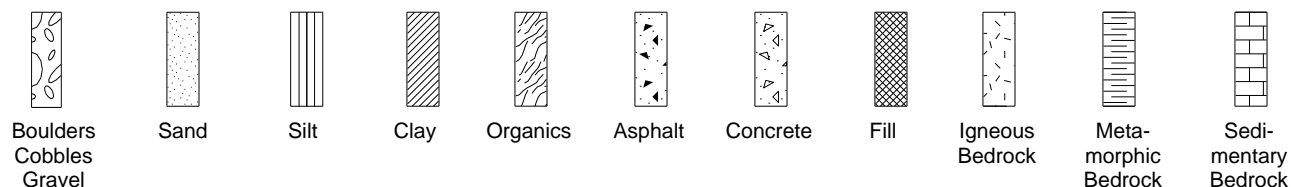
Term	Description
<i>Fresh</i>	No visible signs of rock weathering. Slight discolouration along major discontinuities
<i>Slightly Weathered</i>	Discolouration indicates weathering of rock on discontinuity surfaces. All the rock material may be discoloured.
<i>Moderately Weathered</i>	Less than half the rock is decomposed and/or disintegrated into soil.
<i>Highly Weathered</i>	More than half the rock is decomposed and/or disintegrated into soil.
<i>Completely Weathered</i>	All the rock material is decomposed and/or disintegrated into soil. The original mass structure is still largely intact.



Stantec

STRATA PLOT

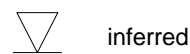
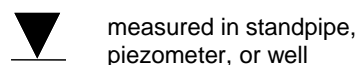
Strata plots symbolize the soil or bedrock description. They are combinations of the following basic symbols. The dimensions within the strata symbols are not indicative of the particle size, layer thickness, etc.



SAMPLE TYPE

SS	Split spoon sample (obtained by performing the Standard Penetration Test)
ST	Shelby tube or thin wall tube
PS	Piston sample
BS	Bulk sample
WS	Wash sample
HQ, NQ, BQ, etc.	Rock core samples obtained with the use of standard size diamond coring bits.

WATER LEVEL MEASUREMENT



RECOVERY

For soil samples, the recovery is recorded as the length of the soil sample recovered. For rock core, recovery is defined as the total cumulative length of all core recovered in the core barrel divided by the length drilled and is recorded as a percentage on a per run basis.

N-VALUE / RQD

Numbers in this column are the field results of the Standard Penetration Test: the number of blows of a 140 pound (64 kg) hammer falling 30 inches (760 mm), required to drive a 2 inch (50.8 mm) O.D. split spoon sampler one foot (305 mm) into the soil. For split spoon samples where insufficient penetration was achieved and N-values cannot be presented, the number of blows are reported over sampler penetration in millimetres (e.g. 50/75). Some design methods make use of N value corrected for various factors such as overburden pressure, energy ratio, borehole diameter, etc. No corrections have been applied to the N-values presented on the log. RQD is based on a modified core recovery percentage in which all pieces of sound core over 100 mm long are counted as recovery.

DYNAMIC CONE PENETRATION TEST (DCPT)

Dynamic cone penetration tests are performed using a standard 60 degree apex cone connected to A size drill rods with the same standard fall height and weight as the Standard Penetration Test. The DCPT value is the number of blows of the hammer required to drive the cone one foot (305 mm) into the soil. The DCPT is used as a probe to assess soil variability. Soil type may be inferred from adjacent boreholes and test pits.

OTHER TESTS

S	Sieve analysis
H	Hydrometer analysis
k	Laboratory permeability
γ	Unit weight
G_s	Specific gravity of soil particles
CD	Consolidated drained triaxial
CU	Consolidated undrained triaxial with pore pressure measurements
UU	Unconsolidated undrained triaxial
DS	Direct Shear
C	Consolidation
Q_u	Unconfined compression
I_p	Point Load Index (I_p on Borehole Record equals $I_p(50)$ in which the index is corrected to a reference diameter of 50 mm)

	Single packer permeability test; test interval from depth shown to bottom of borehole
	Double packer permeability test; test interval as indicated
	Falling head permeability test using casing
	Falling head permeability test using well point or piezometer

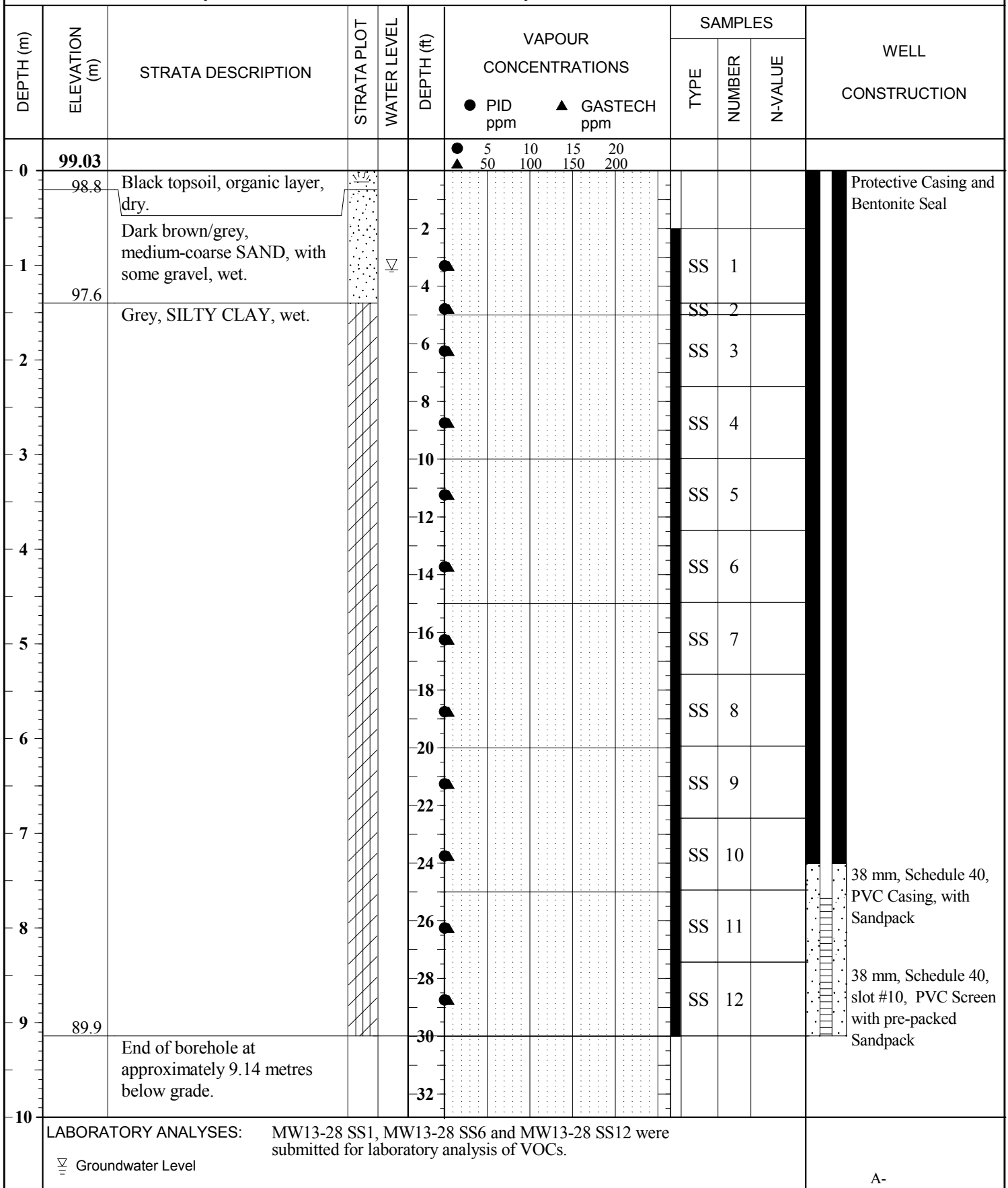


Stantec

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	VAPOUR CONCENTRATIONS				SAMPLES			WELL CONSTRUCTION
						● PID ppm	▲ GASTECH ppm			TYPE	NUMBER	N-VALUE	
0	99.09					● 5 ▲ 50	10 100	15 150	20 200				
0.9	98.9	Black topsoil, peat and trace organics, dry.			2					SS	1		Protective Casing and Bentonite Seal
1.9	97.9	Dark brown/grey, medium-coarse SAND, with some gravel, wet.			4					SS	2		
2.9		Grey, SILTY CLAY, wet, sticky, very plastic.			6					SS	3		
3.9			8				SS	4					
4.9			10				SS	5					
5.9			12				SS	6					
6.9			14				SS	7					
7.9			16				SS	8					
8.9			18				SS	9					
9.9			20				SS	10					
10.9			22				SS	11					
11.9			24				SS	12					
12.9	90.0	End of borehole at approximately 9.14 metres below grade.			30								38 mm, Schedule 40, PVC Casing, with Sandpack
13.9					32								38 mm, Schedule 40, slot #10, PVC Screen with pre-packed Sandpack
LABORATORY ANALYSES: MW13-26 SS1 and MW13-26 SS4 were submitted for laboratory analysis of VOCs.													
<div> <div>▽</div> Groundwater Level </div>													A-

[illegible]

CLIENT National Capital Commission PROJECT No. 122510780 ORIGINATED BY JU
 LOCATION NCC Property Asset 97390, Leitrim Road, Ottawa, Ontario DATUM _____ COMPILED BY JU
 DATES: BORING May 15, 2013 WATER LEVEL May 28, 2013 TPC ELEV. 99.894 CHECKED BY JAY



CLIENT National Capital Commission PROJECT No. 122510780 ORIGINATED BY JU
 LOCATION NCC Property Asset 97390, Leitrim Road, Ottawa, Ontario DATUM _____ COMPILED BY JU
 DATES: BORING May 16, 2013 WATER LEVEL May 28, 2013 TPC ELEV. 99.934 CHECKED BY JAY

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	VAPOUR CONCENTRATIONS					SAMPLES			WELL CONSTRUCTION
						● PID ppm		▲ GASTECH ppm			TYPE	NUMBER	N-VALUE	
0	99.03					● 5	10	15	20					
	98.9	Black topsoil, organic layer, dry.				▲ 50	100	150	200					
		Dark brown, medium-coarse SAND, with some gravel, wet.			2						SS	1		Protective Casing and Bentonite Seal
1					4						SS	2		
	97.5													
	97.2	Dark brown, medium-coarse SAND, with some gravel and large cobbles, wet.			6						SS	3		
2		Grey, SILTY CLAY, wet.			8						SS	4		
					10									
					12						SS	5		
					14						SS	6		
					16						SS	7		
					18						SS	8		
					20						SS	9		
					22									
					24						SS	10		
					26						SS	11		
					28									
					30						SS	12		
9	89.9	End of borehole at approximately 9.14 metres below grade.												38 mm, Schedule 40, PVC Casing, with Sandpack
														38 mm, Schedule 40, slot #10, PVC Screen with pre-packed Sandpack
10					32									
LABORATORY ANALYSES: MW13-32 SS2 was submitted for laboratory analysis of pH. MW13-32 SS7 was submitted for laboratory analysis of VOCs.														
▽ Groundwater Level														A-

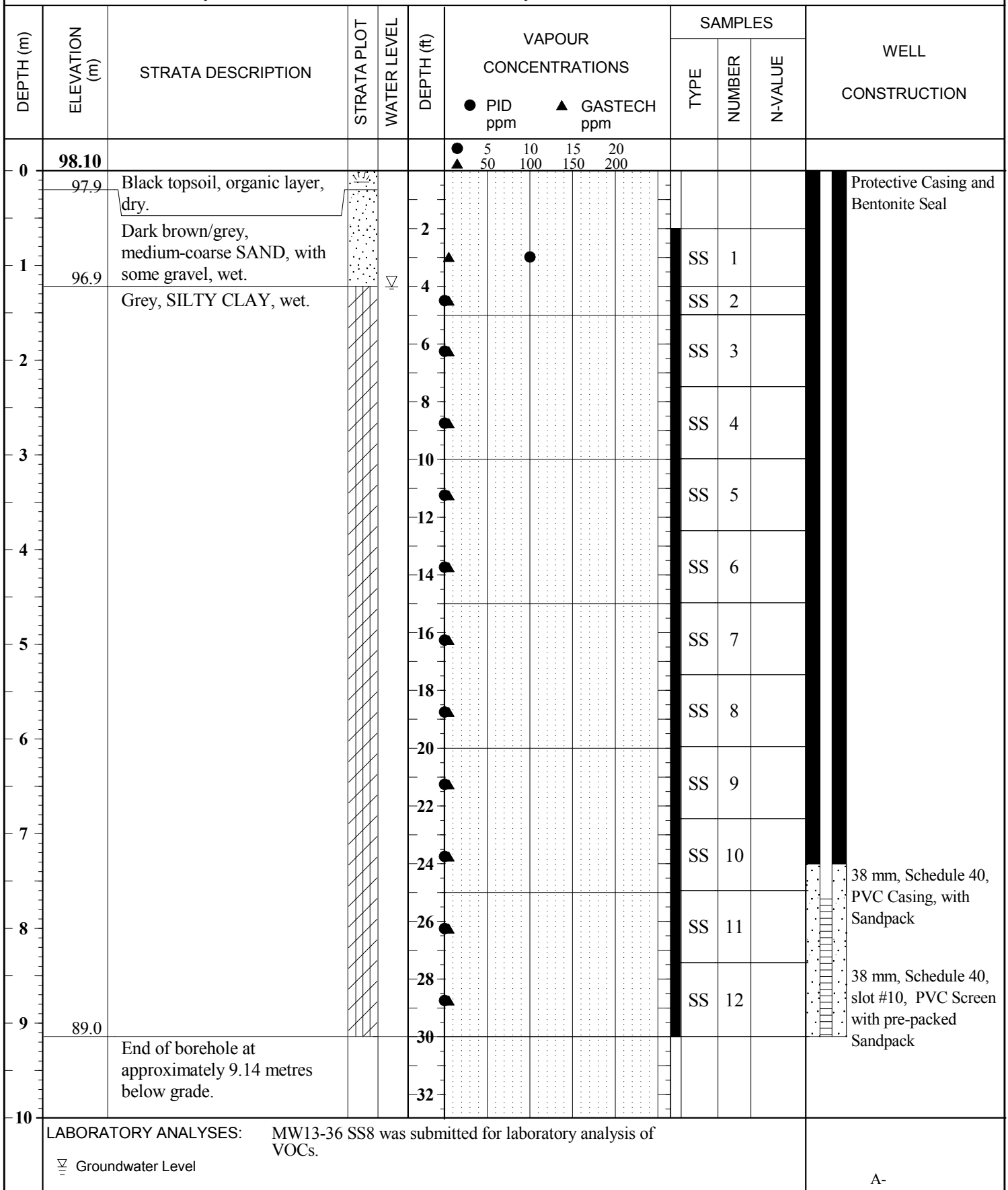
LABORATORY ANALYSES:

MW13-32 SS2 was submitted for laboratory analysis of pH. MW13-32 SS7 was submitted for laboratory analysis of VOCs.

▽ Groundwater Level

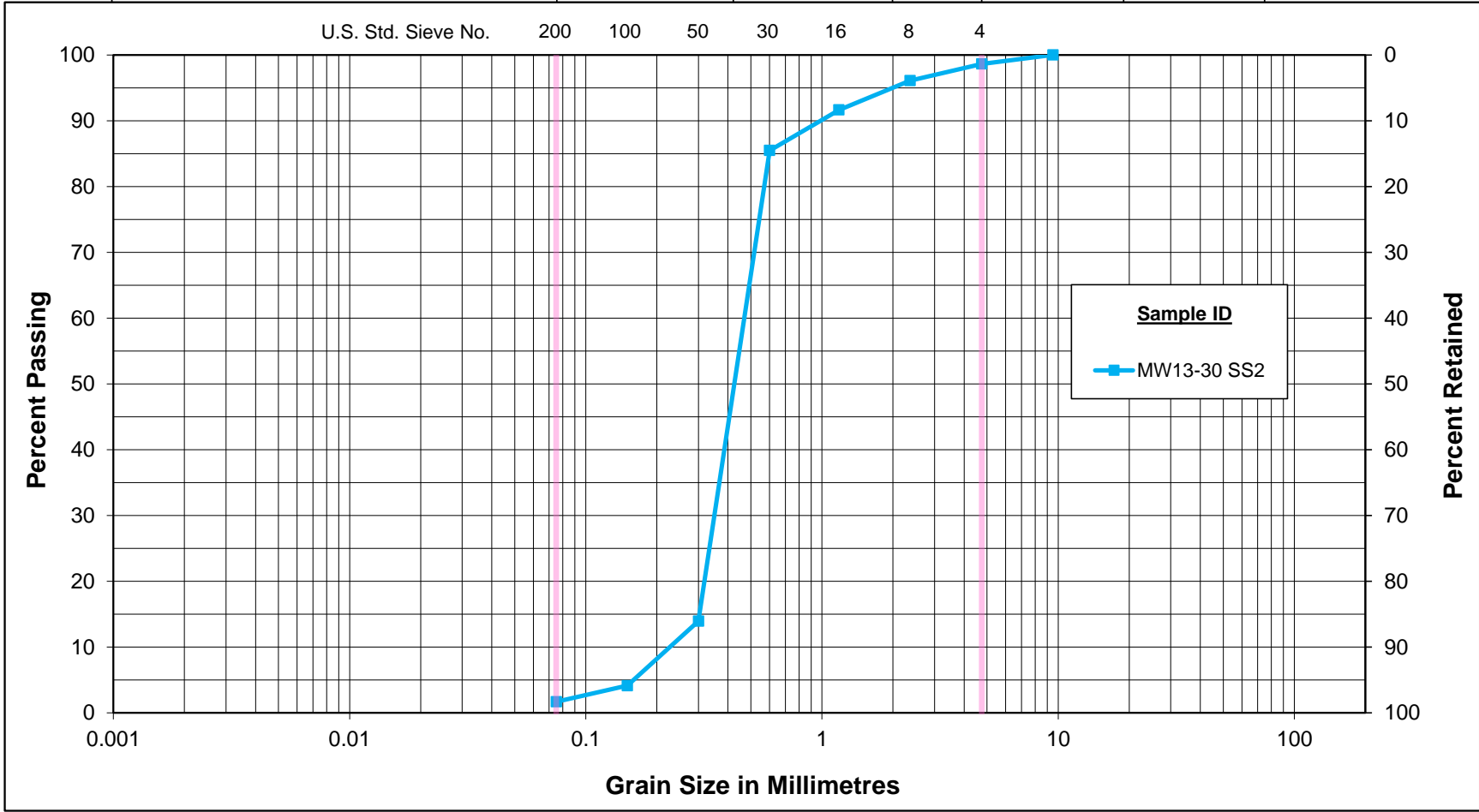
A-

CLIENT National Capital Commission PROJECT No. 122510780 ORIGINATED BY JU
 LOCATION NCC Property Asset 97390, Leitrim Road, Ottawa, Ontario DATUM _____ COMPILED BY JU
 DATES: BORING May 16, 2013 WATER LEVEL May 28, 2013 TPC ELEV. 98.914 CHECKED BY JAY



Unified Soil Classification System

CLAY & SILT	SAND			Gravel	
	Fine	Medium	Coarse	Fine	Coarse



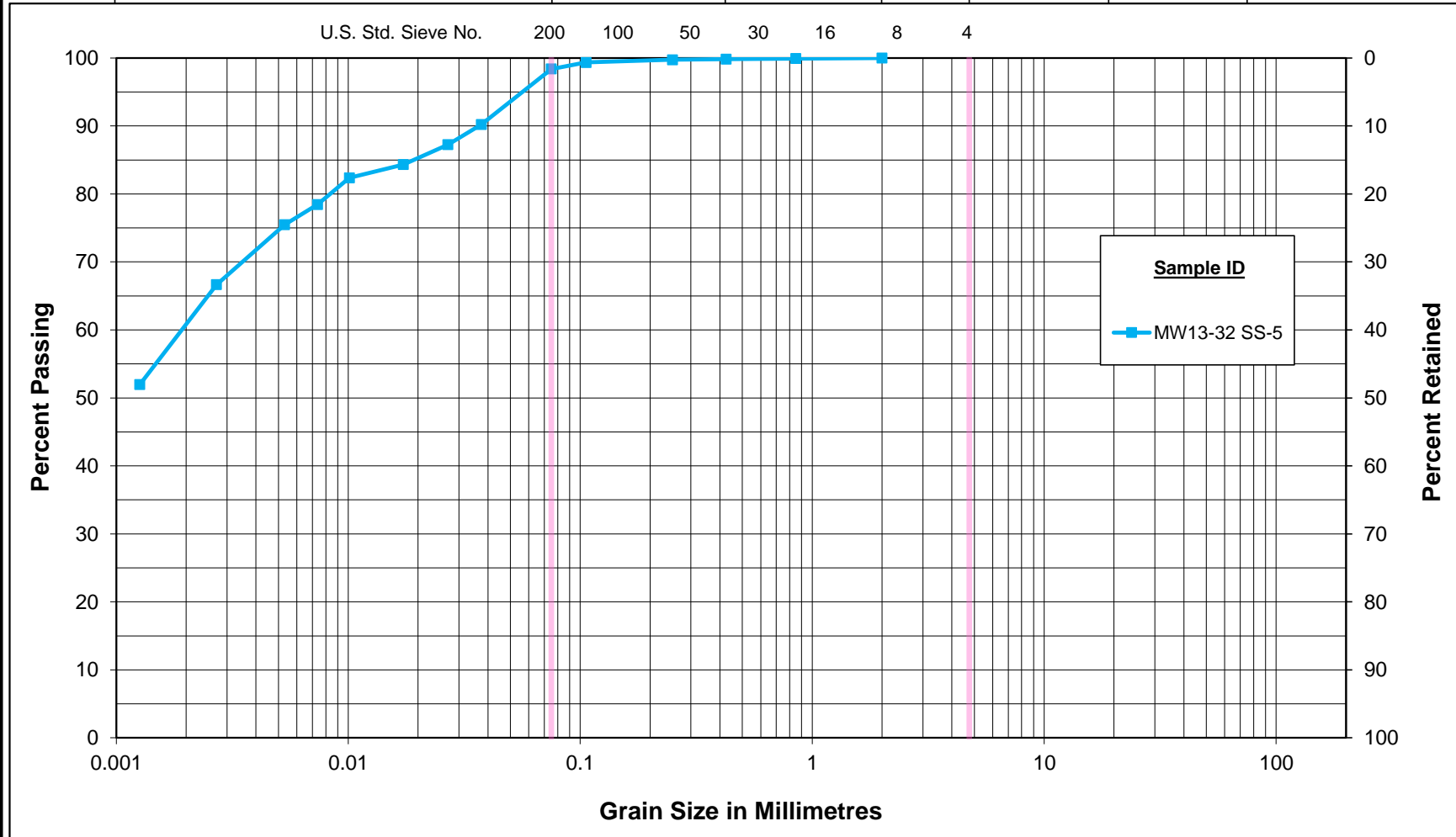
GRAIN SIZE DISTRIBUTION

Figure No. 1

Project No. 122510780

Unified Soil Classification System

CLAY & SILT	SAND			Gravel	
	Fine	Medium	Coarse	Fine	Coarse



GRAIN SIZE DISTRIBUTION

Figure No. 2

Project No. 122510780

**FINAL REPORT – SUPPLEMENTAL SOIL AND GROUNDWATER SAMPLING NCC PROPERTY
ASSET 97390, PARKING LOT 19**

Appendix D
Summary Analytical Tables
October 24, 2013

Appendix D

Summary Analytical Tables

**FINAL REPORT – SUPPLEMENTAL SOIL AND GROUNDWATER SAMPLING NCC PROPERTY
ASSET 97390, PARKING LOT 19**

Appendix E
Laboratory Certificates of Analysis
October 24, 2013

Appendix E
Laboratory Certificates of Analysis

Certificate of Analysis

Stantec Consulting Ltd. (Ottawa)

1331 Clyde Avenue Suite 400

Ottawa, ON K2C 3G4

Attn: Sarah Montesano

Phone: (613) 722-4420

Fax: (613) 738-0721

Client PO: NCC P19 Supplemental Soil & GW Assessment

Report Date: 17-Jun-2013

Project: 122510780.200

Order Date: 17-May-2013

Custody: 8625

Revised Report **Order #: 1320306**

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1320306-01	MW13-34 SS12
1320306-02	MW13-84 SS12
1320306-03	MW13-36 SS8
1320306-04	MW13-26 SS4
1320306-05	MW13-32 SS7
1320306-06	MW13-30 SS11
1320306-07	MW13-28 SS12
1320306-08	MW13-28 SS6
1320306-09	MW13-32 SS2

Approved By:



Mark Foto, M.Sc. For Dale Robertson, BSc
Laboratory Director

Any use of these results implies your agreement that our total liability in connection with this work, however arising shall be limited to the amount paid by you for this work, and that our employees or agents shall not under circumstances be liable to you in connection with this work

Certificate of AnalysisClient: **Stantec Consulting Ltd. (Ottawa)**

Client PO: NCC P19 Supplemental Soil & GW

Assessment

Project Description: 122510780.200

Report Date: 17-Jun-2013

Order Date: 17-May-2013

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
pH	EPA 150.1 - pH probe @ 25 °C, CaCl buffered ext.	22-May-13	22-May-13
Solids, %	Gravimetric, calculation	22-May-13	24-May-13
VOCs by P&T GC-MS, low level	EPA 8260 - P&T GC-MS	21-May-13	24-May-13

Certificate of Analysis

Report Date: 17-Jun-2013

Order Date: 17-May-2013

Client: **Stantec Consulting Ltd. (Ottawa)**

Client PO: NCC P19 Supplemental Soil & GW

Project Description: 122510780.200

Assessment

Client ID:	MW13-34 SS12	MW13-84 SS12	MW13-36 SS8	MW13-26 SS4
Sample Date:	16-May-13	16-May-13	16-May-13	15-May-13
Sample ID:	1320306-01	1320306-02	1320306-03	1320306-04
MDL/Units	Soil	Soil	Soil	Soil

Physical Characteristics

% Solids	0.1 % by Wt.	54.4	55.7	64.5	62.1
----------	--------------	------	------	------	------

General Inorganics

pH	0.05 pH Units	8.36	-	-	-
----	---------------	------	---	---	---

Volatiles

Acetone	0.050 ug/g dry	<0.050	<0.050	<0.050	<0.050
Benzene	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
Bromodichloromethane	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
Bromoform	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
Bromomethane	0.003 ug/g dry	<0.003	<0.003	<0.003	<0.003
Carbon Tetrachloride	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
Chlorobenzene	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
Chloroethane	0.005 ug/g dry	<0.005	<0.005	<0.005	<0.005
Chloroform	0.003 ug/g dry	<0.003	<0.003	<0.003	<0.003
Chloromethane	0.020 ug/g dry	<0.020	<0.020	<0.020	<0.020
Dibromochloromethane	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
1,2-Dibromoethane	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
1,2-Dichlorobenzene	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
1,3-Dichlorobenzene	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
1,4-Dichlorobenzene	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
1,1-Dichloroethane	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
1,2-Dichloroethane	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
1,1-Dichloroethylene	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
Dichlorodifluoromethane	0.029 ug/g dry	<0.029	<0.029	<0.029	<0.029
cis-1,2-Dichloroethylene	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
trans-1,2-Dichloroethylene	0.003 ug/g dry	<0.003	<0.003	<0.003	<0.003
1,2-Dichloroethylene, total	0.003 ug/g dry	<0.003	<0.003	<0.003	<0.003
1,2-Dichloropropane	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
cis-1,3-Dichloropropylene	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
trans-1,3-Dichloropropylene	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
1,3-Dichloropropene, total	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
Ethylbenzene	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
Hexane	0.029 ug/g dry	<0.029	<0.029	<0.029	<0.029
Methyl Ethyl Ketone (2-Butanone)	0.050 ug/g dry	<0.050	<0.050	<0.050	<0.050
Methyl Butyl Ketone (2-Hexanone)	0.050 ug/g dry	<0.050	<0.050	<0.050	<0.050

Certificate of Analysis

Report Date: 17-Jun-2013

Order Date: 17-May-2013

Client: **Stantec Consulting Ltd. (Ottawa)**

Client PO: NCC P19 Supplemental Soil & GW

Project Description: 122510780.200

Assessment

Client ID:	MW13-34 SS12	MW13-84 SS12	MW13-36 SS8	MW13-26 SS4
Sample Date:	16-May-13	16-May-13	16-May-13	15-May-13
Sample ID:	1320306-01	1320306-02	1320306-03	1320306-04
MDL/Units	Soil	Soil	Soil	Soil

Volatiles (continued)

Methyl Isobutyl Ketone	0.050 ug/g dry	<0.050	<0.050	<0.050	<0.050
Methyl tert-butyl ether	0.050 ug/g dry	<0.050	<0.050	<0.050	<0.050
Methylene Chloride	0.003 ug/g dry	<0.003	<0.003	<0.003	<0.003
Styrene	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
1,1,1,2-Tetrachloroethane	0.003 ug/g dry	<0.003	<0.003	<0.003	<0.003
1,1,2,2-Tetrachloroethane	0.003 ug/g dry	<0.003	<0.003	<0.003	<0.003
Tetrachloroethylene	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
Toluene	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
1,2,4-Trichlorobenzene	0.050 ug/g dry	<0.050	<0.050	<0.050	<0.050
1,1,1-Trichloroethane	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
1,1,2-Trichloroethane	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
Trichloroethylene	0.003 ug/g dry	<0.003	<0.003	<0.003	<0.003
Trichlorofluoromethane	0.005 ug/g dry	<0.005	<0.005	<0.005	<0.005
1,3,5-Trimethylbenzene	0.003 ug/g dry	<0.003	<0.003	<0.003	<0.003
Vinyl chloride	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
m,p-Xylenes	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
o-Xylene	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
Xylenes, total	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
4-Bromofluorobenzene	Surrogate	110%	114%	113%	114%
Dibromofluoromethane	Surrogate	106%	106%	104%	102%
Toluene-d8	Surrogate	108%	112%	109%	100%

Certificate of Analysis

Report Date: 17-Jun-2013

Order Date: 17-May-2013

Client: **Stantec Consulting Ltd. (Ottawa)**

Client PO: NCC P19 Supplemental Soil & GW

Project Description: 122510780.200

Assessment

Client ID:	MW13-32 SS7	MW13-30 SS11	MW13-28 SS12	MW13-28 SS6
Sample Date:	16-May-13	17-May-13	15-May-13	15-May-13
Sample ID:	1320306-05	1320306-06	1320306-07	1320306-08
MDL/Units	Soil	Soil	Soil	Soil

Physical Characteristics

% Solids	0.1 % by Wt.	60.5	57.8	59.3	59.4
----------	--------------	------	------	------	------

Volatiles

Acetone	0.050 ug/g dry	<0.050	<0.050	<0.050	<0.050
Benzene	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
Bromodichloromethane	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
Bromoform	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
Bromomethane	0.003 ug/g dry	<0.003	<0.003	<0.003	<0.003
Carbon Tetrachloride	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
Chlorobenzene	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
Chloroethane	0.005 ug/g dry	<0.005	<0.005	<0.005	<0.005
Chloroform	0.003 ug/g dry	<0.003	<0.003	<0.003	<0.003
Chloromethane	0.020 ug/g dry	<0.020	<0.020	<0.020	<0.020
Dibromochloromethane	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
1,2-Dibromoethane	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
1,2-Dichlorobenzene	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
1,3-Dichlorobenzene	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
1,4-Dichlorobenzene	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
1,1-Dichloroethane	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
1,2-Dichloroethane	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
1,1-Dichloroethylene	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
Dichlorodifluoromethane	0.029 ug/g dry	<0.029	<0.029	<0.029	<0.029
cis-1,2-Dichloroethylene	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
trans-1,2-Dichloroethylene	0.003 ug/g dry	<0.003	<0.003	<0.003	<0.003
1,2-Dichloroethylene, total	0.003 ug/g dry	<0.003	<0.003	<0.003	<0.003
1,2-Dichloropropane	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
cis-1,3-Dichloropropylene	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
trans-1,3-Dichloropropylene	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
1,3-Dichloropropene, total	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
Ethylbenzene	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
Hexane	0.029 ug/g dry	<0.029	<0.029	<0.029	<0.029
Methyl Ethyl Ketone (2-Butanone)	0.050 ug/g dry	<0.050	<0.050	<0.050	<0.050
Methyl Butyl Ketone (2-Hexanone)	0.050 ug/g dry	<0.050	<0.050	<0.050	<0.050
Methyl Isobutyl Ketone	0.050 ug/g dry	<0.050	<0.050	<0.050	<0.050
Methyl tert-butyl ether	0.050 ug/g dry	<0.050	<0.050	<0.050	<0.050

P: 1-800-749-1947
E: PARACEL@PARACELLABS.COM

WWW.PARACELLABS.COM

OTTAWA
300-2319 St. Laurent Blvd.
Ottawa, ON K1G 4J8

MISSISSAUGA
6645 Kitimat Rd. Unit #27
Mississauga, ON L5N 6J3

NIAGARA FALLS
5415 Morning Glory Cr.
Niagara Falls, ON L2J 0A3

SARNIA
123 Christina St. N.
Sarnia, ON N7T 5T7

Certificate of Analysis

Report Date: 17-Jun-2013

Order Date: 17-May-2013

Client: **Stantec Consulting Ltd. (Ottawa)**

Client PO: NCC P19 Supplemental Soil & GW

Project Description: 122510780.200

Assessment

Client ID:	MW13-32 SS7	MW13-30 SS11	MW13-28 SS12	MW13-28 SS6
Sample Date:	16-May-13	17-May-13	15-May-13	15-May-13
Sample ID:	1320306-05	1320306-06	1320306-07	1320306-08
MDL/Units	Soil	Soil	Soil	Soil

Volatiles (continued)

Methylene Chloride	0.003 ug/g dry	<0.003	<0.003	<0.003	<0.003
Styrene	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
1,1,1,2-Tetrachloroethane	0.003 ug/g dry	<0.003	<0.003	<0.003	<0.003
1,1,2,2-Tetrachloroethane	0.003 ug/g dry	<0.003	<0.003	<0.003	<0.003
Tetrachloroethylene	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
Toluene	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
1,2,4-Trichlorobenzene	0.050 ug/g dry	<0.050	<0.050	<0.050	<0.050
1,1,1-Trichloroethane	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
1,1,2-Trichloroethane	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
Trichloroethylene	0.003 ug/g dry	<0.003	<0.003	<0.003	<0.003
Trichlorofluoromethane	0.005 ug/g dry	<0.005	<0.005	<0.005	<0.005
1,3,5-Trimethylbenzene	0.003 ug/g dry	<0.003	<0.003	<0.003	<0.003
Vinyl chloride	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
m,p-Xylenes	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
o-Xylene	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
Xylenes, total	0.002 ug/g dry	<0.002	<0.002	<0.002	<0.002
4-Bromofluorobenzene	Surrogate	111%	114%	111%	113%
Dibromofluoromethane	Surrogate	105%	103%	102%	104%
Toluene-d8	Surrogate	110%	109%	110%	98.0%

Certificate of Analysis

Report Date: 17-Jun-2013

Order Date: 17-May-2013

 Client: **Stantec Consulting Ltd. (Ottawa)**

Client PO: NCC P19 Supplemental Soil & GW

Project Description: 122510780.200

Assessment

Client ID:	MW13-32 SS2	-	-	-
Sample Date:	16-May-13	-	-	-
Sample ID:	1320306-09	-	-	-
MDL/Units	Soil	-	-	-

Physical Characteristics

% Solids	0.1 % by Wt.	81.4	-	-	-
----------	--------------	------	---	---	---

General Inorganics

pH	0.05 pH Units	7.54	-	-	-
----	---------------	------	---	---	---

Certificate of Analysis

Report Date: 17-Jun-2013

Order Date: 17-May-2013

Client: **Stantec Consulting Ltd. (Ottawa)**

Client PO: NCC P19 Supplemental Soil & GW

Project Description: 122510780.200

Assessment

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Volatiles									
Benzene	ND	0.002	ug/g						
Bromodichloromethane	ND	0.002	ug/g						
Bromoform	ND	0.002	ug/g						
Bromomethane	ND	0.003	ug/g						
Carbon Tetrachloride	ND	0.002	ug/g						
Chlorobenzene	ND	0.002	ug/g						
Chloroethane	ND	0.005	ug/g						
Chloroform	ND	0.003	ug/g						
Chloromethane	ND	0.020	ug/g						
Dibromochloromethane	ND	0.002	ug/g						
1,2-Dibromoethane	ND	0.002	ug/g						
1,2-Dichlorobenzene	ND	0.002	ug/g						
1,3-Dichlorobenzene	ND	0.002	ug/g						
1,4-Dichlorobenzene	ND	0.002	ug/g						
1,1-Dichloroethane	ND	0.002	ug/g						
1,2-Dichloroethane	ND	0.002	ug/g						
1,1-Dichloroethylene	ND	0.002	ug/g						
cis-1,2-Dichloroethylene	ND	0.002	ug/g						
trans-1,2-Dichloroethylene	ND	0.003	ug/g						
1,2-Dichloroethylene, total	ND	0.003	ug/g						
1,2-Dichloropropane	ND	0.002	ug/g						
cis-1,3-Dichloropropylene	ND	0.002	ug/g						
trans-1,3-Dichloropropylene	ND	0.002	ug/g						
1,3-Dichloropropene, total	ND	0.002	ug/g						
Ethylbenzene	ND	0.002	ug/g						
Methylene Chloride	ND	0.003	ug/g						
Styrene	ND	0.002	ug/g						
1,1,1,2-Tetrachloroethane	ND	0.003	ug/g						
1,1,2,2-Tetrachloroethane	ND	0.003	ug/g						
Tetrachloroethylene	ND	0.002	ug/g						
Toluene	ND	0.002	ug/g						
1,1,1-Trichloroethane	ND	0.002	ug/g						
1,1,2-Trichloroethane	ND	0.002	ug/g						
Trichloroethylene	ND	0.003	ug/g						
Trichlorofluoromethane	ND	0.005	ug/g						
1,3,5-Trimethylbenzene	ND	0.003	ug/g						
Vinyl chloride	ND	0.002	ug/g						
m,p-Xylenes	ND	0.002	ug/g						
o-Xylene	ND	0.002	ug/g						
Xylenes, total	ND	0.002	ug/g						
Surrogate: 4-Bromofluorobenzene	0.154		ug/g		113	83-134			
Surrogate: Dibromofluoromethane	0.118		ug/g		86.7	78-124			
Surrogate: Toluene-d8	0.145		ug/g		107	76-118			

Certificate of Analysis

Report Date: 17-Jun-2013

Order Date: 17-May-2013

Client: **Stantec Consulting Ltd. (Ottawa)**

Client PO: NCC P19 Supplemental Soil & GW

Project Description: 122510780.200

Assessment

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
pH	7.24	0.05	pH Units	6.97			3.8	10	
Physical Characteristics									
% Solids	85.3	0.1	% by Wt.	86.0			0.9	25	
Volatiles									
Benzene	ND	0.002	ug/g dry	ND				50	
Bromodichloromethane	ND	0.002	ug/g dry	ND				50	
Bromoform	ND	0.002	ug/g dry	ND				50	
Bromomethane	ND	0.003	ug/g dry	ND				50	
Carbon Tetrachloride	ND	0.002	ug/g dry	ND				50	
Chlorobenzene	ND	0.002	ug/g dry	ND				50	
Chloroethane	ND	0.005	ug/g dry	ND				50	
Chloroform	ND	0.003	ug/g dry	ND				32	
Chloromethane	ND	0.020	ug/g dry	ND				50	
Dibromochloromethane	ND	0.002	ug/g dry	ND				50	
1,2-Dibromoethane	ND	0.002	ug/g dry	ND				50	
1,2-Dichlorobenzene	ND	0.002	ug/g dry	ND				50	
1,3-Dichlorobenzene	ND	0.002	ug/g dry	ND				50	
1,4-Dichlorobenzene	ND	0.002	ug/g dry	ND				50	
1,1-Dichloroethane	ND	0.002	ug/g dry	ND				27	
1,2-Dichloroethane	ND	0.002	ug/g dry	ND				50	
1,1-Dichloroethylene	ND	0.002	ug/g dry	ND				50	
cis-1,2-Dichloroethylene	ND	0.002	ug/g dry	ND				33	
trans-1,2-Dichloroethylene	ND	0.003	ug/g dry	ND				50	
1,2-Dichloropropane	ND	0.002	ug/g dry	ND				50	
cis-1,3-Dichloropropylene	ND	0.002	ug/g dry	ND				50	
trans-1,3-Dichloropropylene	ND	0.002	ug/g dry	ND				50	
Ethylbenzene	ND	0.002	ug/g dry	ND				34	
Methylene Chloride	ND	0.003	ug/g dry	ND				50	
Styrene	ND	0.002	ug/g dry	ND				50	
1,1,1,2-Tetrachloroethane	ND	0.003	ug/g dry	ND				50	
1,1,2,2-Tetrachloroethane	ND	0.003	ug/g dry	ND				50	
Tetrachloroethylene	ND	0.002	ug/g dry	ND				32	
Toluene	ND	0.002	ug/g dry	ND				32	
1,1,1-Trichloroethane	ND	0.002	ug/g dry	ND				50	
1,1,2-Trichloroethane	ND	0.002	ug/g dry	ND				50	
Trichloroethylene	ND	0.003	ug/g dry	ND				31	
Trichlorofluoromethane	ND	0.005	ug/g dry	ND				50	
1,3,5-Trimethylbenzene	ND	0.003	ug/g dry	ND				43	
Vinyl chloride	ND	0.002	ug/g dry	ND				50	
m,p-Xylenes	ND	0.002	ug/g dry	ND				35	
o-Xylene	ND	0.002	ug/g dry	ND				50	
Surrogate: 4-Bromofluorobenzene	0.284		ug/g dry	ND	113	83-134			
Surrogate: Dibromofluoromethane	0.262		ug/g dry	ND	105	78-124			
Surrogate: Toluene-d8	0.240		ug/g dry	ND	95.8	76-118			

Certificate of Analysis

Report Date: 17-Jun-2013

Order Date: 17-May-2013

Client: **Stantec Consulting Ltd. (Ottawa)**

Client PO: NCC P19 Supplemental Soil & GW

Project Description: 122510780.200

Assessment

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Volatiles									
Benzene	0.0604	0.002	ug/g	ND	88.9	55-141			
Bromodichloromethane	0.0650	0.002	ug/g	ND	95.5	52-139			
Bromoform	0.0873	0.002	ug/g	ND	128	52-170			
Bromomethane	0.0319	0.003	ug/g	ND	46.9	32-138			
Carbon Tetrachloride	0.0749	0.002	ug/g	ND	110	49-149			
Chlorobenzene	0.0659	0.002	ug/g	ND	96.9	64-137			
Chloroethane	0.0356	0.005	ug/g	ND	52.3	39-152			
Chloroform	0.0634	0.003	ug/g	ND	93.2	58-138			
Chloromethane	0.0327	0.020	ug/g	ND	48.1	24-163			
Dibromochloromethane	0.0877	0.002	ug/g	ND	129	61-153			
1,2-Dibromoethane	0.0710	0.002	ug/g	ND	104	61-145			
1,2-Dichlorobenzene	0.0779	0.002	ug/g	ND	115	60-150			
1,3-Dichlorobenzene	0.0878	0.002	ug/g	ND	129	62-149			
1,4-Dichlorobenzene	0.0636	0.002	ug/g	ND	93.6	63-132			
1,1-Dichloroethane	0.0589	0.002	ug/g	ND	86.7	51-156			
1,2-Dichloroethane	0.0624	0.002	ug/g	ND	91.7	50-140			
1,1-Dichloroethylene	0.0552	0.002	ug/g	ND	81.2	43-153			
cis-1,2-Dichloroethylene	0.0652	0.002	ug/g	ND	95.9	58-145			
trans-1,2-Dichloroethylene	0.0652	0.003	ug/g	ND	95.9	51-145			
1,2-Dichloropropane	0.0543	0.002	ug/g	ND	79.8	56-136			
cis-1,3-Dichloropropylene	0.0502	0.002	ug/g	ND	73.8	54-141			
trans-1,3-Dichloropropylene	0.0608	0.002	ug/g	ND	89.4	61-140			
Ethylbenzene	0.0721	0.002	ug/g	ND	106	61-139			
Methylene Chloride	0.0449	0.003	ug/g	ND	66.0	58-149			
Styrene	0.0719	0.002	ug/g	ND	106	63-143			
1,1,1,2-Tetrachloroethane	0.0710	0.003	ug/g	ND	104	61-148			
1,1,2,2-Tetrachloroethane	0.0583	0.003	ug/g	ND	85.7	50-157			
Tetrachloroethylene	0.0796	0.002	ug/g	ND	117	51-145			
Toluene	0.0681	0.002	ug/g	ND	100	54-136			
1,1,1-Trichloroethane	0.0691	0.002	ug/g	ND	102	55-140			
1,1,2-Trichloroethane	0.0589	0.002	ug/g	ND	86.5	63-144			
Trichloroethylene	0.0552	0.003	ug/g	ND	81.1	52-135			
Trichlorofluoromethane	0.0362	0.005	ug/g	ND	53.2	37-155			
1,3,5-Trimethylbenzene	0.0691	0.003	ug/g	ND	102	61-151			
Vinyl chloride	0.0315	0.002	ug/g	ND	46.4	31-159			
m,p-Xylenes	0.133	0.002	ug/g	ND	97.5	61-139			
o-Xylene	0.0676	0.002	ug/g	ND	99.4	60-142			
Surrogate: 4-Bromofluorobenzene	0.142		ug/g		105	83-134			

Certificate of Analysis

Client: **Stantec Consulting Ltd. (Ottawa)**

Client PO: NCC P19 Supplemental Soil & GW

Assessment

Project Description: 122510780.200

Report Date: 17-Jun-2013

Order Date: 17-May-2013

Qualifier Notes:

None

Sample Data Revisions:

None

Work Order Revisions / Comments:

Revision 1 - This report includes additional VOC analytes.

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.

OTTAWA • KINGSTON • NIAGARA • MISSISSAUGA • SARNIA

Client Name: <u>Stantec Consulting Ltd.</u>	Project Reference: <u>NCC P19 Supplemental Soil & GW Assessment</u>	Page <u>1</u> of <u>1</u>
Contact Name: <u>Sarah Montesano</u>	Quote # <u>/</u>	TAT: <input checked="" type="checkbox"/> Regular <input type="checkbox"/> 13 Day
Address: <u>1331 Clyde Avenue, Suite 400</u> <u>Ottawa, ON K2C 3G4</u>	PO # <u>12510780, 200</u>	<input type="checkbox"/> 12 Day <input type="checkbox"/> 1 Day
Telephone: <u>613-722-4420</u>	Email Address: <u>Sarah.Montesano@stantec.com</u>	Date Required: _____

Criteria: ☐ O. Reg. 153/04 Table 1 ☒ O. Reg. 153/11 (Current) Table 1 ☐ 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: <u>1320306</u>													
Sample ID/Location Name				Matrix	Air Volume	# of Containers	Sample Taken		VOCs	pH			
							Date	Time					
1	MW13-34	SS12		Soil	X	3	2013/05/16	13:00	✓	✓			- 1x 50ml + 2x 1/4l -
2	MW13-84	SS12		Soil	X	3	2013/05/16	13:40	✓				
3	MW13-36	SS8		Soil	X	3	2013/05/16	9:30	✓				
4	MW13-26	SS4		Soil	X	3	2013/05/15	10:45	✓				
5	MW13-32	SS7		Soil	X	3	2013/05/16	15:40	✓				
6	MW13-30	SS11		Soil	X	3	2013/05/17	11:15	✓				
7	MW13-28	SS12		Soil	X	3	2013/05/15	13:45	✓				
8	MW13-28	SS6		Soil	X	3	2013/05/15	13:30	✓				
9	MW13-32	SS2		Soil	X	1	2013/05/16	15:20		✓			- 60ml -
10													

Comments: _____	Method of Delivery: <u>Walk-in</u>
-----------------	------------------------------------

Relinquished By (Print & Sign): <u>J. Urban</u>	Received by Driver/Depot: _____	Received at Lab: <u>M/C</u>	Verified By: <u>M/C</u>
Date/Time: <u>2013/05/17 16:15</u>	Date/Time: _____	Date/Time: <u>May 17/13 4:19</u>	Date/Time: <u>May 17/13 6:07</u>
Temperature: _____ °C	Temperature: <u>17.01</u> °C	pH Verified: <u>17.01</u>	By: <u>N/A</u>

Certificate of Analysis

Stantec Consulting Ltd. (Ottawa)

1331 Clyde Avenue Suite 400
Ottawa, ON K2C 3G4
Attn: Sarah Montesano

Phone: (613) 722-4420
Fax: (613) 738-0721

Client PO: NCC P19 Supplemental Soil+GW Assessment

Report Date: 17-Jun-2013

Project: 122510780

Order Date: 22-May-2013

Custody: 8630

Revised Report **Order #: 1321060**

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1321060-01	MW13-26 SS1
1321060-02	MW13-30 SS2
1321060-03	MW13-28 SS1

Approved By:



Mark Foto, M.Sc. For Dale Robertson, BSc
Laboratory Director

Certificate of AnalysisClient: **Stantec Consulting Ltd. (Ottawa)**

Client PO: NCC P19 Supplemental Soil+GW

Assessment

Project Description: 122510780

Report Date: 17-Jun-2013

Order Date: 22-May-2013

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Solids, %	Gravimetric, calculation	24-May-13	24-May-13
VOCs by P&T GC-MS, low level	EPA 8260 - P&T GC-MS	21-May-13	24-May-13

Certificate of Analysis

Report Date: 17-Jun-2013

Order Date: 22-May-2013

Client: **Stantec Consulting Ltd. (Ottawa)**

Client PO: NCC P19 Supplemental Soil+GW

Project Description: 122510780

Assessment

Client ID:	MW13-26 SS1	MW13-30 SS2	MW13-28 SS1	-
Sample Date:	15-May-13	17-May-13	15-May-13	-
Sample ID:	1321060-01	1321060-02	1321060-03	-
MDL/Units	Soil	Soil	Soil	-

Physical Characteristics

% Solids	0.1 % by Wt.	85.1	85.4	85.1	-
----------	--------------	------	------	------	---

Volatiles

Acetone	0.050 ug/g dry	<0.050	<0.050	<0.050	-
Benzene	0.002 ug/g dry	<0.002	<0.002	<0.002	-
Bromodichloromethane	0.002 ug/g dry	<0.002	<0.002	<0.002	-
Bromoform	0.002 ug/g dry	<0.002	<0.002	<0.002	-
Bromomethane	0.003 ug/g dry	<0.003	<0.003	<0.003	-
Carbon Tetrachloride	0.002 ug/g dry	<0.002	<0.002	<0.002	-
Chlorobenzene	0.002 ug/g dry	<0.002	<0.002	<0.002	-
Chloroethane	0.005 ug/g dry	<0.005	<0.005	<0.005	-
Chloroform	0.003 ug/g dry	<0.003	<0.003	<0.003	-
Chloromethane	0.020 ug/g dry	<0.020	<0.020	<0.020	-
Dibromochloromethane	0.002 ug/g dry	<0.002	<0.002	<0.002	-
1,2-Dibromoethane	0.002 ug/g dry	<0.002	<0.002	<0.002	-
1,2-Dichlorobenzene	0.002 ug/g dry	<0.002	<0.002	<0.002	-
1,3-Dichlorobenzene	0.002 ug/g dry	<0.002	<0.002	<0.002	-
1,4-Dichlorobenzene	0.002 ug/g dry	<0.002	<0.002	<0.002	-
1,1-Dichloroethane	0.002 ug/g dry	<0.002	<0.002	<0.002	-
1,2-Dichloroethane	0.002 ug/g dry	<0.002	<0.002	<0.002	-
1,1-Dichloroethylene	0.002 ug/g dry	<0.002	<0.002	<0.002	-
Dichlorodifluoromethane	0.029 ug/g dry	<0.029	<0.029	<0.029	-
cis-1,2-Dichloroethylene	0.002 ug/g dry	<0.002	<0.002	<0.002	-
trans-1,2-Dichloroethylene	0.003 ug/g dry	<0.003	<0.003	<0.003	-
1,2-Dichloroethylene, total	0.003 ug/g dry	<0.003	<0.003	<0.003	-
1,2-Dichloropropane	0.002 ug/g dry	<0.002	<0.002	<0.002	-
cis-1,3-Dichloropropylene	0.002 ug/g dry	<0.002	<0.002	<0.002	-
trans-1,3-Dichloropropylene	0.002 ug/g dry	<0.002	<0.002	<0.002	-
1,3-Dichloropropene, total	0.002 ug/g dry	<0.002	<0.002	<0.002	-
Ethylbenzene	0.002 ug/g dry	<0.002	<0.002	<0.002	-
Hexane	0.029 ug/g dry	<0.029	<0.029	<0.029	-
Methyl Ethyl Ketone (2-Butanone)	0.050 ug/g dry	<0.050	<0.050	<0.050	-
Methyl Butyl Ketone (2-Hexanone)	0.050 ug/g dry	<0.050	<0.050	<0.050	-
Methyl Isobutyl Ketone	0.050 ug/g dry	<0.050	<0.050	<0.050	-

P: 1-800-749-1947
E: PARACEL@PARACELLABS.COM

WWW.PARACELLABS.COM

OTTAWA
300-2319 St. Laurent Blvd.
Ottawa, ON K1G 4J8

MISSISSAUGA
6845 Kitimat Rd. Unit #27
Mississauga, ON L5N 6J3

NIAGARA FALLS
5415 Morning Glory Cr.
Niagara Falls, ON L2J 0A3

SARNIA
123 Christina St. N.
Sarnia, ON N7T 5T7

Certificate of Analysis

Report Date: 17-Jun-2013

Order Date: 22-May-2013

Client: **Stantec Consulting Ltd. (Ottawa)**

Client PO: NCC P19 Supplemental Soil+GW

Project Description: 122510780

Assessment

	Client ID:	MW13-26 SS1	MW13-30 SS2	MW13-28 SS1	
	Sample Date:	15-May-13	17-May-13	15-May-13	
	Sample ID:	1321060-01	1321060-02	1321060-03	
	MDL/Units	Soil	Soil	Soil	
Methyl tert-butyl ether	0.050 ug/g dry	<0.050	<0.050	<0.050	-
Methylene Chloride	0.003 ug/g dry	<0.003	<0.003	<0.003	-
Styrene	0.002 ug/g dry	<0.002	<0.002	<0.002	-
1,1,1,2-Tetrachloroethane	0.003 ug/g dry	<0.003	<0.003	<0.003	-
1,1,2,2-Tetrachloroethane	0.003 ug/g dry	<0.003	<0.003	<0.003	-
Tetrachloroethylene	0.002 ug/g dry	<0.002	<0.002	<0.002	-
Toluene	0.002 ug/g dry	<0.002	<0.002	<0.002	-
1,2,4-Trichlorobenzene	0.050 ug/g dry	<0.050	<0.050	<0.050	-
1,1,1-Trichloroethane	0.002 ug/g dry	<0.002	<0.002	<0.002	-
1,1,2-Trichloroethane	0.002 ug/g dry	<0.002	<0.002	<0.002	-
Trichloroethylene	0.003 ug/g dry	<0.003	<0.003	<0.003	-
Trichlorofluoromethane	0.005 ug/g dry	<0.005	<0.005	<0.005	-
1,3,5-Trimethylbenzene	0.003 ug/g dry	<0.003	<0.003	<0.003	-
Vinyl chloride	0.002 ug/g dry	<0.002	<0.002	<0.002	-
m,p-Xylenes	0.002 ug/g dry	<0.002	<0.002	<0.002	-
o-Xylene	0.002 ug/g dry	<0.002	<0.002	<0.002	-
Xylenes, total	0.002 ug/g dry	<0.002	<0.002	<0.002	-
4-Bromofluorobenzene	Surrogate	117%	113%	113%	-
Dibromofluoromethane	Surrogate	102%	103%	105%	-
Toluene-d8	Surrogate	110%	89.6%	96.5%	-

Certificate of Analysis

Client: **Stantec Consulting Ltd. (Ottawa)**

Report Date: 17-Jun-2013

Client PO: NCC P19 Supplemental Soil+GW

Project Description: 122510780

Order Date: 22-May-2013

Assessment

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Volatiles									
Benzene	ND	0.002	ug/g						
Bromodichloromethane	ND	0.002	ug/g						
Bromoform	ND	0.002	ug/g						
Bromomethane	ND	0.003	ug/g						
Carbon Tetrachloride	ND	0.002	ug/g						
Chlorobenzene	ND	0.002	ug/g						
Chloroethane	ND	0.005	ug/g						
Chloroform	ND	0.003	ug/g						
Chloromethane	ND	0.020	ug/g						
Dibromochloromethane	ND	0.002	ug/g						
1,2-Dibromoethane	ND	0.002	ug/g						
1,2-Dichlorobenzene	ND	0.002	ug/g						
1,3-Dichlorobenzene	ND	0.002	ug/g						
1,4-Dichlorobenzene	ND	0.002	ug/g						
1,1-Dichloroethane	ND	0.002	ug/g						
1,2-Dichloroethane	ND	0.002	ug/g						
1,1-Dichloroethylene	ND	0.002	ug/g						
cis-1,2-Dichloroethylene	ND	0.002	ug/g						
trans-1,2-Dichloroethylene	ND	0.003	ug/g						
1,2-Dichloroethylene, total	ND	0.003	ug/g						
1,2-Dichloropropane	ND	0.002	ug/g						
cis-1,3-Dichloropropylene	ND	0.002	ug/g						
trans-1,3-Dichloropropylene	ND	0.002	ug/g						
1,3-Dichloropropene, total	ND	0.002	ug/g						
Ethylbenzene	ND	0.002	ug/g						
Methylene Chloride	ND	0.003	ug/g						
Styrene	ND	0.002	ug/g						
1,1,1,2-Tetrachloroethane	ND	0.003	ug/g						
1,1,2,2-Tetrachloroethane	ND	0.003	ug/g						
Tetrachloroethylene	ND	0.002	ug/g						
Toluene	ND	0.002	ug/g						
1,1,1-Trichloroethane	ND	0.002	ug/g						
1,1,2-Trichloroethane	ND	0.002	ug/g						
Trichloroethylene	ND	0.003	ug/g						
Trichlorofluoromethane	ND	0.005	ug/g						
1,3,5-Trimethylbenzene	ND	0.003	ug/g						
Vinyl chloride	ND	0.002	ug/g						
m,p-Xylenes	ND	0.002	ug/g						
o-Xylene	ND	0.002	ug/g						
Xylenes, total	ND	0.002	ug/g						
Surrogate: 4-Bromofluorobenzene	0.154		ug/g		113	83-134			
Surrogate: Dibromofluoromethane	0.118		ug/g		86.7	78-124			
Surrogate: Toluene-d8	0.145		ug/g		107	76-118			

Certificate of Analysis

Client: **Stantec Consulting Ltd. (Ottawa)**

Report Date: 17-Jun-2013

Client PO: NCC P19 Supplemental Soil+GW

Project Description: 122510780

Order Date: 22-May-2013

Assessment

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Physical Characteristics									
% Solids	90.0	0.1	% by Wt.	88.4			1.8	25	
Volatiles									
Benzene	ND	0.002	ug/g dry	ND				50	
Bromodichloromethane	ND	0.002	ug/g dry	ND				50	
Bromoform	ND	0.002	ug/g dry	ND				50	
Bromomethane	ND	0.003	ug/g dry	ND				50	
Carbon Tetrachloride	ND	0.002	ug/g dry	ND				50	
Chlorobenzene	ND	0.002	ug/g dry	ND				50	
Chloroethane	ND	0.005	ug/g dry	ND				50	
Chloroform	ND	0.003	ug/g dry	ND				32	
Chloromethane	ND	0.020	ug/g dry	ND				50	
Dibromochloromethane	ND	0.002	ug/g dry	ND				50	
1,2-Dibromoethane	ND	0.002	ug/g dry	ND				50	
1,2-Dichlorobenzene	ND	0.002	ug/g dry	ND				50	
1,3-Dichlorobenzene	ND	0.002	ug/g dry	ND				50	
1,4-Dichlorobenzene	ND	0.002	ug/g dry	ND				50	
1,1-Dichloroethane	ND	0.002	ug/g dry	ND				27	
1,2-Dichloroethane	ND	0.002	ug/g dry	ND				50	
1,1-Dichloroethylene	ND	0.002	ug/g dry	ND				50	
cis-1,2-Dichloroethylene	ND	0.002	ug/g dry	ND				33	
trans-1,2-Dichloroethylene	ND	0.003	ug/g dry	ND				50	
1,2-Dichloropropane	ND	0.002	ug/g dry	ND				50	
cis-1,3-Dichloropropylene	ND	0.002	ug/g dry	ND				50	
trans-1,3-Dichloropropylene	ND	0.002	ug/g dry	ND				50	
Ethylbenzene	ND	0.002	ug/g dry	ND				34	
Methylene Chloride	ND	0.003	ug/g dry	ND				50	
Styrene	ND	0.002	ug/g dry	ND				50	
1,1,1,2-Tetrachloroethane	ND	0.003	ug/g dry	ND				50	
1,1,2,2-Tetrachloroethane	ND	0.003	ug/g dry	ND				50	
Tetrachloroethylene	ND	0.002	ug/g dry	ND				32	
Toluene	ND	0.002	ug/g dry	ND				32	
1,1,1-Trichloroethane	ND	0.002	ug/g dry	ND				50	
1,1,2-Trichloroethane	ND	0.002	ug/g dry	ND				50	
Trichloroethylene	ND	0.003	ug/g dry	ND				31	
Trichlorofluoromethane	ND	0.005	ug/g dry	ND				50	
1,3,5-Trimethylbenzene	ND	0.003	ug/g dry	ND				43	
Vinyl chloride	ND	0.002	ug/g dry	ND				50	
m,p-Xylenes	ND	0.002	ug/g dry	ND				35	
o-Xylene	ND	0.002	ug/g dry	ND				50	
Surrogate: 4-Bromofluorobenzene	0.284		ug/g dry	ND	113	83-134			
Surrogate: Dibromofluoromethane	0.262		ug/g dry	ND	105	78-124			
Surrogate: Toluene-d8	0.240		ug/g dry	ND	95.8	76-118			

Certificate of Analysis

Report Date: 17-Jun-2013

 Client: **Stantec Consulting Ltd. (Ottawa)**

Order Date: 22-May-2013

Client PO: NCC P19 Supplemental Soil+GW

Project Description: 122510780

Assessment

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Volatiles									
Benzene	0.0604	0.002	ug/g	ND	88.9	55-141			
Bromodichloromethane	0.0650	0.002	ug/g	ND	95.5	52-139			
Bromoform	0.0873	0.002	ug/g	ND	128	52-170			
Bromomethane	0.0319	0.003	ug/g	ND	46.9	32-138			
Carbon Tetrachloride	0.0749	0.002	ug/g	ND	110	49-149			
Chlorobenzene	0.0659	0.002	ug/g	ND	96.9	64-137			
Chloroethane	0.0356	0.005	ug/g	ND	52.3	39-152			
Chloroform	0.0634	0.003	ug/g	ND	93.2	58-138			
Chloromethane	0.0327	0.020	ug/g	ND	48.1	24-163			
Dibromochloromethane	0.0877	0.002	ug/g	ND	129	61-153			
1,2-Dibromoethane	0.0710	0.002	ug/g	ND	104	61-145			
1,2-Dichlorobenzene	0.0779	0.002	ug/g	ND	115	60-150			
1,3-Dichlorobenzene	0.0878	0.002	ug/g	ND	129	62-149			
1,4-Dichlorobenzene	0.0636	0.002	ug/g	ND	93.6	63-132			
1,1-Dichloroethane	0.0589	0.002	ug/g	ND	86.7	51-156			
1,2-Dichloroethane	0.0624	0.002	ug/g	ND	91.7	50-140			
1,1-Dichloroethylene	0.0552	0.002	ug/g	ND	81.2	43-153			
cis-1,2-Dichloroethylene	0.0652	0.002	ug/g	ND	95.9	58-145			
trans-1,2-Dichloroethylene	0.0652	0.003	ug/g	ND	95.9	51-145			
1,2-Dichloropropane	0.0543	0.002	ug/g	ND	79.8	56-136			
cis-1,3-Dichloropropylene	0.0502	0.002	ug/g	ND	73.8	54-141			
trans-1,3-Dichloropropylene	0.0608	0.002	ug/g	ND	89.4	61-140			
Ethylbenzene	0.0721	0.002	ug/g	ND	106	61-139			
Methylene Chloride	0.0449	0.003	ug/g	ND	66.0	58-149			
Styrene	0.0719	0.002	ug/g	ND	106	63-143			
1,1,1,2-Tetrachloroethane	0.0710	0.003	ug/g	ND	104	61-148			
1,1,2,2-Tetrachloroethane	0.0583	0.003	ug/g	ND	85.7	50-157			
Tetrachloroethylene	0.0796	0.002	ug/g	ND	117	51-145			
Toluene	0.0681	0.002	ug/g	ND	100	54-136			
1,1,1-Trichloroethane	0.0691	0.002	ug/g	ND	102	55-140			
1,1,2-Trichloroethane	0.0589	0.002	ug/g	ND	86.5	63-144			
Trichloroethylene	0.0552	0.003	ug/g	ND	81.1	52-135			
Trichlorofluoromethane	0.0362	0.005	ug/g	ND	53.2	37-155			
1,3,5-Trimethylbenzene	0.0691	0.003	ug/g	ND	102	61-151			
Vinyl chloride	0.0315	0.002	ug/g	ND	46.4	31-159			
m,p-Xylenes	0.133	0.002	ug/g	ND	97.5	61-139			
o-Xylene	0.0676	0.002	ug/g	ND	99.4	60-142			
Surrogate: 4-Bromofluorobenzene	0.142		ug/g		105	83-134			

Certificate of Analysis

Client: **Stantec Consulting Ltd. (Ottawa)**

Client PO: NCC P19 Supplemental Soil+GW

Assessment

Project Description: 122510780

Report Date: 17-Jun-2013

Order Date: 22-May-2013

Qualifier Notes:

None

Sample Data Revisions

None

Work Order Revisions / Comments:

Revision 1 - this report includes additional VOC analytes.

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.

P: 1-800-749-1947
E: PARACEL@PARACELLABS.COM

WWW.PARACELLABS.COM

OTTAWA
300-2319 St. Laurent Blvd.
Ottawa, ON K1G 4J8

MISSISSAUGA
6845 Kitimat Rd. Unit #27
Mississauga, ON L5N 6J3

NIAGARA FALLS
5415 Morning Glory Crt.
Niagara Falls, ON L2J 0A3

SARNIA
123 Christina St. N.
Sarnia, ON N7T 5T7

OTTAWA • KINGSTON • NIAGARA • MISSISSAUGA • SARNIA

Client Name: <u>Stantec Consulting Ltd.</u>	Project Reference: <u>NCC 919 Supplemental Soil + GW Assessment</u>	TAT: <input checked="" type="checkbox"/> Regular <input type="checkbox"/> 3 Day <input type="checkbox"/> 2 Day <input type="checkbox"/> 1 Day Date Required: _____
Contact Name: <u>Sarah Montesano</u>	Quote # _____	
Address: <u>1331 Clyde Avenue</u> <u>Ottawa 10N K2C 3G4</u>	PO # <u>127510780</u>	
Telephone: <u>613-722-4420</u>	Email Address: <u>Sarah.montesano@stantec.com</u>	

Criteria: ☐ O. Reg. 153/04 Table ☐ O. Reg. 153/11 (Current) 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

Parcel Order Number:		Matrix	Air Volume	# of Containers	Sample Taken		VOCs												
Sample ID/Location Name					Date	Time													
1	MW13-26 SS1	Soil	X	1	2013/05/15	10:30	✓												-60ml
2	MW13-30 SS2	Soil	X	1	2013/05/17	11:00	✓												↓
3	MW13-28 SS1	Soil	X	1	2013/05/15	13:15	✓												↓
4																			
5																			
6																			
7																			
8																			
9																			
10																			

Comments:

Method of Delivery:

Relinquished By (Print & Sign): <u>J. Urban</u>	Received by Driver/Depot:	Received at Lab: <u>SCOL</u>	Verified By: <u>SCOL</u>
Date/Time: <u>2013/05/22 9:55</u>	Temperature: _____ °C	Date/Time: <u>May 22/13 9:58</u>	Date/Time: <u>May 22/13</u>
		Temperature: <u>19</u> °C	pH Verified [] By: <u>N/A</u>

Certificate of Analysis

Stantec Consulting Ltd. (Ottawa)1331 Clyde Avenue Suite 400
Ottawa, ON K2C 3G4
Attn: Sarah MontesanoPhone: (613) 722-4420
Fax: (613) 738-0721Client PO:
Project: 122510780
Custody: 97787/9/90/88Report Date: 3-Jun-2013
Order Date: 29-May-2013**Order #: 1322182**

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1322182-01	MW08-4
1322182-02	MW08-5
1322182-03	MW08-1
1322182-04	MW08-2
1322182-05	MW13-26
1322182-06	MW13-27
1322182-07	MW13-29
1322182-08	MW10-19
1322182-09	MW10-20
1322182-10	MW10-15
1322182-11	MW-10-24
1322182-12	Trip Blank
1322182-13	MW10-14
1322182-14	MW10-13
1322182-15	MW10-22
1322182-16	MW10-25
1322182-17	MW13-28
1322182-19	MW-08-3
1322182-20	MW-10-18
1322182-21	MW-10-17
1322182-22	MW-10-16
1322182-23	MW-10-10
1322182-24	MW-10-11
1322182-25	MW-10-110
1322182-26	MW-10-12
1322182-27	MW-09-8
1322182-28	MW-09-9

Approved By:

Mark Foto, M.Sc. For Dale Robertson, BSc
Laboratory Director

Certificate of AnalysisClient: **Stantec Consulting Ltd. (Ottawa)**

Client PO:

Project Description: 122510780

Report Date: 03-Jun-2013

Order Date: 29-May-2013

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
VOCs by P&T GC-MS	EPA 624 - P&T GC-MS	31-May-13	1-Jun-13

P: 1-800-749-1947
E: PARACEL@PARACELLABS.COM
WWW.PARACELLABS.COM

OTTAWA
300-2319 St. Laurent Blvd.
Ottawa, ON K1G 4J8
MISSISSAUGA
6845 Kitimat Rd. Unit #27
Mississauga, ON L5N 6J3

NIAGARA FALLS
5415 Morning Glory Crt.
Niagara Falls, ON L2J 0A3
SARNIA
123 Christina St. N.
Sarnia, ON N7T 5T7

Certificate of Analysis

Client: **Stantec Consulting Ltd. (Ottawa)**

Report Date: 03-Jun-2013

Client PO:

Project Description: 122510780

Order Date: 29-May-2013

Client ID:	MW08-4	MW08-5	MW08-1	MW08-2
Sample Date:	28-May-13	28-May-13	28-May-13	28-May-13
Sample ID:	1322182-01	1322182-02	1322182-03	1322182-04
MDL/Units	Water	Water	Water	Water

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
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	1.5	<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	1.6	<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

P: 1-800-749-1947
E: PARACEL@PARACELLABS.COM

WWW.PARACELLABS.COM

OTTAWA
300-2319 St. Laurent Blvd.
Ottawa, ON K1G 4J8

MISSISSAUGA
6845 Kitimat Rd. Unit #27
Mississauga, ON L5N 6J3

NIAGARA FALLS
5415 Morning Glory Crt.
Niagara Falls, ON L2J 0A3

SARNIA
123 Christina St. N.
Sarnia, ON N7T 5T7

Certificate of Analysis

Client: **Stantec Consulting Ltd. (Ottawa)**

Report Date: 03-Jun-2013

Client PO:

Project Description: 122510780

Order Date: 29-May-2013

	Client ID: Sample Date: Sample ID:	MW08-4 28-May-13 1322182-01 Water	MW08-5 28-May-13 1322182-02 Water	MW08-1 28-May-13 1322182-03 Water	MW08-2 28-May-13 1322182-04 Water
	MDL/Units				
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	4.1	<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
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	114%	114%	114%	114%
Dibromofluoromethane	Surrogate	92.7%	94.4%	93.4%	94.1%
Toluene-d8	Surrogate	111%	110%	111%	112%

Certificate of Analysis

Client: **Stantec Consulting Ltd. (Ottawa)**

Report Date: 03-Jun-2013

Order Date: 29-May-2013

Client PO:

Project Description: 122510780

	Client ID:	MW13-26	MW13-27	MW13-29	MW10-19
	Sample Date:	28-May-13	28-May-13	29-May-13	29-May-13
	Sample ID:	1322182-05	1322182-06	1322182-07	1322182-08
	MDL/Units	Water	Water	Water	Water

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
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

P: 1-800-749-1947
E: PARACEL@PARACELLABS.COM

WWW.PARACELLABS.COM

OTTAWA
300-2319 St. Laurent Blvd.
Ottawa, ON K1G 4J8

MISSISSAUGA
6845 Kitimat Rd. Unit #27
Mississauga, ON L5N 6J3

NIAGARA FALLS
5415 Morning Glory Crt.
Niagara Falls, ON L2J 0A3

SARNIA
123 Christina St. N.
Sarnia, ON N7T 5T7

Certificate of Analysis

Client: **Stantec Consulting Ltd. (Ottawa)**

Report Date: 03-Jun-2013

Client PO:

Project Description: 122510780

Order Date: 29-May-2013

	Client ID: Sample Date: Sample ID:	MW13-26 28-May-13 1322182-05 Water	MW13-27 28-May-13 1322182-06 Water	MW13-29 29-May-13 1322182-07 Water	MW10-19 29-May-13 1322182-08 Water
	MDL/Units				
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
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	113%	114%	113%	115%
Dibromofluoromethane	Surrogate	95.4%	94.6%	92.6%	93.9%
Toluene-d8	Surrogate	111%	112%	110%	110%

Certificate of Analysis

Client: **Stantec Consulting Ltd. (Ottawa)**

Report Date: 03-Jun-2013

Client PO:

Project Description: 122510780

Order Date: 29-May-2013

Client ID:	MW10-20	MW10-15	MW-10-24	Trip Blank
Sample Date:	29-May-13	29-May-13	29-May-13	24-May-13
Sample ID:	1322182-09	1322182-10	1322182-11	1322182-12
MDL/Units	Water	Water	Water	Water

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
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	0.6	<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	0.6	<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

P: 1-800-749-1947
E: PARACEL@PARACELLABS.COM

WWW.PARACELLABS.COM

OTTAWA
300-2319 St. Laurent Blvd.
Ottawa, ON K1G 4J8

MISSISSAUGA
6845 Kitimat Rd. Unit #27
Mississauga, ON L5N 6J3

NIAGARA FALLS
5415 Morning Glory Cr.
Niagara Falls, ON L2J 0A3

SARNIA
123 Christina St. N.
Sarnia, ON N7T 5T7

Certificate of Analysis

Client: **Stantec Consulting Ltd. (Ottawa)**

Report Date: 03-Jun-2013

Client PO:

Project Description: 122510780

Order Date: 29-May-2013

	Client ID: Sample Date: Sample ID:	MW10-20 29-May-13 1322182-09 Water	MW10-15 29-May-13 1322182-10 Water	MW-10-24 29-May-13 1322182-11 Water	Trip Blank 24-May-13 1322182-12 Water
	MDL/Units				
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	3.4	<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
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	113%	113%	112%	112%
Dibromofluoromethane	Surrogate	93.8%	95.3%	93.2%	92.0%
Toluene-d8	Surrogate	114%	111%	111%	112%

Certificate of Analysis

Client: **Stantec Consulting Ltd. (Ottawa)**

Report Date: 03-Jun-2013

Client PO:

Project Description: 122510780

Order Date: 29-May-2013

	Client ID: Sample Date: Sample ID:	MW10-14 24-May-13 1322182-13 Water	MW10-13 24-May-13 1322182-14 Water	MW10-22 24-May-13 1322182-15 Water	MW10-25 29-May-13 1322182-16 Water
	MDL/Units				
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
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	0.6	<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	0.7	<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

P: 1-800-749-1947
E: PARACEL@PARACELLABS.COM

WWW.PARACELLABS.COM

OTTAWA
300-2319 St. Laurent Blvd.
Ottawa, ON K1G 4J8

MISSISSAUGA
6845 Kitimat Rd. Unit #27
Mississauga, ON L5N 6J3

NIAGARA FALLS
5415 Morning Glory Crt.
Niagara Falls, ON L2J 0A3

SARNIA
123 Christina St. N.
Sarnia, ON N7T 5T7

Certificate of Analysis

Client: **Stantec Consulting Ltd. (Ottawa)**

Report Date: 03-Jun-2013

Client PO:

Project Description: 122510780

Order Date: 29-May-2013

	Client ID: Sample Date: Sample ID:	MW10-14 24-May-13 1322182-13 Water	MW10-13 24-May-13 1322182-14 Water	MW10-22 24-May-13 1322182-15 Water	MW10-25 29-May-13 1322182-16 Water
	MDL/Units				
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	5.1	<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
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	114%	112%	114%	113%
Dibromofluoromethane	Surrogate	92.4%	95.2%	93.8%	94.5%
Toluene-d8	Surrogate	111%	111%	110%	112%

Certificate of Analysis

Client: **Stantec Consulting Ltd. (Ottawa)**

Report Date: 03-Jun-2013

Client PO:

Project Description: 122510780

Order Date: 29-May-2013

	Client ID:	MW13-28	MW-08-3	MW-10-18	MW-10-17
	Sample Date:	29-May-13	29-May-13	29-May-13	29-May-13
	Sample ID:	1322182-17	1322182-19	1322182-20	1322182-21
	MDL/Units	Water	Water	Water	Water
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	3.0
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	1.1	<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
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	5.4
trans-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	0.9
1,2-Dichloroethylene, total	0.5 ug/L	<0.5	<0.5	<0.5	6.3
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

P: 1-800-749-1947
E: PARACEL@PARACELLABS.COM

WWW.PARACELLABS.COM

OTTAWA
300-2319 St. Laurent Blvd.
Ottawa, ON K1G 4J8

MISSISSAUGA
6845 Kitimat Rd. Unit #27
Mississauga, ON L5N 6J3

NIAGARA FALLS
5415 Morning Glory Crt.
Niagara Falls, ON L2J 0A3

SARNIA
123 Christina St. N.
Sarnia, ON N7T 5T7

Certificate of Analysis

Client: **Stantec Consulting Ltd. (Ottawa)**

Report Date: 03-Jun-2013

Client PO:

Project Description: 122510780

Order Date: 29-May-2013

	Client ID: Sample Date: Sample ID:	MW13-28 29-May-13 1322182-17 Water	MW-08-3 29-May-13 1322182-19 Water	MW-10-18 29-May-13 1322182-20 Water	MW-10-17 29-May-13 1322182-21 Water
	MDL/Units				
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	14.7
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
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	113%	112%	107%	112%
Dibromofluoromethane	Surrogate	93.6%	93.0%	93.3%	95.3%
Toluene-d8	Surrogate	112%	112%	110%	112%

Certificate of Analysis

Client: **Stantec Consulting Ltd. (Ottawa)**

Report Date: 03-Jun-2013

Client PO:

Project Description: 122510780

Order Date: 29-May-2013

	Client ID: Sample Date: Sample ID:	MW-10-16 29-May-13 1322182-22 Water	MW-10-10 29-May-13 1322182-23 Water	MW-10-11 29-May-13 1322182-24 Water	MW-10-110 29-May-13 1322182-25 Water
	MDL/Units				
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	5.0	4.1	4.0
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
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	112%	112%	112%	112%
Dibromofluoromethane	Surrogate	94.0%	97.2%	95.2%	95.3%
Toluene-d8	Surrogate	110%	113%	113%	112%

Certificate of Analysis

Client: **Stantec Consulting Ltd. (Ottawa)**

Report Date: 03-Jun-2013

Client PO:

Project Description: 122510780

Order Date: 29-May-2013

	Client ID:	MW-10-12	MW-09-8	MW-09-9	-
	Sample Date:	29-May-13	29-May-13	29-May-13	-
	Sample ID:	1322182-26	1322182-27	1322182-28	-
	MDL/Units	Water	Water	Water	-
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
Tetrachloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
Toluene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,2,4-Trichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1,1-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1,2-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
Trichloroethylene	0.5 ug/L	<0.5	11.9	<0.5	-
Trichlorofluoromethane	1.0 ug/L	<1.0	<1.0	<1.0	-
1,3,5-Trimethylbenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
Vinyl chloride	0.5 ug/L	<0.5	<0.5	<0.5	-
m,p-Xylenes	0.5 ug/L	<0.5	<0.5	<0.5	-
o-Xylene	0.5 ug/L	<0.5	<0.5	<0.5	-
Xylenes, total	0.5 ug/L	<0.5	<0.5	<0.5	-
4-Bromofluorobenzene	Surrogate	110%	113%	110%	-
Dibromofluoromethane	Surrogate	92.9%	94.3%	91.4%	-
Toluene-d8	Surrogate	114%	112%	114%	-

Certificate of AnalysisClient: **Stantec Consulting Ltd. (Ottawa)**

Client PO:

Project Description: 122510780

Report Date: 03-Jun-2013

Order Date: 29-May-2013

Qualifier Notes:**QC Qualifiers :**

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.

Certificate of Analysis

Stantec Consulting Ltd. (Ottawa)

1331 Clyde Avenue Suite 400
Ottawa, ON K2C 3G4
Attn: Sarah Montesano

Phone: (613) 722-4420
Fax: (613) 738-0721

Client PO:
Project: 122510780
Custody: 96310/97791

Report Date: 5-Jun-2013
Order Date: 30-May-2013

Order #: 1322244

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1322244-01	MW10-25
1322244-02	MW10-21
1322244-03	MW10-23
1322244-04	MW13-37
1322244-05	MW13-370
1322244-06	MW13-36
1322244-07	MW13-35
1322244-08	MW13-34
1322244-09	MW13-32
1322244-10	MW13-33
1322244-11	MW13-30
1322244-12	MW13-300
1322244-13	MW13-31
1322244-14	MW13-310
1322244-15	Trip Blank

Approved By:



Mark Foto, M.Sc. For Dale Robertson, BSc
Laboratory Director

Certificate of AnalysisClient: **Stantec Consulting Ltd. (Ottawa)**

Client PO:

Project Description: 122510780

Report Date: 05-Jun-2013

Order Date: 30-May-2013

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
VOCs by P&T GC-MS	EPA 624 - P&T GC-MS	31-May-13	4-Jun-13

Certificate of Analysis

Client: **Stantec Consulting Ltd. (Ottawa)**

Report Date: 05-Jun-2013

Client PO:

Project Description: 122510780

Order Date: 30-May-2013

	Client ID: Sample Date: Sample ID:	MW10-25 30-May-13 1322244-01 Water	MW10-21 30-May-13 1322244-02 Water	MW10-23 30-May-13 1322244-03 Water	MW13-37 30-May-13 1322244-04 Water
	MDL/Units				
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
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	94.5%	97.0%	95.8%	98.4%
Dibromofluoromethane	Surrogate	113%	112%	105%	105%
Toluene-d8	Surrogate	87.1%	89.3%	99.2%	97.5%

Certificate of Analysis

Client: **Stantec Consulting Ltd. (Ottawa)**

Report Date: 05-Jun-2013

Client PO:

Project Description: 122510780

Order Date: 30-May-2013

	Client ID: Sample Date: Sample ID:	MW13-370 30-May-13 1322244-05 Water	MW13-36 30-May-13 1322244-06 Water	MW13-35 30-May-13 1322244-07 Water	MW13-34 30-May-13 1322244-08 Water
	MDL/Units				
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
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	96.4%	95.2%	94.7%	95.1%
Dibromofluoromethane	Surrogate	106%	106%	108%	107%
Toluene-d8	Surrogate	99.7%	99.6%	99.1%	103%

Certificate of Analysis

Client: **Stantec Consulting Ltd. (Ottawa)**

Report Date: 05-Jun-2013

Client PO:

Project Description: 122510780

Order Date: 30-May-2013

	Client ID: Sample Date: Sample ID:	MW13-32 30-May-13 1322244-09 Water	MW13-33 30-May-13 1322244-10 Water	MW13-30 30-May-13 1322244-11 Water	MW13-300 30-May-13 1322244-12 Water
	MDL/Units				
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
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	96.2%	97.9%	97.0%	96.2%
Dibromofluoromethane	Surrogate	125%	83.2%	105%	106%
Toluene-d8	Surrogate	90.3%	103%	99.2%	100%

Certificate of Analysis

Client: **Stantec Consulting Ltd. (Ottawa)**

Report Date: 05-Jun-2013

Client PO:

Project Description: 122510780

Order Date: 30-May-2013

	Client ID: Sample Date: Sample ID:	MW13-31 30-May-13 1322244-13	MW13-310 30-May-13 1322244-14	Trip Blank 24-May-13 1322244-15	- - - -
	MDL/Units	Water	Water	Water	-
Styrene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
Tetrachloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
Toluene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,2,4-Trichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1,1-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1,2-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
Trichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
Trichlorofluoromethane	1.0 ug/L	<1.0	<1.0	<1.0	-
1,3,5-Trimethylbenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
Vinyl chloride	0.5 ug/L	<0.5	<0.5	<0.5	-
m,p-Xylenes	0.5 ug/L	<0.5	<0.5	<0.5	-
o-Xylene	0.5 ug/L	<0.5	<0.5	<0.5	-
Xylenes, total	0.5 ug/L	<0.5	<0.5	<0.5	-
4-Bromofluorobenzene	Surrogate	97.5%	97.2%	95.2%	-
Dibromofluoromethane	Surrogate	107%	107%	107%	-
Toluene-d8	Surrogate	99.3%	98.1%	97.0%	-

Certificate of Analysis

Client: **Stantec Consulting Ltd. (Ottawa)**

Client PO:

Project Description: 122510780

Report Date: 05-Jun-2013

Order Date: 30-May-2013

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.

P: 1-800-749-1947
E: PARACEL@PARACELLABS.COM

WWW.PARACELLABS.COM

OTTAWA
300-2319 St. Laurent Blvd.
Ottawa, ON K1G 4J8

MISSISSAUGA
6845 Kitimat Rd. Unit #27
Mississauga, ON L5N 6J3

NIAGARA FALLS
5415 Morning Glory Crt.
Niagara Falls, ON L2J 0A3

SARNIA
123 Christina St. N.
Sarnia, ON N7T 5T7

