

September 2014

**SUPPLEMENTAL ENVIRONMENTAL
INVESTIGATIONS - FINAL REPORT**

**City of Barrie Dymont's Creek
Historical Landfills**

Submitted to:
City of Barrie
Environmental Operations
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REPORT





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1.0 INTRODUCTION

Golder Associates Ltd. (Golder) was retained by the City of Barrie (City), to carry out a supplemental environmental investigation of Historical Waste Sites within the City of Barrie. This report describes the results of investigations conducted at the Dymment's Creek waste disposal area between April 2013 and February 2014 as illustrated on Figures 1 and 2. Also indicated in Figure 1 is the initial D-4 Assessment Area as identified in the City's 2009 Official Plan. The initial D-4 Assessment Area was approximately 241 Ha and based on the findings of these investigations has been confirmed that it can be reduced to 8.1 Ha.

Golder previously conducted a D4 Study and Environmental Assessment of Historical Waste Sites within the City between 2011 and 2012. The Ministry of the Environment (MOE) identified nine possible closed waste disposal sites within the City on the basis of information collected largely in 1979, supplemented with information available up to 1994 when the MOE Waste Inventory was finalized. As these waste sites were largely "unorganized" their exact locations and character were not known. Residential, commercial, and industrial development has occurred on the parts of the waste sites; the remainder is public parkland.

The impact of waste sites is a factor of the type and age of the material deposited, the depth of waste, the cover material and the local hydrogeology and stream character. As a result, investigations of areas where waste is known to have been deposited must assess these factors in order to determine the potential for impact. Older waste fill areas containing little putrescible material and pre-dating the use of industrial organics may be relatively innocuous, whereas those containing large amounts of organic material or liquid waste can continue to generate landfill gas or seepage although more than twenty-five years has passed since closure of these sites.

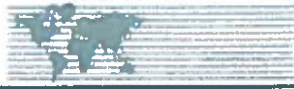
2.0 BACKGROUND

Three of the nine sites identified in the MOE Waste Disposal Site Inventory within the City of Barrie are considered to be included in the Dymment's Creek Landfill area:

- **Site 4 - Sanford Street and Brock Street:** Located on the east side of Sanford Street, north of Brock Street – closed 1961 – MOE Site No. X 4104;
- **Site 5 - Innisfil Street and Brock Street:** Located between Innisfil Street and Sanford Street, north of Brock Street (known as Brock Park) – closed 1962 – MOE Site No. X 4105; and,
- **Site 6 - John Street and Innisfil Street:** Located southwest of the intersection of Innisfil Street and John Street – closed 1963 – MOE Site No. X 4106.

The findings of the D4 Assessment Study established that the estimated areal extent of waste as illustrated on Figure 2. It is noted that the delineation of waste extent was limited to sites accessible to the City (i.e., City owned lands). Access to the southern portion of Site 6 (including south of 15 Frederick Street located on the south side of Frederick Street nearest the dead-end) was limited due to forest cover.

In regards to the privately owned properties within Site 4, the available information indicates that the waste extends north of the creek and onto the private property, and south, to the middle of the property occupied by an apartment building at 111 Sanford Street. Waste at Site 6 reportedly extends to the western limit of 113 John Street, but not as far as the building foundation and it is reported that waste may extend onto the southern portions of these properties. According to previous reports, waste extends onto 15 Frederick Street.



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The material within the Dymment's Creek Landfills consisted of coarse soil fill overlying thin layers of waste material. Waste thickness ranged from 0.05 m at several locations to a maximum thickness of 4.37 m. The maximum depth of waste extended to 7.87 mbgs, on the north side of Dymment's Creek in the southwest portion of Site 6. With the exception of two borehole locations, there is a minimum of 1.0 m of fill above the top of the waste and direct human contact to waste is not likely at these locations. Where waste commences directly below the topsoil at two locations, direct human contact with the waste is possible. Cover or fill material ranged in depth from 2.57 m, above the waste to 8.13 m at the top of the north bank of Dymment's Creek within Site 6.

For the most part, the waste identified in the boreholes consisted of solid materials (e.g., glass, plastic, bricks and metal), however, putrescible materials, including animal hides were encountered in boreholes within two boreholes at Site 6 and one borehole in the middle of Site 5. These waste materials were odorous and also contained black organics. Industrial fabrics were also encountered at one location in Site 6.

Based on the 1962 and 1965 aerial photographs, the creek was relocated north from its original location and it is possible that the former creek bed was infilled with waste as this was consistent with filling operation dates.

Soil impacts are not anticipated to extend beyond the limits of waste. Interpreted groundwater flow direction is toward Dymment's Creek and ultimately to the east toward Lake Simcoe. Based on interpreted shallow horizontal groundwater flow, groundwater outside the limits of waste (with the exception of to the east of Site 4), would not be impacted by buried waste materials.

Landfill gas has not migrated outside of Sites 4 and 5, or south of the Creek on Site 6 (as shown by non-detectable readings of CH₄ at locations GP-D14, GP-D15, GP-D16, GP-D17, GP-D19, and GP-D7). Within the private properties at Site 4, landfill gas north of Dymment's Creek and in the vicinity of the apartment building could not be assessed and based on this, the D-4 Assessment Area extend beyond the City owned rights of way on John, Brock, Frederick and Robert Streets. Investigations within the identified areas would be required to reduce the D-4 Assessment Area. It is noted that within Site 6, the area south of the residential properties at the west end of Frederick Street, where landfill gas was historically reported, also could not be assessed due to forest cover. Elevated methane concentrations are located north of Dymment's Creek in Site 6 within the waste fill area and in the northeast corner of Site 5, south of Dymment's Creek. The northern limits of landfill gas at Site 6 and the limits of landfill gas in the vicinity of Site 4 cannot be confirmed with information obtained to date. Additional investigations are required in these areas.

Based on the surface water results obtained by the MOE and during this investigation, leachate pools within Dymment's Creek in the vicinity of Site 6 may be attributed to industrial properties located on the west and south sides of Dymment's Creek and may not be attributable to the former landfills at some locations (i.e., the "left" bank leachate locations). Based on the elevated ammonia and PAH concentrations in groundwater in Dymment's Creek monitoring wells in the east portion of Site 6 and within Site 5, and the elevated iron concentration also noted, these parameters are appropriate for use as landfill tracers to determine impacts to surface water resulting from the waste.

Based on the findings of the D4 Assessment Study, the following recommendations were made:

- Installation of landfill gas wells at locations within City rights of way to reduce the extent of the D4 Assessment Area. Such wells would be located on John Street between Sanford and Bradford Streets, Bradford Street north and south of GP-D7, and Brock Street between Sanford and Bradford Streets;



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- As elevated methane gas concentrations are located adjacent to private properties at Site 6, specifically at GP-D10 (west of the dead end on Frederick Street) and GP-D13 (west of the southern portion of the westernmost residential property on the south side of Frederick Street), additional gas probe installations were recommended to the north and east on the John Street, Robert Street and Frederick Street rights-of-way. Additional investigations are required to be completed in the vicinity of the private residences to assess the risks associated with methane gas adjacent to residential dwellings;
- To confirm the limits of groundwater impact to the east, install one additional monitoring well east of Site 4 (on the east side of Bradford Street, south of Dymment's Creek);
- Where waste and/or impacted soil above generic MOE standards on-Site is left on-Site, a risk assessment under the O.Reg.153/04 guidelines is recommended to assess risk to current and/or future site users and the natural environment, notably at Brock Park, where public accessibility is a defined land use;
- Based on the findings of this investigation, the D-4 Assessment Area can tentatively be reduced to the limits shown on Figure 9; however, additional investigations in the vicinity of Sites 4 and 6 are required to confirm these limits. Investigations on private properties should be considered to reduce the D4 Assessment Area further;
- The proposed landfill gas investigations should be completed as soon as possible to assess the risk levels associated with methane gas generation. Given the potential for methane to be present in the vicinity of private residences at Sites 4 and 6, it is recommended that the City notify the MOE and owners of the potentially affected properties of the identified risk; and,
- A review of each alternative is required to identify the preferred alternative for each Site.

Recommendations for environmental monitoring were as follows:

- The City should monitor LFG at all existing probes every two months for one year;
- The groundwater and surface water quality should be monitored tri-annually for one year at all existing locations. Submit all groundwater and surface water samples for laboratory analysis of major ions and indicators, metals, PAH, VOC, and PHC F1 to F4. Surface water sampling should be completed at least 72 hours following a rainfall event;
- Upon completion of the annual monitoring, re-assess the monitoring program; and,
- Decommission the on-Site monitoring wells and landfill gas probes in accordance with O. Reg. 903 should be completed when these wells are no longer required.



3.0 SCOPE OF WORK

3.1 Monitoring Well and Landfill Gas Probe Installation

The borehole drilling, monitoring well construction and gas probe construction program was completed to further delineate groundwater and soil gas quality near the estimated perimeter of the former landfills. The scope of work for the delineation program conducted in the Dymment's Creek Landfills involved the following:

- Advancement of 10 boreholes within City owned rights of way (ROW) to confirm limits of waste. The work was completed by the City's drilling Contractor, Altech Drilling and Investigative Services Ltd. (Altech) of Elmira, Ontario (MOE licence #7282), using a geo-probe drill rig equipped with a soil core sampler;
- Installation of two monitoring wells (MW-D26) in the Sanford Street ROW and within the City's Wastewater Treatment Facility ("WwTF") east of Site 4 (MW-D29; just south of Dymment's Creek) to delineate impacts identified at Site 4. See Figure 2;
- Installation of five soil-gas probes in the vicinity of Site 6 (i.e., GP-B20 to GP-B24) in areas where elevated methane was detected, in order to delineate the extent of landfill gas migration (i.e., within the John Street, Robert Street, and Frederick Street ROWs);
- Installation of four soil-gas probes in the vicinity of Site 4 (i.e., GP-B25 to GP-B28) in areas where elevated methane was detected, in order to delineate the extent of landfill gas migration (i.e., within the John Street, Sanford Street, and Brock Street ROWs);
- Collection of soil samples during drilling for visual characterization, head space screening of volatile organic compounds; and,
- Submission of one soil sample from borehole MW-D29 for laboratory analysis of benzene, toluene, ethylbenzene, and xylenes (BTEX) and PHC F1 to F4.

3.2 Groundwater and Landfill Gas Monitoring

Based on the recommendations from the D4 Assessment Studies the following monitoring program was implemented:

- Collection of groundwater samples from the seven previously existing monitoring wells (MW-D1 through MW-D7) on a tri-annual basis (i.e., in April, August, and December 2013) and from the recent monitoring wells (MW-D26 and MW-D29) twice following their installation (i.e., in August and December 2013);
- Collection of landfill gas samples from the nineteen existing landfill gas monitors (GP-D1 through GP-D19) on a bi-monthly basis between April 2013 and February 2014, and from the nine new landfill gas monitors on a bi-monthly basis, following their installation, between August 2013 and February 2014;
- Groundwater samples were collected from each monitoring well and submitted for analysis of parameters including VOC, PHC F1 to F4, PAH, O. Reg. 153/04 metals, inorganics, and general water quality parameters during each sampling event;
- Measurement of headspace vapour concentrations in the eight monitoring wells using an RKI Eagle 2 combustible gas meter calibrated to both hexane (for detection of hydrocarbons) and isobutylene (for detection of volatile organic compounds);



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- Measurement of gas concentrations in the 28 gas probes using a GEM 2000 gas meter to analyze methane, carbon dioxide and oxygen; and,
- Completion of a survey of the elevation and location of the new monitoring well/LFG monitor locations to one of the City's second order benchmarks by a registered Ontario Land Surveyor

Subsurface investigations were limited to the City owned lands including road allowances.

3.3 Impact Assessment Using D-4 Guidelines

The available information was reviewed in the context of D-4 Guidelines to determine the extent of impact of the waste sites. Factors to be considered when land use is proposed on or within 500 metres of a non-operating site include: ground and surface water contamination by leachate, surface runoff, ground settlement, visual impact, soil contamination and hazardous waste, and in particular, landfill-generated gases. The focus of the current study completed by Golder includes groundwater, leachate and landfill gas (i.e., methane) migration from the site to adjacent properties. Visual impacts were not commented on as the waste was not apparent (i.e., there were no mounds in Sites 4, 5 or 6). Comments are provided on general direction of runoff from the Site, where possible. The scope of the current study completed by Golder does not include assessment of ground settlement or contaminated soils and impacts on private sites.



4.0 FIELD INVESTIGATION METHODS

The field work at the Dymment's Creek Landfills (Sites 4 to 6) was completed between April 4, 2013 and April 3, 2014. The work consisted of the advancement of 10 boreholes to better delineate the extent of impacts, installation of two groundwater monitoring wells and nine landfill gas wells, and groundwater, landfill gas, and surface water sampling.

Borehole, monitoring well, and gas probe locations for this investigation were limited to the City owned lands and road allowances.

4.1 Health and Safety

The City retained the drilling contractor (Altech), who was responsible for the health and safety of on-Site workers during the drilling program. Altech was responsible for the coordination of utility clearances with the local utility companies prior to the initiation of the field work to identify possible buried services in the area of the proposed test pit and borehole locations. A health and safety tailgate meeting was held with Altech each day prior to commencement of the drilling activities.

Golder developed and implemented Site-specific protocols to protect the health and safety of its employees and subcontractors through the preparation of a Site-specific Health and Safety Plan. An assessment of potential health and safety hazards and those associated with the proposed work was completed each day of the field program.

4.2 Borehole Advancement

Altech was retained by the City for borehole drilling, monitoring well installation, and gas probe installation. Drilling was completed between July 16 and 25, 2013. The boreholes were advanced and soil samples were obtained at regular depth intervals using a Geo-Probe drill rig equipped with soil core sampling equipment.

Soil cuttings generated during the drilling of the boreholes were placed in 205 L drums and left on-Site for subsequent disposal by Assured Industrial Services (AIS), a MOE licensed waste hauler (Certificate of Approval #A840688), of Gormley, Ontario.

4.3 Soil Sampling

Soil samples were obtained at regular depth intervals in the boreholes and were logged in the field noting subsurface conditions and visual evidence of waste and/or contamination (if observed). A portion of each soil sample was placed in a sealed plastic bag, and, if sent for analysis was placed in laboratory supplied sample jars. Bagged portions of the samples were subsequently screened for combustible vapours using either an RKI Eagle gas detector operated in methane elimination mode, and calibrated to hexane (for hydrocarbon detection [OVM]) or an RKI Eagle 2 gas detector, operated in methane elimination mode, and calibrated to both hexane (for hydrocarbon detection) and isobutylene (for volatile organic compound detection [PID]). The gas in the plastic soil sample bag headspace was sampled shortly after sample collection. Conditions encountered in the boreholes are summarized on the Record of Borehole Log sheets provided in Appendix A.

Soil samples selected for analysis generally consisted of representative cover or fill material in boreholes where waste was encountered. The soil samples were immediately placed in coolers with ice and submitted to AGAT Laboratories Ltd. (AGAT) of Mississauga, Ontario, under chain-of-custody. The selection of samples for



laboratory analysis was based on the presence of waste, visual and olfactory observations (i.e., odour or staining) during drilling, and headspace readings.

4.4 Well Installation

4.4.1 Monitoring Wells

Two groundwater monitoring wells were constructed within boreholes D26 and D29 on July 25 and July 17, 2013, respectively. The monitoring wells were subsequently re-labeled MW-D26 and MW-D29, respectively. The monitoring well screens were installed to facilitate the assessment of potential impacts relating to the identified waste at Site 4.

Each monitoring well installation consisted of a single monitoring well constructed with a nominal 50 mm (2-inch) diameter solid PVC plastic riser pipe fitted with a nominal 50 mm diameter threaded PVC screen, 3.05 m in length. The pipe was pre-washed and delivered to the Site in factory sealed plastic bags. At each monitoring well location, the annulus of the borehole adjacent to the screened portion of the well was backfilled with #1 silica filter sand to a minimum level of approximately 0.15 m above the top of the screen. The remainder of the borehole annulus adjacent to the well riser pipe was backfilled with bentonite and/or grout to within 0.3 m of ground surface, where a concrete plug was placed. Monitoring well MW-D26 was completed with a flushmount protective well casing set in the concrete. Monitoring well MW-D29 was completed with a 100 mm stick-up steel protective well casing set in the concrete. Details of the monitoring well installations are provided on the Record of Borehole sheets contained in Appendix A. The MOE Well Record for these wells is provided in Appendix B.

The monitoring wells were surveyed on July 30, 2013 by Rudy Mak Surveying Ltd., of Barrie, Ontario, a registered Ontario Land Surveyor. The elevations of the ground surface in the vicinity of the wells, and the top of the measuring pipe were measured relative to a geodetic benchmark. Groundwater levels were measured up to five times in the monitoring wells between February 14 and December 3, 2012, using an electronic water level tape.

4.4.1 Gas Probes

A shallow nested gas probe was installed at monitoring well MW-D26. The gas monitors was correspondingly re-labeled GP-D26. In addition to this location, an additional eight landfill gas probes were installed at boreholes D20 through D25, D27 and D28 between July 26 and 23, 2013 (subsequently re-labeled GP-D20 through GP-D25, GP-27, and GP-28, respectively). The landfill gas probe screens were installed in the vadose zone (i.e., above the anticipated groundwater elevation) to facilitate the assessment of the presence/absence of landfill gas.

Each landfill gas probe installation consisted of a single monitoring well constructed with a nominal 50 mm (2 inch) diameter solid PVC plastic riser pipe fitted with a nominal 50 mm diameter threaded PVC screen, ranging in length from 1.52 m to 3.05 m. The pipe was pre-washed and delivered to the Site in factory-sealed plastic bags. At each gas probe location, the annulus of the borehole adjacent to the screened portion of the well was backfilled with silica filter sand to just above the top of the screen. The remainder of the borehole annulus adjacent to the well riser pipe was backfilled with bentonite to within 0.15 m of ground surface, where a concrete plug was placed. Gas probes GP-D22 to GP-D24 and GP-D26 to GP-D28 were completed with a flush mounted well casing, while the remaining gas probes were completed with a 100 mm diameter stick-up steel protective well casing set in the concrete. Details of the landfill gas probe installations are provided on the



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Record of Borehole sheets contained in Appendix A. The MOE Well Records for the probes are provided in Appendix B.

Landfill gas probes were surveyed on July 30, 2013 by Rudy Mak Surveying Ltd.

Table 4.1: Summary of Monitoring Well and Gas Probe Installation - Dymment's Creek Landfills

Well	Monitoring Pipe Elev. (masl)	Ground Surface Elev. (masl)	Depth to Bottom of Screen (mbgs)	Top of Screen Elev. (masl)	Bottom of Well Elev. (masl)	Screen Installation Description
Site 4						
GP-D25	226.31	225.23	3.40	223.35	221.83	Unknown – daylighted hole
MW-D26	224.50	224.57	4.39	223.23	220.19	Sand underlying fill
GP-D26	224.51	224.63	4.12	223.56	220.51	Sand underlying fill
GP-D27	224.60	224.74	3.96	223.83	220.78	Sand underlying fill
GP-D28	225.05	225.15	4.11	222.56	221.04	Unknown – daylighted hole
MW-D29	223.35	222.42	3.98	221.48	218.43	Sand fill
Site 6						
GP-D20	228.16	227.25	4.42	225.88	222.83	Sand underlying fill
GP-D21	227.82	226.84	4.27	225.62	222.57	Sand underlying fill
GP-D22	227.03	227.15	4.57	225.62	222.58	Sand underlying fill
GP-D23	225.73	225.93	3.96	225.01	221.97	Sand underlying fill
GP-D24	226.79	227.00	5.49	224.56	221.51	Sand

Notes:

mbgs = metres below ground surface

masl = metres above sea level

4.5 Groundwater Sampling

Monitoring wells MW-D26 and MW-D29 were equipped with dedicated low density polyethylene (LDPE) tubing and a foot valve (Waterra™-type system) for subsequent well purging and water sampling. The wells were developed using dedicated surge blocks to pump the wells until ten well volumes were removed from the well, using a hydraulic lift pump to flush out the annulus of excess sediment to aid in reduction of silt content in the groundwater samples. The wells were allowed to recover for a minimum of 24 hours prior to sample collection.

Prior to collection of groundwater samples, a minimum of approximately three well volumes were purged from the wells. Purged water was placed in 205 L drums for subsequent disposal off-Site by AIS.



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Groundwater samples were collected at least twice from each monitoring well in 2013. At the time of sampling, the groundwater samples were placed in coolers with ice and subsequently submitted to the commercial analytical laboratory under chain-of-custody procedures. Table 4.2 provides a summary of the groundwater samples submitted for laboratory analysis.

During the groundwater sampling events at each location, the wells were sampled for parameters including VOC, PHC F1 to F4, metals, major ions and indicators, ammonia, cyanide, mercury, phenols, chromium VI, and PAH.

A number of wells were constructed in the vicinity of Site 5 as part of earlier investigations. These wells include MW8/00 and CB03-4 on the northeast corner of Brock and Anne Streets (upgradient of Site 5), CB10-1, on the west side of Anne Street, south of John Street (upgradient of the former landfills), CB10-2, on the northeast corner of Brock and Innisfil Streets, CB03-1 on the east side of Site 5, and CB08-2/CB12-1, on the east side of Bradford Street, just north of Brock Street (downgradient of the former landfills). See Figures 2 through 9 for locations.



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Table 4.2: Summary of Analyzed Groundwater Samples – Dymont's Creek Landfills

Well Number and I.D.	Date Sampled	OVM Reading in Well Headspace (ppm)	PID Reading in Well Headspace (ppm)	Final Field pH	Final Field Temp. (°C)	Final Field Cond. (µS/cm)	Total Volume Purged (L)
MW-D1	22-Apr-2013	NM	NM	6.99	8.5	591	16
	21-Aug-2013	NM	NM	7.51	12.3	2630	15
	11-Dec-2013	15	0	7.16	10.0	1245	18
MW-D2	22-Apr-2013	NM	NM	6.49	9.9	558	13.5
	21-Aug-2013	NM	NM	6.23	13.8	1700	9
	11-Dec-2013	0	1	6.93	10.0	1295	12
MW-D3	22-Apr-2013	NM	NM	6.74	6.8	706	21
	21-Aug-2013	NM	NM	6.70	12.6	3136	19.5
	11-Dec-2013	125	0	6.40	7.1	2710	21
MW-D4	22-Apr-2013	NM	NM	6.78	10.9	518	23
	21-Aug-2013	NM	NM	6.78	14.9	2802	19.5
	11-Dec-2013	230	1	6.35	10.0	2155	21
MW-D5	22-Apr-2013	NM	NM	6.82	7.2	502	21
	21-Aug-2013	NM	NM	6.87	13.1	2465	19
	12-Dec-2013	155	0	7.20	9.9	1185	21
MW-D6	22-Apr-2013	NM	NM	6.86	10.1	544	33
	21-Aug-2013	NM	NM	7.01	13.4	1940	30.5
	11-Dec-2013	12% LEL	0	6.81	10.9	1490	33
MW-D7	22-Apr-2013	NM	NM	6.89	7.9	652	15
	21-Aug-2013	NM	NM	6.49	18.1	2450	14
	11-Dec-2013	10% LEL	0	6.66	11.8	2270	15
MW-D26	21-Aug-2013	NM	NM	7.68	16.7	717	9.6
	11-Dec-2013	145	7	7.20	10.5	650	12



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Well Number and I.D.	Date Sampled	OVM Reading in Well Headspace (ppm)	PID Reading in Well Headspace (ppm)	Final Field pH	Final Field Temp. (°C)	Final Field Cond. (µS/cm)	Total Volume Purged (L)
MW-D29	21-Aug-2013	NM	NM	6.80	20.1	2426	7.5
	11-Dec-2013	65	16	6.92	11.1	2241	9

Notes:
OVM = organic vapour meter (for petroleum hydrocarbon detection) PID = photoionization detector (for organic vapour detection) ppm = parts per million by volume
µS/cm = micro Siemens per centimetre (NM – not measured)



4.6 Landfill Gas Sampling

Landfill gas sampling was conducted at previously existing landfill gas monitors every two months at each location between April 2013 and February 2014. Landfill gas sampling was conducted at gas monitors GP-D20 to GP-D28 every two months at each location between August 2013 and February 2014 (i.e., following their installation).

A portable, high volume pump (25 L/min) was used to purge three times the volume of each gas well prior to sampling. Readings including the relative concentrations of carbon dioxide (CO₂), methane (CH₄), and oxygen (O₂) were obtained from the nineteen gas probes using a calibrated GEM 2000 monitor.

Table 1 provides a full list of landfill gas readings in the landfill gas probes. Figure 3 provides a summary of methane gas concentrations in plan view.

In some locations, groundwater was above the top of the screens and methane gas readings at these locations should be viewed as approximate.

4.7 Surface Water Sampling

Five surface water samples (SWD1 through SWD5) were collected three times between April 22, 2013 and December 10, 2013 in the vicinity of the former landfills (see Figure 2 for sampling locations). Samples were collected from downstream (SWD1) to upstream (SWD3) locations to prevent cross-contamination. A clean, dry amber glass jar was used to collect samples from the middle of the water column and was subsequently poured into laboratory supplied sampling containers. At the time of sampling, the surface water samples were placed in coolers with ice and subsequently submitted to the commercial analytical laboratory under chain-of-custody procedures. Each surface water sample was submitted for laboratory analysis of VOC, metals, and major ions and indicators. Table 4.3 provides a summary of the surface water samples submitted for laboratory analysis.

Table 4.3: Summary of Analyzed Surface Water Samples – Dymment's Creek Landfills

Well Number and I.D.	Location Relative to Former Landfills	Date Sampled	Final Field pH	Final Field Temp. (°C)	Final Field Cond. (µS/cm)	Dissolved Oxygen (mg/L)	Flow
SWD1	Downstream	23-Apr-13	7.36	7.9	409	10.69	Moderate
		23-Aug-13	7.41	18.3	1090	5.43	Moderate
		11-Dec-13	7.14	0.5	1430	13.80	Moderate
SWD2	Between Sites 5 and 6	23-Apr-13	7.15	8.3	402	7.30	Low
		23-Aug-13	7.83	18.8	1057	5.26	Moderate
		11-Dec-13	7.04	1.0	1360	12.08	Moderate
SWD3	Upstream	23-Apr-13	7.51	8.4	403	10.54	Low
		23-Aug-13	8.41	19.3	942	5.48	Low
		11-Dec-13	7.31	1.0	1390	4.94	Low
SWD4	Site 5	23-Aug-13	7.87	19.4	1164	5.82	Moderate
		11-Dec-13	7.44	0.8	1530	13.08	Moderate



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Well Number and I.D.	Location Relative to Former Landfills	Date Sampled	Final Field pH	Final Field Temp. (°C)	Final Field Cond. (µS/cm)	Dissolved Oxygen (mg/L)	Flow
SWD5	Site 6	23-Aug-13	8.19	22.1	1097	4.29	Moderate
		11-Dec-13	7.33	1.0	1530	12.89	Low

Notes:

ppm = parts per million by volume
µS/cm = micro Siemens per centimetre

VOC = volatile organic compounds

4.8 Analytical Program

Golder retained the services of AGAT Laboratories Inc. (AGAT) of Mississauga, Ontario for the analysis of soil samples. The City retained the services of Exova of Ottawa, Ontario for the analysis of groundwater and surface water samples during the April 2013 sampling event and E3 Laboratories Inc. (E3) of Niagara-on-the-Lake, Ontario (which subcontracted a portion of the analyses to Caduceon Environmental Laboratories (Caduceon) of Kingston, Ontario in August 2013 and to Paracel Laboratories Ltd. (Paracel) of Niagara Falls in December 2013) for the August and December 2013 sampling events. AGAT, Exova, E3, Caduceon, and Paracel are accredited by the Standards Council of Canada/Canadian Association of Environmental Analytical Laboratories ("CAEAL") program. Analytical methods are reported by the laboratories on the Laboratory Certificates of Analysis provided in Appendices D, E, and F.

4.8.1 Quality Assurance/Quality Control

The standard analytical methods and procedures used, as well as internal laboratory method blanks, duplicates and surrogate recoveries for organic analyses are also provided on the AGAT Laboratory Certificates of Analysis provided in Appendices D through F.

The laboratories maintain in-house quality assurance/quality control ("QA/QC") programs to govern sample analysis. Standard QA/QC protocols include the analysis of method blanks, matrix spikes and 10% replicates for each sample batch. In addition to the quality control employed by the laboratories, the following QA/QC samples were also submitted during the work program:

- One blind groundwater duplicate sample during the August and December sampling events (Dup B, a duplicate of MW-D29 and Dup2, a duplicate of MW-D7, in August, and December 2013, respectively) were submitted for analysis of all analyzed parameters;
- Four blind field blank samples were submitted for analysis of all analysed parameters during the work program (i.e., a minimum of one field blank per sampling event); and,
- Three trip blank samples (labelled as Trip Blank) were submitted for analysis of all analyzed parameters during the April and August 2013 sampling events and for VOC only during the December 2013 sampling event.



5.0 PHYSICAL CHARACTERISTICS

5.1 Utilities and Water Supply

A number of public utilities are located in the vicinity of the Dymment's Creek Landfills, including municipal sewer and water services, natural gas, and telephone lines (Figure 5). These services are primarily located within the Sanford, Innisfil and John Street road allowances. No municipal services are located within Innisfil and Sanford Streets, south of Dymment's Creek, where the majority of the waste is located.

5.2 Stratigraphy and Waste/Fill Distribution

Details of the conditions encountered in the boreholes are presented on the Record of Borehole sheets provided in Appendix A. Subsurface conditions encountered are specific to the borehole locations and are expected to vary between and beyond borehole and sampling locations. Whereas this is generally the case for any subsurface investigation, the variable nature of fill and waste placement associated with unorganized waste disposal operations is difficult to correlate. The drilling locations were limited by property ownership (only on City lands) and access, and the distribution and character of the waste between the wells is inferred and should be interpreted with caution.

The material encountered at the boreholes largely consisted of sand and gravel fill, waste, or surficial sand overlying peat, underlain by sand. Figure 8 illustrates the materials encountered in the boreholes along a cross-section generally oriented from west to east through the Dymment's Creek Landfills.

Fill, in the absence of waste materials, was encountered in the boreholes ranging in thickness from 0.28 m (GP-D26) and 4.34 m (MW-D29). Asphalt debris was noted in the surficial fill at Borehole D27 to a depth of 0.61 m below grade, located in the Sanford Street ROW, south of Site 4. The majority of these boreholes are located within City road allowances, with the exception of: borehole D29, located along the south bank of Dymment's Creek east of Bradford Street.

The waste/fill material is underlain by fine to medium sand to the maximum depth of investigation. Based on previous investigations, there is a 4 m intermittent confining unit ranging in elevation from 213 masl to 219 masl located within the vicinity of Sites overlying a deeper aquifer which extends to a depth of 208 masl. This upper aquifer overlies a thicker confining unit (i.e., approximately 8 m thick). The municipal aquifer is encountered at an elevation of approximately 180 masl in the vicinity of the Site. The nearest pumping well (Well 12) is located approximately 450 m southeast of Site 4.

5.3 Groundwater

A summary of groundwater elevations obtained from the on-Site monitoring wells and gas probes is provided in Table C-1 (Appendix C). The depths to groundwater in the monitoring wells as obtained during the work program are summarized in Table 5.1 below. Each monitoring well exhibited organic odours during at least one sampling event. Hydrocarbon-related sheen or odours were noted in groundwater purged from monitoring well MW-D4 in April 2013 only and from MW-D29 in August 2013. Groundwater elevations during the work program ranged from 219.69 masl (at MW-D29 in December 2013) to 223.96 masl (at MW-D1 in April 2013).

Figure 4 illustrates the groundwater flow directions within the waste and fill based on the available information from the wells in this study in August 2013, supplemented by groundwater levels from other City of Barrie wells in the area. Groundwater flow is interpreted to be easterly overall, but locally towards Dymment's Creek. At



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Site 4, shallow groundwater flow is interpreted to be toward Dymment's Creek; however, there are a limited number of monitoring locations at this Site and a component of groundwater may flow northeasterly and potentially flows off-Site to the adjacent properties to the east before discharging to Dymment's Creek northeast of monitoring well MW-D7. At Sites 5 and 6, shallow groundwater is interpreted to be toward Dymment's Creek. Groundwater originating from these Sites is therefore not expected to flow off to adjacent properties, prior to discharging to the creek.

Vertical gradients were calculated for the nested monitoring well locations. Vertical gradients at monitoring well nests D4 and D6 had slight downward gradients (ranging from 0.09 m/m to 0.21 m/m). Vertical gradients at D2, D5, and D7 were consistently upwards ranging from 0.001 m/m to 0.16 m/m. The vertical gradients at D1, D3, and D26 fluctuated from upward to downward during each sampling event, ranging from 0.28 m/m downward at D26 in August 2013 to 0.11 m/m upward at D1 in August 2013.

Table 5.1: Summary of Groundwater Elevations - Dymment's Creek Monitoring Wells

Well	Monitoring Pipe Elev. (masl)	Ground Surface Elev. (masl)	Top of Screen Elev. (masl)	Bottom of Well Elev. (masl)	Sampling Date	Depth to Groundwater (mbgs)	Groundwater Elevation (masl)
Site 4							
MW-D6	224.50	223.51	218.78	215.73	17-Sep-12	2.17	221.34
					22-Apr-13	1.92	221.59
					20-Jun-13	2.13	221.38
					21-Aug-13	2.19	221.32
					11-Dec-13	2.24	221.27
MW-D7	222.80	222.10	219.32	217.80	17-Sep-12	1.85	220.25
					20-Jun-13	1.62	220.48
					22-Apr-13	1.74	220.36
					21-Aug-13	1.89	220.21
					11-Dec-13	1.82	220.28
MW-D26	224.50	224.57	230.71	220.19	22-Aug-13	3.67	220.91
					11-Dec-13	2.63	221.94
MW-D29	223.35	222.42	231.96	218.43	21-Aug-13	1.79	220.62
					11-Dec-13	2.72	219.69



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Well	Monitoring Pipe Elev. (masl)	Ground Surface Elev. (masl)	Top of Screen Elev. (masl)	Bottom of Well Elev. (masl)	Sampling Date	Depth to Groundwater (mbgs)	Groundwater Elevation (masl)
Site 5							
MW-D4	224.22	223.30	220.38	218.86	17-Sep-12	1.23	222.07
					22-Apr-13	0.67	222.63
					20-Jun-13	1.09	222.21
					21-Aug-13	1.21	222.09
					11-Dec-13	1.01	222.30
MW-D5	224.99	224.03	222.25	219.20	17-Sep-12	1.72	222.31
					22-Apr-13	1.26	222.77
					20-Jun-13	1.46	222.57
					21-Aug-13	1.66	222.37
					12-Dec-13	1.52	222.51
Site 6							
MW-D1	226.23	225.30	222.32	220.80	17-Sep-12	1.74	223.55
					22-Apr-13	1.34	223.96
					20-Jun-13	1.50	223.80
					21-Aug-13	1.68	223.61
					11-Dec-13	2.04	223.26
MW-D2	226.07	225.16	222.31	220.79	17-Sep-12	2.57	222.59
					22-Apr-13	2.09	223.08
					20-Jun-13	2.37	222.79
					21-Aug-13	2.56	222.61
					11-Dec-13	2.36	222.81



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Well	Monitoring Pipe Elev. (masl)	Ground Surface Elev. (masl)	Top of Screen Elev. (masl)	Bottom of Well Elev. (masl)	Sampling Date	Depth to Groundwater (mbgs)	Groundwater Elevation (masl)
MW-D3	224.39	223.36	220.63	219.11	17-Sep-12	1.03	222.33
					22-Apr-13	0.56	222.79
					20-Jun-13	0.80	222.56
					21-Aug-13	1.05	222.31
					11-Dec-13	0.82	222.54

Notes:
mbgs = metres below ground surface
masl = metres above sea level



6.0 CHEMICAL ANALYTICAL FINDINGS

6.1 Site Condition Standards

The analytical results for soil and groundwater were compared to the full depth site condition standards for residential/parkland/institutional land use, coarse textured soil, listed in Table 2 (potable groundwater situation) of the "Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act", dated April 15, 2011 ("MOE Table 2 Standards").

Based on information obtained from the boreholes, the Site is generally underlain by soils, which consist of more than 50 percent by mass of particles that are 75 µm or larger in mean diameter. Therefore, the texture of soil at the Site would likely be classified as coarse-grained for the application of site-condition standards set out in O. Reg. 153/04, as amended.

The MOE Table 2 Standards are considered an appropriate basis of comparison for the sites based on public/pedestrian access and the use of an underlying aquifer as a water supply source for the City.

The MOE Table 2 Standards are provided in Tables 2 through 5 (attached). The respective Ontario Drinking Water Standards (ODWS) are also provided with the groundwater analytical results in Tables 3 through 5 following the text of the report. The analytical results for surface water samples were compared to the respective Provincial Water Quality Objectives (PWQO) for surface water and are summarized provided in Tables 6 through 8 following the text of the report.

In the event of a clean-up and Record of Site Condition filing for the Dymment's Creek Landfills, the MOE Table 2 site condition standards would not strictly apply to all areas of the site due to the proximity to Dymment's Creek (i.e., within 30 m) in select soil samples obtained from this investigation. The MOE Table 2 Standards have been used as a basis of comparison for this report.

6.2 Analytical Results

6.2.1 Soil

Laboratory Certificates of Analysis for soil are provided in Appendix D.

Previous waste classification analysis on two soil samples indicated that the soil could be classified as solid non-hazardous waste (Golder, 2013).

The soil sample submitted from borehole D26 at a depth of 3.05 to 3.53 m exceeded the MOE Table 2 standard for the following parameters:

- Total xylenes, 3.2 µg/g, compared to the MOE Table 2 Standard of 3.1 µg/g; and,
- PHC F1, 2,500 µg/g, compared to the MOE Table 2 Standard of 55 µg/g.

These exceedances were consistent with strong hydrocarbon odours noted between 1.93 m below grade and 3.45 m below grade. These hydrocarbon odours do not likely originate from the Dymment's Creek Landfills as the odours were not evident during the drilling of borehole D7 located on the east side of Site 4 and there are also non-detectable concentrations of these parameters in groundwater from monitoring well MW-D7 (located upgradient from MW-D29). There has been a long history of vehicle sales and service activities in the vicinity of this borehole, which may be a potential source for this impact.



6.3 Groundwater

Groundwater sample locations for which the analytical results exceed the various standards used for comparison are provided on Figure 6. Total ammonia concentrations are shown on Figure 6 for informational purposes as this parameter is a common constituent of waste, and unionized ammonia often represents a potential impact to surface water. Laboratory Certificates of Analysis for groundwater are provided in Appendix E.

With the exception of monitoring well MW-D29, where hydrocarbon odours were noted, no hydrocarbon-related sheen or odours were noted in groundwater purged from the monitoring wells. As noted above, the presence of hydrocarbon in D29 is considered to be unrelated to impact from the landfills

VOC, Metals, Major Ions, and PAH

Groundwater quality in samples collected from the monitoring wells met the MOE Table 2 Standards and/or the ODWS for the analyzed parameters, with the exception of the following:



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Table 6.1: Summary of 2013 Groundwater Exceedances – Dymont's Creek Wells

Monitoring Well ID	Contaminant Type	Parameter	Units	ODWS	MOE Table 2 Standard	Concentration	Date
MW-D1	Inorganics	Chloride	mg/L	250 (AO)	790	400 to 532	Apr-13 to Dec-13
		Sodium	mg/L	200 (AO)	490	280 to 355	Apr-13 to Dec-13
MW-D2	VOC	Benzene	µg/L	5	5.0	4.7 to 12.9	Apr-13 to Dec-13
		1,4-Dichlorobenzene	µg/L	5	1	1.6 to 5.5	Apr-13 to Dec-13
	Metals	Iron Vanadium	µg/L µg/L	300 (AO) NS	NV 6.2	8200 to 53000 31.9	Apr-13 to Dec-13 Dec-2013
MW-D3	Inorganics	Chloride	mg/L	250 (AO)	790	800 to 848	Apr-13 to Dec-13
		Benzene	µg/L	5	5.0	26.7 / 31.0	Apr-13 / Dec-13
	VOC	1,4-Dichlorobenzene	µg/L	5	1	4.5 to 7.9	Apr-13 to Dec-13
		Ethylbenzene	µg/L	2.4 (AO)	2.4	22.9 / 8.2	Apr-13 / Dec-13
		Xylenes	µg/L	300 (AO)	300	406	Apr-13
PAH	Naphthalene 2- and 1-methylnaphthalene	µg/L µg/L	NS NS	11 3.2	11.5 / 12.5 3.72 / 4.32	Aug-13 / Dec-13 Aug-13 / Dec-13	
Metals	Chromium Cobalt Iron Vanadium	µg/L µg/L µg/L µg/L	50 NS 300 (AO) NS	50 3.8 NV 6.2	55 3.5 to 6.5 102 to 42700 8.0 / 109	Dec-13 Apr-13 to Dec-13 Apr-13 to Dec-13 Aug-13 / Dec-13	
Inorganics	Chloride Sodium Nitrite	mg/L mg/L	250 (AO) 200 (AO) 1.0	790 490 NV	277 to 340 236 to 283 4.82	Apr-13 to Dec-13 Apr-13 to Dec-13 Dec-13	

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Monitoring Well ID	Contaminant Type	Parameter	Units	ODWS	MOE Table 2 Standard	Concentration	Date
MW-D4	VOC	Benzene 1,4-Dichlorobenzene	µg/L	5	5.0	10.7 to 25.8	Apr-13 to Dec-13
			µg/L	5	1	9.7 to 13.4	Apr-13 to Dec-13
	PHC	PHC F2 PHC F3	µg/L	NS	150	300	Apr-13
			µg/L	NS	500	2000	Apr-13
	PAH	Naphthalene Phenanthrene Fluoranthene Benzo(a)anthracene Chrysene Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(a)pyrene Indeno(1,2,3-cd)pyrene Benzo(g,h,i)perylene 2-and 1-methylnaphthalene	µg/L	NS	11	34.0 to 149	Apr-13 to Dec-13
			µg/L	NS	1	3.1 to 10.5	Apr-13 to Dec-13
			µg/L	NS	0.41	1.0 to 4.76	Apr-13 to Dec-13
			µg/L	NS	1.0	1.05	Aug-13
			µg/L	NS	0.1	0.11 to 1.09	Apr-13 to Dec-13
			µg/L	NS	0.1	0.89 / <1.00	Aug-13 / Dec-13
µg/L			NS	0.1	0.36 / <1.00	Aug-13 / Dec-13	
µg/L			0.01	0.01	0.08 to 0.685	Apr-13 to Dec-13	
Metals	Cobalt Iron Vanadium	µg/L	NS	3.8	4.3	Aug-13	
		µg/L	300 (AO)	NV	419 to 21800	Apr-13 to Dec-13	
		µg/L	NS	6.2	11 / 62	Aug-13 / Dec-13	
		µg/L	5	5.0	7.1 to 11.5	Apr-13 to Dec-13	
		µg/L	5	1	3.8 to 4.8	Apr-13 to Dec-13	
		µg/L	0.01	0.01	0.091 / 0.11	Aug-13 / Dec-13	
MW-D5	PAH	Benzo(a)pyrene Biphenyl	µg/L	NS	0.05	0.58	Dec-13
			µg/L	NS	3.8	4.8	Aug-13
	Metals	Iron Vanadium	µg/L	300 (AO)	NV	44900 / 51000	Apr-13 / Dec-13
			µg/L	NS	6.2	7.4 / 31.9	Aug-13 / Dec-13
Inorganics	Chloride Sodium	mg/L	250 (AO)	790	709 to 1430	Apr-13 to Dec-13	
		mg/L	200 (AO)	490	643 to 712	Apr-13 to Dec-13	



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Monitoring Well ID	Contaminant Type	Parameter	Units	ODWS	MOE Table 2 Standard	Concentration	Date	
MW-D6	PAH	Benzo(a)pyrene	µg/L	0.01	0.01	0.054	Aug-13	
	Metals	Barium	µg/L	1000	1000	1100	Dec-13	
		Iron Vanadium	µg/L µg/L	300 (AO) NS	NV 6.2	301 to 16900 16.6	Apr-13 to Dec-13 Dec-2013	
MW-D7	Inorganics	Chloride	mg/L	250 (AO)	790	260 to 306	Apr-13 to Dec-13	
	PAH	Benzo(a)pyrene	µg/L	0.01	0.01	0.07	Aug-13	
	Metals	Iron Vanadium	µg/L µg/L	300 (AO) NS	NV 6.2	2610 to 26200 20.2 / 13.2	Apr-13 to Dec-13 Dec-2013 (dup)	
Inorganics		Chloride Sodium	mg/L mg/L	250 (AO) 200 (AO)	790 490	624 to 1160 326 to 625	Apr-13 to Dec-13 Apr-13 to Dec-13	
	MW-D26	PAH	Benzo(a)pyrene	µg/L	0.01	0.025	Aug-13	
MW-D29	PHC	PHC F2	µg/L	NS	150	400 / 600	Aug-13 (dup)	
	PAH	Naphthalene	µg/L	NS	11	11.0 / 7.83	Aug-13 (dup)	
		Phenanthrene	µg/L	NS	1	1.85 / 1.72	Aug-13 (dup)	
		Fluoranthene	µg/L	NS	0.41	2.43 / 2.57	Aug-13 (dup)	
		Benzo(a)anthracene	µg/L	NS	1.0	0.87 / 1.07	Aug-13 (dup)	
		Chrysene	µg/L	NS	0.1	0.78 / 1.07	Aug-13 (dup)	
		Benzo(b)fluoranthene	µg/L	NS	0.1	1.17 / 1.50	Aug-13 (dup)	
		Benzo(k)fluoranthene	µg/L	NS	0.1	<0.5 / 0.64	Aug-13 (dup)	
		Benzo(a)pyrene	µg/L	0.01	0.01	0.777 / 0.965	Aug-13 (dup)	
		Indeno(1,2,3-cd)pyrene	µg/L	NS	0.2	0.68 / 0.96	Aug-13 (dup)	
		Benzo(g,h,i)perylene	µg/L	NS	0.2	0.87 / 1.18	Aug-13 (dup)	
		2-and1-methylnaphthalene	µg/L	NS	NS	3.2	3.6 to 13.7	Aug-13 / Dec-13
		Metals	Iron	µg/L	300 (AO)	NV	793 to 26600	Aug-13 / Dec-13
Inorganics	Chloride	mg/L	250 (AO)	790	721 to 781	Aug-13 / Dec-13		
	Sodium	mg/L	200 (AO)	490	406 to 532	Aug-13 / Dec-13		

Notes:

NS = No standard NV = No value AO = Aesthetic objective



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Elevated sodium and chloride concentrations were reported at all monitoring well locations, with the exception of MW-D4, and may be attributable to road salt application in the vicinity of the adjacent ROW; however, waste material in these areas may also contribute to these elevated concentrations. The elevated benzene and 1,4-dichlorobenzene values at MW-D2 to MW-D5 (located within Sites 5 and 6) are also likely attributable to leaching of the waste materials at these locations from disposal of liquid chemical wastes.

Concentrations of analyzed parameters were lowest at MW-D1, MW-D6, MW-D7, and MW-D26 located upgradient and downgradient of the Dymment's Creek Landfills; concentrations were elevated at the wells located within waste. Trace concentrations of trichloroethylene (TCE) have been detected at MW-D1 (0.75 µg/L in August 2012 and 1.0 µg/L in April 2013), but were below the MOE Table 2 Standard of 1.6 µg/L. This parameter is likely associated with the TCE plume monitored by the City in the vicinity of these sites and is likely derived from upgradient industrial facilities, not from waste in the Dymment's Creek Landfills.

Indicator Parameters

In the absence of either an MOE Table 2 Standard or ODWS, relative comparisons are provided for general water quality for parameters including electrical conductivity, ammonia as N, chromium III, phenols, potassium, bromide, and phosphate. Ammonia is notably present in landfill leachate as a result of the breakdown of the organic waste component. This parameter has been added to the information in Table 6.

Elevated ammonia concentrations, often associated with landfills containing organic waste, were identified at most monitoring wells in the waste, including MW-D3, MW-D4 and MW-D5, typically at concentrations of greater than 120 mg/L. Slightly lower concentrations were detected at monitoring wells MW-D2, MW-D6, and MW-D7, ranging from approximately 12.2 mg/L to 68.7 mg/L. There was essentially no ammonia detected at the upgradient monitoring wells MW-D1 or MW-D26 and was low, ranging from 5.37 to 6.04 mg/L, at MW-D29. Whereas ammonia concentrations are elevated in the landfill, it is noted that the unionized ammonia measured in the streams by the MOE in 2001 was not appreciably elevated (MOE, 2011).

Concentrations of calcium range from 79 mg/L, in monitoring well MW-D1 in April 2013, to 370 mg/L, in monitoring well MW-D6 in December 2013 and concentrations of magnesium range from 5 mg/L, in monitoring well MW-D1, in April 2013 to 48.2 mg/L in monitoring well MW-D6 in December 2013. Concentrations of potassium are highest (55.5 mg/L in August 2013) at monitoring well MW-D4 and lowest (1.89 mg/L in December 2013) at MW-D1. Potassium is often associated with waste materials; however it is typically not very mobile.

Phenols were not detected at MW-D26 and were highest at MW-D3 (0.149 mg/L in August 2013).

PWQO

Based on the location of the former landfills, the groundwater results were compared to the PWQO to determine the impacts relating to surface water. There were no exceedances of the PWQO in the upgradient well, MW-D1, during the 2013 sampling events.

Elevated metals and VOC, including chlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, ethylbenzene, and xylenes were also noted above the PWQO at Sites 5 and 6. Toluene, previously identified in exceedance of the PWQO at MW-D7, located on the west side of Bradford Street, was no longer detected in 2013, nor at MW-D29.



Results of Adjacent Monitoring Wells

Seven monitoring wells installed previously to monitor a TCE plume originating outside of the Dymment's Creek Landfills (see Figure 2) were sampled at least once between September 20 and December 12, 2012 and the samples submitted for analysis of VOC. The sample from CB13-1 was also submitted for analysis of major ions and indicators and metals. No waste was noted during the drilling and installation of these wells.

Monitoring well nests MW8/00, CB03-4, CB08-2, CB10-1, CB10-2 and CB13-1 exhibit impacts associated with the TCE plume. There is no evidence of impacts in these wells relating to the presence of the Dymment's Creek Landfills, which would include, for example, PAH and VOC parameters, including 1,4-dichlorobenzene, benzene, ethylbenzene, toluene, or xylenes.

Monitoring well CB03-1#1 is located on the east side of Site 5, to a depth of 5.9 m below grade. This monitoring well is impacted by buried waste based on the detection of several VOC parameters associated with waste (e.g., 1,4-dichlorobenzene). Monitoring well CB03-1#2 is installed to a depth of 14.3 m below grade at the base of the deeper unconfined sand aquifer. None of the parameters noted in the upper screen were detected at this deeper screen. Concentrations of TCE, up to 500 µg/L, have historically been present at this location; however, TCE has decreased over time to a current concentration of 1.4 µg/L. Vinyl chloride and cis-1,2-DCE are also present at this screen location. These parameters are unrelated to the former waste disposal sites.

Based on the results, other than CB03#1, there is no evidence of TCE impact within the waste sites originating from off-Site sources.

6.3.1 Surface Water

Surface water sample locations for which the analytical results exceed the various standards used for comparison are provided on Figure 7. Laboratory Certificates of Analysis for surface water are provided in Appendix F.

VOC, Metals, Major Ions, and PAH

Surface water quality in samples collected from three locations along Dymment's Creek (see Figures 2 and 7) met the PWQO for the analyzed parameters, with the exception of the following:

- **Iron at all sampling locations** ranging in concentration from 0.75 mg/L (SWD3 in April 2013) to 4.42 mg/L (SWD5 in August 2013), greater than the PWQO of 0.3 mg/L;
- **Aluminum (0.21 mg/L), cadmium (0.00046 mg/L), lead (0.0105 mg/L), and zinc (0.059 mg/L) at SWD5 only in August 2013**, greater than their respective PWQOs of 0.075 mg/L, 0.0002 mg/L, 0.005 mg/L, and 0.03 mg/L;
- **Copper at all locations in August 2013 only** ranging in concentration from 0.0086 mg/L (SWD1) to 0.0256 mg/L (SW5), greater than the PWQO of 0.005 mg/L;
- **Tungsten (0.04 mg/L) at SWD3 only in August 2013**, greater than the PWQO of 0.03 mg/L;
- **Dissolved mercury at SWD3 (0.003 mg/L) and SWD4 (0.0009 mg/L) in December 2013 only**, greater than the PWQO of 0.0002 mg/L.

It is noted that iron concentrations exceeded the PWQO in Dymment's Creek prior to flowing through the landfill sites. The elevated metals, specifically during the August 2013 at SWD5, is likely related to the industrial properties in the vicinity of the creek and not likely related to the buried waste as the groundwater in the vicinity



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of this location (i.e., at MW-D3) does not have those parameters present at elevated levels. There is also no mercury at any groundwater monitoring well location and therefore, the mercury reported in December 2013 does not appear to be related to buried waste.

Indicator Parameters

In the absence of a PWQO, relative comparisons can be made regarding general water quality for parameters such as electrical conductivity, calcium, magnesium, potassium, sodium and chloride.

Concentrations of the indicator parameters are similar in all surface water samples.

6.3.2 Quality Assurance/Quality Control

Relative Percent Difference (RPD) is calculated for results where results for both the original and duplicate samples are at concentrations of greater than five times the laboratory RDL. Field duplicate groundwater samples with calculated RPD of greater than 50% are considered questionable. Two blind field duplicate samples were collected throughout the 2013 work program. With the exception of iron and 2-and 1-methylnaphthalene in MW-D29 and its' field duplicate in August 2013 (DupB; 175% and 81%, respectively) and iron in MW-D7 and its' field duplicate in December 2013 (Dup2; 150%), RPD values for field duplicate samples were less than 50% and therefore, are considered acceptable. The RPD values that are above the limit of 50% do not significantly affect the results of the monitoring program as the concentrations of iron all samples were above the ODWS and the concentration of 2-and 1-methylnaphthalene in both samples from MW-D29 were above the MOE Table 2 Standard. Duplicate samples generally confirmed the results of the original sample and overall were considered acceptable for the analyzed parameters.

Concentrations of analyzed parameters in the trip blanks and field blank samples were less than their respective laboratory detection limits, with the exception of the following:

- Electrical conductivity in three field blanks and one trip blank (ranging from 1.8 $\mu\text{S}/\text{cm}$ to 7 $\mu\text{S}/\text{cm}$). This does not alter the findings of the report as the electrical conductivity in the groundwater and surface water samples was significantly higher;
- Ammonia in one field blank (0.07 mg/L) and one trip blank (0.06 mg/L) from April 2013. This does not alter the findings of the report as the ammonia in the groundwater and surface water samples was not detected in some locations; and,
- Chloroform in one field blank (0.08 $\mu\text{g}/\text{L}$) from April 2013. This does not alter the findings of the report as the chloroform concentrations were less than the laboratory RDL in the analyzed groundwater samples during the sampling event.

The pH values in the monitoring wells were within the allowable range for comparison to the MOE Table 2 Standards for all samples.

Surrogate standard recoveries outside the range, typically, of 70-130% are indicative of questionable results for the tested volatile organic compounds. The reported surrogate recoveries are considered acceptable on this basis.

Matrix spike recoveries outside the typical range of individual parameters are indicative of questionable results for the tested VOC. The reported matrix spike recoveries are considered acceptable on this basis.

Based on the above, the associated analytical results generally appear to be representative and reproducible.



7.0 LANDFILL GAS

Figure 3 provides a summary in plan view of the methane gas distribution at the Dymment's Creek Landfill Sites based on the current investigation. In some cases, the gas probe screens were submerged below the depths to groundwater and these results should be viewed as concentrations exsolving from the groundwater and not in an unsaturated zone above the water table. GP-D13 had methane concentrations greater than 5% during all sampling events. GP-D4 had methane concentrations of up to 3.2% in April 2013.

Table 7.1 provides a summary of methane gas concentrations in gas probes where methane concentrations of greater than 5% LEL were noted on at least one occasion. Concentrations of methane gas above the LEL represent a potential hazard to adjacent buildings, as the gas within the soil can potentially accumulate within adjacent buildings and result in conditions where open flame or a spark could cause an explosion.

Methane was not detected in wells constructed to the immediate west or east of Site 4, nor at wells constructed at greater distances to the north and south in the John and Brock ROWs. All of these wells are located outside of the waste fill area. Additional investigations within the private properties on and in the vicinity of Site 4 would be required to confirm the presence and extent of landfill gas on Site 4. A private residence is located adjacent to the waste fill area north of Dymment's Creek and an apartment building is located south of Dymment's Creek. Given the potential for methane to be present in the vicinity of these residences, it is recommended that the City notify the MOE and the owners of the potentially affected properties of the issue. It is noted that there were earlier reports of elevated methane concentrations in the vicinity of residential buildings on this Site and that the MOE was aware of these conditions.

There is no methane in the wells located in and surrounding Site 5, with the exception of two wells closest to the north part of Site 5 (i.e., GP-D4 and GP-D18). The concentrations at these wells is less than the LEL (i.e., 5% methane) and indicate that the potential for LFG migration from this Site is limited, as the detections of LFG are in the north part of the Site where migration will be limited by Dymment's Creek.

Elevated methane is present at a number of wells within the fill area of Site 6. This notably includes wells adjacent to residences in the vicinity of the west end of Frederick Street. These conditions were previously recognized during historical construction programs along John Street, resulting in the MOE recommending installation of controls at a number of the residences to limit the potential for build up of landfill gas. There were no detections of LFG in the well located south of the creek. Additional investigations conducted north of Site 6 confirm the absence of landfill gas in the vicinity of John, Frederick and Robert Streets as noted by non-detectable readings of CH₄ at locations GP-D20 through GP-D24. The limits of landfill gas for the purposes of D-4 studies can be reduced as shown on Figure 9. The highest concentration of methane was noted at GP-D9 (up to 74.1% methane in April 2013); however, it is noted that methane at GP-D9 appears to fluctuate throughout the year as indicated by a measured concentration of 18.9% in December 2013.



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Table 7.1 Summary of Methane Concentrations Greater than 5% LEL - Dymment's Creek Landfills

Location	Screen Interval (mbgs)	Screen Installation Description	Date	Depth to Groundwater (mbgs)	Gem 2000 Reading (% by volume)
Site 5					
GP-D4	1.07 – 2.44	Within the fill overlying waste	28-Jun-12	NM	CH ₄ = 17.3**
			18-Oct-12	NM	CH ₄ = 2.6
			3-Dec-12	0.59	CH ₄ = 0.0
			18-Dec-12	0.64	CH ₄ = 0.0
			4-Apr-13	0.46	CH ₄ = 3.2
			20-Jun-13	0.90	CH ₄ = 1.4
			22-Aug-13	1.09	CH ₄ = 2.3
			11-Oct-13	0.68	CH ₄ = 0.1
			13-Dec-13	0.80	CH ₄ = 0.0
12-Feb-14	0.91	CH ₄ = 0.0			
Site 6					
GP-D2	1.52 – 3.05	Construction debris (asphalt) and sand fill	28-Jun-12	NM	CH ₄ = 6.6**
			18-Oct-12	NM	CH ₄ = 10.4**
			3-Dec-12	2.42	CH ₄ = 15.8**
			18-Dec-12	2.36	CH ₄ = 18.6**
			4-Apr-13	2.16	CH ₄ = 16.8**
			20-Jun-13	2.43	CH ₄ = 19.6**
			22-Aug-13	2.62	CH ₄ = 16.8**
			11-Oct-13	2.48	CH ₄ = 20.6**
			13-Dec-13	2.42	CH ₄ = 13.6**
12-Feb-14	2.54	CH ₄ = 17.0**			
GP-D3	0.31 – 1.83	Surficial cover overlying waste	21-Mar-12	0.81	CH ₄ = 65.2**
			22-Mar-12	NM	CH ₄ = 57.3**
			28-Jun-12	NM	CH ₄ = 23.1**
			18-Oct-12	NM	CH ₄ = 35.1**
			3-Dec-12	0.81	CH ₄ = 29.4**
			18-Dec-12	0.91	CH ₄ = 11.5**
			4-Apr-13	0.74	CH ₄ = 18.2**
			20-Jun-13	0.98	CH ₄ = 17.8**
			22-Aug-13	1.23	CH ₄ = 43.8**
			11-Oct-13	0.94	CH ₄ = 25.2**
			13-Dec-13	0.97	CH ₄ = 10.8**
			12-Feb-14	1.03	CH ₄ = 50.7**



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Location	Screen Interval (mbgs)	Screen Installation Description	Date	Depth to Groundwater (mbgs)	Gem 2000 Reading (% by volume)
GP-D9	1.43 – 2.95	Sand fill overlying waste	28-Jun-12	NM	CH ₄ = 19.3**
			18-Oct-12	NM	CH ₄ = 43.5**
			3-Dec-12	2.42	CH ₄ = 38.2**
			18-Dec-12	2.36	CH ₄ = 65.5**
			4-Apr-13	1.64	CH ₄ = 74.1**
			20-Jun-13	1.78	CH ₄ = 57.8**
			22-Aug-13	1.92	CH ₄ = 36.2**
			11-Oct-13	1.95	CH ₄ = 32.5**
			13-Dec-13	1.81	CH ₄ = 18.9**
			12-Feb-14	1.91	CH ₄ = 36.0**
GP-D10	1.52 – 3.05	Waste	3-Dec-12	2.15	CH ₄ = 44.8**
			18-Dec-12	2.06	CH ₄ = 41.1**
			4-Apr-13	1.92	CH ₄ = 49.2**
			20-Jun-13	2.07	CH ₄ = 42.2**
			22-Aug-13	2.34	CH ₄ = 30.0**
			11-Oct-13	2.31	CH ₄ = 43.5**
			13-Dec-13	2.11	CH ₄ = 36.8**
			12-Feb-14	2.30	CH ₄ = 38.3**
GP-D13	0.46 – 1.98	Waste	3-Dec-12	0.37	CH ₄ = 20.4**
			18-Dec-12	0.39	CH ₄ = 20.8**
			4-Apr-13	0.26	CH ₄ = 5.1**
			20-Jun-13	0.42	CH ₄ = 24.0**
			22-Aug-13	0.68	CH ₄ = 16.8**
			11-Oct-13	0.43	CH ₄ = 20.6**
			13-Dec-13	0.44	CH ₄ = 42.5**
			12-Feb-14	0.45	CH ₄ = 28.5**

Notes:

CH₄ = methane

NM = not measured

CO₂ = carbon dioxide

O₂ = oxygen

** Headspace methane concentration is greater than 5% by volume, the lower explosive limit of methane.



8.0 SUMMARY AND DISCUSSION

8.1 Estimated Extent of Waste

The estimated areal extent of waste is illustrated on Figure 2 and in cross-section on Figure 8. The estimated areal extent of waste in the Dymment's Creek Landfills is based on aerial photographs and the subsurface investigations described in this report. It is noted that the delineation of waste extent was limited to sites accessible to the City (i.e., City owned lands). It is further noted that access to the southern portion of Site 6 was limited due to forest cover.

In regards to the privately owned properties within Site 4, the available information indicates that the waste extends north of the creek and onto the private property, and south, to the middle of the property with an apartment building located at 111 Sanford Street. Waste at Site 6 reportedly extends to the western limit of 113 John Street, but not as far as the building foundation and it is reported that waste may extend onto the southern portions of these properties. According to previous reports, waste extends onto 15 Frederick Street.

The material within the Dymment's Creek Landfills consisted of coarse soil fill overlying thin layers of waste material. Waste thickness ranged from 0.05 m at several locations to a maximum thickness of 4.37 m. The maximum depth of waste extended to 7.87 mbgs, on the north side of Dymment's Creek in the southwest portion of Site 6. With the exception of boreholes A1-6/GP-D10 and D6-6/GP-D13, there is a minimum of 1.0 m of fill above the top of the waste and direct human contact to waste is not considered likely. The waste is located directly below the topsoil at two borehole locations and direct human contact with the waste in these areas of thinner (less than 1.0 m) is possible. Cover or fill material ranged in depth from 2.57 m, above the waste to 8.13 m at the top of the north bank of Dymment's Creek within Site 6.

The waste identified in the boreholes consisted primarily of solid materials (e.g., glass, plastic, bricks and metal), however, putrescible materials, including animal hides were encountered in boreholes D5-6/MW-D3, E2-6, and D2-5/GP-D5. These waste materials were odorous and also contained black organic material. Industrial fabrics were also encountered at one location (i.e., E2-6).

Based on the 1962 and 1965 aerial photographs, the creek was relocated north from its original location and it is possible that the former creek bed was infilled with waste as this is consistent with filling operation dates. It is further noted that the waste is now well below the water table.

8.2 Environmental Conditions

Concentrations of several PAH parameters in soil samples previously collected from Sites 4 and 5 exceeded the MOE Table 2 Standards. The soils in Site 6 and the western portion of Site 5 appear to be impacted by petroleum hydrocarbons. The cover/fill material within Site 6 boreholes, specifically along the northern bank of Dymment's Creek within Site 6, exceeded the MOE Table 2 Standards for one or more metals including hot water soluble boron, copper and lead along with elevated electrical conductivity at two locations (i.e., Boreholes D1-6 and D5-6/MW-D3).

With the exception of sodium and chloride, likely attributed to road salt application, no groundwater exceedances were noted in MW-D1, located upgradient of Site 6 and south of John Street. Elevated sodium and chloride in groundwater within an urbanized area is common due to road salting and it is difficult to use these parameters as landfill indicators. The elevated benzene and 1,4-dichlorobenzene concentrations at MW-D2 to MW-D5



(located within Sites 5 and 6) are also likely attributable to leaching of the waste materials at these locations from disposal of liquid chemical waste.

Concentrations of analyzed parameters were lowest at MW-D1, MW-D6, MW-D7, and MW-D26, located upgradient and downgradient of the Dyment's Creek Landfills; concentrations were elevated at the wells located within waste.

Groundwater flow is interpreted to be easterly overall, but locally towards the low point of Dyment's Creek. As a result, groundwater impacts from the landfills are considered to be limited to the identified waste fill area and do not extend north, south, or west of Sites 4, 5 and 6.

There is little to no methane in the wells located on Sites 4 and 5, with the exception of two wells closest to the north part of Site 5 (i.e., GP-D4 and GP-D18). Conversely, there are a number of wells with elevated methane in Site 6, notably including two wells adjacent to residences near Frederick Street. Landfill gas (as defined by methane concentrations) is not present outside of Site 5, nor surrounding Site 4 within the City-owned rights-of-way, or south of the creek on Site 6. Additional investigations within the private properties on Site 4 would be required to confirm the presence and extent of landfill gas on Site 4. Additional investigations conducted north of Site 6 confirm the absence of landfill gas in the vicinity of John, Frederick and Robert Streets as noted by non-detectable readings of CH₄ at locations GP-D20 through GP-D24. The highest concentration of methane was noted at GP-D9 (up to 74.1% methane in April 2013); however, it is noted that methane concentrations at this well fluctuate between this value and the lowest recorded concentration of 18.9%. The behaviour at this well suggests that whereas elevated concentrations are present, there is likely not significant ongoing generation of methane, which would be characterized by consistent concentrations on the order of 50% to 60%.

A number of public utilities are located in the vicinity of the Dyment's Creek Landfills, including municipal sewer and water services, natural gas, and telephone lines (Figure 5). These services are primarily located within the Sanford, Innisfil and John Street road allowances. No municipal services are located within Innisfil and Sanford Streets, south of Dyment's Creek, where the majority of the waste is located.

Based on the surface water results obtained by the MOE and during this investigation, elevated metals reported for August 2013 at SWD5, are likely related to the industrial properties in the vicinity of the creek and not to the buried waste. This is based on the absence of these parameters at elevated concentrations in the groundwater in the vicinity of this location (i.e., at MW-D3). There is also no mercury at any groundwater monitoring well location and therefore, the presence of mercury reported in December 2013 does not appear to be related to buried waste.

8.3 Extent of Dyment's Creek Landfills Impact

The D4 Assessment Area is shown on Figure 9. Refer to the previous D4 Assessment Study results (Golder, 2013b). The following is a summary of these areas:

- Soil impacts are not anticipated to extend beyond the limits of waste.
- Interpreted groundwater flow direction is toward Dyment's Creek and ultimately to the east toward Lake Simcoe. Based on interpreted shallow horizontal groundwater flow direction, groundwater outside the limits of waste (with the exception of to the east of Site 4), would not be impacted by buried waste materials.



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- Landfill gas (as defined by methane concentrations) is not present outside of Site 5, nor surrounding Site 4 within the City owned rights-of-way, or south of the creek on Site 6 (as shown by non-detectable readings of methane at locations GP-D14, GP-D15, GP-D16, GP-D17, GP-D19, GP-D7, GPD25, GP-D28, and GP-D29). Additional investigations within the private properties on Site 4 would be required to confirm the presence and extent of landfill gas on Site 4. Additional investigations conducted north of Site 6 confirm the absence of landfill gas in the vicinity of John, Frederick and Robert Streets as noted by non-detectable readings of methane at locations GP-D20 through GP-D24.



9.0 POTENTIAL REMEDIAL MEASURES FOR CONSIDERATION OF FUTURE DEVELOPMENT

With respect to the potential for future development of lands adjacent to a former landfill, the guidelines set out a number of criteria relative to D-4 guidelines, including those related to groundwater, surface water, soil, land settlement and landfill gas (LFG). Of these, landfill gas migration is typically the primary concern associated with the presence of waste materials in developed areas. This is because LFG can migrate through permeable unsaturated soils and potentially result in explosive concentrations of flammable gas. The typical action level for landfill gas monitoring programs is 1% methane (10% to 20% of the LEL).

Typical Landfill Gas Remedial Measures

Actions which are taken with respect to LFG are dependent upon the specific situation at each Site, but can include:

- Notification of the nearby receptors (e.g., property owner, residents) and building design risk assessment possibly including monitoring of methane in the potentially affected buildings;
- Installation of methane monitoring alarm systems in adjacent buildings;
- Installation and monitoring of new gas probes closer to the receptor/building;
- Installation of or construction with passive or active LFG control at the receptor/building;
- Excavation (removal) of the waste materials; and,
- Construction of cut-off walls and passive or active gas venting/collection systems.

As requested, we have broadly considered potential future actions or remedial alternatives at Sites 5 and 6, where the City owns a majority of the waste fill areas. It is noted that the costs outlined below would need to be refined based on more detailed evaluation of local conditions and consultation with the regulatory authorities. It is also noted that, given the relatively low and apparently declining concentrations of methane at Site 5, consideration of remedial options may be premature at this time and should be revisited following further monitoring.

Waste Excavation Option

Excavation of waste to remove the source of LFG and rehabilitate the property through the placement of clean fill is a commonly used approach. In some cases, waste excavation is undertaken as part of development and can be incorporated into the design of the buildings and land development features. Appropriate environmental and safety controls should be developed for any such excavation.

The waste materials excavated from the closed landfills may be disposed of at a licenced landfill site, provided that the materials meet the required testing standards and the material is managed in accordance with MOE regulations. In the case of Sites 5 and 6, it is noted that the total waste fill depth exceeds 7 metres in places, and the bottom 4 metres is below the water table and located adjacent to a water course. As a result, removal of the waste is likely only practical to a depth at or just into the water table. As a result, the remaining waste would have the potential to continue to generate LFG; however remedial measures could be incorporated to reduce the



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potential impact of gas migration. It is also noted that some of the waste remaining on private lands will also have the potential to generate LFG.

Costs for excavation of the waste at Sites 5 and 6 were estimated based on excavation of the material above the water table, within the boundaries of the waste fill area owned by the City. The costs assume that the excavated waste (24,000 m³ for Site 5 and 35,000 m³ for Site 6) will be deposited at no charge at the City's landfill and that imported soil and streambank reconstruction will be undertaken to return the area to passive use.

The total costs for waste excavation at Sites 5 and 6 are estimated as follows:

- Site 5 – Waste excavation and Site Restoration: \$1,400,000
- Site 6 – Waste excavation and Site Restoration: \$2,000,000

Should the City want to export the waste to another licenced facility, a cost of \$125 per tonne may be used for an estimate, resulting in an estimated additional cost of \$5,600,000 for both Sites.

Landfill Gas Barrier System and Landfill Gas Vent Option

The installation of a landfill gas barrier system or vents typically involves the excavation of a trench between the waste ("source") and the receptor, followed by the installation of a low permeability geomembrane on the "receptor" side of the barrier to just below the water table. A passive or active vent system, typically consisting of perforated pipe and coarse stone on the "waste" side of the barrier allows the gas to vent to the atmosphere. Passive systems rely on wind driven devices or soil gas pressures to vent the gas, whereas active systems include pumping systems (i.e., blowers). These systems, particularly an active one, may require approval of the MOE relative to air quality discharge. Landfill gas probes are installed on the "receptor" side to confirm system performance.

Due to the presence of elevated methane concentrations adjacent to residential developments cut-off measures and venting within lands controlled by the City could be considered at these locations to limit the City's contribution. As noted above, some waste is located outside of City owned lands, and would continue to generate LFG. LFG generated within the waste on City owned lands would continue to vent vertically, but would be prevented from migrating laterally in the unsaturated materials above the water table by the barrier and vent.

It is further noted that in some cases, there have been specific measures recommended (by others including the MOE) at individual residences at Site 4; however it is not known if such actions were completed, or if the measures are effective.

With respect to the approach to installation of the barrier trench, alternatives may include a wider 2:1 trench allowing for controlled backfill and placement of the geomembrane and pipe, or a narrow "slot" trench (1 m wide) located at the edge of the Site. The feasibility of either option would be dependent on test trenching to confirm conditions adjacent to the landfill boundary. In addition, to these costs, approvals for an Environmental Compliance Approval (air) could be required.

An alternative approach to installation of a barrier would be to install an active collection system, which would require monitoring to determine the effectiveness of the negative pressure generated by a blower and buried header or wells as well as ongoing costs for power and maintenance, which would be in addition to the capital



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costs outlined below. In addition, to these costs, approvals for an Environmental Compliance Approval (air) would be required.

The total costs for landfill gas barrier and venting system at Sites 5 and 6 are estimated as follows:

■ Site 5 – LFG Cutoff Wall and Passive Venting, 2:1:	\$700,000
■ Site 5 – LFG Cutoff Wall and Passive Venting, 1:1:	\$370,000
■ Site 5 – Active LFG Collection:	\$700,000
■ Site 6 – LFG Cutoff Wall and Passive Venting, 2:1:	\$640,000
■ Site 6 – LFG Cutoff Wall and Passive Venting, 1:1:	\$330,000
■ Site 6 – Active LFG Collection:	\$650,000

As above, there would be some excavation of waste from the trenches, which may involve off-site export of waste. Should the City want to export the waste to another licenced facility, a cost of \$125 per tonne may be used for an estimate, resulting in additional cost commensurate with the volume of waste to be exported.

As noted above, given the recent lower concentrations of methane at Site 5, consideration of remedial actions may not be warranted at this time. In the case of Site 6, methane concentrations are consistently elevated and could pose a risk to adjacent residences; however it is noted that the extent of migration/generation of LFG may be limited even for this Site, and additional monitoring, would be required to confirm this.

Risk Assessment

The overall purpose of a risk assessment for these sites would be to ensure that potential visitors who may access City-owned lands (i.e., Sites 5 and 6) are not impacted by the waste fill areas. This risk assessment does not consider adjacent land owner impacts or impacts to the adjacent stream.

A risk assessment should evaluate the available environmental data for the City-owned lands (i.e., Sites 5 and 6) as well as existing risk management measures, and support the analysis of remediation options and/or the implementation of additional risk management measures to prevent or mitigate potential exposures by current and anticipated future users of the City-owned lands. The potential exposure to landfill gas emissions and odours would be evaluated and specific types of activities that are planned in each site, and how these activities may lead to exposure pathways would be considered. Potential contact between human receptors and landfill infrastructure will be considered. Exposure parameters for receptors that may use the Site should be adopted from MOE and other regulators and the estimated risks resulting from exposure to chemicals of concern calculated for all identified exposure pathways. Finally, a cost/benefit comparison of the various options should be completed.

Based on a study covering the above items, it is estimated that a risk assessment for the City-owned lands (i.e., Sites 5 and 6) could be completed for a budget of approximately \$50,000 to \$70,000.



10.0 RECOMMENDATIONS

With respect to the D-4 Guidelines and the requirement to complete investigations for proposed land use changes, it is recommended that these studies be required within the areas outlined on Figure 9.

Based on the findings of the above scope of work, Golder recommends the following:

- Based on the findings of this investigation, the D-4 Assessment Area can be reduced to the limits shown on Figure 9;
- Investigations on private properties should be considered to reduce the D4 Assessment Area further;
- Where waste and/or impacted soil above generic MOE standards on-Site is left on property owned by the City, a risk assessment under the O.Reg.153/04 guidelines is recommended to assess risk to current and/or future Site users and the natural environment. This notably includes Brock Park, where public accessibility is a defined land use; and,
- Given the potential for elevated methane to be present in the vicinity of private residences at Sites 4 and 6, it is recommended that the City notify the MOE and the owners of the potentially affected properties of the identified risk as identified on Figure 9.

Recommendations for Further Monitoring:

- The City should monitor LFG at existing probes located within waste limits on a quarterly basis;
- The groundwater and surface water quality should be monitored annually. All groundwater and surface water samples should be analyzed for major ions and indicators, metals, PAH, VOC, and PHC F1 to F4. Surface water sampling should be completed at least 72 hours following a rainfall event; and,
- The on-Site monitoring wells and landfill gas probes should be decommissioned in accordance with O. Reg. 903 when these wells are no longer required.



10.0 RECOMMENDATIONS

With respect to the D-4 Guidelines and the requirement to complete investigations for proposed land use changes, it is recommended that these studies be required within the areas outlined on Figure 9.

Based on the findings of the above scope of work, Golder recommends the following:

- Based on the findings of this investigation, the D-4 Assessment Area can be reduced to the limits shown on Figure 9;
- Should the City choose to further reduce the D4 Assessment Area, additional investigations would be required on private properties;
- Where waste and/or impacted soil above generic MOE standards on-Site is left on property owned by the City, a risk assessment under the O.Reg.153/04 guidelines is recommended to assess risk to current and/or future Site users and the natural environment. This notably includes Brock Park, where public accessibility is a defined land use; and,
- Given the potential for elevated methane to be present in the vicinity of private residences at Sites 4 and 6, it is recommended that the City notify the MOE and the owners of the potentially affected properties of the identified risk as identified on Figure 9.

Recommendations for Further Monitoring:

- The City should monitor LFG at existing probes located within waste limits on a quarterly basis;
- The groundwater and surface water quality should be monitored annually. All groundwater and surface water samples should be analyzed for major ions and indicators, metals, PAH, VOC, and PHC F1 to F4. Surface water sampling should be completed at least 72 hours following a rainfall event; and,
- The on-Site monitoring wells and landfill gas probes should be decommissioned in accordance with O. Reg. 903 when these wells are no longer required.



11.0 CLOSURE

We trust that this report meets with your current requirements. Please do not hesitate to call should you have any questions regarding this report.

GOLDER ASSOCIATES LTD.

Christi Groves, B.Sc.,
Environmental Scientist

Paul Dewaele, M.Sc., P.Eng.
Principal

CLG/PJD/plc

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12.0 LIMITATIONS

This report was prepared for the exclusive use of the City of Barrie and has been prepared as part of environmental due diligence activities and is not intended to be utilized as supporting documentation for a Record of Site Condition under Ontario Regulation 153/04.

Golder's professional services for this assignment addressed only the geo-environmental (chemical) aspects of the subsurface conditions at this Site. The geotechnical (physical) aspects, including engineering recommendations for the design and construction of building foundations, pavements, underground servicing and the like are outside the terms of reference for this report and have not been investigated or addressed.

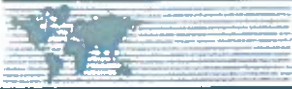
This report is based on data and information collected during the subsurface environmental investigations conducted by Golder and is based solely on Site conditions encountered at the time of the field work (i.e., between April 4, 2013 to April 3, 2014), as described in this report.

In evaluating the Site, Golder has relied in good faith on information provided by others and evaluated only conditions at a limited number of test locations. Only limited chemical analyses of soil samples were carried out. It should be noted that the results of an investigation of this nature should, in no way, be construed as a warranty that the Sites are free from any and all contamination from past or current practices.

We accept no responsibility for any deficiency, misstatements or inaccuracies contained in this report as a result of omission, misinterpretations or fraudulent acts of the persons interviewed. Golder accepts no responsibility for any reduction in property value, either real or perceived, as a result of the reporting of factual information herein.

This assessment was carried out using existing historical information as available from various agencies and no assurance is made regarding the accuracy or completeness of this information.

If additional information is obtained during future work at the Sites, including excavations, borings, or other studies, and/or if conditions exposed during construction are different from those encountered in this assessment, Golder should be requested to re-evaluate the conclusions presented in this report and provide amendments as required.



13.0 REFERENCES

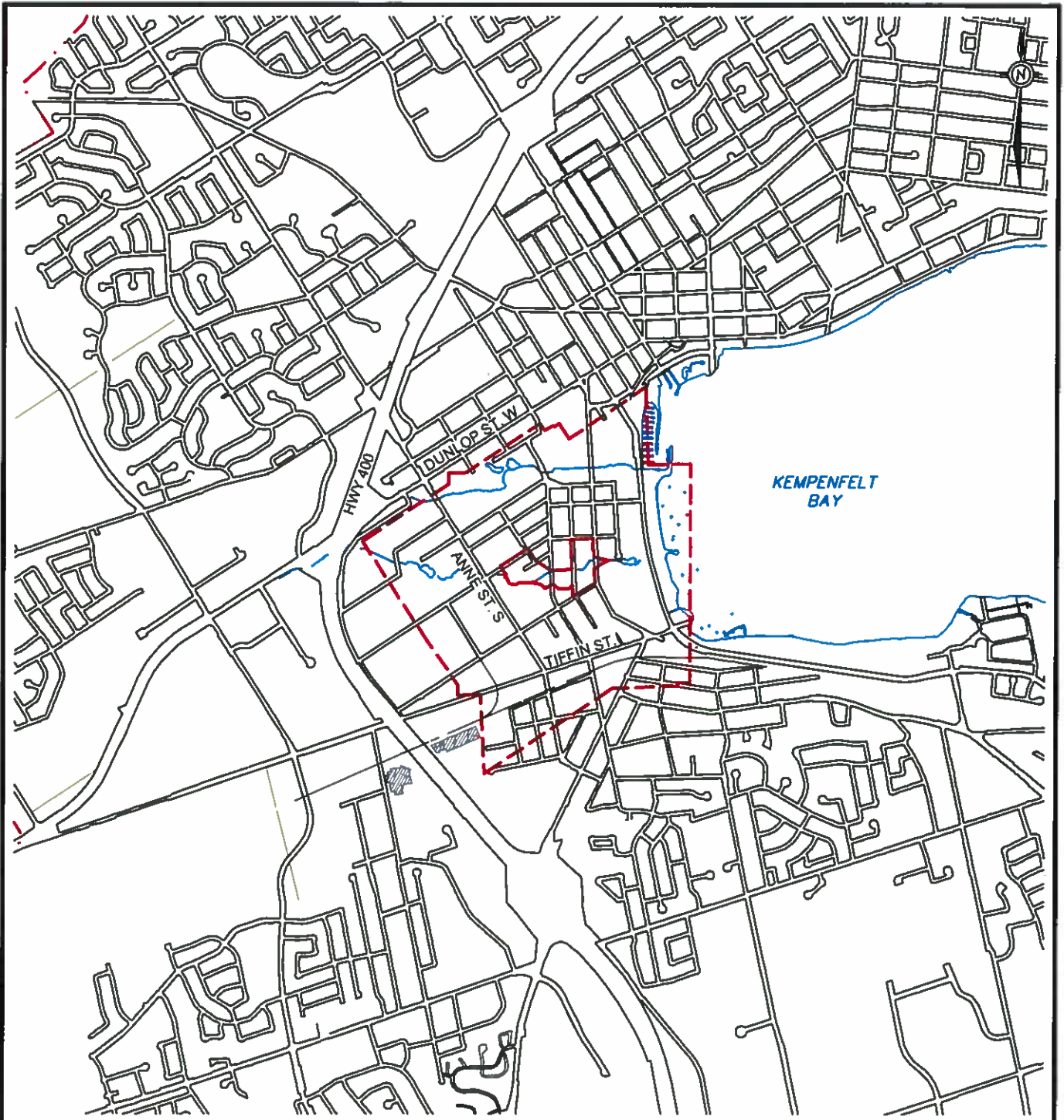
The following is a list of references reviewed for the purposes of preparing this report:

Source	Date
<u>By-Law No. 2009-141</u> , The Corporation of the City of Barrie Comprehensive Zoning By-Law, August 10, 2009. Map last updated January 2011	2009
Golder Associates Ltd., 2013a. 2012 Annual Groundwater Monitoring Program Report.	October 2013
Golder Associates Ltd., 2013b. D4 Study and Environmental Assessment – Final Report, Dymment's Creek Landfills, City of Barrie	April 2013



FIGURES

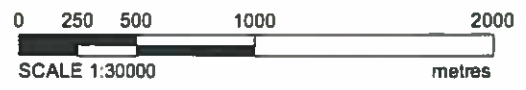
PLOT DATE: August 25, 2014
 FILENAME: T:\Projects\2011\11-1170-0043 (Barrie, Historic Landfills)\-GC-\111700043GCREG.dwg




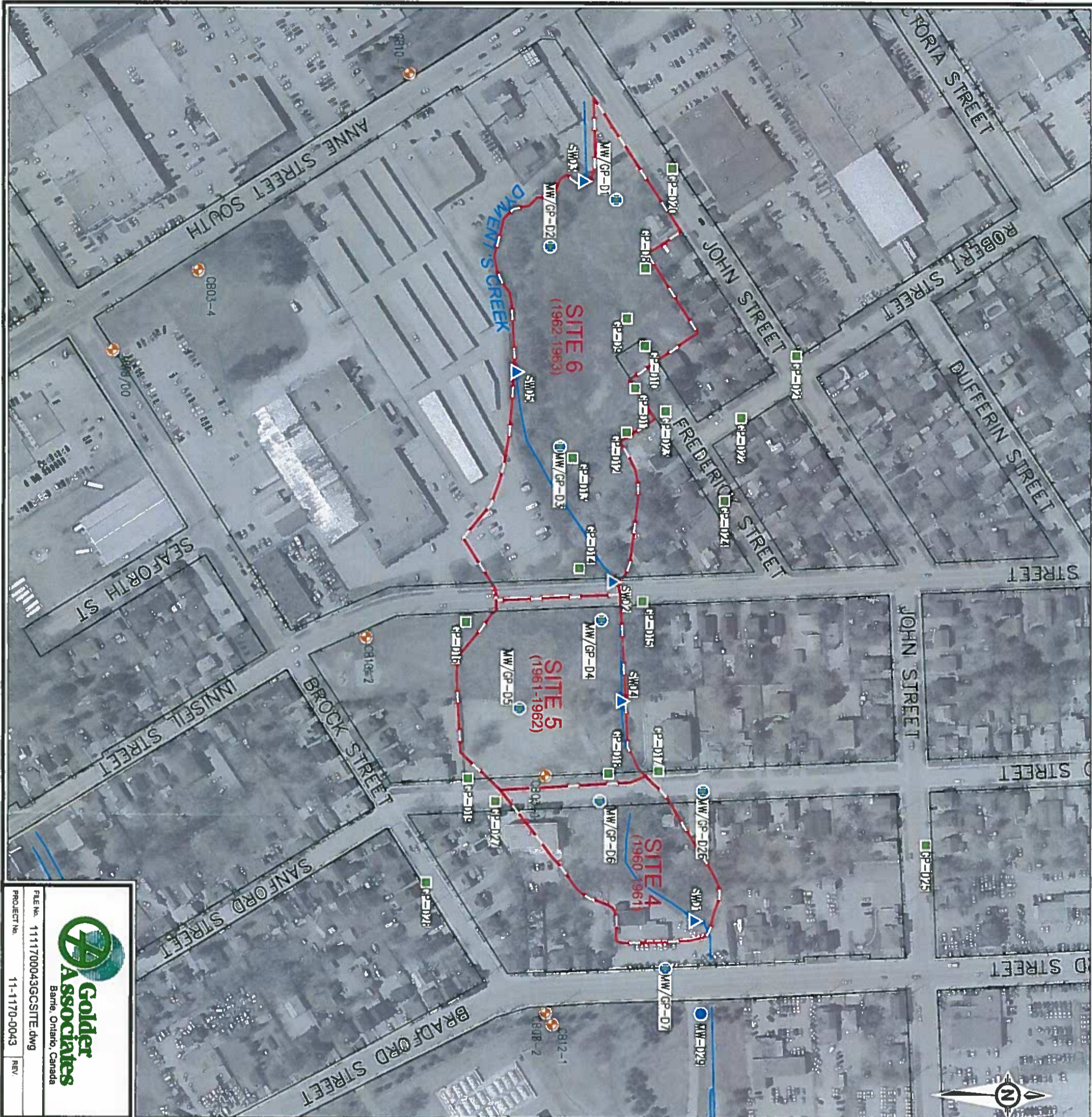
--- 500 m ESTIMATED WASTE LIMIT OFFSET (ORIGINAL D4 ASSESSMENT AREA)
 — NEW D4 ASSESSMENT AREA (REFER TO FIGURE 10)

The City of
BARRIE

- NOTES:**
1. DATUM IS NAD UTM 83 ZONE 17
 2. MAPPING BASED ON COUNTY OF SIMCOE MUNICIPAL BASE
 3. 500 m OFFSET D-4 ASSESSMENT AS PER CITY OF BARRIE 2009 OFFICIAL PLAN



 Golder Associates Mississauga, Ontario, Canada	SCALE	AS SHOWN	TITLE	REGIONAL LOCATION MAP
	DATE	2014-08-25		
	DESIGN			
	CAD	STB		
FILE No. 1111700043GCREG.dwg	CHECK			DYMENT'S CREEK LANDFILLS CITY OF BARRIE
PROJECT No. 11-1170-0043	REV			

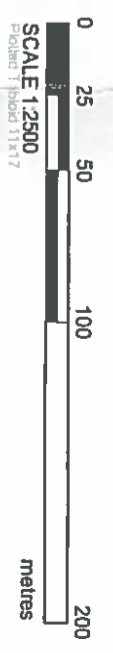


LEGEND:

- ESTIMATED WASTE LIMIT
- GAS PROBE
- MONITORING WELL
- MONITORING WELL / GAS PROBE
- ▲ SURFACE WATER SAMPLING LOCATION
- CITY OF BARRIE MONITORING WELL

NOTES:

1. DATUM IS NAD83 ZONE 17
2. ALL MAPPED BOUNDARIES, LIMITS, AND INTERPOLATED FEATURES ARE APPROXIMATE
3. CAD BASE DIGITAL 1:2000 MUNICIPAL MAPPING COURTESY CITY OF BARRIE
4. IMAGE COURTESY CITY OF BARRIE 2002. SITE FEATURES ARE APPROXIMATE
5. SITE 6 OPERATIONAL FROM 1962-1963, SITE 5 OPERATIONAL FROM 1961-1962, AND SITE 4 OPERATIONAL FROM 1960-1961



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 Barrie, Ontario, Canada

FILE No. 1111700043GCSITE.dwg
 PROJECT No. 11-1170-0043

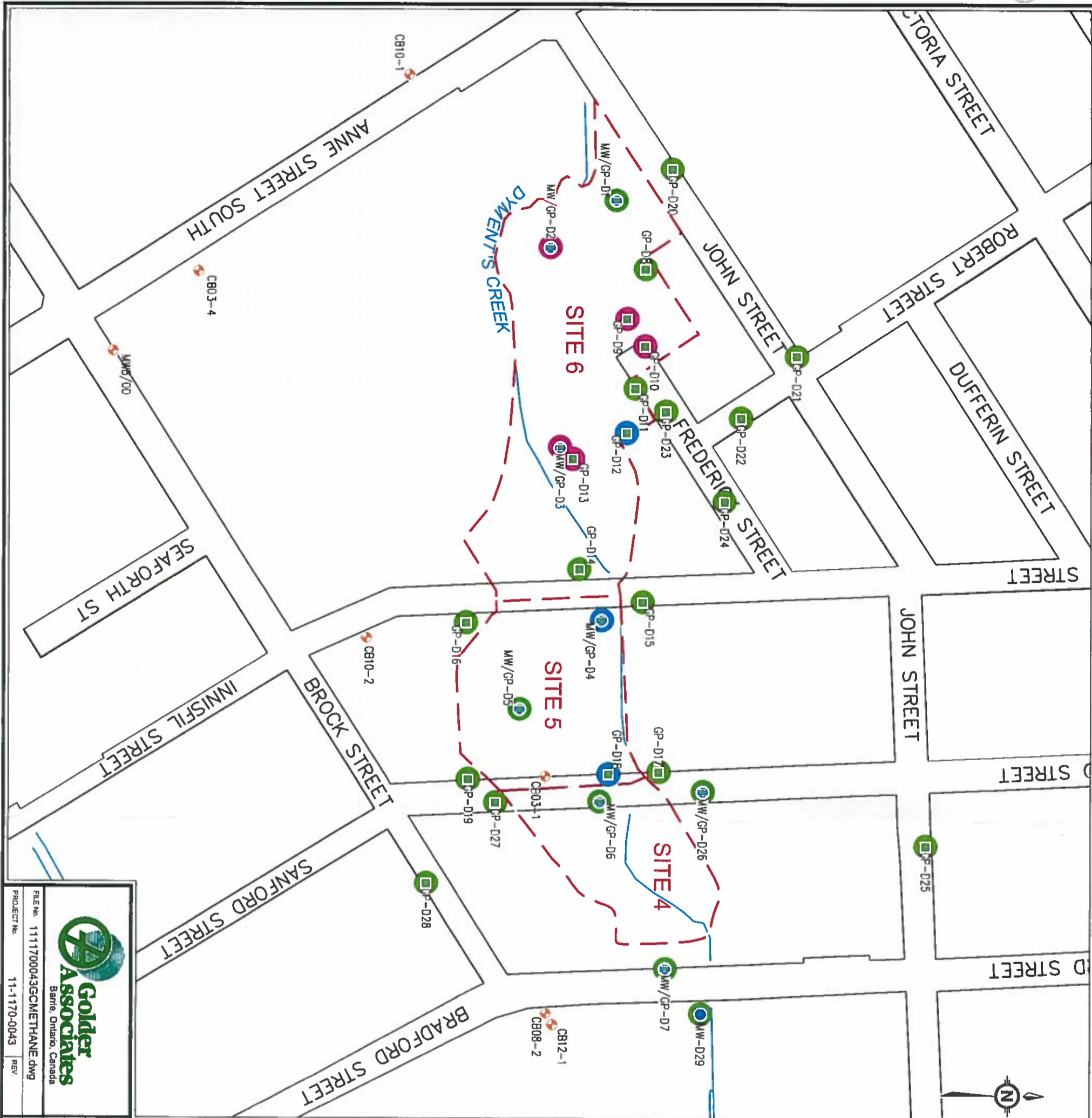
REV. /

SCALE	AS SHOWN	DATE	DESIGN	CAD	CHECK	REVIEW
		2014-01-09				
				STB		

**DYMENT'S CREEK
 WASTE SITES
 GAS PROBE AND MONITORING WELL
 LOCATION MAP**

**HISTORICAL WASTE DISPOSAL SITES
 CITY OF BARRIE**

FIGURE
2

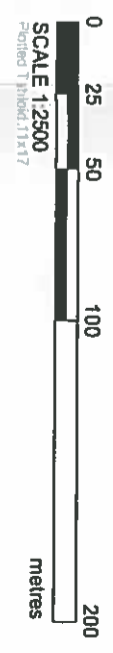


LEGEND:

- ESTIMATED WASTE LIMIT
- GAS PROBE
- MONITORING WELL
- MONITORING WELL / GAS PROBE
- CITY OF BARRIE MONITORING WELL
- <0.2% METHANE GAS CONCENTRATION
- 0.2% - 4.9% METHANE GAS CONCENTRATION
- >5.0% METHANE GAS CONCENTRATION

NOTES:

1. DATUM IS NAD83 ZONE 17
2. ALL MAPPED BOUNDARIES, LIMITS, AND INTERPOLATED FEATURES ARE APPROXIMATE
3. CAD BASE DIGITAL 1:2000 MUNICIPAL MAPPING COURTESY CITY OF BARRIE
4. READINGS REPRESENT WORST CASE CONDITIONS FROM ALL SAMPLING EVENTS





Golder Associates
Barrie, Ontario, Canada

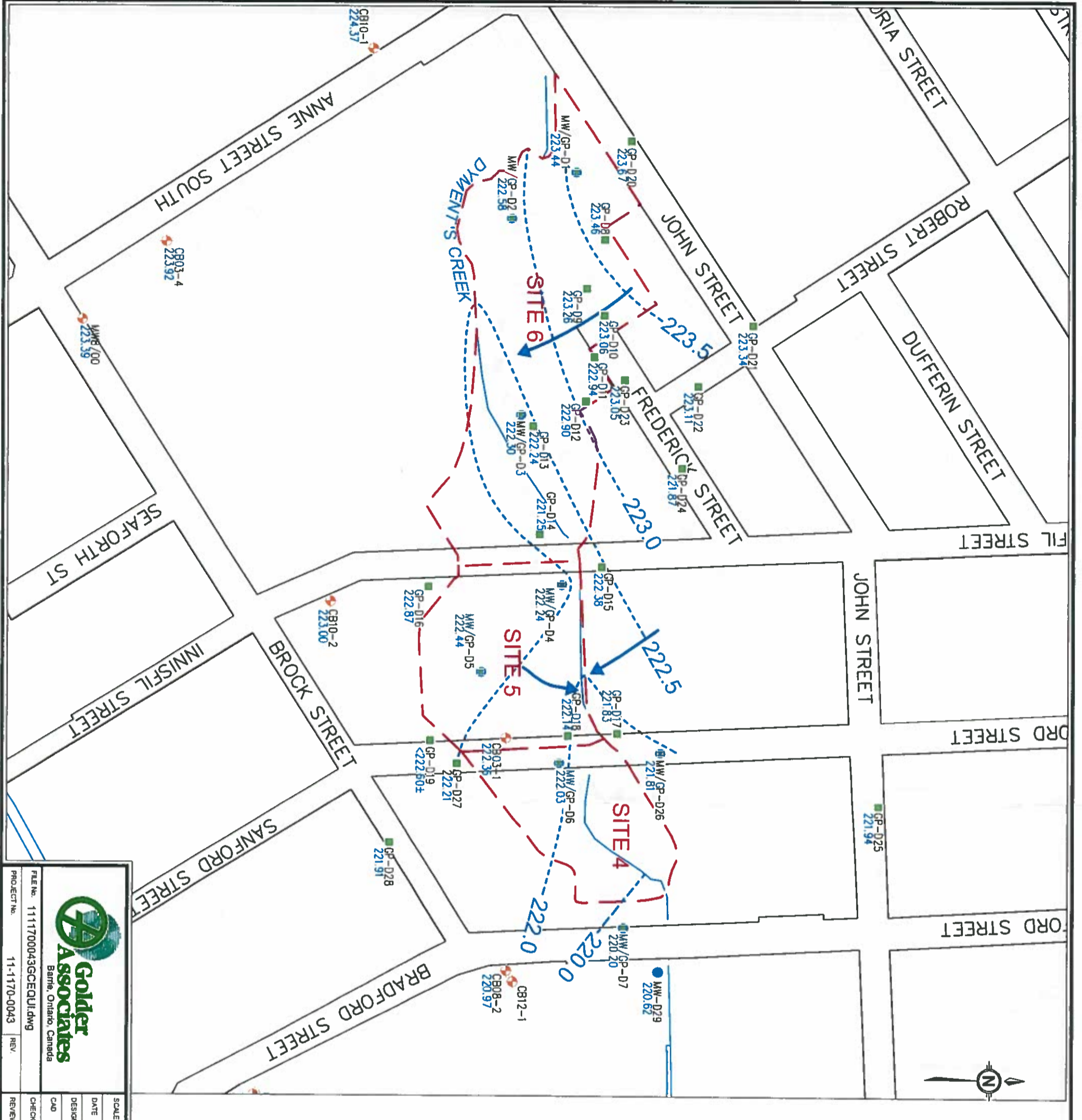
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 PROJECT No. 11-1170-0043

SCALE	AS SHOWN	TIME
DATE	2014-01-09	
DESIGN		
CAD		
CHECK		STB
REVIEW		

METHANE GAS CONCENTRATIONS
 APR. 2013 - FEB. 2014

HISTORICAL WASTE DISPOSAL SITES
 CITY OF BARRIE

FIGURE **3**

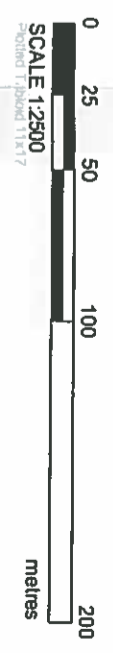


LEGEND:

- ESTIMATED WASTE LIMIT
- INTERPOLATED EQUIPOTENTIAL LINE
- INTERPOLATED GROUNDWATER FLOW DIRECTION
- 222.62
- SHALLOW STATIC WATER ELEVATION (masl)
- GAS PROBE
- MONITORING WELL / GAS PROBE
- CITY OF BARRIE MONITORING WELL

NOTES:

1. DATUM IS NAD83 ZONE 17
2. ALL MAPPED BOUNDARIES, LIMITS, AND INTERPOLATED FEATURES ARE APPROXIMATE
3. CAD BASE DIGITAL 1:2000 MUNICIPAL MAPPING COURTESY CITY OF BARRIE
4. SHALLOW STATIC WATER ELEVATIONS TAKEN AUGUST 22, 2013





Golder Associates
 Barrie, Ontario, Canada

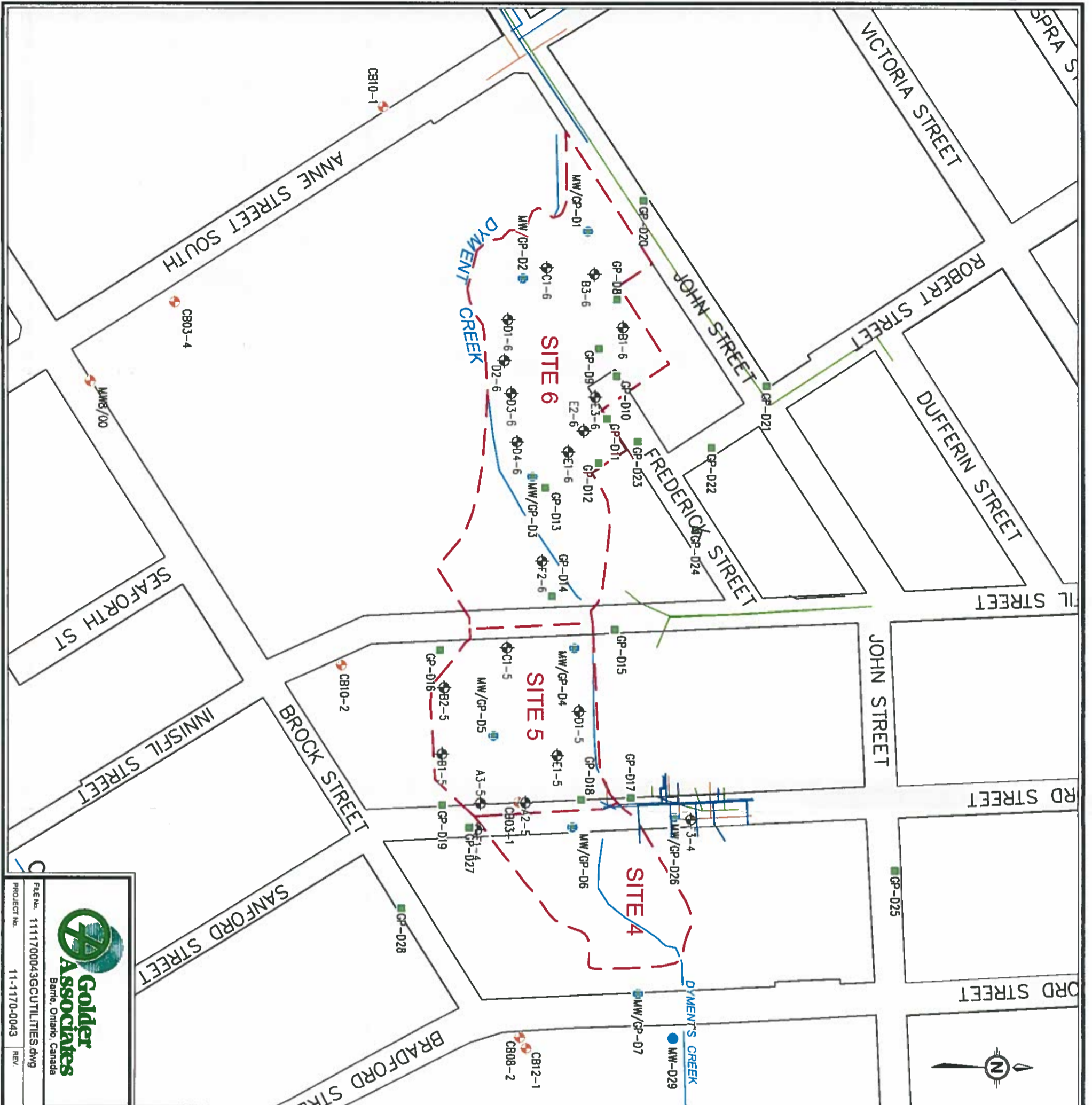
FILE No. 1111700043GCEQUI.dwg
 PROJECT No. 11-1170-0043

SCALE	DATE	TIME
AS SHOWN	2014-01-09	
CAD	DESIGN	
CHECK	STB	
REVIEW		

GROUNDWATER ELEVATIONS
SUMMER 2013

HISTORIC WASTE DISPOSAL SITES

FIGURE **4**



LEGEND:

- ESTIMATED WASTE LIMIT
- SANITARY SEWER
- STORM SEWER
- WATER LINE
- GAS LINE
- FIBEROPTIC LINE (BELL)
- TELEPHONE LINE (BELL)
- BOREHOLE
- GAS PROBE
- MONITORING WELL
- MONITORING WELL / GAS PROBE
- CITY OF BARRIE MONITORING WELL

NOTES:

1. DATUM IS NAD83 ZONE 17
2. ALL MAPPED BOUNDARIES, LIMITS, AND INTERPOLATED FEATURES ARE APPROXIMATE
3. CAD BASE DIGITAL 1:2000 MUNICIPAL MAPPING COURTESY CITY OF BARRIE
4. UTILITY SURVEYS COURTESY CITY OF BARRIE ENGINEERING DEPARTMENT

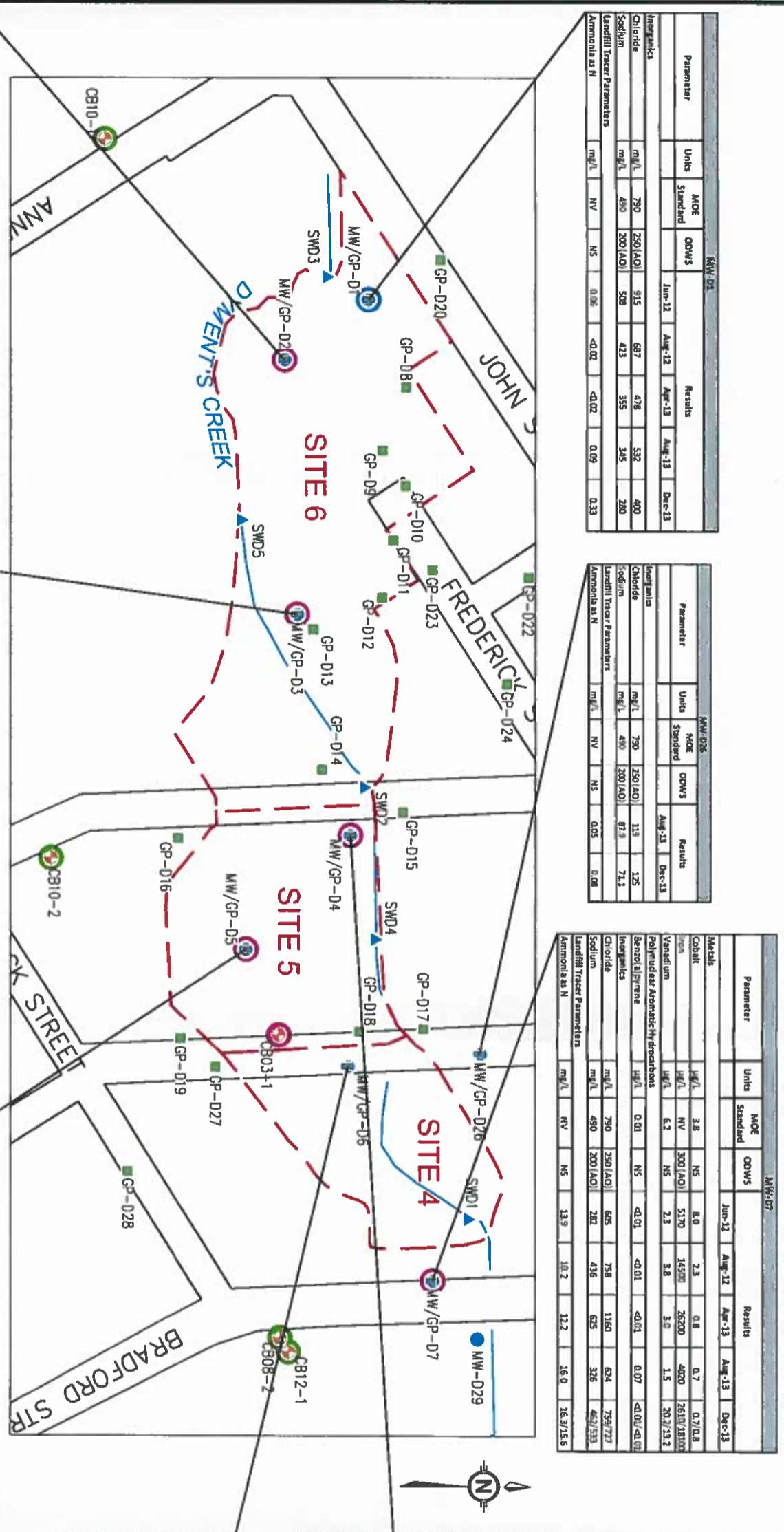




Golder Associates
 Barrie, Ontario, Canada

FILE No. 1111700043GCUTILITIES.dwg
 PROJECT No. 11-1170-0043

SCALE	TITLE
AS SHOWN	HISTORICAL WASTE DISPOSAL SITES
DATE 2014-01-09	CITY OF BARRIE
DESIGN	
CAD	
CHECK	FIGURE
REVIEW	5



MW-01

Parameter	Units	MOE Standard	OOWS	Jun-12	Aug-12	Apr-13	Aug-13	Dec-13
Metals								
Cobalt	µg/L	3.8	NS	11.0	7.5	3.6	2.2	2.8
Iron	mg/L	300 (AO)	42700	42300	48800	8200	53000	53000
Vanadium	µg/L	6.2	NS	2.7	3.4	<5	4.4	31.9
VOC	µg/L	5.0	5	8.4	6.4	8.1	4.7	12.9
1,4-Dichlorobenzene	µg/L	1	5	5.0	<0.20	3.9	1.6	5.5
Polynuclear Aromatic Hydrocarbons	µg/L	11	NS	7.0	11	0.3	5.1	9.2
Naphthalene	µg/L	790	250 (AO)	36.7	43.0	70.0	60.0	67.0
Chloride	mg/L	490	200 (AO)	26.3	28.8	37.0	33.6	40.1
Sodium	mg/L	NS	NS	28.4	57.9	57.4	67.7	64.7
Ammonia as N	mg/L	NS	NS	0.06	<0.02	<0.02	0.09	0.33

MW-026

Parameter	Units	MOE Standard	OOWS	Aug-13	Dec-13
Metals					
Cobalt	µg/L	3.8	NS	6.0	0.7
Iron	mg/L	300 (AO)	5170	14520	2610/2810
Vanadium	µg/L	6.2	NS	2.3	3.0
VOC	µg/L	5.0	5	1.5	20.7/13.2
1,4-Dichlorobenzene	µg/L	0.01	NS	<0.01	<0.01
Polynuclear Aromatic Hydrocarbons	µg/L	11	NS	2.8	0.07
Naphthalene	µg/L	790	250 (AO)	605	759/777
Chloride	mg/L	490	200 (AO)	282	436
Sodium	mg/L	NS	NS	625	326
Ammonia as N	mg/L	NS	NS	13.9	16.9/15.6

MW-07

Parameter	Units	MOE Standard	OOWS	Jun-12	Aug-12	Apr-13	Aug-13	Dec-13
Metals								
Cobalt	µg/L	3.8	NS	8.0	2.3	0.8	0.7	0.7
Iron	mg/L	300 (AO)	5170	14520	26200	4920	2610/2810	2610
Vanadium	µg/L	6.2	NS	2.3	3.8	3.0	1.5	20.7/13.2
VOC	µg/L	5.0	5	1.3	1.5	0.07	<0.01	<0.01
1,4-Dichlorobenzene	µg/L	1	5	4.5	0.20	3.8	4.8	3.8
Polynuclear Aromatic Hydrocarbons	µg/L	11	NS	2.7	6.7	4.5	7.9	8.2
Naphthalene	µg/L	790	250 (AO)	2.4	14	22.9	<0.5	8.2
Chloride	mg/L	490	200 (AO)	24	130	15.2	<0.5	2.0
Sodium	mg/L	NS	NS	290	386	406	<1.1	159
Ammonia as N	mg/L	NS	NS	11	6.8	5.7	11.5	12.5

MW-02

Parameter	Units	MOE Standard	OOWS	Jun-12	Aug-12	Apr-13	Aug-13	Dec-13
Metals								
Cobalt	µg/L	3.8	NS	11.0	7.5	3.6	2.2	2.8
Iron	mg/L	300 (AO)	42700	42300	48800	8200	53000	53000
Vanadium	µg/L	6.2	NS	2.7	3.4	<5	4.4	31.9
VOC	µg/L	5.0	5	8.4	6.4	8.1	4.7	12.9
1,4-Dichlorobenzene	µg/L	1	5	5.0	<0.20	3.9	1.6	5.5
Polynuclear Aromatic Hydrocarbons	µg/L	11	NS	7.0	11	0.3	5.1	9.2
Naphthalene	µg/L	790	250 (AO)	36.7	43.0	70.0	60.0	67.0
Chloride	mg/L	490	200 (AO)	26.3	28.8	37.0	33.6	40.1
Sodium	mg/L	NS	NS	28.4	57.9	57.4	67.7	64.7
Ammonia as N	mg/L	NS	NS	0.06	<0.02	<0.02	0.09	0.33

MW-03

Parameter	Units	MOE Standard	OOWS	Mar-12	Jun-12	Apr-13	Aug-13	Dec-13
Metals								
Chromium (Total)	µg/L	50	50	38.4	27.0	23	11	55
Cobalt	µg/L	3.8	NS	10.3	8.0	6.5	3.8	3.5
Iron	mg/L	300 (AO)	38500	43100	42700	102	2570	2570
Vanadium	µg/L	6.2	NS	1.5	2.4	<5	8.0	109
VOC	µg/L	5.0	5	7.7	18	26.7	<0.5	31
1,4-Dichlorobenzene	µg/L	1	5	5.5	<0.20	6.7	4.5	7.9
Polynuclear Aromatic Hydrocarbons	µg/L	2.4 (AO)	2.4	19	14	22.9	<0.5	8.2
Naphthalene	µg/L	790	250 (AO)	24	130	15.2	<0.5	2.0
Chloride	mg/L	490	200 (AO)	300	290	386	406	<1.1
Sodium	mg/L	NS	NS	3.2	2.8	3.1	3.72	4.32
Ammonia as N	mg/L	NS	NS	1.99	236	214	281	281

MW-05

Parameter	Units	MOE Standard	OOWS	Mar-12	Jun-12	Apr-13	Aug-13	Dec-13
Metals								
Cobalt	µg/L	3.8	NS	4.0	3.3	1.8	4.8	1.5
Iron	mg/L	300 (AO)	42700	48800	44900	222	51000	51000
Vanadium	µg/L	6.2	NS	4.2	1.1	5.0	7.4	21.9
VOC	µg/L	5.0	5	1.3	14	7.1	11.1	11.5
1,4-Dichlorobenzene	µg/L	1	5	4.5	<0.10	3.8	4.8	3.8
Polynuclear Aromatic Hydrocarbons	µg/L	2.4 (AO)	2.4	2.7	0.29	<0.5	<0.5	<0.5
Naphthalene	µg/L	790	250 (AO)	2.4	13	19	4.6	7.87
Chloride	mg/L	490	200 (AO)	32.3	14.3	14.0	102	12.5
Sodium	mg/L	NS	NS	146	31.8	32.1	121	43.8
Ammonia as N	mg/L	NS	NS	1.46	31.8	32.1	121	43.8

MW-028

Parameter	Units	MOE Standard	OOWS	Aug-13	Dec-13
Metals					
Iron	mg/L	300 (AO)	11200/790	24600	24600
Vanadium	µg/L	150	NS	480/600	<100
VOC	µg/L	11	NS	116/743	3.69
1,4-Dichlorobenzene	µg/L	0.41	NS	2.40/57	0.15
Polynuclear Aromatic Hydrocarbons	µg/L	1.0	NS	0.80/107	<0.01
Naphthalene	µg/L	0.1	NS	0.80/107	<0.05
Chloride	mg/L	0.1	NS	1.37/50	<0.05
Sodium	mg/L	0.1	NS	0.77/0.95	<0.05
Ammonia as N	mg/L	0.2	NS	0.80/107	<0.05

MW-06

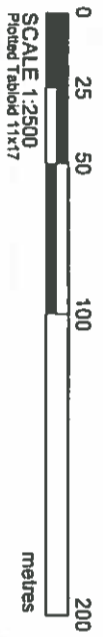
Parameter	Units	MOE Standard	OOWS	Mar-12	Jun-12	Apr-13	Aug-13	Dec-13
Metals								
Barium	µg/L	1000	790/787	907/902	830	970	1100	1100
Cobalt	µg/L	3.8	NS	7.9/8.3	3.9/4.4	1.7	0.6	1.0
Iron	mg/L	300 (AO)	9140/9140	10600/20900	16900	301	6400	6400
Vanadium	µg/L	6.2	NS	4.3/4.5	1.1/1.7	4.0	4.1	16.6
VOC	µg/L	5.0	5	2.0/2.07	264/245	207	206	260
1,4-Dichlorobenzene	µg/L	490	200 (AO)	57.0/55.9	62.2/106	116	116	86.8
Ammonia as N	mg/L	NS	NS	9.08/11.4	12.5/10.3	13.0	13.9	16.2

MW-04

Parameter	Units	MOE Standard	OOWS	Jun-12	Aug-12	Apr-13	Aug-13	Dec-13
Metals								
Cobalt	µg/L	3.8	NS	17.0	9.2	2.2	4.3	3.3
Iron	mg/L	300 (AO)	34700	31400	21800	419	2620	2620
Vanadium	µg/L	6.2	NS	3.0	1.7	5	11	62
VOC	µg/L	5.0	5	28	23	16.2	10.7	26.8
1,4-Dichlorobenzene	µg/L	1	5	15	<0.20	10.1	5.7	13.4
Polynuclear Aromatic Hydrocarbons	µg/L	2.4 (AO)	2.4	3.3	1.9	1.7	<0.5	0.9
Naphthalene	µg/L	150	NS	<100	<100	300	110	<100
Chloride	mg/L	500	NS	650	2900	2000	400	369
Ammonia as N	mg/L	NS	NS	190	92.4	231	232	232

- LEGEND:**
- ESTIMATED WASTE LIMIT
 - GAS PROBE
 - MONITORING WELL
 - MONITORING WELL / GAS PROBE
 - CITY OF BARRIE MONITORING WELL
 - SURFACE WATER SAMPLING LOCATION
 - INORGANICS
 - > ODWS OR MOE TABLE 2
 - NO LANDFILL RELATED IMPACTS

- NOTES:**
- DATUM IS NAD83 ZONE 17
 - ALL MAPPED BOUNDARIES, LIMITS, AND INTERPOLATED FEATURES ARE APPROXIMATE
 - CAD BASE DIGITAL 1:2000 MUNICIPAL MAPPING COURTESY CITY OF BARRIE
 - AMMONIA CONCENTRATIONS FOR REFERENCE PURPOSES ONLY



Goldier Associates
Barrie, Ontario, Canada

SCALE AS SHOWN

DATE 2014-01-09

DESIGN

CAD

CHECK

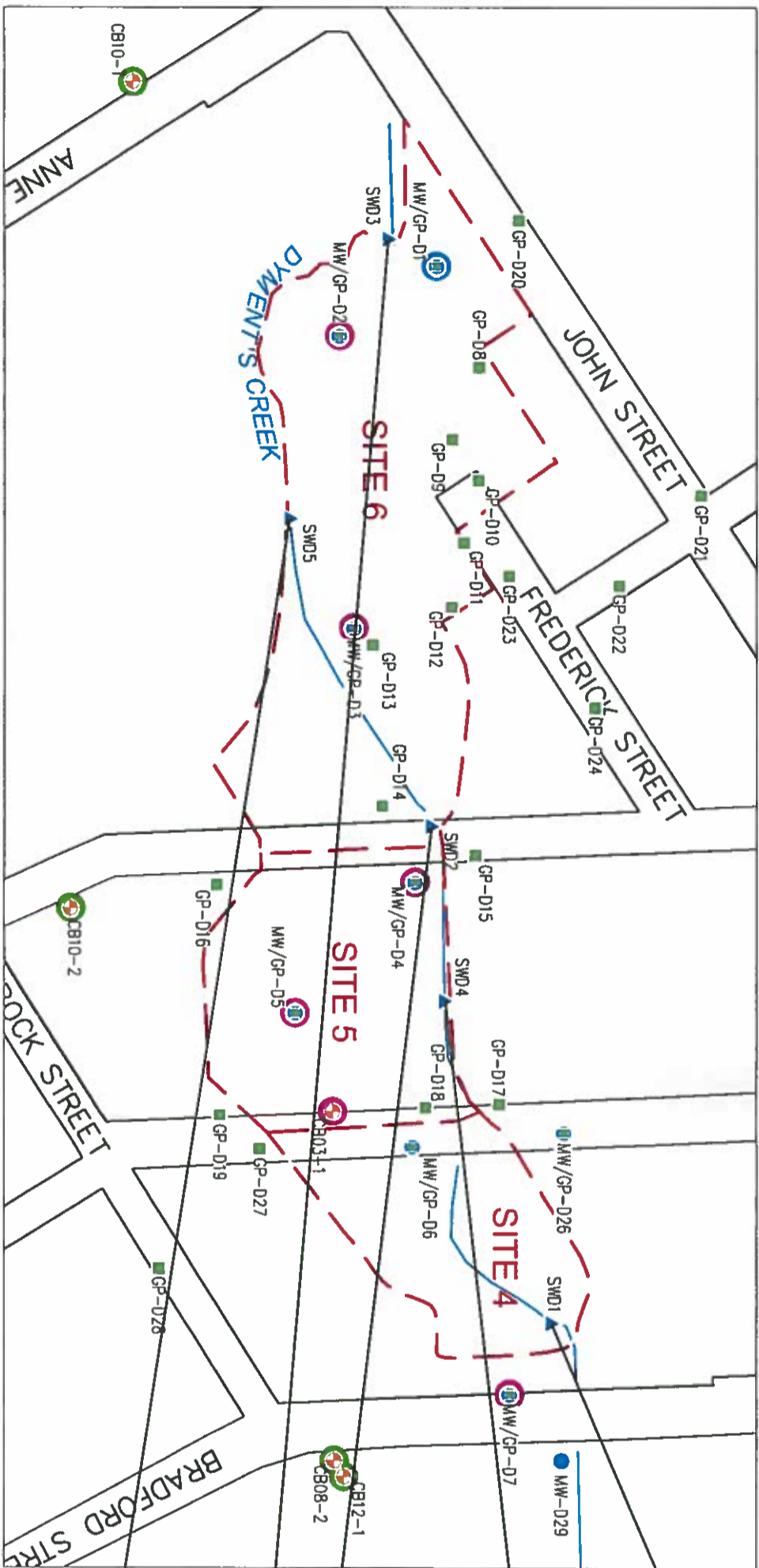
REVIEW

STB

HISTORICAL WASTE DISPOSAL SITES

CITY OF BARRIE

FIGURE 6



SWD1				
Parameter	Units	PW/QD	Results	
Metal	µg/L	5	2	3
Copper	µg/L	300	504	1350
Iron	µg/L	300	904	1140
				1350

SWD4				
Parameter	Units	PW/QD	Results	
Metal	µg/L	5	9.3	1.8/7.5
Copper	µg/L	300	1050	1360/1340
Mercury - Dissolved	µg/L	0.2	<0.02	0.2/0.9

SWD2				
Parameter	Units	PW/QD	Results	
Metal	µg/L	5	<2	3/7
Copper	µg/L	300	784	1600/1520
Iron	µg/L	300	784	1020
Polynuclear Aromatic Hydrocarbons	µg/L	0.0005	<0.1	<0.1/<0.1
				0.85
				<0.01

SWD3				
Parameter	Units	PW/QD	Results	
Metal	µg/L	5	2	3
Copper	µg/L	300	453	855
Iron	µg/L	0.2	<0.1	<0.02
Mercury - Dissolved	µg/L	0.03	<0.010	<0.005
Turbiten	µg/L	0.03	<0.010	0.04
				<0.010

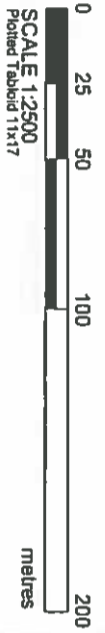
SWD5				
Parameter	Units	PW/QD	Results	
Metal	µg/L	75	210	5
Aluminum	µg/L	0.2	0.46	<0.1
Cadmium	µg/L	5	25.6	2.4
Copper	µg/L	300	440	1340
Lead	µg/L	5	10.5	0.6
Zinc	µg/L	30	99	7

LEGEND:

- ESTIMATED WASTE LIMIT
- GAS PROBE
- MONITORING WELL
- MONITORING WELL / GAS PROBE
- CITY OF BARRIE MONITORING WELL
- SURFACE WATER SAMPLING LOCATION
- INORGANICS
- > ODWS OR MOE TABLE 2
- NO LANDFILL RELATED IMPACTS

NOTES:

1. DATUM IS NAD83 ZONE 17
2. ALL MAPPED BOUNDARIES, LIMITS, AND INTERPOLATED FEATURES ARE APPROXIMATE
3. CAD BASE DIGITAL 1:2000 MUNICIPAL MAPPING COURTESY CITY OF BARRIE
4. AMMONIA CONCENTRATIONS FOR REFERENCE PURPOSES ONLY



Golder Associates
Barrie, Ontario, Canada

SCALE AS SHOWN

DATE 2014-08-25

DESIGN CAD

CHECK STB

REVIEW

SURFACE WATER EXCEEDANCES

HISTORICAL WASTE DISPOSAL SITES

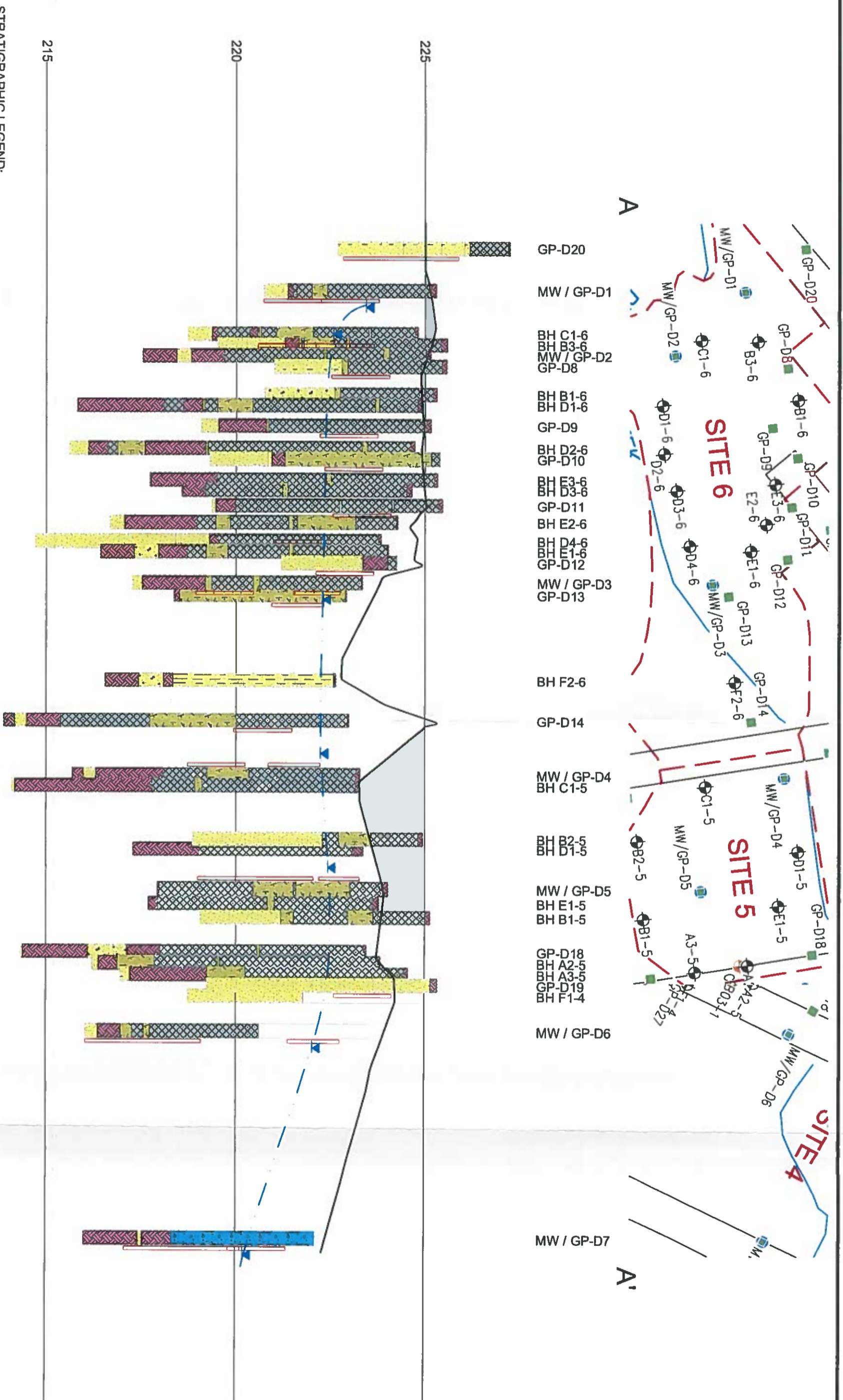
CITY OF BARRIE

FILE No. 1111700043GCXGW.dwg

PROJECT No. 11-1170-0043

REV.

FIGURE 7

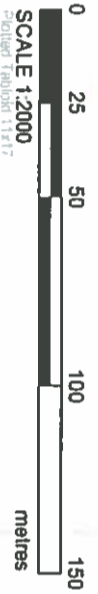


STRATIGRAPHIC LEGEND:

- FILLOVERBURDEN
- ORGANICS/TOPSOIL
- SAND & GRAVEL
- SAND
- SILTY SAND
- SILTY SAND TILL
- SANDY SILT TILL
- CLAYEY SILT TILL
- WASTE

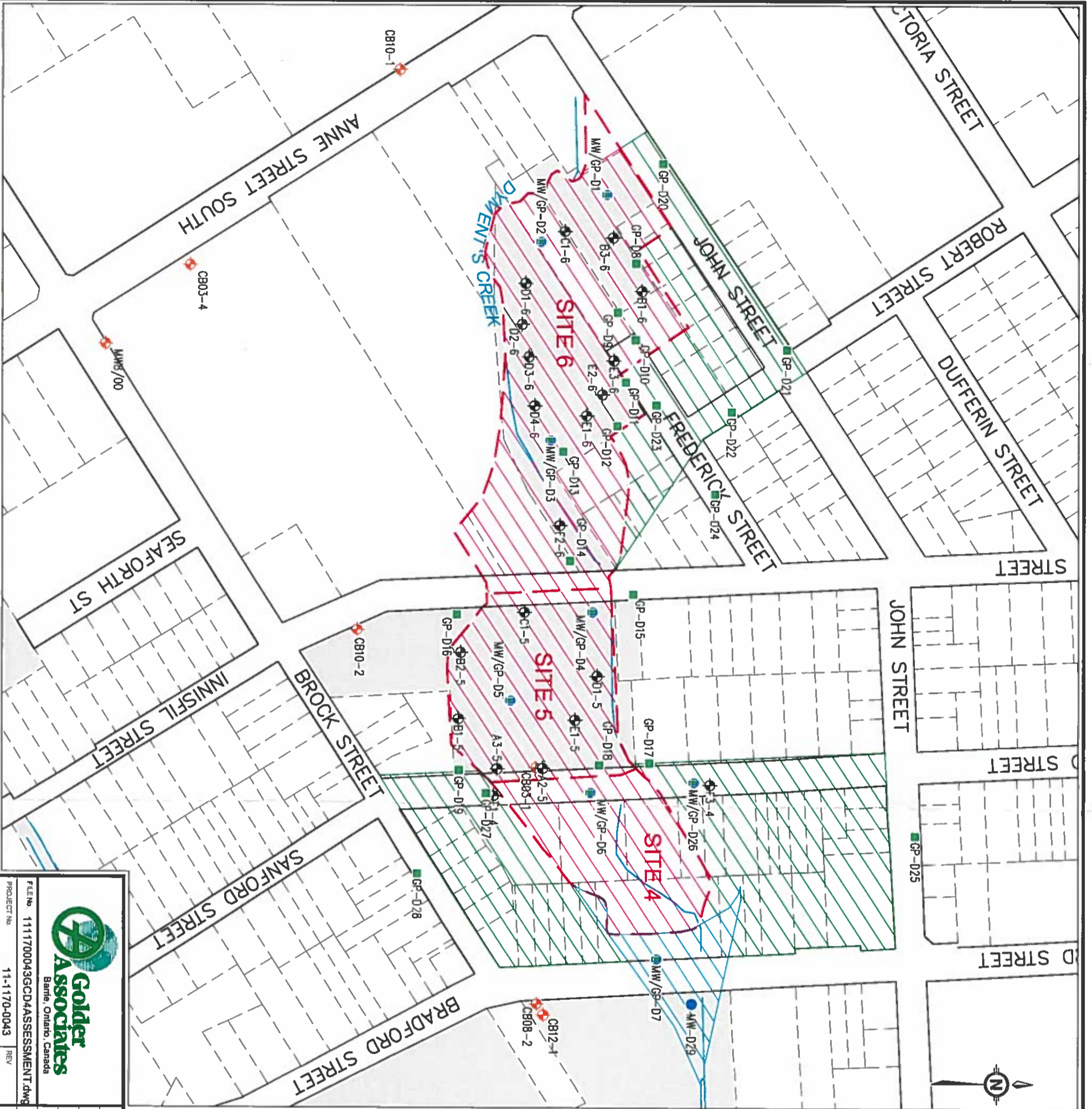
WATER LEVEL (AUG 2013)

WELL SCREEN



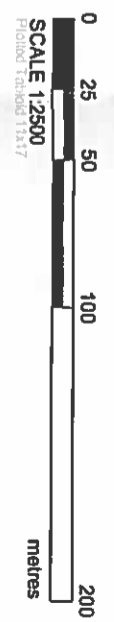
Refer to Figure 2 for Legend and Notes

<p>Goldier Associates Barrie, Ontario, Canada</p>		SCALE	AS SHOWN	TITLE
		DATE	2014-01-09	<p>SITE SECTION A-A'</p> <p>HISTORICAL WASTE DISPOSAL SITES CITY OF BARRIE</p>
DESIGN	CAD	CHECK	STB	
PROJECT No.	11-1170-0043	REVIEW		FIGURE
FILE No.	1111700043GCSCCT.dwg	REVIEW		8



- LEGEND:**
- ESTIMATED WASTE LIMIT
 - BOREHOLE
 - GAS PROBE
 - MONITORING WELL
 - MONITORING WELL / GAS PROBE
 - CITY OF BARRIE MONITORING WELL
 - CITY OF BARRIE OWNED PROPERTY
 - D4 ASSESSMENT REQUIRED DUE TO POSSIBLE LANDFILL GAS
 - D4 ASSESSMENT REQUIRED DUE TO POSSIBLE GROUNDWATER IMPACTS
 - D4 ASSESSMENT REQUIRED DUE TO LANDFILL WASTE / LANDFILL GAS

- NOTES:**
1. DATUM IS NAD83 ZONE 17
 2. ALL MAPPED BOUNDARIES, LIMITS, AND INTERPOLATED FEATURES ARE APPROXIMATE
 3. CAD BASE DIGITAL 1:2000 MUNICIPAL MAPPING COURTESY CITY OF BARRIE
 4. POSSIBLE LANDFILL GAS LIMITS TO BE VERIFIED THROUGH FURTHER INVESTIGATION
 5. CITY OWNED PROPERTY PROVIDED BY CITY OF BARRIE



Golder Associates
 Barrie, Ontario, Canada

FILE No. 1111700043GCD4ASSESSMENT.dwg
 PROJECT No. 11-1170-0043

SCALE	TITLE
AS SHOWN	D4 ASSESSMENT AREAS
DATE 2014-11-25	
DESIGN	
CAD	
CHECK	STB
REVIEW	

HISTORICAL WASTE DISPOSAL SITES

CITY OF BARRIE

FIGURE **9**



TABLES

Table 1
Landfill Gas Concentrations (% methane by volume)
Dyment's Creek Landfills

Well ID	Water (mbgs)	Site	Sample Date	Landfill Gas Readings - GEM 2000			
				CH4 (%)	CO2 (%)	O2 (%)	Bal. (%)
GP-D1	NM	Site 6	28-Jun-12	0.0	0.0	17.8	82.2
GP-D1	NM	Site 6	18-Oct-12	0.4	4.8	11.3	83.5
GP-D1	1.67	Site 6	3-Dec-12	0.0	2.2	16.4	81.4
GP-D1	1.65	Site 6	18-Dec-12	0.5	1.3	17.9	80.3
GP-D1	1.46	Site 6	4-Apr-13	0.0	2.1	12.7	85.2
GP-D1	1.64	Site 6	20-Jun-13	0.0	2.1	17.6	80.3
GP-D1	1.68	Site 6	22-Aug-13	0.1	5.8	12.9	81.2
GP-D1	1.71	Site 6	11-Oct-13	0.1	0.9	20.1	79.0
GP-D1	1.68	Site 6	13-Dec-13	0.1	1.0	22.3	76.6
GP-D1	1.76	Site 6	12-Feb-14	0.0	1.6	21.1	77.3
GP-D2	NM	Site 6	28-Jun-12	6.6	5.9	11.2	76.4
GP-D2	NM	Site 6	18-Oct-12	10.4	12.0	8.8	68.8
GP-D2	2.42	Site 6	3-Dec-12	15.8	14.1	4.9	65.2
GP-D2	2.36	Site 6	18-Dec-12	18.6	15.5	2.2	63.7
GP-D2	2.16	Site 6	4-Apr-13	16.8	12.7	1.4	69.1
GP-D2	2.43	Site 6	20-Jun-13	19.6	13.5	1.4	65.5
GP-D2	2.62	Site 6	22-Aug-13	16.8	6.3	2.1	64.7
GP-D2	2.48	Site 6	11-Oct-13	20.6	16.7	3.0	59.7
GP-D2	2.42	Site 6	13-Dec-13	13.6	10.8	11.0	64.6
GP-D2	2.54	Site 6	12-Feb-14	17.0	13.8	4.7	64.5
GP-D3	0.81	Site 6	21-Mar-12	65.2	11.0	4.0	19.7
GP-D3	-	Site 6	22-Mar-12	57.3	12.0	4.1	26.6
GP-D3	-	Site 6	28-Jun-12	23.1	15.7	5.7	54.3
GP-D3	-	Site 6	18-Oct-12	35.1	19.0	6.9	30.0
GP-D3	0.81	Site 6	3-Dec-12	29.4	11.1	12.4	47.1
GP-D3	0.91	Site 6	18-Dec-12	11.5	5.3	17.1	66.1
GP-D3	0.74	Site 6	4-Apr-13	18.2	3.6	15.5	62.7
GP-D3	0.98	Site 6	20-Jun-13	17.8	9.7	10.3	62.2
GP-D3	1.23	Site 6	22-Aug-13	43.8	24.7	2.7	29.2
GP-D3	0.94	Site 6	11-Oct-13	25.2	11.5	13.3	49.9
GP-D3	0.97	Site 6	13-Dec-13	10.8	5.5	19.6	64.1
GP-D3	1.03	Site 6	12-Feb-14	50.7	16.9	2.8	29.6
GP-D4	-	Site 5	28-Jun-12	17.3	5.1	14.4	62.8
GP-D4	-	Site 5	18-Oct-12	2.6	1.3	20.3	75.8
GP-D4	0.59	Site 5	3-Dec-12	0.0	0.1	21.3	78.6
GP-D4	0.64	Site 5	18-Dec-12	0.0	0.1	21.4	78.5
GP-D4	0.46	Site 5	4-Apr-13	3.2	0.3	19.5	76.9
GP-D4	0.92	Site 5	20-Jun-13	1.4	0.3	19.2	79.1
GP-D4	1.09	Site 5	22-Aug-13	2.3	0.9	20.2	76.5
GP-D4	0.68	Site 5	11-Oct-13	0.1	0.0	21.5	78.4
GP-D4	0.80	Site 5	13-Dec-13	0.0	0.3	21.8	77.9
GP-D4	0.91	Site 5	12-Feb-14	0.0	0.3	22.1	77.6

Table 1
Landfill Gas Concentrations (% methane by volume)
Dyment's Creek Landfills

Well ID	Water (mbgs)	Site	Sample Date	Landfill Gas Readings - GEM 2000			
				CH4 (%)	CO2 (%)	O2 (%)	Bal. (%)
GP-D5	1.06	Site 5	21-Mar-12	0.4	3.5	16.6	79.5
GP-D5	-	Site 5	22-Mar-12	0.3	3.6	16.2	79.8
GP-D5	-	Site 5	28-Jun-12	0.0	0.4	18.3	81.3
GP-D5	-	Site 5	18-Oct-12	0.0	9.9	9.7	80.4
GP-D5	1.24	Site 5	3-Dec-12	0.0	4.3	16.9	78.8
GP-D5	1.12	Site 5	18-Dec-12	0.0	4.6	15.8	79.6
GP-D5	0.73	Site 5	4-Apr-13	0.0	4.7	17.4	77.9
GP-D5	1.22	Site 5	20-Jun-13	0.0	3.9	15.8	80.3
GP-D5	1.55	Site 5	22-Aug-13	0.1	5.1	15.3	79.5
GP-D5	1.50	Site 5	11-Oct-13	0.0	5.7	14.6	79.9
GP-D5	1.15	Site 5	13-Dec-13	0.0	6.6	19.0	74.4
GP-D5	1.38	Site 5	12-Feb-14	0.0	10.7	6.3	83.0
GP-D6	-	Site 4	21-Mar-12	0.0	0.2	17.5	82.5
GP-D6	-	Site 4	22-Mar-12	0.0	0.3	16.9	82.8
GP-D6	0.86	Site 4	28-Jun-12	0.0	0.6	15.7	83.6
GP-D6	-	Site 4	18-Oct-12	0.0	0.1	20.6	79.3
GP-D6	1.52	Site 4	3-Dec-12	0.0	0.1	21.1	78.8
GP-D6	1.02	Site 4	18-Dec-12	0.0	0.1	20.6	79.3
GP-D6	0.75	Site 4	4-Apr-13	0.0	0.1	20.3	79.6
GP-D6	1.00	Site 4	20-Jun-13	0.0	0.4	15.1	84.5
GP-D6	1.39	Site 4	22-Aug-13	0.1	1.9	16.5	81.5
GP-D6	0.39	Site 4	11-Oct-13	0.1	0.3	21.0	78.6
GP-D6	1.22	Site 4	13-Dec-13	0.0	0.4	21.2	78.4
GP-D6	1.64	Site 4	12-Feb-14	0.0	0.6	21.8	77.6
GP-D7	-	Site 4	28-Jun-12	0.0	0.8	14.2	85.0
GP-D7	-	Site 4	18-Oct-12	0.0	0.3	20.1	79.6
GP-D7	1.85	Site 4	3-Dec-12	0.0	1.1	16.7	82.2
GP-D7	1.85	Site 4	18-Dec-12	0.0	1.2	16.5	82.3
GP-D7	1.70	Site 4	4-Apr-04	0.0	0.4	19.2	80.4
GP-D7	1.75	Site 4	20-Jun-13	0.0	0.7	14.0	85.3
GP-D7	1.92	Site 4	22-Aug-13	0.0	2.6	13.7	83.6
GP-D7	1.85	Site 4	11-Oct-13	0.0	1.1	17.6	81.2
GP-D7	1.85	Site 4	13-Dec-13	0.0	0.7	20.8	78.5
GP-D7	1.94	Site 4	13-Feb-14	0.0	1.5	19.2	79.3
GP-D8	-	Site 6	28-Jun-12	0.0	0.0	18.1	81.9
GP-D8	-	Site 6	18-Oct-12	0.2	0.8	20.3	78.8
GP-D8	1.99	Site 6	3-Dec-12	0.2	0.5	20.8	78.5
GP-D8	1.96	Site 6	18-Dec-12	0.0	0.5	21.0	78.5
GP-D8	1.79	Site 6	4-Apr-13	0.0	0.3	20.3	79.4
GP-D8	1.91	Site 6	20-Jun-13	0.1	0.5	19.3	80.1
GP-D8	2.11	Site 6	22-Aug-13	0.0	0.9	20.2	78.9
GP-D8	2.04	Site 6	11-Oct-13	0.1	0.5	21.0	78.4
GP-D8	1.96	Site 6	13-Dec-13	0.0	0.5	20.8	78.7
GP-D8	2.10	Site 6	12-Feb-14	0.0	0.8	22.6	76.6

Table 1
Landfill Gas Concentrations (% methane by volume)
Dyment's Creek Landfills

Well ID	Water (mbgs)	Site	Sample Date	Landfill Gas Readings - GEM 2000			
				CH4 (%)	CO2 (%)	O2 (%)	Bal. (%)
GP-D9	-	Site 6	28-Jun-12	19.3	8.5	12.9	58.0
GP-D9	-	Site 6	18-Oct-12	43.5	23.8	6.7	26.0
GP-D9	1.82	Site 6	3-Dec-12	38.2	18.1	9.2	34.5
GP-D9	1.71	Site 6	18-Dec-12	65.5	27.5	2.3	4.7
GP-D9	1.64	Site 6	4-Apr-13	74.1	13.8	1.1	5.8
GP-D9	1.78	Site 6	20-Jun-13	57.8	26.1	3.3	12.9
GP-D9	1.92	Site 6	22-Aug-13	36.2	22.2	8.0	33.4
GP-D9	1.95	Site 6	11-Oct-13	32.5	19.6	11.4	36.5
GP-D9	1.81	Site 6	13-Dec-13	18.9	9.3	18.3	53.5
GP-D9	1.91	Site 6	12-Feb-14	36.0	12.9	10.9	40.2
GP-D10	2.15	Site 6	3-Dec-12	44.8	19.1	1.3	34.8
GP-D10	2.06	Site 6	18-Dec-12	41.1	19.1	0.4	39.4
GP-D10	1.92	Site 6	4-Apr-13	49.2	16.1	0.6	34.0
GP-D10	2.07	Site 6	20-Jun-13	42.2	20.3	1.2	36.2
GP-D10	2.34	Site 6	22-Aug-13	30.0	22.0	1.3	46.7
GP-D10	2.31	Site 6	11-Oct-13	43.5	24.6	1.0	30.9
GP-D10	2.11	Site 6	13-Dec-13	36.8	17.5	15.4	30.3
GP-D10	2.30	Site 6	12-Feb-14	38.3	17.8	1.5	42.4
GP-D11	-	Site 6	28-Jun-12	0.0	0.1	16.9	83.0
GP-D11	-	Site 6	18-Oct-12	0.1	1.4	19.6	78.9
GP-D11	2.15	Site 6	3-Dec-12	0.0	6.9	13.6	79.5
GP-D11	2.13	Site 6	18-Dec-12	0.7	6.8	12.9	79.6
GP-D11	1.95	Site 6	4-Apr-13	0.0	3.4	18.0	78.6
GP-D11	2.12	Site 6	20-Jun-13	0.1	0.2	19.7	80.0
GP-D11	2.53	Site 6	22-Aug-13	0.1	2.7	18.3	79.0
GP-D11	2.21	Site 6	11-Oct-13	0.1	1.5	19.5	78.9
GP-D11	2.27	Site 6	13-Dec-13	0.0	2.0	22.8	75.2
GP-D11	2.45	Site 6	12-Feb-14	0.0	1.9	21.4	76.7
GP-D12	1.17	Site 6	3-Dec-12	0.6	2.1	18.7	78.6
GP-D12	1.14	Site 6	18-Dec-12	2.0	2.7	17.7	77.6
GP-D12	0.96	Site 6	4-Apr-13	1.3	1.5	18.9	78.4
GP-D12	1.15	Site 6	20-Jun-13	1.6	4.4	13.2	80.8
GP-D12	1.36	Site 6	22-Aug-13	0.1	3.3	17.3	79.4
GP-D12	1.16	Site 6	11-Oct-13	0.1	0.1	21.3	78.5
GP-D12	1.06	Site 6	13-Dec-13	1.0	1.0	22.5	75.5
GP-D12	1.17	Site 6	12-Feb-14	0.0	1.0	22.7	76.2
GP-D13	0.37	Site 6	3-Dec-12	20.4	7.4	15.7	56.5
GP-D13	0.39	Site 6	18-Dec-12	20.8	7.2	15.7	56.3
GP-D13	0.26	Site 6	4-Apr-13	5.1	1.4	19.5	74.4
GP-D13	0.42	Site 6	20-Jun-13	24.0	5.6	14.1	57.4
GP-D13	0.68	Site 6	22-Aug-13	16.8	5.9	16.1	58.2
GP-D13	0.43	Site 6	11-Oct-13	20.6	8.3	15.2	53.6
GP-D13	0.44	Site 6	13-Dec-13	42.5	12.7	15.8	29.0
GP-D13	0.45	Site 6	12-Feb-14	28.5	7.9	14.9	48.7



Table 1
Landfill Gas Concentrations (% methane by volume)
Dymont's Creek Landfills

Well ID	Water (mbgs)	Site	Sample Date	Landfill Gas Readings - GEM 2000			
				CH4 (%)	CO2 (%)	O2 (%)	Bal. (%)
GP-D14	-	Site 6	28-Jun-12	0.2	0.0	18.5	81.3
GP-D14	-	Site 6	18-Oct-12	0.0	0.0	21.3	78.7
GP-D14	1.49	Site 6	3-Dec-12	0.0	0.1	21.3	78.6
GP-D14	1.53	Site 6	18-Dec-12	0.0	0.1	21.2	78.7
GP-D14	1.32	Site 6	4-Apr-13	0.0	0.0	21.0	79.0
GP-D14	1.66	Site 6	20-Jun-13	0.2	0.3	19.4	80.1
GP-D14	1.75	Site 6	22-Aug-13	0.1	0.2	20.8	78.9
GP-D14	1.62	Site 6	11-Oct-13	0.1	0.0	21.4	78.5
GP-D14	1.62	Site 6	13-Dec-13	0.0	1.7	22.1	76.2
GP-D14	1.65	Site 6	12-Feb-14	0.0	0.6	20.8	78.6
GP-D15	1.98	Site 5	3-Dec-12	0.0	1.6	19.8	78.6
GP-D15	1.99	Site 5	18-Dec-12	0.0	1.9	19.8	78.3
GP-D15	1.89	Site 5	4-Apr-13	0.0	1.2	19.8	79.0
GP-D15	1.99	Site 5	20-Jun-13	0.0	1.1	19.7	79.1
GP-D15	2.15	Site 5	22-Aug-13	0.1	3.4	18.0	78.4
GP-D15	2.07	Site 5	11-Oct-13	0.1	0.6	20.9	78.4
GP-D15	2.00	Site 5	13-Dec-13	0.0	2.6	22.0	75.4
GP-D15	2.10	Site 5	12-Feb-14	0.0	1.9	21.9	76.2
GP-D16	-	Site 5	28-Jun-12	0.0	0.2	18.4	81.4
GP-D16	-	Site 5	18-Oct-12	0.0	2.8	18.2	79.0
GP-D16	2.34	Site 5	3-Dec-12	0.0	2.5	19.1	78.4
GP-D16	2.33	Site 5	18-Dec-12	0.0	2.3	19.1	78.6
GP-D16	2.18	Site 5	4-Apr-13	0.0	2.7	16.9	80.4
GP-D16	2.19	Site 5	20-Jun-13	0.0	2.7	15.6	81.7
GP-D16	2.39	Site 5	22-Aug-13	0.1	2.2	19.1	78.6
GP-D16	2.38	Site 5	11-Oct-13	0.1	1.7	19.7	78.5
GP-D16	2.33	Site 5	13-Dec-13	0.0	2.9	21.8	75.3
GP-D16	2.45	Site 5	12-Feb-14	0.0	3.9	16.1	80.0
GP-D17	2.08	Site 5	3-Dec-12	0.0	0.5	20.8	78.7
GP-D17	2.08	Site 5	19-Dec-12	0.0	0.5	20.6	78.9
GP-D17	1.97	Site 5	4-Apr-13	0.0	0.1	20.1	79.8
GP-D17	1.83	Site 5	20-Jun-13	0.0	1.1	15.8	83.1
GP-D17	2.21	Site 5	22-Aug-13	0.1	1.6	19.1	79.2
GP-D17	2.12	Site 5	11-Oct-13	0.1	0.8	20.7	78.4
GP-D17	2.04	Site 5	13-Dec-13	0.0	0.7	22.3	77.0
GP-D17	2.16	Site 5	25-Feb-14	0.0	0.7	21.4	77.9
GP-D18	-	Site 5	28-Jun-12	0.0	0.0	18.5	81.5
GP-D18	-	Site 5	18-Oct-12	2.1	2.0	16.8	79.1
GP-D18	2.08	Site 5	3-Dec-12	0.0	0.2	21.0	78.8
GP-D18	2.07	Site 5	18-Dec-12	0.0	0.1	21.0	78.9
GP-D18	1.78	Site 5	4-Apr-13	0.0	0.1	21.0	78.9
GP-D18	2.11	Site 5	20-Jun-13	0.0	0.0	17.6	82.3
GP-D18	1.33	Site 5	22-Aug-13	2.9	0.8	17.7	77.8
GP-D18	2.13	Site 5	11-Oct-13	1.0	1.0	18.9	79.1
GP-D18	2.15	Site 5	13-Dec-13	0.0	2.0	21.3	76.7
GP-D18	2.26	Site 5	12-Feb-14	0.0	0.5	22.5	77.0

Table 1
Landfill Gas Concentrations (% methane by volume)
Dymont's Creek Landfills

Well ID	Water (mbgs)	Site	Sample Date	Landfill Gas Readings - GEM 2000			
				CH4 (%)	CO2 (%)	O2 (%)	Bal. (%)
GP-D19	-	Site 5	28-Jun-12	0.0	0.0	18.8	81.2
GP-D19	-	Site 5	18-Oct-12	0.0	1.8	19.2	79.0
GP-D19	Dry	Site 5	3-Dec-12	0.0	1.4	20.0	78.6
GP-D19	Dry	Site 5	18-Dec-12	0.0	1.3	19.8	78.9
GP-D19	Dry	Site 5	4-Apr-13	0.0	2.6	14.0	83.4
GP-D19	Dry	Site 5	20-Jun-13	0.0	1.7	16.3	82.0
GP-D19	Dry	Site 5	22-Aug-13	0.1	1.4	19.7	78.8
GP-D19	Dry	Site 5	11-Oct-13	0.0	1.2	26.3	78.5
GP-D19	Dry	Site 5	13-Dec-13	0.0	1.3	20.1	78.6
GP-D19	2.37	Site 5	12-Feb-14	0.0	2.5	19.8	77.7
GP-D20	3.57	Site 6	22-Aug-13	0.0	1.9	19.0	79.1
GP-D20	3.51	Site 6	11-Oct-13	0.0	1.6	19.4	79.0
GP-D20	3.46	Site 6	13-Dec-13	0.0	0.2	21.7	78.1
GP-D20	3.58	Site 6	12-Feb-14	0.0	0.8	22.5	76.7
GP-D21	3.50	Site 6	22-Aug-13	0.0	0.7	20.2	79.0
GP-D21	3.44	Site 6	11-Oct-13	0.0	0.5	21.1	78.4
GP-D21	3.36	Site 6	13-Dec-13	0.0	0.2	22.2	77.6
GP-D21	3.53	Site 6	12-Feb-14	0.0	0.4	22.8	76.8
GP-D22	4.03	Site 6	22-Aug-13	0.0	0.7	20.0	79.3
GP-D22	3.97	Site 6	11-Oct-13	0.0	0.5	20.8	78.7
GP-D22	3.88	Site 6	13-Dec-13	0.0	0.3	22.8	76.9
GP-D22	4.04	Site 6	25-Feb-14	0.0	0.2	22.2	77.6
GP-D23	2.88	Site 6	22-Aug-13	0.0	4.4	17.1	78.5
GP-D23	2.79	Site 6	11-Oct-13	0.0	0.3	21.2	78.5
GP-D23	2.71	Site 6	13-Dec-13	0.0	0.3	22.7	77.0
GP-D23	2.89	Site 6	25-Feb-14	0.0	2.3	21.2	76.5
GP-D24	5.14	Site 6	22-Aug-13	0.0	1.0	20.0	79.0
GP-D24	4.07	Site 6	11-Oct-13	0.1	0.5	21.0	78.4
GP-D24	3.98	Site 6	13-Dec-13	0.0	0.3	22.8	76.9
GP-D24	-	Site 6	12-Feb-14	Well Buried- No Reading Taken			
GP-D24	4.01	Site 6	3-Apr-14	0.0	0.6	21.4	78.0
GP-D25	3.30	Site 4	22-Aug-13	0.1	2.2	18.6	79.2
GP-D25	3.30	Site 4	11-Oct-13	0.1	1.3	20.1	78.5
GP-D25	3.18	Site 4	13-Dec-13	0.0	1.4	22.6	75.0
GP-D25	3.36	Site 4	12-Feb-14	0.0	1.1	22.0	76.9
GP-D26	2.81	Site 4	22-Aug-13	0.1	1.0	19.8	79.1
GP-D26	2.77	Site 4	11-Oct-13	0.1	0.6	20.9	78.4
GP-D26	2.67	Site 4	13-Dec-13	0.0	0.4	22.7	76.9
GP-D26	2.80	Site 4	25-Feb-14	0.0	0.5	21.8	77.7
GP-D27	2.53	Site 4	22-Aug-13	0.1	4.2	15.3	80.4
GP-D27	2.58	Site 4	11-Oct-13	0.1	1.9	18.7	79.3
GP-D27	2.53	Site 4	13-Dec-13	0.0	3.5	18.1	78.4
GP-D27	2.71	Site 4	25-Feb-14	0.0	2.5	18.3	79.2

**Table 1
Landfill Gas Concentrations (% methane by volume)
Dymont's Creek Landfills**

Well ID	Water (mbgs)	Site	Sample Date	Landfill Gas Readings - GEM 2000			
				CH4 (%)	CO2 (%)	O2 (%)	Bal. (%)
GP-D28	3.24	Site 4	22-Aug-13	0.0	4.4	15.5	80.0
GP-D28	3.17	Site 4	11-Oct-13	0.1	1.9	18.7	79.2
GP-D28	3.23	Site 4	13-Dec-13	0.0	3.2	20.9	75.9
GP-D28	-	Site 4	12-Feb-14	Well Buried- No Reading Taken			
GP-D28	3.43	Site 4	3-Apr-14	0.0	3.8	14.4	81.8

Notes:

NM = not measured

bold and shaded indicates a methane concentration above 5%, the lower explosive limit of methane

Table 2
Soil Analytical Results
BTEX and Petroleum Hydrocarbons
City of Barrie Bunker's Creek Historic Waste Sites

Sample I.D.	MWD29-SA3A		
Borehole Number	MW-D29		
Site Number	Site 4		
Sampling Depth (m below grade)	3.05 - 3.53		
Combustible Gas Meter Reading (ppm)	3750		
Photoinitiation Detector Reading (ppm)	624		
Sampling Date	17-Jul-13		
	MOE Table 2		
Parameter	Units	RDL	Res/park/inst Standard
VOCs			
Benzene	µg/g	0.02	0.21
Ethylbenzene	µg/g	0.05	1.1
Toluene	µg/g	0.08	2.3
Xylene Mixture	µg/g	0.05	3.1
Petroleum Hydrocarbons			
C6 - C10 (PHC F1 minus BTEX)	µg/g	5	55
C>10 - C16 (PHC F2)	µg/g	10	98
C>16 - C34 (PHC F3)	µg/g	50	300
C>34 - C50 (PHC F4)	µg/g	50	2800

Notes:

1. Combustible Gas Meter Reading - measured in ppm (parts per million by volume), calibrated to hexane
2. Photoinitiation Detector Reading - measured in ppm (parts per million by volume), calibrated to isobutylene
3. µg/g = Microgram per Gram
4. RDL = Laboratory Reportable Detection Limit
5. Table 2 Standard = Ministry of Environment (MOE) "Soil, Groundwater, and Sediment Standards, Part XV.1 Environment Protection Act, April 15, 2011" full depth generic site condition standards for residential/parkland/institutional land use, potable groundwater condition, coarse textured soil
6. Bold type and shaded indicates an exceedance of the MOE Table 2 site condition standard



Prepared by: 
Checked by: JEB 

Table 3
Groundwater Analytical Results
Metals and Inorganics
City of Barrie Historic Waste Sites Dymen's Creek

Monitoring Well Location Sampling Date	MW-D4					MW-D5				
	28-Jun-12	22-Aug-12	22-Apr-13	21-Aug-13	11-Dec-13	2-Mar-12	27-Jun-12	22-Apr-13	21-Aug-13	12-Dec-13
Organic Vapour Meter Reading (ppm)*	150*	nm	nm	nm	230	2050*	nm	nm	nm	155
Photoionization Detector Reading (ppm)*	0*	nm	nm	nm	1	0*	nm	nm	nm	0
Parameter	Units	RDL	ODWS	PWQO	MOE Table 2 Standards					
Dissolved Metals										
Antimony	µg/L	0.5	6	20	6					
Arsenic	µg/L	1.0	25	100	25					
Barium	µg/L	2.0	1000	NO	1000					
Beryllium	µg/L	0.5	NS	1100	4.0					
Boron	µg/L	10.0	5000	200	715					
Cadmium	µg/L	0.2	5	0.5	2.7					
Chromium (Total Dissolved)	µg/L	2.0	50	50	50					
Cobalt	µg/L	0.5	NS	0.9	3.8					
Copper	µg/L	1.0	1000 (AO)	5	87					
Iron	µg/L	10.0	300 (AO)	300	NV					
Lead	µg/L	0.5	10	25	10					
Molybdenum	µg/L	0.5	NS	40	70					
Nickel	µg/L	1.0	NS	25	100					
Selenium	µg/L	1.0	10	100	10					
Silver	µg/L	0.2	NS	0.1	1.5					
Thallium	µg/L	0.3	NS	0.3	2					
Uranium	µg/L	0.5	20	5	20					
Vanadium	µg/L	0.4	NS	6	6.2					
Zinc	µg/L	5.0	5000 (AO)	20	1100					
Inorganics										
Electrical Conductivity	µS/cm	2	NS	NO	NV					
pH	pH Units	NA	6.5-8.5 (OG)	6.5-8.5	5-9					
Alkalinity (as CaCO3)	mg/L	5	30-500 (OG)	384	NV					
Chloride	mg/L	0.10	250 (AO)	NO	790					
Sulphate	mg/L	0.10	500 (AO)	NO	NV					
Ammonia as N	mg/L	0.02	NS	1.3	NV					
Calcium	mg/L	0.05	NS	NO	NV					
Magnesium	mg/L	0.05	NS	NO	NV					
Chromium III	mg/L	0.003	NS	8.9	NV					
Chromium VI	mg/L	0.005	NS	1	0.025					
Sodium	mg/L	0.05	200 (AO)	NO	490					
Mercury	mg/L	0.0001	0.001	0.2	0.00029					
Cyanide, Free	mg/L	0.002	0.2	5	0.066					
Phenols	mg/L	0.001	NS	1	NV					
Potassium	mg/L	0.05	NS	NO	NV					
Total Hardness (as CaCO3)	mg/L	10	80-100 (OG)	NO	NV					
Nitrate as N	mg/L	0.05	10.0	NO	NV					
Nitrite as N	mg/L	0.05	1.0	NO	NV					
Fluoride	mg/L	0.05	1.5	NO	NV					
Bromide	mg/L	0.05	NS	NO	NV					
Phosphate as P	mg/L	0.10	NS	NO	NV					

Notes:
 * Readings obtained on different date
 1. Organic Vapour Meter Reading - measured in ppm (parts per million by volume), calibrated to hexane
 2. Photoionization Detector Reading - measured in ppm (parts per million by volume), calibrated to isobutylene
 3. NV = No value
 4. NS = No standard
 5. µg/L = Microgram per Litre
 6. mg/L = Milligram per Litre
 7. - = Not analysed
 8. RDL = Laboratory Reportable Detection Limit
 9. na = Not applicable
 10. nm = not measured
 11. Table 2 Standard = Ministry of Environment (MOE) "Soil, Groundwater, and Sediment Standards, Part XV.1 Environment Protection Act, April 15, 2011" full depth generic site condition standards for all types of land uses, potable groundwater condition, coarse textured soil
 12. ODWS = Ontario Drinking Water Standard, 2006
 13. Bold type and outlined indicates an exceedance of the MOE Table 2 site condition standard
 14. Shaded indicates an exceedance of the ODWS

Prepared by
Checked by

Table 3
Groundwater Analytical Results
Metals and Inorganics
City of Barrie Historic Waste Sites Dymal's Creek

Monitoring Well Location	Sampling Date	Organic Vapour Meter Reading (ppm)*	Photoionization Detector Reading (ppm)*	Parameter	Units	RDL	ODWS	PW/QO	MOE Table 2 Standards	MW-D6		MW-D7		MW-D26			
										2-Mar-12 980° 0°	27-Jun-12 nm	22-Apr-13 nm	21-Aug-13 nm		11-Dec-13 12% LEL 0	29-Jun-12 <25° 0°	21-Aug-12 nm
Disolved Metals																	
Antimony					µg/L	0.5	6	20	6	<0.5	<0.5	<0.05	<0.1	<0.5	<0.5	0.8	1.2
Arsenic					µg/L	1.0	25	100	25	1.8	1.9	<1	0.5	<1	<1	0.2	<1
Barium					µg/L	2.0	1000	NO	1000	790	787	907	902	277	285	290	207
Beryllium					µg/L	0.5	NS	1100	4.0	<0.5	<0.5	<0.5	<0.1	<0.5	<0.5	<0.1	<0.5
Boron					µg/L	10.0	5000	200	5000	27.7	27.6	20.0	35.1	106	133	60	89
Cadmium					µg/L	0.2	5	0.5	2.7	<0.2	<0.2	<0.2	<0.1	<0.2	<0.1	0.05	<0.1
Chromium (Total Dissolved)					µg/L	2.0	50	NO	50	12.5	14.6	<2.0	8	8.1	8.8	29	14
Cobalt					µg/L	0.5	NS	0.9	3.8	7.9	8.3	3.9	1.7	1.0	2.3	0.8	0.7
Copper					µg/L	1.0	1000 (AO)	5	87	<1.0	<1.0	1.3	<1	1.6	<1.0	<1	<0.5
Iron					µg/L	10.0	300 (AO)	300	NO	9140	9840	10800	20900	16800	5170	14500	26200
Lead					µg/L	0.5	10	25	10	<0.5	<0.5	<0.5	<1	<1	<0.5	<1	<1
Molybdenum					µg/L	0.5	NS	40	70	0.7	0.7	<0.5	0.2	0.7	0.6	<5	0.2
Nickel					µg/L	1.0	NS	25	100	<1.0	<1.0	5.4	<5	3.8	<1.0	<1.0	<5
Selenium					µg/L	1.0	100	100	10	3.0	3.2	<1.0	<1.0	<1.0	<1.0	<1	<1
Silver					µg/L	0.2	NS	0.1	1.5	<0.2	<0.2	<0.2	<0.1	<0.1	<0.2	<0.1	<0.1
Thallium					µg/L	0.3	NS	0.3	2	<0.3	<0.3	<0.3	<0.1	<0.1	<0.3	<0.1	<0.1
Uranium					µg/L	0.5	NS	5	20	1.2	1.3	<0.5	<1	0.08	<0.5	<1	<0.5
Vanadium					µg/L	0.4	NS	6	6.2	4.9	4.5	1.1	4.0	4.1	3.8	3.0	20.2
Zinc					µg/L	5.0	5000 (AO)	20	1100	<5.0	<5.0	5.4	<10	<10	<5.0	<10	5.0
Inorganics																	
Electrical Conductivity					uS/cm	2	NS	NO	NV	1810	1810	2000	2100	1800	1790	2460	4530
pH					pH Units	NA	6.5-8.5 (OG)	6.5-8.5	5-9	7.53	7.58	7.51	7.48	7.48	6.43	8.03	7.50
Alkalinity (as CaCO3)					mg/L	5	30-500 (OG)	394	NV	752	751	205	673	798	805	528	548
Chloride					mg/L	0.10	250 (AO)	NO	790	205	207	264	345	287	605	758	1160
Sulphate					mg/L	0.10	500 (AO)	NO	NV	3.25	3.17	<0.10	1.75	<3	2.00	2.38	4
Ammonia as N					mg/L	0.02	NS	1.3	NV	9.08	11.4	12.5	13.0	13.9	16.2	13.9	12.2
Calcium					mg/L	0.05	NS	NO	NV	277	266	-	274	316	370	173	245
Magnesium					mg/L	0.05	NS	NO	NV	36.4	35.6	-	32.0	48.2	18.3	19.1	24.0
Chromium III					mg/L	0.003	NS	8.9	NV	0.012	0.015	-	<0.005	<0.010	<0.010	0.03	0.14
Chromium VI					mg/L	0.005	NS	1	NV	<0.005	<0.005	<0.005	<0.005	<0.010	<0.010	<0.005	<0.010
Sodium					mg/L	0.05	200 (AO)	NO	490	57.0	55.9	62.2	106	116	86.8	282	436
Mercury					mg/L	0.0001	0.001	0.2	0.00029	-	-	-	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001
Cyanide-Free					mg/L	0.002	0.2	5	0.066	0.003	0.002	-	<0.005	<0.005	<0.005	<0.005	<0.005
Phenols					mg/L	0.001	NS	1	NV	5.17	4.98	-	5.00	5.30	4.88	9.21	12.0
Potassium					mg/L	0.05	NS	NO	NV	842	811	-	816	952	1120	507	711
Total Hardness (as CaCO3)					mg/L	10	80-100 (OG)	NO	NV	-	-	-	<0.10	<0.10	<0.10	<0.10	<0.10
Nitrate as N					mg/L	0.05	1.0	NO	NV	<0.05	<0.05	<0.05	<0.10	<0.10	<0.10	<0.10	<0.10
Nitrite as N					mg/L	0.05	1.5	NO	NV	-	-	<0.05	<0.10	0.2	<0.1	<0.10	<0.10
Fluoride					mg/L	0.05	NS	NO	NV	-	-	<0.05	2.04	0.8	0.8	<0.10	<0.25
Bromide					mg/L	0.05	NS	NO	NV	-	-	<0.10	<0.01	0.1	<1	<1	<1
Phosphate as P					mg/L	0.10	NS	NO	NV	-	-	<0.10	<0.01	0.1	<1	<1	<1

Notes:

* Readings obtained on different date

1 Organic Vapour Meter Reading - measured in ppm (parts per million by volume), calibrated to hexane

2 Photoionization Detector Reading - measured in ppm (parts per million by volume), calibrated to toluene

3 NV = No value

4 NS = No standard

5 µg/L = Microgram per Litre

6 mg/L = Milligram per Litre

7 - = Not analysed

8 RDL = Laboratory Reportable Detection Limit

9 na = Not applicable

10 nm = not measured

11 Table 2 Standard = Ministry of Environment (MOE) Soil, Groundwater, and Sediment Standards, Part XV, Environment Protection Act, April 15, 2011 - full depth generic site condition standards for all types of land uses, potable groundwater condition, coarse textured soil

12 ODWS = Ontario Drinking Water Standard, 2006

13 Bold type and outlined indicates an exceedance of the MOE Table 2 site condition standard

14 Shaded indicates an exceedance of the ODWS

Table 4
Groundwater Analytical Results
VOC and Petroleum Hydrocarbons
City of Barris Historic Waste Sites Dymest's Creek

Monitoring Well Location Sampling Date Organic Vapor Meter Reading (ppm)* Petrochemical Detector Reading (ppm)**	MW-D4				MW-D5				MW-D6				11-Dec-13 12% LEL 0
	28-Jun-12 150° 0"	22-Aug-12 nm nm	21-Aug-13 nm nm	11-Dec-13 230 1	2-Mar-12 2050° 0"	27-Jun-12 nm nm	22-Apr-13 nm nm	2-Mar-12 960° 0"	27-Jun-12 nm nm	22-Apr-13 nm nm	21-Aug-13 nm nm	11-Dec-13 195 0	
Parameter	Units	RDL	ODWS	PWQO	MOE Table 2 Standard	Field Duplicate of MW-D5	Field Duplicate of MW-D6	Field Duplicate of MW-D6	Field Duplicate of MW-D6	Field Duplicate of MW-D6	Field Duplicate of MW-D6	Field Duplicate of MW-D6	
VOC													
Acetone	µg/L	1.0	NS	NO	2700	<2.0	<1.0	<1.0	<1.0	<1.0	6.1	<1.0	
Benzene	µg/L	0.20	5	100	5.0	23	11.1	11.5	<0.20	<0.20	<0.20	<0.20	
Bromochloromethane	µg/L	0.20	NS	200	16	<0.40	<0.3	<0.5	<0.20	<0.20	<0.20	<0.20	
Bromoform	µg/L	0.10	NS	60	25	<0.20	<0.4	<0.5	<0.20	<0.20	<0.20	<0.20	
Bromomethane	µg/L	0.20	NS	60	25	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	
Carbon Tetrachloride	µg/L	0.20	5	NS	0.79	<0.40	<0.2	<0.2	<0.20	<0.20	<0.20	<0.20	
Chlorobenzene	µg/L	0.10	60	NS	30	13.0	7.9	4.8	<0.10	<0.10	4.8	<0.10	
Chloroethane	µg/L	0.2	NS	NO	NV	<0.2	<0.2	<1.0	<0.20	<0.20	<1.0	<0.20	
Chloroform	µg/L	0.20	NS	NO	2.4	<0.40	<0.2	<3.0	<0.20	<0.20	<3.0	<0.20	
C1-Monochlorobenzene	µg/L	0.2	NS	NO	NV	<0.2	<0.2	<0.2	<0.20	<0.20	<0.20	<0.20	
1,2-Dichlorobenzene	µg/L	0.10	NS	40	25	<0.20	<0.3	<0.5	<0.10	<0.10	<0.5	<0.10	
1,2-Dichloroethane	µg/L	0.10	200	2.5	3	1.1	0.23	0.8	<0.10	<0.10	<0.5	<0.10	
1,3-Dichlorobenzene	µg/L	0.10	NS	2.5	59	<0.20	<0.4	<0.5	<0.10	<0.10	<0.5	<0.10	
1,4-Dichlorobenzene	µg/L	0.10	5	1	4	18.1	13.4	3.8	6.1	4.8	3.8	<0.10	
Dichlorodifluoromethane	µg/L	0.20	NS	NO	590	<0.40	<0.20	<1.0	<0.20	<0.20	<1.0	<0.20	
1,1-Dichloroethane	µg/L	0.30	NS	200	5	<0.60	<0.40	<0.5	<0.30	<0.30	<0.5	<0.30	
1,2-Dichloroethane	µg/L	0.20	5	100	1.6	<0.40	<0.20	<0.5	<0.20	<0.20	<0.5	<0.20	
1,1-Dichloroethylene	µg/L	0.30	14	40	1.6	<0.60	<0.40	<0.5	<0.30	<0.30	<0.5	<0.30	
trans-1,2-Dichloroethylene	µg/L	0.20	NS	200	1.6	<0.40	<0.20	<0.5	<0.20	<0.20	<0.5	<0.20	
cis-1,2-Dichloroethylene	µg/L	0.20	NS	200	1.6	<0.40	<0.20	<0.5	<0.20	<0.20	<0.5	<0.20	
1,2-Dichloropropane	µg/L	0.20	NS	7.7	5	<0.40	<0.40	<0.5	<0.20	<0.20	<0.5	<0.20	
1,3-Dichloropropane	µg/L	0.30	NS	0.7	5	<0.60	<0.40	<0.5	<0.30	<0.30	<0.5	<0.30	
Ethylbenzene	µg/L	0.10	2.4 (AO)	8	2.4	1.7	2.7	0.9	<0.20	<0.20	<0.5	<0.20	
Ethylene Dibromide	µg/L	0.20	NS	5	2.4	<0.20	<0.20	<0.2	<0.10	<0.10	<0.2	<0.10	
n-Hexane	µg/L	0.20	NS	NO	51	<0.40	<0.40	<5	<0.20	<0.20	<10.0	<0.20	
2-Hexanone (MEK)	µg/L	10	NS	NO	NV	<10	<10	<10	<0.20	<0.20	<10.0	<0.20	
Methylene Chloride	µg/L	0.30	50	100	50	<0.60	<0.40	<5	<0.30	<0.30	<5	<0.30	
Methyl Isobutyl Ketone	µg/L	1.0	NS	NO	640	<2.0	<1.0	<10	<1.0	<1.0	<10	<1.0	
Methyl Ethyl Ketone	µg/L	1.0	NS	400	1800	<2.0	<1.0	<10	<1.0	<1.0	<10	<1.0	
Methyl tert-butyl ether	µg/L	0.20	NS	200	15	<0.40	<0.20	<10	<0.20	<0.20	<10	<0.20	
Styrene	µg/L	0.10	NS	4	5.4	<0.20	<0.20	<0.5	<0.10	<0.10	<0.5	<0.10	
1,1,1,2-Tetrachloroethane	µg/L	0.10	NS	20	11	<0.20	<0.20	<0.5	<0.10	<0.10	<0.5	<0.10	
1,1,1,2,2-Tetrachloroethane	µg/L	0.10	NS	70	1	<0.20	<0.20	<0.5	<0.10	<0.10	<0.5	<0.10	
Tetrachloroethylene	µg/L	0.20	30	50	1.6	<0.40	<0.40	<0.3	<0.20	<0.20	<0.5	<0.20	
Toluene	µg/L	0.20	24 (AO)	0.8	24	0.69	0.65	0.6	<0.20	<0.20	0.6	<0.20	
1,2,4-Trichlorobenzene	µg/L	0.5	NS	NO	70	<0.5	<0.5	<0.5	<0.20	<0.20	<0.5	<0.20	
1,1,1-Trichloroethane	µg/L	0.30	NS	10	200	<0.60	<0.40	<0.5	<0.30	<0.30	<0.5	<0.30	
1,1,2-Trichloroethane	µg/L	0.20	NS	800	4.7	<0.40	<0.20	<0.4	<0.20	<0.20	<0.5	<0.20	
Trichloroethylene	µg/L	0.20	5	20	1.6	<0.40	<0.20	<0.3	<0.20	<0.20	<0.5	<0.20	
1,3,5-trimethylbenzene	µg/L	0.3	NS	NO	NV	<0.40	<0.20	2.1	<0.20	<0.20	2.50	<0.20	
Vinyl Chloride	µg/L	0.17	2	600	0.5	<0.34	<0.17	<0.5	<0.17	<0.17	<0.5	<0.17	
m,p-Xylene	µg/L	0.20	NS	2	NV	17	44	23	<0.20	<0.20	18.6	<0.20	
o-Xylene	µg/L	0.10	NS	40	NV	3.0	0.8	1.1	<0.10	<0.10	<0.5	<0.10	
Xylene Mixture	µg/L	0.20	300 (AO)	NO	300	20	24	25.6	<0.20	<0.20	18.6	<0.20	
Trichlorofluoromethane	µg/L	0.40	NS	NO	150	<0.80	<0.40	<1.0	<0.40	<0.40	<1.0	<0.40	
Petroleum Hydrocarbons C6 - C10 (PHC F1 minus BTEX)	µg/L	25	NS	NO	750	250	33	<25	<25	<25	105	<25	
C10 to C16 (PHC F2 minus Naphthalene)	µg/L	100	NS	NO	150	<100	<100	80	<100	<100	<100	<100	
C16 - C34 (PHC F3 minus PAHs)	µg/L	100	NS	NO	500	2300	<100	<400	<100	<100	<400	<100	
C34 - C50 (PHC F4)	µg/L	100	NS	NO	500	180	<100	<400	<100	<100	<400	<100	

* Readings obtained on different date
 ** Sampled on March 21, 2012
 1. Organic Vapor Meter Reading - measured in ppm (parts per million by volume), calibrated to hexane
 2. Petrochemical Detector Reading - measured in ppm (parts per million by volume), calibrated to isobutylene
 3. ns = not applicable
 4. nm = not measured
 5. NV = No value
 6. NS = No standard
 7. µg/L = Microgram per Liter
 8. - = not analyzed
 9. RDL = Laboratory Reportable Detection Limit
 10. Table 2 Standard = Ministry of Environment (MOE) "Soil, Groundwater, and Sediment Standards, Part XV: Environmental Protection Act, April 15, 2011" full length generic site condition standards for all types of land uses, potable groundwater condition, dense textured soil
 11. ODWS = Ontario Drinking Water Standards, 2008
 12. Bold type and outlined indicates an exceedance of the MOE Table 2 site condition standard
 13. Shaded indicates an exceedance of the ODWS
 14. Italicized only indicates the RDL is above the Standard



Table 4
Groundwater Analytical Results
VOC and Petroleum Hydrocarbons
City of Barrie Historic Waste Sites Project's Creek

Table with columns for Monitoring Well Location, Sampling Date, Organic Vapor Meter Reading (ppm), Petrochemicals Detector Reading (ppm), Parameter, Units, RDL, ODWS, PW/QO, NOE Table 2 Standard, and multiple columns for MW-D7, MW-D26, MW-D29, and Trip Blank results across various dates from 2012 to 2013.

1. Sampled on March 21, 2012
1. Organic Vapor Meter Reading - measured in ppm (parts per million by volume), calibrated to hexane
2. Petrochemicals Detector Reading - measured in ppm (parts per million by volume), calibrated to toluene
3. ns = not applicable
4. nm = not measured
5. NV = No value
6. NS = No standard
7. µg/L = Microgram per Liter
8. - = not analyzed
9. RDL = Laboratory Reportable Detection Limit
10. Table 2 Standard = Ministry of Environment (MOE) Soil, Groundwater, and Sediment Standards, Part XV.1. Environmental Protection Act, April 19, 2011. Full description and conditions standards for all types of land uses, including groundwater condition, can be found at: <http://www.moe.gov.on.ca/en/soil/gw/sediment/standards.html>
11. ODWS = Ontario Drinking Water Standards, 2006
12. Bold type and outlined indicates an exceedance of the MOE Table 2 site condition standard
13. Shaded indicates an exceedance of the ODWS
14. Italicized only indicates the RDL is above the Standard

Table 4
Groundwater Analytical Results
VOC and Petroleum Hydrocarbons
City of Barrie Historic Waste Sites Dynamat's Creek

Monitoring Well Location	Field Blank 27-Jun-12	Field Blank 22-Apr-13	Field Blank 21-Aug-13	Field Blank 10-Dec-13	Field Blank 11-Dec-13					
Sampling Date	na	na	na	na	na					
Organic Vapour Meter Reading (ppm)*	na	na	na	na	na					
Photoionization Detector Reading (ppm)*	na	na	na	na	na					
Parameter	Units	RDL	ODWS	PW/QO	MOE Table 2 Standard	Field Blank	Field Blank	Field Blank	Field Blank	Field Blank
VOC										
Acetone	µg/L	1.0	NS	NO	2700	<5.0	<5.0	<5.0	<5.0	<5.0
Benzene	µg/L	0.20	5	100	5.0	<0.5	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	µg/L	0.20	NS	200	16	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L	0.10	NS	60	25	<0.5	<0.5	<0.5	<0.5	<0.5
Bromomethane	µg/L	0.20	NS	0.9	0.89	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	µg/L	0.20	5	NO	0.79	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	µg/L	0.10	80	15	30	<0.2	<0.2	<0.2	<0.2	<0.2
Chloroethane	µg/L	0.2	NS	NO	NV	<0.2	<0.2	<0.2	<0.2	<0.2
Chloroform	µg/L	0.20	NS	NO	2.4	0.8	<1	<1	<1	<1
Chloromethane	µg/L	0.2	NS	NO	NV	<0.2	<0.2	<0.2	<0.2	<0.2
Dibromochloromethane	µg/L	0.10	NS	40	25	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	µg/L	0.10	200	2.5	3	<0.4	<0.4	<0.4	<0.4	<0.4
1,3-Dichlorobenzene	µg/L	0.10	NS	2.5	50	<0.4	<0.4	<0.4	<0.4	<0.4
1,4-Dichlorobenzene	µg/L	0.20	5	4	1	<0.4	<0.4	<0.4	<0.4	<0.4
Dichlorodifluoromethane	µg/L	0.20	NS	NO	590	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	µg/L	0.30	NS	200	5	<0.4	<0.4	<0.4	<0.4	<0.4
1,2-Dichloroethane	µg/L	0.20	5	100	1.6	<0.2	<0.2	<0.2	<0.2	<0.2
1,1-Dichloroethylene	µg/L	0.30	14	40	1.8	<0.5	<0.5	<0.5	<0.5	<0.5
cis-1,2-Dichloroethylene	µg/L	0.20	NS	200	1.6	<0.4	<0.4	<0.4	<0.4	<0.4
trans-1,2-Dichloroethylene	µg/L	0.20	NS	200	1.6	<0.4	<0.4	<0.4	<0.4	<0.4
1,2-Dichloropropane	µg/L	0.20	NS	0.7	5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropane	µg/L	0.30	NS	7	0.5	<0.4	<0.4	<0.4	<0.4	<0.4
Ethylbenzene	µg/L	0.10	2.4 (AO)	8	2.4	<0.10	<0.10	<0.10	<0.10	<0.10
Ethylene Dibromide	µg/L	0.10	NS	5	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
n-Hexane	µg/L	0.20	NS	NO	51	<5	<5	<5	<5	<5
2-Hexanone (MBK)	µg/L	10	NS	NO	NV	<10	<10	<10	<10	<10
Methylene Chloride	µg/L	0.30	50	100	50	<4.0	<4.0	<4.0	<4.0	<4.0
Methyl Isobutyl Ketone	µg/L	1.0	NS	NO	640	<10	<10	<10	<10	<10
Methyl Ethyl Ketone	µg/L	1.0	NS	NO	1800	<10	<10	<10	<10	<10
Methyl tert-butyl ether	µg/L	0.20	NS	200	15	<10	<10	<10	<10	<10
Styrene	µg/L	0.10	NS	4	5.4	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1,2-Tetrachloroethane	µg/L	0.10	NS	20	1.1	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2,2-Tetrachloroethane	µg/L	0.10	NS	70	1	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	µg/L	0.20	30	50	1.6	<0.3	<0.3	<0.3	<0.3	<0.3
Toluene	µg/L	0.20	24 (AO)	0.8	24	<0.5	<0.5	<0.5	<0.5	<0.5
1,2,4-Trichlorobenzene	µg/L	0.5	NS	NO	700	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	µg/L	0.30	NS	10	200	<0.4	<0.4	<0.4	<0.4	<0.4
1,1,2-Trichloroethane	µg/L	0.20	NS	800	4.7	<0.4	<0.4	<0.4	<0.4	<0.4
Trichloroethylene	µg/L	0.20	5	20	1.6	<0.3	<0.3	<0.3	<0.3	<0.3
1,3,5-Trimethylbenzene	µg/L	0.3	NS	NO	NV	<0.3	<0.3	<0.3	<0.3	<0.3
Vinyl Chloride	µg/L	0.17	2	600	0.5	<0.2	<0.2	<0.2	<0.2	<0.2
m & p-Xylene	µg/L	0.20	NS	2	NV	<0.5	<0.5	<0.5	<0.5	<0.5
o-Xylene	µg/L	0.10	NS	40	NV	<0.5	<0.5	<0.5	<0.5	<0.5
Xylene Mixture	µg/L	0.20	300 (AO)	NO	300	<0.20	<0.20	<0.20	<0.20	<0.20
Trichlorofluoromethane	µg/L	0.40	NS	NO	150	<0.5	<0.5	<0.5	<0.5	<0.5
Petroleum Hydrocarbons										
G6 - C10 (PHC F1 minus BTEX)	µg/L	25	NS	NO	750	<25	<25	<25	<25	<25
C10 to C16 (PHC F2 minus Naphthalene)	µg/L	100	NS	NO	150	<100	<100	<100	<100	<100
C16 - C34 (PHC F3 minus PAHs)	µg/L	100	NS	NO	500	<100	<100	<100	<100	<100
C34 - C50 (PHC F4)	µg/L	100	NS	NO	500	<100	<100	<100	<100	<100

* Readings obtained on different date
 ** Sampled on March 21, 2012
 1. Organic Vapour Meter Reading - measured in ppm (parts per million by volume), calibrated to hexane
 2. Photoionization Detector Reading - measured in ppm (parts per million by volume), calibrated to isobutylene
 3. na = not applicable
 4. nm = not measured
 5. NV = No value
 6. NS = No standard
 7. µg/L = Microgram per Liter
 8. - = not analyzed
 9. RDL = Laboratory Reportable Detection Limit
 10. Table 2 Standard = Ministry of Environment (MOE) Soil, Groundwater and Sediment Standards, Part XV 1 Environment Protection Act, April 15, 2011 - full depth generic site condition standards for all types of land uses, potable groundwater condition, coarse textured soil
 11. ODWS = Ontario Drinking Water Standards, 2006
 12. Bold type and outlined indicates an exceedance of the MOE Table 2 site condition standard
 13. Shaded indicates an exceedance of the ODWS
 14. Italicized only indicates the RDL is above the Standard

Table 5
Groundwater Analytical Results
Polynuclear Aromatic Hydrocarbons
City of Barrie Historic Waste Sites Dymont's Creek

Monitoring Well Location	28-Jun-12		22-Aug-12		22-Apr-13		21-Aug-13		11-Dec-13		28-Jun-12		22-Aug-12		22-Apr-13		21-Aug-13		11-Dec-13	
	Sampling Date	Organic Vapour Meter Reading (ppm)	0°	nm	nm	nm	nm	nm	<25	0	200°	nm	nm	nm	nm	nm	nm	nm	<25	1
Photolization Detector Reading (ppm)																				
Parameter	Units	RDL	ODWS	PWQO	MOE Table 2 Standards															
Polycyclic Aromatic Hydrocarbons																				
Naphthalene	µg/L	0.20	NS	7	11	<0.20	<0.20	<0.1	<0.05	<0.05	7.0	11	0.3	5.1	9.2					
Acenaphthylene	µg/L	0.20	NS	NO	1	<0.20	<0.20	<0.1	<0.05	<0.05	<0.20	<0.20	<0.1	<0.05	<0.05					
Acenaphthene	µg/L	0.20	NS	NO	4.1	<0.20	<0.20	<0.1	<0.05	<0.05	<0.20	<0.20	<0.1	0.1	<0.05					
Fluorene	µg/L	0.20	NS	0.2	120	<0.20	<0.20	<0.1	<0.05	<0.05	<0.20	<0.20	<0.1	0.08	<0.05					
Phenanthrene	µg/L	0.10	NS	0.03	1	<0.10	<0.10	<0.1	<0.05	<0.05	<0.10	<0.10	<0.1	<0.05	<0.05					
Anthracene	µg/L	0.10	NS	0.0008	2.4	<0.10	<0.10	<0.1	<0.05	<0.05	<0.10	<0.10	<0.1	<0.05	<0.05					
Fluoranthene	µg/L	0.20	NS	0.0008	0.41	<0.20	<0.20	<0.1	<0.05	<0.05	<0.20	<0.20	<0.1	<0.05	<0.05					
Pyrene	µg/L	0.20	NS	NO	4.1	<0.20	<0.20	<0.1	<0.05	<0.05	<0.20	<0.20	<0.1	<0.05	<0.05					
Benz(a)anthracene	µg/L	0.20	NS	0.0004	1.0	<0.20	<0.20	<0.1	<0.05	<0.05	<0.20	<0.20	<0.1	<0.05	<0.05					
Chrysene	µg/L	0.10	NS	0.0001	0.1	<0.10	<0.10	<0.1	<0.05	<0.05	<0.10	<0.10	<0.1	<0.05	<0.05					
Benzofluoranthene	µg/L	0.10	NS	NO	0.1	<0.10	<0.10	<0.1	<0.05	<0.05	<0.10	<0.10	<0.1	<0.05	<0.05					
Benzofluoranthene	µg/L	0.10	NS	0.0002	0.1	<0.10	<0.10	<0.1	<0.05	<0.05	<0.10	<0.10	<0.1	<0.05	<0.05					
Benz(a)pyrene	µg/L	0.01	NS	NO	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					
Indeno(1,2,3-cd)pyrene	µg/L	0.20	NS	NO	0.2	<0.20	<0.20	<0.1	<0.05	<0.05	<0.20	<0.20	<0.1	<0.05	<0.05					
Dibenz(a,h)anthracene	µg/L	0.20	NS	0.0002	0.2	<0.20	<0.20	<0.1	<0.05	<0.05	<0.20	<0.20	<0.1	<0.05	<0.05					
Benz(g,h,i)perylene	µg/L	0.20	NS	0.00002	0.2	<0.20	<0.20	<0.1	<0.05	<0.05	<0.20	<0.20	<0.1	<0.05	<0.05					
Biphenyl	µg/L	0.05	NS	0.00002	0.05	<0.20	<0.20	<0.2	<0.10	<0.10	1.2	1.9	0.5	1.55	<0.05					
2-and 1-methyl Naphthalene	µg/L	0.20	NS	2	3.2	<0.20	<0.20	<0.2	<0.10	<0.10	1.2	1.9	0.5	1.55	<0.05					

Notes:
 * Readings obtained on different date
 1. Organic Vapour Meter Reading - measured in ppm (parts per million by volume), calibrated to hexane
 2. Photoionization Detector Reading - measured in ppm (parts per million by volume), calibrated to toluene
 3. NS = No standard
 4. µg/L = Microgram per Liter
 5. RDL = Laboratory Reportable Detection Limit
 6. nm = Not applicable
 7. nm = not measured
 8. Table 2 Standard = Ministry of Environment (MOE) "Soil, Groundwater and Sediment Standards, Part XV: 1 Environment Protection Act, April 15, 2011 - full depth generic site condition standards for all types of land uses, potable groundwater condition, coarse textured soil
 9. ODWS = Ontario Drinking Water Standard, 2006
 10. Bold type and outlined indicates an exceedance of the MOE Table 2 site condition standard
 11. Shaded indicates an exceedance of the ODWS

Table 5
Groundwater Analytical Results
Polynuclear Aromatic Hydrocarbons
City of Barré Historic Waste Sites Dymont's Creek

Monitoring Well Location	MM-D3						MM-D4						MM-D5								
	21-Mar-12	27-Jun-12	22-Apr-13	21-Aug-13	11-Dec-13	28-Jun-12	22-Aug-12	22-Apr-13	21-Aug-13	11-Dec-13	21-Mar-12	27-Jun-12	22-Apr-13	21-Aug-13	11-Dec-13	21-Mar-12	27-Jun-12	22-Apr-13	21-Aug-13	11-Dec-13	12-Dec-13
	1450	nm	nm	nm	nm	125	150*	nm	nm	230	2050	nm	nm	nm	1	0	nm	nm	nm	nm	155
Organic Vapor Meter Reading (ppm)	Photoluminescence Detector Reading (ppm)	Parameter	Units	RDL	ODWS	PWQO	MOE Table 2 Standards														
Polycyclic Aromatic Hydrocarbons																					
Naphthalene	11	6.8	5.7	11.5	12.5	160	150	46.4	34	149	19	8.5	4.6	8.71	7.87						
Acenaphthylene	<0.20	<0.20	<0.1	<0.08	<0.05	0.28	0.37	<0.1	0.24	<1.00	<0.20	<0.20	<0.1	<0.2	<0.05						
Acenaphthene	<0.20	<0.20	<0.1	0.08	<0.05	4.0	3.8	1.5	3.4	3.6	<0.20	<0.20	<0.1	<0.2	<0.05						
Fluorene	<0.20	<0.20	0.10	0.12	<0.05	6.1	6.0	1.9	4.8	3.8	0.24	<0.20	0.1	0.23	0.17						
Phenanthrene	<0.10	<0.10	0.10	0.11	0.10	11	13	3.1	10.5	7.48	0.31	0.23	0.1	0.41	0.25						
Anthracene	<0.10	<0.10	<0.1	<0.08	<0.01	1.5	1.8	0.4	1.45	0.99	<0.10	<0.10	<0.1	<0.2	0.07						
Fluoranthene	<0.20	<0.20	<0.1	<0.08	<0.01	2.2	2.4	1.0	4.76	3.07	<0.20	<0.20	<0.1	<0.2	0.17						
Pyrene	<0.20	<0.20	<0.1	<0.08	<0.01	1.6	1.6	0.8	1.05	<0.20	<0.20	<0.20	<0.1	<0.2	0.16						
Benz(a)anthracene	<0.10	<0.10	<0.05	<0.08	<0.05	0.29	0.29	0.11	1.09	<1.00	<0.10	<0.10	<0.05	<0.2	0.18						
Chrysene	<0.10	<0.10	<0.05	<0.08	<0.05	0.24	0.20	0.06	0.89	<1.00	<0.10	<0.10	<0.05	<0.2	0.18						
Benz(b)fluoranthene	<0.10	<0.10	<0.05	<0.08	<0.05	<0.10	0.11	0.07	0.36	<1.00	<0.10	<0.10	<0.05	<0.2	0.18						
Benz(k)fluoranthene	<0.10	<0.10	<0.01	<0.02	<0.01	0.22	0.23	0.08	0.585	<1.00	<0.10	<0.10	<0.01	0.091	0.11						
Indeno(1,2,3-cd)pyrene	<0.20	<0.20	<0.1	<0.08	<0.05	<0.20	<0.20	<0.1	0.36	<1.00	<0.20	<0.20	<0.1	<0.2	0.13						
Dibenz(a,h)anthracene	<0.20	<0.20	<0.1	<0.08	<0.05	<0.20	<0.20	<0.1	<0.2	<1.00	<0.20	<0.20	<0.1	<0.2	0.11						
Benz(g,h,i)perylene	<0.20	<0.20	<0.1	<0.08	<0.05	<0.20	<0.20	<0.1	0.44	<1.00	<0.20	<0.20	<0.1	<0.2	0.15						
Biphenyl	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.58						
2- and 1-methyl Naphthalene	2.8	3.1	2.0	3.72	4.32	15	14	5.7	11.29	14.8	4.4	3.2	1.3	2.99	2.09						

Notes:
 * Readings obtained on different date
 1. Organic Vapor Meter Reading - measured in ppm (parts per million by volume), calibrated to hexane
 2. Photoluminescence Detector Reading - measured in ppm (parts per million by volume), calibrated to isobutylene
 3. NS = No standard
 4. µg/L = Microgram per Liter
 5. RDL = Laboratory Reportable Detection Limit
 6. na = Not applicable
 7. nm = not measured
 8. Table 2 Standard = Ministry of Environment (MOE) Soil, Groundwater, and Sediment Standards, Part XV.1 Environment Protection Act, April 15, 2011 - full depth generic site condition standards for all types of land uses, potable groundwater condition, coarse textured soil
 9. ODWS = Ontario Drinking Water Standard, 2006
 10. Bold type and outlined indicates an exceedance of the MOE Table 2 site condition standard
 11. Shaded indicates an exceedance of the ODWS

Table 5
Groundwater Analytical Results
Polynuclear Aromatic Hydrocarbons
City of Barrie Historic Waste Sites Dymont's Creek

Monitoring Well Location	MW-D6		MW-D7		MW-D26		MW-D29	
	Sampling Date	Organic Vapor Meter Reading (ppm)	Sampling Date	Organic Vapor Meter Reading (ppm)	Sampling Date	Organic Vapor Meter Reading (ppm)	Sampling Date	Organic Vapor Meter Reading (ppm)
Parameter	Units	RDL	ODWS	PWQO	MOE Table 2 Standards	Field Duplicate of MW #2	Field Duplicate of MW-D7	Field Duplicate of MW-D29
Polycyclic Aromatic Hydrocarbons								
Naphthalene	µg/L	0.20	NS	7	11	<0.20	<0.20	<0.20
Acenaphthylene	µg/L	0.20	NS	NO	1	<0.20	<0.20	<0.20
Acenaphthene	µg/L	0.20	NS	NO	4.1	<0.20	<0.20	<0.20
Fluorene	µg/L	0.20	NS	0.2	120	<0.20	<0.20	<0.20
Phenanthrene	µg/L	0.10	NS	0.03	1	<0.10	<0.10	<0.10
Anthracene	µg/L	0.10	NS	0.0008	2.4	<0.10	<0.10	<0.10
Fluoranthene	µg/L	0.20	NS	0.0008	0.41	<0.20	<0.20	<0.20
Pyrene	µg/L	0.20	NS	NO	4.1	<0.20	<0.20	<0.20
Benz(a)anthracene	µg/L	0.20	NS	0.0004	1.0	<0.20	<0.20	<0.20
Chrysene	µg/L	0.10	NS	0.0001	0.1	<0.10	<0.10	<0.10
Benz(b)fluoranthene	µg/L	0.10	NS	NO	0.1	<0.10	<0.10	<0.10
Benz(k)fluoranthene	µg/L	0.10	NS	0.0002	0.1	<0.10	<0.10	<0.10
Benz(a)pyrene	µg/L	0.01	NS	NO	0.01	<0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	µg/L	0.20	NS	NO	0.2	<0.20	<0.20	<0.20
Dibenz(a,h)anthracene	µg/L	0.20	NS	0.0002	0.2	<0.20	<0.20	<0.20
Benz(g,h,i)perylene	µg/L	0.20	NS	0.00002	0.2	<0.20	<0.20	<0.20
Biphenyl	µg/L	0.05	NS	0.00002	0.05	-	-	-
2-and 1-methyl Naphthalene	µg/L	0.20	NS	2	3.2	<0.20	<0.20	<0.20

Notes:
 - Readings obtained on different date
 1. Organic Vapor Meter Reading - measured in ppm (parts per million by volume), calibrated to hexane
 2. Photoionization Detector Reading - measured in ppm (parts per million by volume), calibrated to isobutylene
 3. NS = No standard
 4. µg/L = Microgram per Liter
 5. RDL = Laboratory Reportable Detection Limit
 6. na = Not applicable
 7. nm = not measured
 8. Table 2 Standard = Ministry of Environment (MOE) Soil, Groundwater and Sediment Standards, Part XV.1 Environment Protection Act, April 15, 2011 - full depth generic site condition standards for all types of land uses, potable groundwater condition, coarse textured soil
 9. ODWS = Ontario Drinking Water Standard, 2006
 10. Bold type and outline indicates an exceedance of the MOE Table 2 site condition standard
 11. Shaded indicates an exceedance of the ODWS

Table 5
Groundwater Analytical Results
Polynuclear Aromatic Hydrocarbons
City of Barrie Historic Waste Sites Dymen's Creek

Monitoring Well Location	Field Blank 27-Jun-12	Field Blank 22-Apr-13	Field Blank 21-Aug-13	Field Blank 10-Dec-13	Field Blank 11-Dec-13	Field Blank 22-Apr-13	Field Blank 21-Aug-13	Field Blank 10-Dec-13	Field Blank 11-Dec-13	Trip Blank 21-Aug-13	Trip Blank 22-Apr-13
Parameter	Field Blank	Field Blank	Field Blank	Field Blank	Field Blank	Field Blank	Field Blank	Field Blank	Field Blank	Trip Blank	Trip Blank
Units	Field Blank	Field Blank	Field Blank	Field Blank	Field Blank	Field Blank	Field Blank	Field Blank	Field Blank	Trip Blank	Trip Blank
RDL	Field Blank	Field Blank	Field Blank	Field Blank	Field Blank	Field Blank	Field Blank	Field Blank	Field Blank	Trip Blank	Trip Blank
ODWS	Field Blank	Field Blank	Field Blank	Field Blank	Field Blank	Field Blank	Field Blank	Field Blank	Field Blank	Trip Blank	Trip Blank
PWQO	Field Blank	Field Blank	Field Blank	Field Blank	Field Blank	Field Blank	Field Blank	Field Blank	Field Blank	Trip Blank	Trip Blank
MOE Table 2 Standards	Field Blank	Field Blank	Field Blank	Field Blank	Field Blank	Field Blank	Field Blank	Field Blank	Field Blank	Trip Blank	Trip Blank
Polycyclic Aromatic Hydrocarbons											
Naphthalene	<0.20	<0.1	0.07	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.1	<0.05
Acenaphthylene	<0.20	<0.1	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.1	<0.05
Acenaphthene	<0.20	<0.1	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.1	<0.05
Fluorene	<0.20	<0.1	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.1	<0.05
Phenanthrene	<0.10	<0.1	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.1	<0.05
Anthracene	<0.10	<0.1	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.1	<0.05
Fluoranthene	<0.20	<0.1	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.1	<0.05
Pyrene	<0.20	<0.1	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.1	<0.05
Benzo(a)anthracene	<0.20	<0.1	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.1	<0.05
Chrysene	<0.10	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.1	<0.05
Benzo(k)fluoranthene	<0.10	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.1	<0.05
Benzo(b)fluoranthene	<0.10	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.1	<0.05
Benzo(a)pyrene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	<0.20	<0.1	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.1	<0.05
Dibenz(a,h)anthracene	<0.20	<0.1	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.1	<0.05
Benzo(g,h,i)perylene	<0.20	<0.1	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.1	<0.05
Biphenyl	0.05	-	-	<0.05	<0.05	-	-	<0.05	<0.05	-	-
2-and 1-methyl Naphthalene	<0.20	<0.2	<0.10	<0.10	<0.10	<0.2	<0.10	<0.10	<0.10	<0.2	0.23

Notes:
 * Readings obtained on different date
 1. Organic Vapour Meter Reading - measured in ppm (parts per million by volume), calibrated to hexane
 2. Photoionization Detector Reading - measured in ppm (parts per million by volume), calibrated to isobutylene
 3. NS = No standard
 4. µg/L = Microgram per Litre
 5. RDL = Laboratory Reportable Detection Limit
 6. na = Not applicable
 7. nm = not measured

8. Table 2 Standard = Ministry of Environment (MOE) "Soil, Groundwater, and Sediment Standards, Part XV.1 Environment Protection Act, April 15, 2011" - full depth generic site condition standards for all types of land uses, potable groundwater condition, coarse textured soil
 9. ODWS = Ontario Drinking Water Standard, 2006
 10. Bold type and outlined indicates an exceedance of the MOE Table 2 site condition standard
 11. Shaded indicates an exceedance of the ODWS

Table 6
Surface Water Analytical Results
Metals and Inorganics
City of Barrie Historic Waste Dymert's Creek

Monitoring Well Location	SWD1				SWD2				SWD3			
	8-Nov-12	23-Apr-13	23-Aug-13	11-Dec-13	8-Nov-12	23-Apr-13	23-Aug-13	11-Dec-13	8-Nov-12	23-Apr-13	23-Aug-13	11-Dec-13
Sampling Location	West of Bradford Street				West of Innisfil Street				South of John Street			
Parameter	Units	RDL	PWQO			Field Duplicate of SWD2						
Dissolved Metals												
Aluminum	mg/L	0.004	0.075	<0.004	0.04	0.06	0.007	<0.004	0.04	0.05	0.005	0.004
Antimony	mg/L	0.003	0.020	<0.003	<0.005	0.0002	<0.0005	<0.003	<0.005	0.0002	<0.0005	<0.0005
Arsenic	mg/L	0.003	0.1	<0.003	<0.001	0.0004	<0.001	<0.003	<0.001	0.0004	<0.001	<0.001
Barium	mg/L	0.002	NO	0.099	0.12	0.161	0.138	0.100	0.12	0.156	0.137	0.152
Beryllium	mg/L	0.001	0.011	<0.001	<0.0005	<0.0001	<0.0005	<0.001	<0.0005	<0.0001	<0.0005	<0.0005
Boron	mg/L	0.010	0.20	0.047	0.03	0.035	0.039	0.042	0.03	0.033	0.04	0.039
Cadmium	mg/L	0.0001	0.0002	<0.0001	<0.0001	0.00015	<0.0001	<0.0001	0.003	0.00018	<0.0001	<0.0001
Chromium	mg/L	0.003	NO	0.013	0.003	0.0027	0.006	0.009	0.003	0.0025	0.006	0.003
Cobalt	mg/L	0.0005	0.0009	<0.0005	0.0003	0.0002	<0.0005	<0.0005	0.0003	0.0001	<0.0005	<0.0005
Copper	mg/L	0.002	0.005	0.002	0.003	0.0086	0.0017	<0.002	0.003	0.011	0.0024	0.008
Iron	mg/L	0.010	0.3	0.904	1.35	1.14	1.35	0.784	1.60	1.02	1.49	1.02
Lead	mg/L	0.001	0.005	0.001	<0.001	0.00172	0.0002	0.089	<0.001	0.00355	0.0005	0.001
Manganese	mg/L	0.002	0.04	0.101	0.18	0.131	0.221	0.089	0.17	0.115	0.232	0.063
Molybdenum	mg/L	0.002	0.04	<0.002	<0.005	0.0015	0.0007	<0.002	<0.005	0.0015	0.0007	<0.002
Nickel	mg/L	0.003	0.025	<0.003	<0.005	<0.01	0.004	<0.003	<0.005	<0.01	0.004	<0.003
Selenium	mg/L	0.004	0.1	<0.004	<0.001	<0.0002	<0.001	<0.004	<0.001	<0.001	<0.001	<0.001
Silver	mg/L	0.0001	0.0001	<0.0001	0.695	0.616	<0.0001	<0.0001	0.740	0.596	0.678	0.652
Strontium	mg/L	0.0003	0.0003	<0.0003	<0.0001	<0.00005	<0.0001	<0.0003	<0.0001	<0.00005	<0.0001	<0.0001
Thallium	mg/L	0.002	NO	<0.002	<0.01	<0.005	<0.005	<0.002	<0.01	<0.005	<0.005	<0.005
Titanium	mg/L	0.010	0.03	<0.010	<0.005	0.01	<0.010	<0.010	<0.005	0.02	<0.010	<0.010
Tungsten	mg/L	0.002	0.005	<0.002	0.001	0.00125	0.0009	<0.002	0.001	0.0008	0.0009	0.0008
Vanadium	mg/L	0.002	0.005	0.003	0.001	0.0005	0.0039	0.004	0.001	0.0004	0.0038	0.003
Zinc	mg/L	0.005	0.03	0.019	<0.01	0.016	0.007	0.016	<0.01	0.014	0.007	0.008
Zirconium	mg/L	0.004	0.004	<0.004	<0.002	<0.003	<0.001	<0.004	<0.002	<0.004	<0.001	<0.001
Dissolved Mercury	mg/L	0.0001	0.0002	<0.0001	<0.0001	<0.00002	<0.0001	<0.0001	<0.0001	<0.00002	<0.0001	0.0030
Inorganics												
Electrical Conductivity	uS/cm	2	NO	1070	1460	1140	1610	1060	1450	1100	1560	1030
pH	pH Units	NA	6.5-8.5	8.29	7.94	7.51	7.62	8.33	7.92	7.49	7.67	8.33
Total Hardness (as CaCO3)	mg/L	0.5	NO	301	337	279	420	299	337	274	407	290
Alkalinity (as CaCO3)	mg/L	5	NO	264	276	216	318	259	274	227	327	255
Chloride	mg/L	0.10	NO	211	277	264	303	207	289	264	302	200
Sulphate	mg/L	0.10	NO	31.7	27	30	30	34.3	29	30	30	35.6
Ammonia as N	mg/L	0.02	NO	-	0.60	0.18	0.86	-	0.58	0.14	0.62	-
Calcium	mg/L	0.05	NO	103	117	99.3	145	102	117	93.6	140	99
Magnesium	mg/L	0.05	NO	10.7	11	11.2	13.6	10.7	11	10.6	13.7	10.4
Sodium	mg/L	0.05	NO	114	165	153	240	112	187	141	213	108
Potassium	mg/L	0.05	NO	3.46	3	3.40	4.43	3.96	3	3.30	4.22	4.04

- Notes:
1. NO = No objective
 2. mg/L = Milligrams per Liter
 3. RDL = Laboratory Reportable Detection Limit
 4. PWQO = Provincial Water Quality Objectives, July, 1994
 5. Bold type and shaded indicates an exceedance of the PWQO

Table 6
Surface Water Analytical Results
Metals and Inorganics
City of Barrie Historic Waste Dymont's Creek

Monitoring Well Location Sampling Date	SWD4 23-Aug-13		SWD4 11-Dec-13		SWD5 23-Aug-13		SWD5 11-Dec-13	
	Between Innisfil and Bradford Streets	Field Duplicate of SWD4	Between Innisfil and Bradford Streets	Field Duplicate of SWD4	Between John and Innisfil Streets	Field Duplicate of SWD4	Between John and Innisfil Streets	
Parameter	Units	RDL	PWQO					
Dissolved Metals								
Aluminum	mg/L	0.004	0.075	0.05	0.004	0.003	0.21	0.005
Antimony	mg/L	0.003	0.020	0.0002	<0.0005	<0.0005	0.0005	<0.0005
Arsenic	mg/L	0.003	0.1	0.0004	<0.001	<0.001	0.0008	<0.001
Barium	mg/L	0.002	NO	0.160	0.156	0.149	0.180	0.157
Beryllium	mg/L	0.001	0.011	<0.0001	<0.0005	<0.0005	<0.0001	<0.0005
Boron	mg/L	0.010	0.20	0.035	0.043	0.040	0.035	0.043
Cadmium	mg/L	0.001	0.0002	0.00008	<0.0001	<0.0001	0.00046	<0.0001
Chromium	mg/L	0.003	NO	0.009	0.004	0.004	0.0048	0.004
Cobalt	mg/L	0.005	0.0009	0.0001	<0.0005	<0.0005	0.0005	<0.0005
Copper	mg/L	0.002	0.005	0.0093	0.0018	0.0015	0.0256	0.0024
Iron	mg/L	0.010	0.3	1.05	1.34	1.34	4.42	1.34
Lead	mg/L	0.001	0.005	0.00143	<0.0001	0.0001	0.0105	0.0006
Manganese	mg/L	0.002	NO	0.126	0.242	0.238	0.383	0.215
Molybdenum	mg/L	0.002	0.04	0.0024	0.0006	0.0007	0.0016	0.0006
Nickel	mg/L	0.003	0.025	<0.01	0.003	0.003	<0.01	0.003
Selenium	mg/L	0.004	0.1	<0.001	<0.001	<0.001	<0.001	<0.001
Silver	mg/L	0.001	0.0001	<0.00002	<0.0001	<0.0001	0.00004	<0.0001
Strontium	mg/L	0.005	NO	0.643	0.767	0.752	0.641	0.754
Thallium	mg/L	0.003	0.0003	<0.00005	<0.0001	<0.0001	<0.00005	<0.0001
Titanium	mg/L	0.002	NO	<0.005	<0.005	<0.005	0.026	<0.005
Tungsten	mg/L	0.010	0.03	0.01	<0.010	<0.010	0.01	<0.010
Uranium	mg/L	0.002	0.005	0.00089	0.0008	0.0009	0.00093	0.0008
Vanadium	mg/L	0.002	0.005	0.0005	0.0033	0.0025	0.0022	0.0032
Zinc	mg/L	0.005	0.03	0.014	0.006	<0.005	0.059	0.007
Zirconium	mg/L	0.004	0.004	<0.003	<0.001	<0.001	<0.003	<0.001
Dissolved Mercury	mg/L	0.0001	0.0002	<0.00002	0.0002	0.0009	<0.00002	0.0002
Inorganics								
Electrical Conductivity	uS/cm	2	NO	1120	1420	1570	1060	1550
pH	pH Units	NA	6.5-8.5	7.55	7.63	7.68	7.47	7.71
Total Hardness (as CaCO3)	mg/L	0.5	NO	275	412	409	296	412
Alkalinity (as CaCO3)	mg/L	5	NO	229	326	325	219	319
Chloride	mg/L	0.10	NO	242	318	328	218	311
Sulphate	mg/L	0.10	NO	30	40	30	30	40
Ammonia as N	mg/L	0.02	NO	0.14	0.66	0.88	0.07	0.48
Calcium	mg/L	0.05	NO	99.1	143	142	106	144
Magnesium	mg/L	0.05	NO	11.2	13.4	13.1	11.6	12.9
Sodium	mg/L	0.05	NO	151	230	229	139	226
Potassium	mg/L	0.05	NO	3.5	4.29	4.17	3.5	4.19

Notes:
 1. NO = No objective
 2. mg/L = Milligrams per Litre
 3. RDL = Laboratory Reportable Deflection Limit
 4. PWQO = Provincial Water Quality Objectives, July, 1994
 5. Bold type and shaded indicates an exceedance of the PWQO

Table 7
Surface Water Analytical Results
VOC and Petroleum Hydrocarbons
City of Barris Historic Waste Sites Dymen's Creek

Parameter	Units	RDL	PWQO	CITY-1 5-Jun-13 NW of Anne and John Streets	CITY-2 5-Jun-13 East of Inisfil Street	CITY-3 5-Jun-13 East of Bradford Street
VOC						
Acetone	µg/L	1.0	NO	<50	<50	<50
Benzene	µg/L	0.20	100	<0.5	<0.5	<0.5
Bromodichloromethane	µg/L	0.20	200	<0.3	<0.3	<0.3
Bromoform	µg/L	0.10	60	<0.4	<0.4	<0.4
Bromomethane	µg/L	0.20	0.9	<0.5	<0.5	<0.5
Carbon Tetrachloride	µg/L	0.20	NO	<0.2	<0.2	<0.2
Chlorobenzene	µg/L	0.10	15	<0.2	<0.2	<0.2
Chloroethane	µg/L	0.20	NO	<0.2	<0.2	<0.2
Chloroform	µg/L	0.20	NO	<0.5	<0.5	<0.5
Chloromethane	µg/L	0.40	700	<0.2	<0.2	<0.2
Dibromochloromethane	µg/L	0.10	40	<0.3	<0.3	<0.3
1,2-Dichlorobenzene	µg/L	0.10	2.5	<0.4	<0.4	<0.4
1,3-Dichlorobenzene	µg/L	0.10	2.5	<0.4	<0.4	<0.4
1,4-Dichlorobenzene	µg/L	0.10	4	<0.4	<0.4	<0.4
Dichlorodifluoromethane	µg/L	0.20	NO	<0.5	<0.5	<0.5
1,1-Dichloroethane	µg/L	0.30	200	<0.4	<0.4	<0.4
1,2-Dichloroethane	µg/L	0.20	100	<0.2	<0.2	<0.2
1,1-Dichloroethylene	µg/L	0.30	40	<0.5	<0.5	<0.5
Cis-1,2-Dichloroethylene	µg/L	0.20	200	<0.4	<0.4	<0.4
trans-1,2-Dichloroethylene	µg/L	0.20	200	<0.4	<0.4	<0.4
1,2-Dichloropropane	µg/L	0.7	NO	<0.5	<0.5	<0.5
1,3-Dichloropropane (Cis + Trans)	µg/L	0.30	NO	<0.4	<0.4	<0.4
Ethylbenzene	µg/L	0.10	8	<0.5	<0.5	<0.5
Ethylene Dibromide	µg/L	0.10	5	<0.2	<0.2	<0.2
n-Hexane	µg/L	0.20	NO	<5	<5	<5
Methylene Chloride	µg/L	0.30	100	<4.0	<4.0	<4.0
Methyl Isobutyl Ketone	µg/L	1.0	NO	<10	<10	<10
Methyl Ethyl Ketone	µg/L	1.0	400	<10	<10	<10
Methyl tert-butyl ether	µg/L	0.20	200	<10	<10	<10
Styrene	µg/L	0.10	4	<0.5	<0.5	<0.5
1,1,1,2-Tetrachloroethane	µg/L	0.10	20	<0.5	<0.5	<0.5
1,1,2,2-Tetrachloroethane	µg/L	0.10	70	<0.5	<0.5	<0.5
Tetrachloroethylene	µg/L	0.20	50	<0.3	<0.3	<0.3
Toluene	µg/L	0.20	0.8	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	µg/L	0.30	10	<0.4	<0.4	<0.4
1,1,2-Trichloroethane	µg/L	0.20	800	<0.4	<0.4	<0.4
1,3,5-Trimethylbenzene	µg/L	0.3	3	<0.3	<0.3	<0.3
Trichloroethylene	µg/L	0.20	20	<0.3	7.6	3.9
Vinyl Chloride	µg/L	0.17	600	<0.2	0.2	<0.2
m & p-Xylene	µg/L	0.20	32	<0.5	<0.5	<0.5
o-Xylene	µg/L	0.10	40	<0.5	<0.5	<0.5
Xylene Mixture (Total)	µg/L	0.20	NO	<1.0	<1.0	<1.0
Trichlorofluoromethane	µg/L	0.40	NO	<0.5	<0.5	<0.5
Petroleum Hydrocarbons						
F1-BTEX (C6-C10)	mg/L	0.1	NO	<0.1	<0.1	<0.1
F2 (C10-C16)	mg/L	0.1	NO	<0.1	<0.1	<0.1
F3 (C18-C34)	mg/L	0.2	NO	<0.2	<0.2	<0.2
F4 (C34-C50)	mg/L	0.2	NO	<0.2	<0.2	<0.2

Notes:
 1. NO = No objective
 2. µg/L = Microgram per Liter
 4. RDL = Laboratory Reportable Detection Limit
 5. PWQO = Provincial Water Quality Objectives, July, 1994
 6. Bold type and shaded indicates an exceedance of the PWQO

Prepared by: [Signature]
 Checked by: S.M.P.

Table 8
Surface Water Analytical Results
Polynuclear Aromatic Hydrocarbons
City of Barrie Historic Waste Sites Dymont's Creek

Surface Water Location	SWD1			SWD2			SWD3					
	West of Bradford Street	West of Inisfil Street	South of John Street	West of Inisfil Street	Field Duplicate of SWD2	23-Aug-13	11-Dec-13	23-Apr-13	23-Apr-13	11-Dec-13		
Sampling Date	23-Apr-13	23-Aug-13	11-Dec-13	23-Apr-13	Field Duplicate of SWD2	23-Aug-13	11-Dec-13	23-Apr-13	23-Apr-13	11-Dec-13		
Parameter	Units	RDL	PWQO	Units	RDL	PWQO	Units	RDL	PWQO	Units	RDL	PWQO
VOC												
Naphthalene	ug/L	0.1	7	<0.1	<0.1	<0.7	<0.05	<0.1	<0.05	<0.05	<0.05	
Acenaphthylene	ug/L	0.1	NO	<0.1	<0.1	<0.7	<0.05	<0.1	<0.05	<0.05		
Acenaphthene	ug/L	0.1	NO	<0.1	<0.1	<0.7	<0.05	<0.1	<0.05	<0.05		
Fluorene	ug/L	0.1	0.2	<0.1	<0.1	<0.7	<0.05	<0.1	<0.05	<0.05		
Phenanthrene	ug/L	0.1	0.03	<0.1	<0.1	<0.7	<0.05	<0.1	<0.05	<0.05		
Anthracene	ug/L	0.1	0.0008	<0.1	<0.1	<0.7	<0.01	<0.1	<0.05	<0.01		
Fluoranthene	ug/L	0.1	0.0008	<0.1	<0.1	0.85	<0.01	<0.1	<0.05	<0.01		
Pyrene	ug/L	0.1	NO	<0.1	<0.1	<0.7	<0.01	<0.1	<0.05	<0.01		
Benzof(a)anthracene	ug/L	0.1	0.0004	<0.1	<0.1	<0.7	<0.01	<0.1	<0.05	<0.01		
Chrysene	ug/L	0.05	0.0001	<0.05	<0.05	<0.7	<0.05	<0.05	<0.05	<0.05		
Benzof(b)fluoranthene	ug/L	0.05	NO	<0.05	<0.05	<0.7	<0.05	<0.05	<0.05	<0.05		
Benzof(k)fluoranthene	ug/L	0.05	0.0002	<0.05	<0.05	<0.7	<0.05	<0.05	<0.05	<0.05		
Benzof(a)pyrene	ug/L	0.01	NO	<0.01	<0.01	<0.1	<0.01	<0.01	<0.01	<0.01		
Indeno(1,2,3-c,d)pyrene	ug/L	0.1	NO	<0.1	<0.1	<0.7	<0.05	<0.1	<0.05	<0.05		
Dibenzo(a,h)anthracene	ug/L	0.1	0.002	<0.1	<0.1	<0.7	<0.05	<0.1	<0.05	<0.05		
Benzof(g,h,i)perylene	ug/L	0.1	0.00002	<0.1	<0.1	<0.7	<0.05	<0.1	<0.05	<0.05		
Biphenyl	ug/L	0.05	0.2	-	-	-	<0.05	-	<0.05	<0.05		
1-methylnaphthalene	ug/L	0.1	2	<0.1	<0.1	<0.7	<0.05	<0.1	<0.05	<0.05		
2-methylnaphthalene	ug/L	0.1	2	<0.1	<0.1	<0.7	<0.05	<0.1	<0.05	<0.05		

Notes:

1. NO = No objective
2. ug/L = Microgram per Litre
4. RDL = Laboratory Reportable Detection Limit
5. PWQO = Provincial Water Quality Objectives, July, 1994
6. Bold type and shaded indicates an exceedance of the PWQO
7. Italicized indicates the RDL is above the PWQO

Table 8
 Surface Water Analytical Results
 Polynuclear Aromatic Hydrocarbons
 City of Barrie Historic Waste Sites Dymont's Creek

Surface Water Location Sampling Location Sampling Date Parameter Units RDL PWQO	SWD4		SWD5 Between John and Innisfil Streets
	Between Innisfil and Bradford Streets		
	23-Apr-13	11-Dec-13 Field Duplicate of SWD4	
VOC			
Naphthalene	ug/L	0.1	7
Acenaphthylene	ug/L	0.1	NO
Acenaphthene	ug/L	0.1	NO
Fluorene	ug/L	0.1	0.2
Phenanthrene	ug/L	0.1	0.03
Anthracene	ug/L	0.1	0.0008
Fluoranthene	ug/L	0.1	0.0008
Pyrene	ug/L	0.1	NO
Benzo(a)anthracene	ug/L	0.1	0.0004
Chrysene	ug/L	0.05	0.0001
Benzo(b)fluoranthene	ug/L	0.05	NO
Benzo(k)fluoranthene	ug/L	0.05	0.0002
Benzo(a)pyrene	ug/L	0.01	NO
Indeno(1,2,3-c,d)pyrene	ug/L	0.1	NO
Dibenzo(a,h)anthracene	ug/L	0.1	0.002
Benzo(g,h,i)perylene	ug/L	0.1	0.00002
Biphenyl	ug/L	0.05	0.2
1-methylnaphthalene	ug/L	0.1	2
2-methylnaphthalene	ug/L	0.1	2

Notes:

1. NO = No objective
2. ug/L = Microgram per Litre
4. RDL = Laboratory Reportable Detection Limit
5. PWQO = Provincial Water Quality Objectives, July, 1994
6. Bold type and shaded indicates an exceedance of the PWQO
7. Italicized indicates the RDL is above the PWQO

Prepared by: *SMK*
 Checked by: *SMK*



APPENDIX A

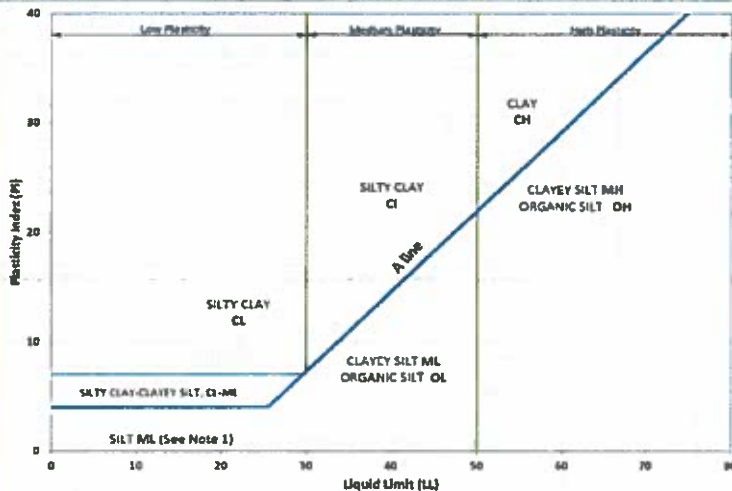
Record of Borehole Log Sheets



METHOD OF SOIL CLASSIFICATION

The Golder Associates Ltd. Soil Classification System is based on the Unified Soil Classification System (USCS)

Organic or Inorganic	Soil Group	Type of Soil	Gradation on Plasticity	$\frac{D_{60}}{D_{10}}$		Organic Content	USCS Group Symbol	Group Name				
				≤ 4	≥ 4							
INORGANIC (Organic Content $\leq 30\%$ by mass)	COARSE-GRAINED SOILS ($>50\%$ by mass is larger than 0.075 mm)	GRAVELS ($>50\%$ by mass of coarse fraction is larger than 4.75 mm)	Poorly Graded	≤ 4	≤ 1 or ≥ 3	$\leq 30\%$	GP	GRAVEL				
			Well Graded	≥ 4	1 to 3		GW	GRAVEL				
			Below A Line		n/a		GM	SILTY GRAVEL				
			Above A Line		n/a		GC	CLAYEY GRAVEL				
		SANDS ($\geq 50\%$ by mass of coarse fraction is smaller than 4.75 mm)	Poorly Graded	≤ 6	≤ 1 or ≥ 3		SP	SAND				
			Well Graded	≥ 6	1 to 3		SW	SAND				
			Below A Line		n/a		SM	SILTY SAND				
			Above A Line		n/a		SC	CLAYEY SAND				
			Laboratory Tests		Field Indicators			Organic Content	USCS Group Symbol	Primary Name		
					Dilatancy		Dry Strength				Shine Test	Thread Diameter
INORGANIC (Organic Content $\leq 30\%$ by mass)	FINE-GRAINED SOILS ($\geq 50\%$ by mass is smaller than 0.075 mm)	SILTS (Non-Plastic or PI and LL plot below A-Line on Plasticity Chart below)	Liquid Limit < 50	Rapid	None	None	> 6 mm	N/A (can't roll 3 mm thread)	$< 5\%$	ML	SILT	
				Slow	None to Low	Dull	3mm to 6 mm	None to low	$< 5\%$	ML	CLAYEY SILT	
			Liquid Limit ≥ 50	Slow to very slow	Low to medium	Dull to slight	3mm to 6 mm	Low	5% to 30%	OL	ORGANIC SILT	
				Slow to very slow	Low to medium	Slight	3mm to 6 mm	Low to medium	$< 5\%$	MH	CLAYEY SILT	
				None	Medium to high	Dull to slight	1 mm to 3 mm	Medium to high	5% to 30%	OH	ORGANIC SILT	
		CLAYS (PI and LL plot above A-Line on Plasticity Chart below)	Liquid Limit < 30	None	Low to medium	Slight to shiny	≈ 3 mm	Low to medium	0% to 30%	CL	SILTY CLAY	
			Liquid Limit 30 to 50	None	Medium to high	Slight to shiny	1 mm to 3 mm	Medium	0% to 30%	CI	SILTY CLAY	
			Liquid Limit ≥ 50	None	High	Shiny	< 1 mm	High	(see Note 2)	CH	CLAY	
		HIGHLY ORGANIC SOILS (Organic Content $> 30\%$ by mass)	Peat and mineral soil mixtures							30% to 75%	PT	SILTY PEAT, SANDY PEAT
			Predominantly peat, may contain some mineral soil, fibrous or amorphous peat							75% to 100%		PEAT



Note 1 - Fine grained materials with PI and LL that plot in this area are named (ML) SILT with slight plasticity. Fine-grained materials which are non-plastic (i.e. a PL cannot be measured) are named SILT.
 Note 2 - For soils with $< 5\%$ organic content, include the descriptor "trace organics" for soils with between 5% and 30% organic content include the prefix "organic" before the Primary name.

Dual Symbol — A dual symbol is two symbols separated by a hyphen, for example, GP-GM, SW-SC and CL-ML. For non-cohesive soils, the dual symbols must be used when the soil has between 5% and 12% fines (i.e. to identify transitional material between "clean" and "dirty" sand or gravel).

For cohesive soils, the dual symbol must be used when the liquid limit and plasticity index values plot in the CL-ML area of the plasticity chart (see Plasticity Chart at left).

Borderline Symbol — A borderline symbol is two symbols separated by a slash, for example, CL/CI, GM/SM, CL/ML. A borderline symbol should be used to indicate that the soil has been identified as having properties that are on the transition between similar materials. In addition, a borderline symbol may be used to indicate a range of similar soil types within a stratum.



ABBREVIATIONS AND TERMS USED ON RECORDS OF BOREHOLES AND TEST PITS

PARTICLE SIZES OF CONSTITUENTS

Soil Constituent	Particle Size Description	Millimetres	Inches (US Std. Sieve Size)
BOULDERS	Not Applicable	>300	>12
COBBLES	Not Applicable	75 to 300	3 to 12
GRAVEL	Coarse	19 to 75	0.75 to 3
	Fine	4.75 to 19	(4) to 0.75
SAND	Coarse	2.00 to 4.75	(10) to (4)
	Medium	0.425 to 2.00	(40) to (10)
	Fine	0.075 to 0.425	(200) to (40)
SILT/CLAY	Classified by plasticity	<0.075	< (200)

MODIFIERS FOR SECONDARY AND MINOR CONSTITUENTS

Percentage by Mass	Modifier
>35	Use 'and' to combine major constituents (i.e., SAND and GRAVEL, SAND and CLAY)
> 12 to 35	Primary soil name prefixed with "gravelly, sandy, SILTY, CLAYEY" as applicable
> 5 to 12	some
≤ 5	trace

PENETRATION RESISTANCE

Standard Penetration Resistance (SPT), N:

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

Cone Penetration Test (CPT)

An electronic cone penetrometer with a 60° conical tip and a project end area of 10 cm² pushed through ground at a penetration rate of 2 cm/s. Measurements of tip resistance (q_t), porewater pressure (u) and sleeve frictions are recorded electronically at 25 mm penetration intervals.

Dynamic Cone Penetration Resistance (DCPT); N_d:

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

PH: Sampler advanced by hydraulic pressure

PM: Sampler advanced by manual pressure

WH: Sampler advanced by static weight of hammer

WR: Sampler advanced by weight of sampler and rod

SAMPLES

AS	Auger sample
BS	Block sample
CS	Chunk sample
DO or DP	Seamless open ended, driven or pushed tube sampler – note size
DS	Denison type sample
FS	Foil sample
RC	Rock core
SC	Soil core
SS	Split spoon sampler – note size
ST	Slotted tube
TO	Thin-walled, open – note size
TP	Thin-walled, piston – note size
WS	Wash sample

SOIL TESTS

w	water content
PL, w _p	plastic limit
LL, w _L	liquid limit
C	consolidation (oedometer) test
CHEM	chemical analysis (refer to text)
CID	consolidated isotropically drained triaxial test ¹
CIU	consolidated isotropically undrained triaxial test with porewater pressure measurement ¹
D _r	relative density (specific gravity, G _s)
DS	direct shear test
GS	specific gravity
M	sieve analysis for particle size
MH	combined sieve and hydrometer (H) analysis
MPC	Modified Proctor compaction test
SPC	Standard Proctor compaction test
OC	organic content test
SO ₄	concentration of water-soluble sulphates
UC	unconfined compression test
UU	unconsolidated undrained triaxial test
V (FV)	field vane (LV-laboratory vane test)
γ	unit weight

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

NON-COHESIVE (COHESIONLESS) SOILS

Compactness²

Term	SPT 'N' (blows/0.3m) ¹
Very Loose	0 - 4
Loose	4 to 10
Compact	10 to 30
Dense	30 to 50
Very Dense	>50

1. SPT 'N' in accordance with ASTM D1586, uncorrected for overburden pressure effects.

2. Definition of compactness descriptions based on SPT 'N' ranges from Terzaghi and Peck (1967) and correspond to typical average N₆₀ values.

Field Moisture Condition

Term	Description
Dry	Soil flows freely through fingers.
Moist	Soils are darker than in the dry condition and may feel cool.
Wet	As moist, but with free water forming on hands when handled.

COHESIVE SOILS

Consistency

Term	Undrained Shear Strength (kPa)	SPT 'N' (blows/0.3m)
Very Soft	<12	0 to 2
Soft	12 to 25	2 to 4
Firm	25 to 50	4 to 8
Stiff	50 to 100	8 to 15
Very Stiff	100 to 200	15 to 30
Hard	>200	>30

1. SPT 'N' in accordance with ASTM D1586, uncorrected for overburden pressure effects; approximate only.

Water Content

Term	Description
w < PL	Material is estimated to be drier than the Plastic Limit.
w ~ PL	Material is estimated to be close to the Plastic Limit.
w > PL	Material is estimated to be wetter than the Plastic Limit.



LIST OF SYMBOLS

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

I. GENERAL

π	3.1416
$\ln x$	natural logarithm of x
$\log_{10} x$	x or log x, logarithm of x to base 10
g	acceleration due to gravity
t	time

II. STRESS AND STRAIN

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

III. SOIL PROPERTIES

(a) Index Properties

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

(a) Index Properties (continued)

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

(b) Hydraulic Properties

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

(c) Consolidation (one-dimensional)

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

(d) Shear Strength

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

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

Notes: 1
2

$\tau = c' + \sigma' \tan \phi'$
shear strength = (compressive strength)/2



LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY

WEATHERINGS STATE

Fresh: no visible sign of weathering

Faintly weathered: weathering limited to the surface of major discontinuities.

Slightly weathered: penetrative weathering developed on open discontinuity surfaces but only slight weathering of rock material.

Moderately weathered: weathering extends throughout the rock mass but the rock material is not friable.

Highly weathered: weathering extends throughout rock mass and the rock material is partly friable.

Completely weathered: rock is wholly decomposed and in a friable condition but the rock and structure are preserved.

BEDDING THICKNESS

Description	Bedding Plane Spacing
Very thickly bedded	Greater than 2 m
Thickly bedded	0.6 m to 2 m
Medium bedded	0.2 m to 0.6 m
Thinly bedded	60 mm to 0.2 m
Very thinly bedded	20 mm to 60 mm
Laminated	6 mm to 20 mm
Thinly laminated	Less than 6 mm

JOINT OR FOLIATION SPACING

Description	Spacing
Very wide	Greater than 3 m
Wide	1 m to 3 m
Moderately close	0.3 m to 1 m
Close	50 mm to 300 mm
Very close	Less than 50 mm

GRAIN SIZE

Term	Size*
Very Coarse Grained	Greater than 60 mm
Coarse Grained	2 mm to 60 mm
Medium Grained	60 microns to 2 mm
Fine Grained	2 microns to 60 microns
Very Fine Grained	Less than 2 microns

Note: * Grains greater than 60 microns diameter are visible to the naked eye.

CORE CONDITION

Total Core Recovery (TCR)

The percentage of solid drill core recovered regardless of quality or length, measured relative to the length of the total core run.

Solid Core Recovery (SCR)

The percentage of solid drill core, regardless of length, recovered at full diameter, measured relative to the length of the total core run.

Rock Quality Designation (RQD)

The percentage of solid drill core, greater than 100 mm length, recovered at full diameter, measured relative to the length of the total core run. RQD varied from 0% for completely broken core to 100% for core in solid sticks.

DISCONTINUITY DATA

Fracture Index

A count of the number of discontinuities (physical separations) in the rock core, including both naturally occurring fractures and mechanically induced breaks caused by drilling.

Dip with Respect to Core Axis

The angle of the discontinuity relative to the axis (length) of the core. In a vertical borehole a discontinuity with a 90° angle is horizontal.

Description and Notes

An abbreviation description of the discontinuities, whether naturally occurring separations such as fractures, bedding planes and foliation planes or mechanically induced features caused by drilling such as ground or shattered core and mechanically separated bedding or foliation surfaces. Additional information concerning the nature of fracture surfaces and infillings are also noted.

Abbreviations

JN Joint	PL Planar
FLT Fault	CU Curved
SH Shear	UN Undulating
VN Vein	IR Irregular
FR Fracture	K Slickensided
SY Stylolite	PO Polished
BD Bedding	SM Smooth
FO Foliation	SR Slightly Rough
CO Contact	RO Rough
AXJ Axial Joint	VR Very Rough
KV Karstic Void	
MB Mechanical Break	

PROJECT: 11-1170-0043
 LOCATION: N 4914725.0 ; E 603574.0

RECORD OF BOREHOLE: GP-D20

SHEET 1 OF 1
 BORING DATE: 18-July-2013
 DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		CH4 (METHANE) (PPM)				ADDITIONAL LAB. TESTING	PIEZOMETER DETAILS		
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	PHOTO IONIZATION DETECTOR (PPM)				NOTE:	MP Elevation (masl)	
							40	80	120				160
0	2" Direct Push Geoprobe, Installation with 8 1/4" Hollow Stem Augers 18-July-2013	GROUND SURFACE		227.25								GP-D20 228.16	
		TOPSOIL		0.05									
		Damp, brown, fine to medium sand, trace silt, trace organics (FILL)				1	DO						Cement with steel casing
1			Damp, orangish brown, fine to medium SAND, trace silt		228.18								Bentonite
			Damp, brown, fine to medium SAND, trace silt		1.07								
			Damp, brown, fine to medium SAND, trace silt		1.22								#1 Silica Sand
2			Moist, brown, laminated, fine to medium SAND, trace silt		225.42								
					1.83		2	DO					
3			Moist to wet, brownish grey, laminated, fine to medium SAND, trace silt Medium sand lensing at 3.05 m		224.41								
					2.84								10 Slot PVC Screen
4		Wet at 3.81 m				3	DO						
				222.88									
5		End of Borehole		4.57									

BAR ENV SIMPLE 111170043LOGPHASE III.GPJ GAL-CANADAGDT 3-5-14 STB

DEPTH SCALE
1 : 50



LOGGED: JTF
CHECKED: SMF

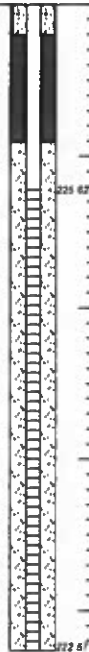
PROJECT: 11-1170-0043
 LOCATION: N 4914801.0 ; E 603689.0

RECORD OF BOREHOLE: GP-D21

SHEET 1 OF 1
 DATUM: Geodetic

BORING DATE: 18-July-2013

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		CH4 (METHANE) (PPM)				ADDITIONAL LAB. TESTING	PIEZOMETER DETAILS		
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	PHOTO IONIZATION DETECTOR (PPM)					
								40	80			120	160
0		GROUND SURFACE		226.84								MP Elevation (mash)	
		TOPSOIL Damp, dark brown, sand, trace gravel, trace silt, trace rootlets (FILL)		0.00 0.08									
1	2" Direct Push Geoprobe, Installation with 8 1/4" Hollow Stem Augers 18-July-2013	Damp, brown, fine to medium, SAND, trace silt		225.82 1.02	1	DO	⊕						
		Damp to wet, brown, laminated, fine to medium SAND, trace silt		225.47 1.37									
2					2	DO	⊕						
3													
4		Wet at 3.66 m			3	DO	⊕						
5		End of Borehole		222.27 4.57									



BAR ENV SIMPLE 111170043LOGPHASE III.GPJ GAL-CANADA.GDT 3-5-14 STB

DEPTH SCALE
 1 : 50



LOGGED: JTF
 CHECKED: SMF

PROJECT: 11-1170-0043
 LOCATION: N 4914767.0 ;E 603727.0

RECORD OF BOREHOLE: GP-D22

SHEET 1 OF 1
 BORING DATE: 16-July-2013
 DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		CH ₄ (METHANE) [PPM]				ADDITIONAL LAB. TESTING	PIEZOMETER DETAILS	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	PHOTO IONIZATION DETECTOR [PPM]					
							40	80	120			160
0		GROUND SURFACE		227.15								
		ASPHALT		0.00								
		Damp, dark brown, fine to medium sand, some gravel, trace silt (FILL)		0.08								
1	2" Direct Push Geoprobe, Installation with 8 1/4" Hollow Stem Augers 16-July-2013	Damp, orangish brown, SAND, trace silt		226.53	1	DO					450	Cement with steel casing
				0.62								Bentonite
					225.78							#1 Silica Sand
2		Moist to wet, brown, laminated, fine to medium SAND, trace silt		1.37							320	
3					2	DO						
4												
5		End of Borehole		222.58							270	10 Slot PVC Screen
				4.57								

BAR ENV_SIMPLE 1111770043.LOGPHASE_III.GPJ GAL-CANADA.GDT 3-5-14 STB

DEPTH SCALE

1 : 50



LOGGED: JTF
 CHECKED: SMF

PROJECT: 11-1170-0043
 LOCATION: N 4914721.0 ; E 603723.0

RECORD OF BOREHOLE: GP-D23

SHEET 1 OF 1
 BORING DATE: 16-July-2013
 DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		CH ₄ (METHANE) [PPM]				ADDITIONAL LAB. TESTING	PIEZOMETER DETAILS	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	PHOTO IONIZATION DETECTOR [PPM]					
							40	80	120			160
0	2" Direct Push Geoprobe, installation with 8 1/4" Hollow Stem Augers 16-July-2013	GROUND SURFACE		225.93							NOTE: GP-D23 MP Elevation (masl) Cement with steel casing Bentonite #1 Silica Sand 10 Slot PVC Screen	
		ASPHALT		0.00								
		Damp, dark brown, sand, some gravel, trace silt, trace asphalt debris (FILL)		0.08								
				225.32								
1		Damp, orangish brown, fine to medium SAND, trace silt		0.61	1	DO						⊕400
		Damp to wet, brown, laminated, fine to medium SAND, trace silt		225.02								
				0.91								
2					2	DO						⊕320
3												
4			Silt lensing from 3.96 m to 4.57 m			3	DO					⊕260
				221.36								
5		End of Borehole		4.57								
6												
7												
8												
9												
10												

BAR ENV SIMPLE 1111770043LOGPHASE III.GPJ GAL-CANADA.GDT 3-5-14 STB

DEPTH SCALE
 1 : 50



LOGGED: JTF
 CHECKED: SMF

PROJECT: 11-1170-0043
 LOCATION: N 4914757.0 :E 603778.0

RECORD OF BOREHOLE: GP-D24

SHEET 1 OF 1
 DATUM: Geodetic

BORING DATE: 17-July-2013

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		CH4 (METHANE) [PPM]				ADDITIONAL LAB. TESTING	PIEZOMETER DETAILS
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER TYPE	40	80	120	160		
0	Direct Push Geoprobez® Direct Push Geoprobe, Installation with 8 1/4" Hollow Stem 2" Direct Push Geoprobe, Installation with 8 1/4" Hollow Stem Augers 17-July-2013	GROUND SURFACE		227.00							NOTE: GP-D24 MP Elevation (mas) Cement with steel casing Bentonite #1 Silica Sand 10 Slot PVC Screen
		ASPHALT		0.05							
		Damp, dark brown, sand, some gravel, trace silt (FILL)		226.64							
		Damp, orangish brown, fine to medium SAND, trace silt		0.38							
		Damp, brown, fine to medium SAND, trace silt		0.46	1	DO	⊕				
1		Damp to wet, brown, laminated, fine to medium SAND, trace silt		226.24							
				0.76							
2					2	DO	⊕ □				
3											
4		Water table at 3.96 m			3	DO	⊕ □				
5											
				221.51	4	DO	□			⊕	
		Wet, brown, laminated, SAND, trace silt, silt tensing noted		5.49							
6				220.90							
		End of Borehole		6.10							
7											
8											
9											
10											

BAR ENV SIMPLE 1111770043LOGPHASE III.GPJ GAL-CANADA.GDT 3-5-14 STB

DEPTH SCALE
 1:50



LOGGED: JTF
 CHECKED: SMF

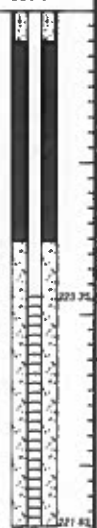
PROJECT: 11-1170-0043
 LOCATION: N 4914880.0 E 603989.0

RECORD OF BOREHOLE: GP-D25

SHEET 1 OF 1
 DATUM: Geodetic

BORING DATE: 23-July-2013

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				ADDITIONAL LAB. TESTING	PIEZOMETER DETAILS			
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH Cu, kPa				NOTE:	GP-D25	
								20	40		60			80
0	Daylighting 23-July-2013	GROUND SURFACE		225.23								MP Elevation (mss)	226.31	
0		Daylighted, No Sample recovered		0.00										
1														
2														
3														
3.40		End of Borehole		221.83										
4				3.40										
5														
6														
7														
8														
9														
10														



BAR ENV_SIMPLE 1111770043 LOGPHASE III.GPJ GAL-CANADA.GDT 3-5-14 STB

DEPTH SCALE
1 : 50



LOGGED: JTF
 CHECKED: SMF

PROJECT: 11-1170-0043
 LOCATION: N 4914744.0 ; E 603956.0

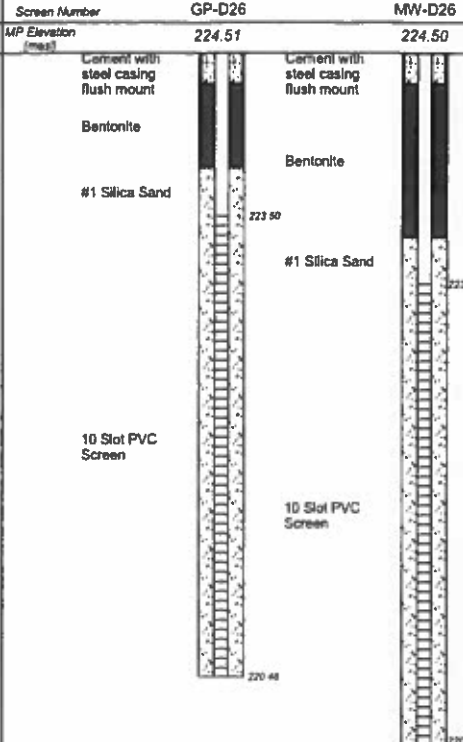
RECORD OF BOREHOLE: MW / GP-D26

SHEET 1 OF 1
 DATUM: Geodetic

BORING DATE: 25-July-2013

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		CH4 (METHANE) (PPM)				ADDITIONAL LAB. TESTING	PIEZOMETER DETAILS				
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	40	80		120	160	Screen Number	MP Elevation (m)	
0	2" Direct Push Geoprobe, Installation with 8 1/4" Hollow Stem Augers 25-July-2013	GROUND SURFACE		224.57								GP-D26	224.51	MW-D26	224.50
		ASPHALT		0.00											
		Damp, brown, fine to medium sand, some gravel, trace silt (FILL)		0.08											
		Damp, dark brown, fine to medium sand, trace gravel, trace silt (FILL)		0.20											
		Damp, brown, fine to medium SAND, trace silt		0.28											
1		Damp to wet, brown, laminated, fine to medium SAND, trace silt		223.66	1	DO									
				0.91											
2															
3		Wet at 2.90 m			2	DO									
4															
					3	DO									
5		End of Borehole		220.00											
				4.57											

NOTE:
 PIEZOMETER CONSTRUCTION DEPTHS ADJUSTED TO GRADE AT DEEPEST SCREEN



BAR ENV SIMPLE 1111770043LOGPHASE III.GPJ GAL-CANADA.GDT 3-5-14 STB

DEPTH SCALE
 1 : 50



LOGGED: JTF
 CHECKED: SMF

PROJECT: 11-1170-0043
 LOCATION: N 4914617.0 ;E 603963.0

RECORD OF BOREHOLE: GP-D27

SHEET 1 OF 1
 BORING DATE: 17-July-2013
 DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		CH ₄ (METHANE) (PPM)				ADDITIONAL LAB. TESTING	PIEZOMETER DETAILS		
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	PHOTO IONIZATION DETECTOR (PPM)					
								40	80			120	160
0	2" Direct Push Geoprobe, Installation with 8 1/4" Hollow Stem Augers 17-July-2013	GROUND SURFACE		224.74							NOTE: MP Elevation (m)		
		ASPHALT		0.00									
		Damp, brown, sand, some gravel, trace silt (FILL)		224.44									
		Damp, dark brown, sand and gravel, some silt, trace asphalt debris (FILL)		224.30									
		Moist, brown, fine to medium SAND, trace silt		224.13	1	DO	⊕	□					
				0.61									
1		Moist to wet, brown, laminated, fine to medium SAND, trace silt		223.22							Cement with steel casing Bentonite #1 Silica Sand 10 Slot PVC Screen		
				1.52									
2					2	DO		□	⊕				
3													
4					3	DO		□	⊕				
				220.40									
5		Wet, grey, laminated, fine to medium SAND, trace silt		4.34									
		End of Borehole		220.17									
				4.57									

BAR ENV SIMPLE 111170003LOGPHASE III.GPJ CAL-CANADAGDT 3-5-14 STB

DEPTH SCALE
 1 : 50



LOGGED: JTF
 CHECKED: SMF

PROJECT: 11-1170-0043

RECORD OF BOREHOLE: GP-D28

SHEET 1 OF 1

LOCATION: N 4914575.0 E 604013.0

BORING DATE: 23-July-2013

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				ADDITIONAL LAB. TESTING	PIEZOMETER DETAILS	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	20	40	60		80	NOTE:
						SHEAR STRENGTH						
						Cu, kPa				nat V. + Q. - rem V. ⊕ U. - ○ ●		
						20	40	60	80			
0	Daylighting 23-July-2013	GROUND SURFACE		225.15							MP Elevation (m)	
		Daylighted, No Sample recovered		0.00								
1												
2												
3												
4				221.04								
		End of Borehole		4.11								
5												
6												
7												
8												
9												
10												



BAR ENV SIMPLE 111170043 LOG PHASE III.GPJ GAL-CANADA.GDT 3-5-14 STB

DEPTH SCALE

1 : 50



LOGGED: JTF

CHECKED: SMF

PROJECT: 11-1170-0043
 LOCATION: N 4914743.0 ,E 604093.0

RECORD OF BOREHOLE: MW-D29

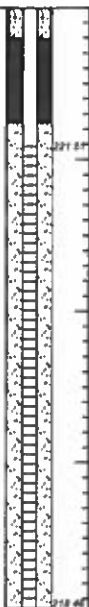
SHEET 1 OF 1
 DATUM: Geodetic

BORING DATE: 17-July-2013

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		CH4 (METHANE) (PPM)				ADDITIONAL LAB. TESTING	PIEZOMETER DETAILS	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER TYPE	BLOWS/0.3m	40	80	120		160	NOTE
0		GROUND SURFACE		222.42								MW-D29 223.35
		Damp, brown, sand, some gravel, trace silt (FILL)		0.00								Cement with steel casing
		Moist, gray, sand, some gravel, trace silt (FILL)		222.04 0.38	1 DO							Bentonite
1												#1 Silica Sand
2												
3		Wet, grey, sand, some gravel, trace silt, hydrocarbon odour (FILL)		218.56 2.84	2 DO							10 Slot PVC Screen
4												
5		Wet, brown, sand, trace gravel, trace silt (FILL) Moist, black, SAND, some organics, trace silt, wood debris noted		218.15 4.34	3A DO							
6												
7												
8												
9												
10												
		End of Borehole		216.32 6.10	4 DO							

2" Direct Push Geoprobe, Installation with 8 1/4" Hollow Stem Augers 17-July-2013

BTEX, F1-F4
 3750
 2200
 19

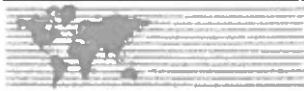


BAR ENV_SIMPLE 1111770043LOGPHASE_III.GPJ GAL-CANADA.GDT 3-5-14 STB

DEPTH SCALE
 1 : 50



LOGGED: JTF
 CHECKED: SMF



APPENDIX B

MOE Well Records

All measurements recorded in: Metric Imperial THE CITY OF BARRIE ENVIRONMENTAL CENTRE
 Follow instructions on the front and back of this form. Print or Type

Well Cluster Location Information
 Address of Well Location (Street Number(s)/Name(s), RR, if available) **Frederick St. (Dead end)**
 City, Town, Village or Hamlet **Frederick St. (Dead end)**

Geographic Township
 Concessions(s) _____
 County/District/Upper Tier Municipality _____

Unit Mode of Operation Undifferentiated Averaged Differentiated, specify: _____

GPS Unit Make Model _____

Province Ontario

Well Details

Well # on Drawing	Zone	Eastings	Northings	Hole Depth (m/ft)	Hole Diameter (cm/in)	Method of Construction	Casing Material, Diameter (cm/in)	Casing From To (m/ft)	Screen Interval (m/ft)	From To	Annular Space Material (m/ft)	Material	Abandonment Filling Material Intervals (m/ft)	Overburden/Bedrock or Abandonment Filling Material Intervals (m/ft)	Static Water Level (m/ft)	Date of Completion (yyyy/mm/dd)
1	17	1017	1147	10	8.25	drilling	2" PVC	0 - 1	2 - 7	2 - 7	fill/sand	fill/sand	fill/sand			2012/12/02
2	17	1017	1147	07	8.25	drilling	2" PVC	0 - 1	2 - 7	2 - 7	fill/sand	fill/sand	fill/sand			2012/12/02
3	17	1017	1147	7	8.25	drilling	2" PVC	0 - 1	2 - 7	2 - 7	fill/sand	fill/sand	fill/sand			2012/12/02
4	17	1017	1147	7.5	8.25	drilling	2" PVC	0 - 1	2 - 7	2 - 7	fill/sand	fill/sand	fill/sand			2012/12/02
5	17	1017	1147	7.5	8.25	drilling	2" PVC	0 - 1	2 - 7	2 - 7	fill/sand	fill/sand	fill/sand			2012/12/02
6	17	1017	1147	7.5	8.25	drilling	2" PVC	0 - 1	2 - 7	2 - 7	fill/sand	fill/sand	fill/sand			2012/12/02
7	17	1017	1147	7.5	8.25	drilling	2" PVC	0 - 1	2 - 7	2 - 7	fill/sand	fill/sand	fill/sand			2012/12/02
8	17	1017	1147	7.5	8.25	drilling	2" PVC	0 - 1	2 - 7	2 - 7	fill/sand	fill/sand	fill/sand			2012/12/02
9	17	1017	1147	7.5	8.25	drilling	2" PVC	0 - 1	2 - 7	2 - 7	fill/sand	fill/sand	fill/sand			2012/12/02
10	17	1017	1147	7.5	8.25	drilling	2" PVC	0 - 1	2 - 7	2 - 7	fill/sand	fill/sand	fill/sand			2012/12/02
11	17	1017	1147	7.5	8.25	drilling	2" PVC	0 - 1	2 - 7	2 - 7	fill/sand	fill/sand	fill/sand			2012/12/02
12	17	1017	1147	7.5	8.25	drilling	2" PVC	0 - 1	2 - 7	2 - 7	fill/sand	fill/sand	fill/sand			2012/12/02

Well Contractor and Well Technician Information
 Business Name of Well Contractor **Altech**
 Business Address (Street Number/Name, RR) **13191**
 Municipality **LN**
 Province **LN**

Well Contractor's Licence No. **2**
 Business E-mail Address _____

Name of Well Technician (First Name, Last Name) **Josh Lindsay**
 Signature of Well Technician _____
 Date Submitted (yyyy/mm/dd) **2013/02/12**

Well Abandonment Information
 Date First Well in Cluster Constructed or Abandoned (yyyy/mm/dd) **2012/12/02**
 Date Last Well in Cluster Completed (yyyy/mm/dd) **2012/12/02**
 Person Abandoning the Wells: **Altech**
 Name (Print or Type). See instruction 11 on the back of this form

Utility Use Only
 Date Received (yyyy/mm/dd) **6**
 Audit No. **20742**

Comments: _____

This form is to be completed by the person who constructs or abandons test holes or dewatering wells that form all or part of a well cluster. If this form is being used to report any well abandonment, these wells must have been previously reported as part of a single well cluster.

Note: For well cluster records, only the owners of the land on which the wells are situated are to give written consent. If the well purchaser (e.g. a consultant who hires the driller) is not the owner of the land, then the well purchaser cannot sign the consent form.

By signing this form, land owners are providing consent to use one well record to report a well cluster of test holes or dewatering wells in accordance with section 16.4 of Regulation 903 made under the *Ontario Water Resources Act*.

This completed Well Record for Well Cluster Part 2 - Land Owner Consent must be attached to Parts 1 and 3.

* Please PRINT if completing by hand.

Well Tag Number: # A 143584

"Well Record for Well Cluster" Audit Number: # C. 20742

Well # on Detailed Drawing	Property Location Description	Land Owner's Name	Signature of Land Owner	Date Signed (yyyy/mm/dd)
11-6	Frederick st (wooded)	Diare Moreau for the City of Barrie	D Moreau	2013/02/11
E4-6	Frederick st (wooded)	↓	D Moreau	
E7-6	Frederick st (wooded)		D Moreau	
C2-6	"		D Moreau	
E4-6	"		D Moreau	
E2-6	"		D Moreau	
A2-6	"		D Moreau	

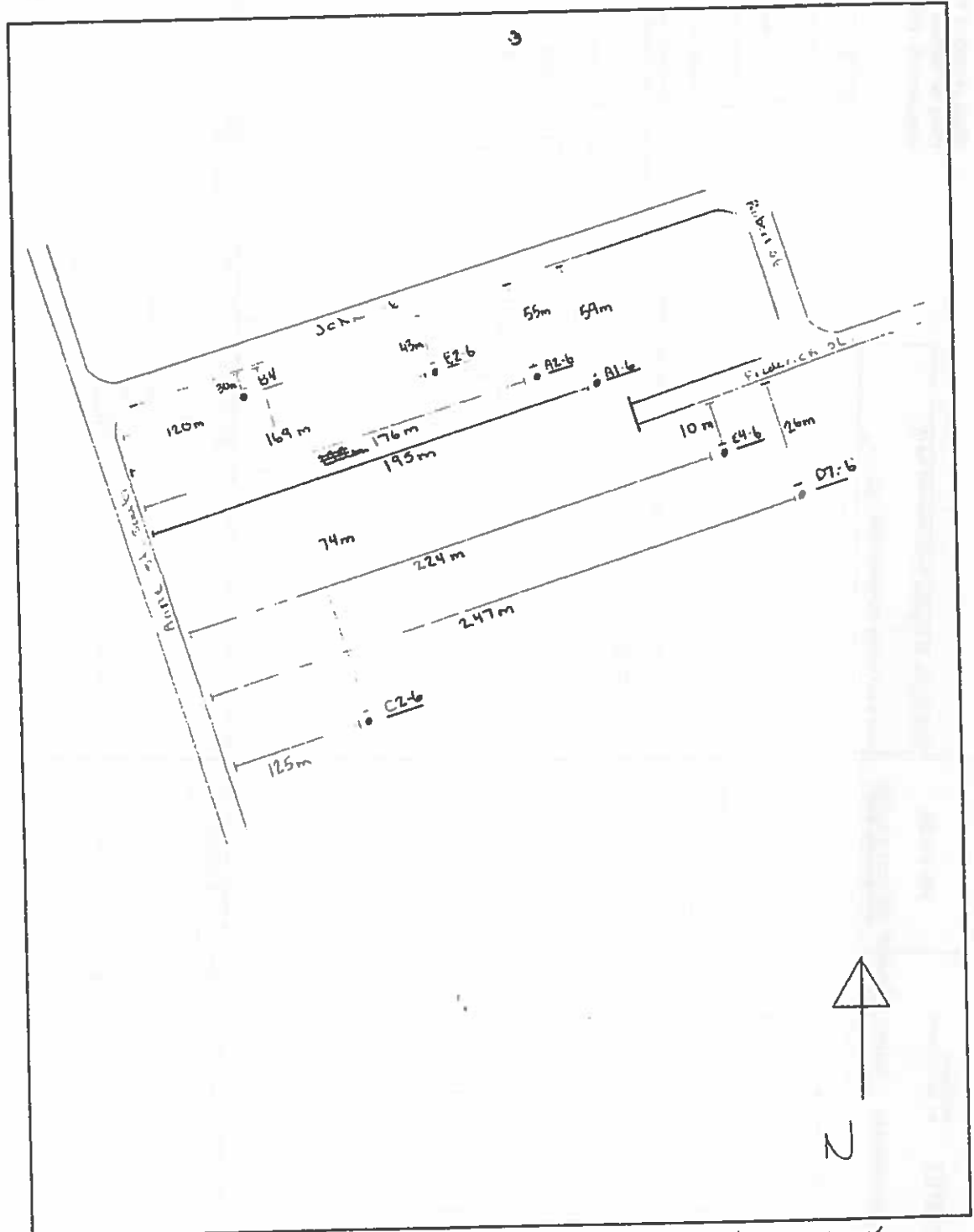
A143584 4582-16

Well Owner's Copy

Note: This Well Record for Well Cluster Part 3 - Detailed Drawing of all Well Locations, must be attached to Parts 1 and 2. The drawing must include all property boundaries, an arrow indicating the North direction, all named roads and sufficient measurements to locate all wells in the cluster in relation to fixed points. The drawing must show the location of each well and each well must be numbered on the drawing to match number used for that well on the Well Record for Well Cluster Parts 1 and 2. The well with the well tag must be clearly identified on the Drawing.
 UTM coordinates should appear beside each well, if space permits. Additional comments on wells can be included on the drawing

Well Tag Number: # A 143884

"Well Record for Well Cluster" Form Audit Number: # C 20742



Well Cluster Location Information
 Address of Well Location (Street Number(s)/Name(s), RR, if available): 138 Innisfil St. Barrie (on L.R.O.W.)
 City, Town, Village or Hamlet: Barrie
 Province: Ontario
 Concession(s): _____ Geographic Township: _____ County/District/Upper Tier Municipality: _____
 GPS Unit Make: _____ Model: _____ Unit Mode of Operation: Undifferentiated Averaged
 Differentiated, specify: _____

Well Details

Well # on Drawing	Zone	Easting	Northing	UTM Coordinates	Hole Depth (mft)	Hole Diameter (cm/in)	Method of Construction	Casing Material, Diameter (cm/in)	Casing From To (mft)	Screen Interval (mft)	Annular Space Material (mft)		Overburden/Bedrock or Abandonment Filing Material Intervals (mft)	Static Water Level (mft)	Date of Completion (yyyy/mm/dd)
											From	To			
F-01		176103831	491416617		5	25	1111	2	6	2	8	0	Fill sand		
F-02		71113113	10116198		5	375	6111	2	2	25	7.5	0	Fill sand		
F-03		16037117	114161712		75	320	6111	2	25	25	7.5	0	Fill sand		
D561		103761749	14114113		75	320	6111	2	25	25	7.5	0	Fill sand		
D61		103771719	141161713		75	320	6111	2	25	25	7.5	0	Fill sand		

Well Contractor and Well Technician Information
 Business Name of Well Contractor: Alice's Drilling
 Business Address (Street Number/Name, RR): 5217 Hemlock Hill Dr.
 Well Contractor's Licence No.: 7252
 Business Telephone No.: 705-644-0331
 Well Contractor's E-mail Address: alice@alice-drilling.com
 Municipality: Simcoe
 Province: ON
 Name of Well Technician (First Name, Last Name): John L. ...
 Well Technician's Licence No.: 24137
 Signature of Well Technician: [Signature]
 Date Submitted (yyyy/mm/dd): 2013/02/12

Mandatory Attachments/Additional Information
 Land Owner Consent Form must be attached.
 Detailed Drawing of All Well Locations must be attached.
 I, the person constructing the well, will promptly submit to the Director, on request, any additional information in my custody or control related to any well in the well cluster that I have constructed.
 Signature of Technician/Contractor: _____ Date (yyyy/mm/dd): _____
 Ministry Use Only
 Date Received (yyyy/mm/dd): _____ Audit No.: 20738
 Comments: _____
 Date Last Well in Cluster Completed (yyyy/mm/dd): 2012/11/27
 Date First Well in Cluster Constructed or Abandoned (yyyy/mm/dd): 2012/11/27
 Well Abandonment Name: _____
 Person Abandoning the Wells: _____
 Name (Print or Type) - See instruction 11 on the back of this form: 1142543
 Well Owner's Copy



Well Record for Well Cluster - Part 2 of 3
Land Owner Consent

This form is to be completed by the person who constructs or abandons test holes or dewatering wells that form all or part of a well cluster. If this form is being used to report any well abandonment, these wells must have been previously reported as part of a single well cluster.

Note: For well cluster records, only the owners of the land on which the wells are situated are to give written consent. If the well purchaser (e.g. a consultant who hires the driller) is not the owner of the land, then the well purchaser cannot sign the consent form.

By signing this form, land owners are providing consent to use one well record to report a well cluster of test holes or dewatering wells in accordance with section 16.4 of Regulation 903 made under the Ontario Water Resources Act.

This completed Well Record for Well Cluster Part 2 - Land Owner Consent must be attached to Parts 1 and 3.

* Please PRINT if completing by hand.

3

Well Tag Number: # A143543

"Well Record for Well Cluster" Audit Number: # C 20738

Well # on Detailed Drawing	Property Location Description	Land Owner's Name	Signature of Land Owner	Date Signed (yyyy/mm/dd)
F16	138 Innisfil st.	Diane Morneau for the City of Barrie	<i>D. Morneau</i>	2013/02/11
C3-5	138 Innisfil st.	↓	<i>D. Morneau</i>	↓
C2-5	138 Innisfil st.	↓	<i>D. Morneau</i>	↓
D5-6	138 Innisfil st.	↓	<i>D. Morneau</i>	↓
D6-6		↓	<i>D. Morneau</i>	↓

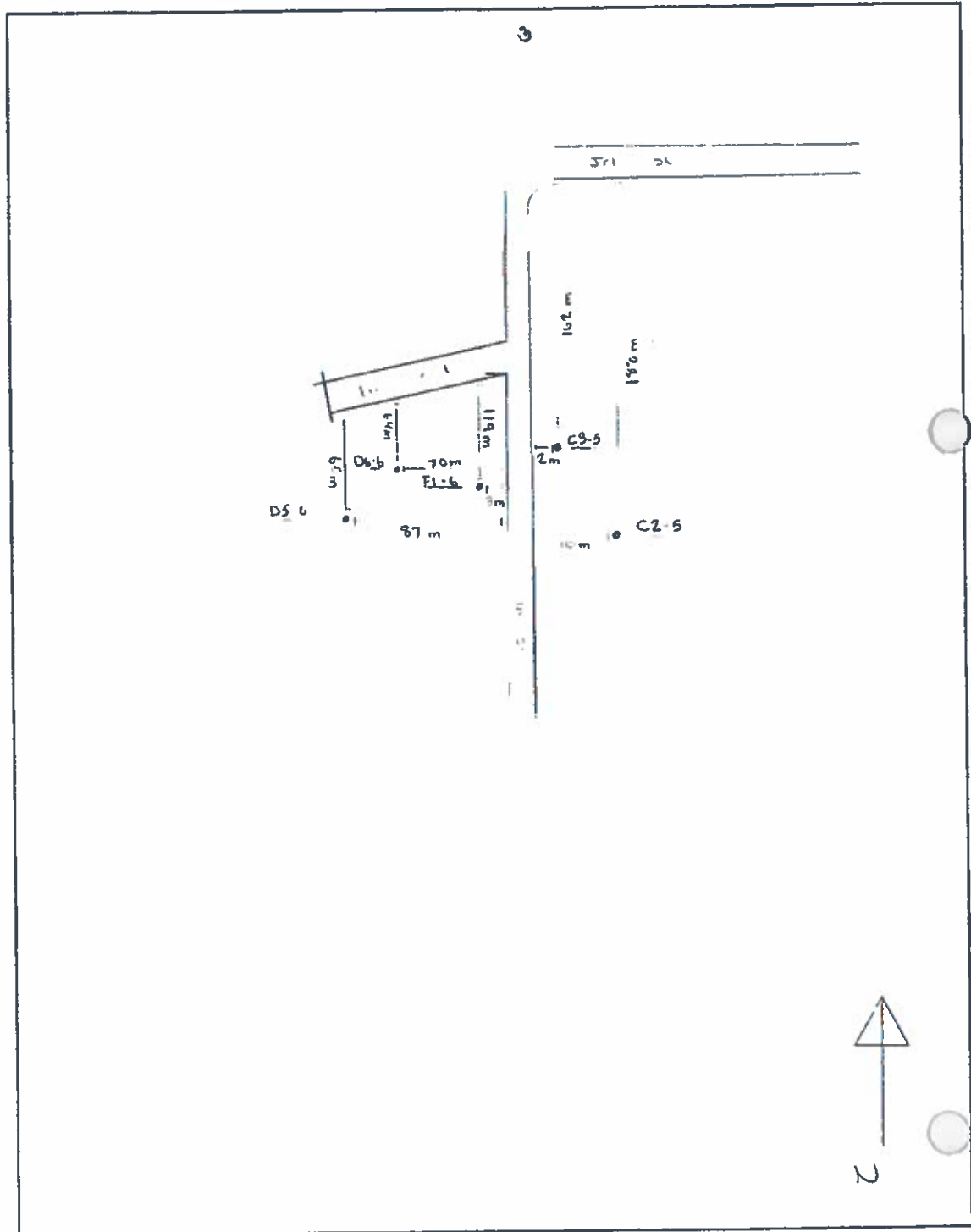
all Owners Consent A143543 54 2

Note: This Well Record for Well Cluster Part 3 - Detailed Drawing of all Well Locations, must be attached to Parts 1 and 2. The drawing must include all property boundaries, an arrow indicating the North direction, all named roads and sufficient measurements to locate all wells in the cluster in relation to fixed points. The drawing must show the location of each well and each well must be numbered on the drawing to match number used for that well on the Well Record for Well Cluster Parts 1 and 2. The well with the well tag must be clearly identified on the Drawing.

UTM coordinates should appear beside each well, if space permits. Additional comments on wells can be included on the drawing

Well Tag Number: # A 143843

"Well Record for Well Cluster" Form Audit Number: # C 20738





Ministry of Environment

FEB 20 2013

THE CITY OF BARRIE ENVIRONMENTAL CENTRE

Well Record for Well Cluster - Part 2 of 3 (Only for Multiple Test Holes or Dewatering Well: Regulation 903 Ontario Water Resources Act)

All measurements recorded in: Metric Imperial

Well Tag No. of Deepest Well: (Print Well Tag No.)

Well # on Drawing of Deepest Well:

Page _____ of _____

Follow instructions on the front and back of this form.

Well # on Drawing of Deepest Well:

Well # on Drawing of Deepest Well:

Page _____ of _____

Well Cluster Location Information

Address of Well Location (Street Number(s)/Name(s), RR, if available)

Sandford St. (Park)

City, Town, Village or Hamlet

Barrie

Province

Ontario

Concession(s)

Geographic Township

County/District/Upper Tier Municipality

Unit Mode of Operation

Undifferentiated Averaged

Differentiated, specify:

Well Details

Well # on Drawing	UTM Coordinates		Hole Depth (mft)	Hole Diameter (cm/m)	Method of Construction	Casing Material Diameter (cm/m)		Screen Interval (mft)		Annular Space Material (mft)		Overburden/Bedrock or Abandonment Filling Material Intervals (mft)	Static Water Level (mft)	Date of Completion (yyyy/mm/dd)
	Zone	Easting				Northing	From	To	From	To	From			
A1-5	17	60328151	4911416717	8	boring	2 PVC	0	3	0	0	11.0 Sand	Sand/fill		2012/11/28
P2-4	17	60328154	4911416710	8.25	boring	2 PVC	0	7.5	0	0	11.0 Sand	Sand/fill		2012/11/28
P2-5	17	60328151	4911416711	8	boring	2 PVC	0	2	0	0	11.0 Sand	Sand/fill		2012/11/28
P3-5	17	60328164	4911416711	8	boring	2 PVC	0	2	0	0	11.0 Sand	Sand/fill		2012/11/28
A5-5	17	60328155	4911417214	8	boring	2 PVC	0	2	0	0	11.0 Sand	Sand/fill		2012/11/28

Signature of Technician/Contractor

Date (yyyy/mm/dd)

Mandatory Attachments/Additional Information

- Land Owner Consent Form must be attached.
 - Detailed Drawing of All Well Locations must be attached.
- I, the person constructing the well, will promptly submit to the Director, on request, any additional information in my custody or control related to any well in the well cluster that I have constructed

Well Contractor and Well Technician Information

Business Name of Well Contractor: **AHECH Drilling**

Business Address (Street Number/Name, RR): _____ Province: **ON**

Well Contractor's Licence No.: **72-2** Business E-mail Address: _____

Bus. Telephone No.: **72-2** Signature of Well Technician: _____

Name of Well Technician (First Name, Last Name): **Josh Lindsay** Date Submitted (yyyy/mm/dd): **2013/02/13**

Ministry Use Only

Date First Well in Cluster Constructed or Abandoned (yyyy/mm/dd): **2012/11/2**

Date Last Well in Cluster Completed (yyyy/mm/dd): **2012/11/2**

Well Abandonment: _____

Person Abandoning the Well: _____ Name: _____

Ministry Use Only: Date Received (yyyy/mm/dd): **6** Audit No.: **20739**

Comments: _____

This form is to be completed by the person who constructs or abandons test holes or dewatering wells that form all or part of a well cluster. If this form is being used to report any well abandonment, these wells must have been previously reported as part of a single well cluster.

Note: For well cluster records, only the owners of the land on which the wells are situated are to give written consent. If the well purchaser (e.g. a consultant who hires the driller) is not the owner of the land, then the well purchaser cannot sign the consent form.

By signing this form, land owners are providing consent to use one well record to report a well cluster of test holes or dewatering wells in accordance with section 16.4 of Regulation 903 made under the *Ontario Water Resources Act*.

This completed Well Record for Well Cluster Part 2 - Land Owner Consent must be attached to Parts 1 and 3.

* Please PRINT if completing by hand.

Well Tag Number: # 0143842 3

"Well Record for Well Cluster" Audit Number: # C 20739

Well # on Detailed Drawing	Property Location Description	Land Owner's Name	Signature of Land Owner	Date Signed (yyyy/mm/dd)
A1-5	Sandford st. (Part)	Diane Moreau for the City of Barrie	<i>D Moreau</i>	2013/02/11
F2-4	"	↓	<i>D Moreau</i>	↓
D2-5	"	↓	<i>D Moreau</i>	↓
B3-5	"	↓	<i>D Moreau</i>	↓
A5-5	"	↓	<i>D Moreau</i>	↓

Well Owner Copy

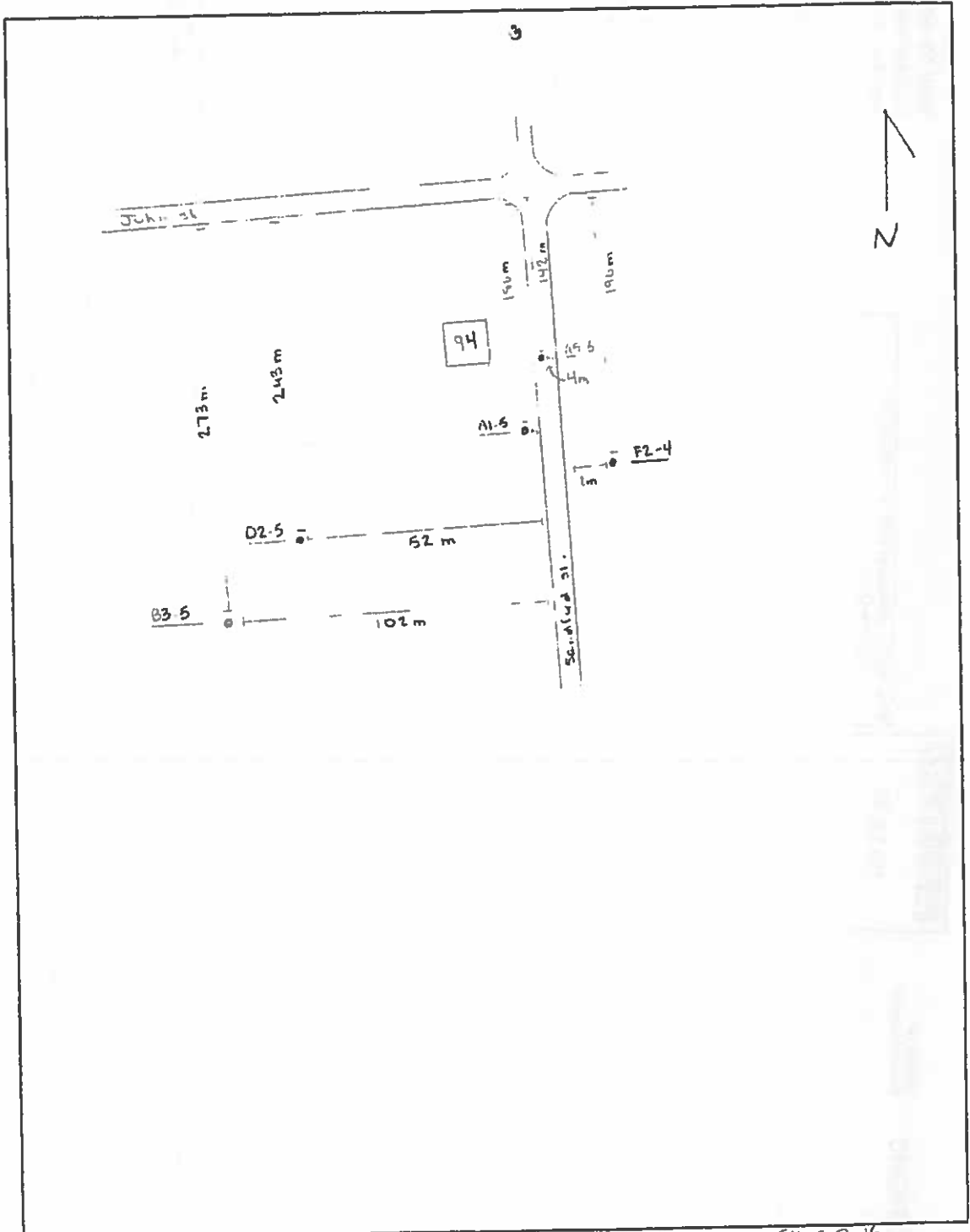
A143842

54882-16

Note: This Well Record for Well Cluster Part 3 - Detailed Drawing of all Well Locations, must be attached to Parts 1 and 2. The drawing must include all property boundaries, an arrow indicating the North direction, all named roads and sufficient measurements to locate all wells in the cluster in relation to fixed points. The drawing must show the location of each well and each well must be numbered on the drawing to match number used for that well on the Well Record for Well Cluster Parts 1 and 2. The well with the well tag must be clearly identified on the Drawing. UTM coordinates should appear beside each well, if space permits. Additional comments on wells can be included on the drawing

Well Tag Number: # 1143842

"Well Record for Well Cluster" Form Audit Number: # C 20739



1143847 54567-16



Ministry of the Environment

RECEIVED

FEB 20 2013

THE CITY OF BARRIE
ENVIRONMENTAL CENTRE

All measurements recorded in: Metric Imperial

Follow instructions on the front and back of this form.

Well Record for Well Cluster - Part 1 of 3
(Only for Multiple Test Holes or Dewatering Wells)
Regulation 903 Ontario Water Resources Act

Page _____ of _____

Well Tag No. of Deepest Well: (Print Well Tag No.)
143240

Well # on Drawing of Deepest Well: **K4**

Well Cluster Location Information

Address of Well Location (Street Number(s), Names, RR, if available) _____

City, Town, Village or Hamlet: **Y. O. C. C. E.**

Province: **Ontario**

County/District/Upper Tier Municipality: _____

Geographic Township: _____

Concession(s): _____

GPS Unit Make: **Garmin**

Model: _____

Unit Mode of Operation: Undifferentiated Averaged

Differentiated, specify: _____

Well Details

Well # on Drawing	Zone	Eastings	Northings	Hole Depth (mft)	Hole Diameter (cm/in)	Method of Construction	Casing Material, Diameter (cm/in)	Casing From To (mft)	Screen Interval (mft) From To	Annular Space Material (mft) From To	Material	Abandonment Filling Material Interval (mft)	Overburden/Bedrock or Abandonment Filling Material Interval (mft)	Static Water Level (mft)	Date of Completion (YYYYMMDD)
K4		1761041074	40151710	8.5	2.52	Hydruc	7 PVC	0 3.5	3.5 8	0 3.5	backfill	backfill / sand			2.12.08/07
A45		176103910	4714595	8.0	3.25	br...	7 PVC	0 3	3 8	0 3	backfill	backfill / sand			2012/08/07

Well Contractor and Well Technician Information

Business Name of Well Contractor: _____

Business Address (Street Number/Name, RR): _____

Province: **ON**

Postal Code: **N2B 1Z13**

Bus. Telephone No.: _____

Well Contractor's Licence No.: _____

Signature of Well Technician: _____

Date Submitted (YYYYMMDD): **2013/02/12**

Name of Well Technician (First Name, Last Name): **osh Landsey**

Well Technician's Licence No.: **1-722**

Date Last Well in Cluster Completed (YYYYMMDD): _____

Date First Well in Cluster Constructed or Abandoned (YYYYMMDD): **7-1-11**

Person Abandoning the Wells: _____

Name (Print or Type): _____

Ministry Use Only: Data Received (YYYYMMDD) **C 20737**

Comments: _____

1991E (2011/04) © Queen's Printer for Ontario, 2011

Well Owner: Copy

This form is to be completed by the person who constructs or abandons test holes or dewatering wells that form all or part of a well cluster. If this form is being used to report any well abandonment, these wells must have been previously reported as part of a single well cluster.

Note: For well cluster records, only the owners of the land on which the wells are situated are to give written consent. If the well purchaser (e.g. a consultant who hires the driller) is not the owner of the land, then the well purchaser cannot sign the consent form.

By signing this form, land owners are providing consent to use one well record to report a well cluster of test holes or dewatering wells in accordance with section 16.4 of Regulation 903 made under the *Ontario Water Resources Act*.

This completed Well Record for Well Cluster Part 2 - Land Owner Consent must be attached to Parts 1 and 3.

* Please PRINT if completing by hand.

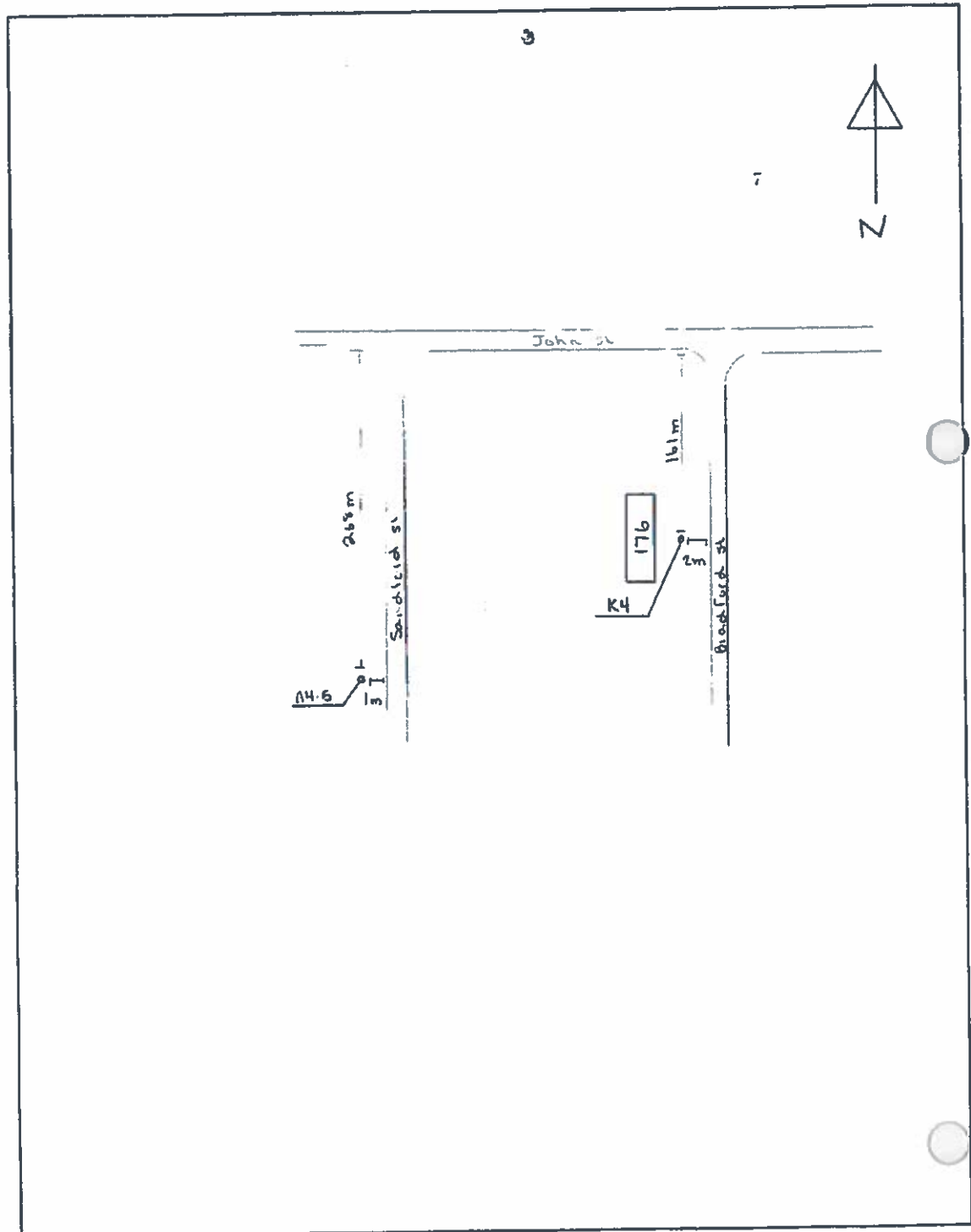
Well Tag Number: # A143840

"Well Record for Well Cluster" Audit Number: # C 20737

Well # on Detailed Drawing	Property Location Description	Land Owner's Name	Signature of Land Owner	Date Signed (yyyy/mm/dd)
K11	176 Bradford St. Barrie	Diare Moreau for the City of Barrie	<i>DM Moreau</i>	2013/02/11
1145	176 Bradford St. Barrie	11	<i>DM Moreau</i>	↓

Well Owner's Copy 143840 882-16

Note: This Well Record for Well Cluster Part 3 - Detailed Drawing of all Well Locations, must be attached to Parts 1 and 2. The drawing must include all property boundaries, an arrow indicating the North direction, all named roads and sufficient measurements to locate all wells in the cluster in relation to fixed points. The drawing must show the location of each well and each well must be numbered on the drawing to match number used for that well on the Well Record for Well Cluster Parts 1 and 2. The well with the well tag must be clearly identified on the Drawing. UTM coordinates should appear beside each well, if space permits. Additional comments on wells can be included on the drawing

Well Tag Number: # A143840"Well Record for Well Cluster" Form Audit Number: # C 20737



APPENDIX C

Groundwater Elevations

Table C-1
Groundwater Elevations
Dymont's Creek Landfills

Well ID	Site Number	Monitoring Pipe Elevation (masl)	Ground Elevation (masl)	Depth to Bottom of Well (mbmp)	Depth to Bottom of Well (mbgs)	Screen Length (m)	Top of Screen Elevation (masl)	Base of Well Elevation (masl)	Date	Depth to Groundwater (mbmp)	Depth to Groundwater (mbgs)	Groundwater Elevation (masl)		
MW-D1	6	226.23	225.30	5.44	4.50	1.52	222.32	220.80	6/26/2012	2.63	1.69	223.61		
										6/28/2012	2.71	1.78	223.52	
										8/22/2012	2.70	1.77	223.53	
										9/17/2012	2.68	1.74	223.55	
										4/4/2013	2.35	1.41	223.89	
										4/22/2013	2.27	1.34	223.96	
										6/20/2012	2.44	1.50	223.80	
										8/21/2013	2.62	1.68	223.61	
										12/11/2013	2.98	2.04	223.26	
		GP-D1	6	226.16	225.28	3.93	3.05	1.52	223.75	222.23	9/17/2012	2.74	1.86	223.41
										12/3/2012	2.55	1.67	223.61	
										12/18/2012	2.53	1.65	223.63	
										4/4/2013	2.34	1.46	223.82	
										6/20/2013	2.52	1.64	223.64	
										8/22/2013	2.72	1.84	223.44	
										10/11/2013	2.59	1.71	223.56	
										12/13/2013	2.56	1.68	223.60	
										2/12/2014	2.64	1.76	223.52	
MW-D2	6			226.07	225.16	5.28	4.37	1.52	222.31	220.79	6/26/2012	3.45	2.54	222.62
										8/22/2012	3.55	2.64	222.53	
										9/17/2012	3.48	2.57	222.59	
										4/4/2013	3.01	2.10	223.06	
										4/22/2013	3.00	2.09	223.08	
										6/20/2013	3.28	2.37	222.79	
										8/21/2013	3.47	2.56	222.61	
										12/11/2013	3.27	2.36	222.81	
		GP-D2	6	226.09	225.20	3.94	3.05	1.52	223.67	222.15	9/17/2012	3.52	2.62	222.57
												12/3/2012	3.31	2.42
										12/18/2012	3.25	2.36	222.84	
										4/4/2013	3.05	2.16	223.04	
										6/20/2013	3.32	2.43	222.77	
										8/22/2013	3.51	2.62	222.58	
										10/11/2013	3.37	2.48	222.72	
										12/13/2013	3.32	2.42	222.78	
										2/12/2014	3.43	2.54	222.66	
MW-D3	6			224.39	223.36	5.28	4.25	1.52	220.63	219.11	2/14/2012	1.85	0.82	222.54
										3/2/2012	1.87	0.84	222.52	
										3/21/2012	1.67	0.64	222.72	
										6/27/2012	2.05	1.01	222.34	
										9/17/2012	2.06	1.03	222.33	
										4/4/2013	1.62	0.59	222.77	
										4/22/2013	1.60	0.56	222.79	
										6/20/2013	1.83	0.80	222.56	
										8/21/2013	2.08	1.05	222.31	
										12/11/2013	1.85	0.82	222.54	

Table C-1
Groundwater Elevations
Dymont's Creek Landfills

Well ID	Site Number	Monitoring Pipe Elevation (masl)	Ground Elevation (masl)	Depth to Bottom of Well (mbmp)	Depth to Bottom of Well (mbgs)	Screen Length (m)	Top of Screen Elevation (masl)	Base of Well Elevation (masl)	Date	Depth to Groundwater (mbmp)	Depth to Groundwater (mbgs)	Groundwater Elevation (masl)
GP-D3	6	224.59	223.53	2.89	1.83	1.52	223.22	221.70	3/21/2012	1.87	0.81	222.72
									9/17/2012	2.26	1.20	222.33
									12/3/2012	1.87	0.81	222.71
									12/18/2012	1.97	0.91	222.62
									4/4/2013	1.80	0.74	222.79
									6/20/2013	2.04	0.98	222.55
									8/22/2013	2.29	1.23	222.30
									10/11/2013	2.00	0.94	222.59
									12/13/2013	2.03	0.97	222.55
									2/12/2014	2.09	1.03	222.49
MW-D4	5	224.22	223.30	5.36	4.44	1.52	220.38	218.86	6/27/2012	2.21	1.29	222.01
									6/28/2012	2.17	1.25	222.05
									8/22/2012	2.28	1.36	221.94
									9/17/2012	2.15	1.23	222.07
									4/4/2013	1.63	0.71	222.59
									4/22/2013	1.59	0.67	222.63
									6/20/2013	2.01	1.09	222.21
									8/21/2013	2.13	1.21	222.09
									12/11/2013	1.93	1.01	222.30
									9/17/2012	2.03	1.16	222.17
GP-D4	5	224.20	223.32	3.31	2.44	1.37	222.25	220.88	12/3/2012	1.46	0.59	222.73
									12/18/2012	1.51	0.64	222.68
									4/4/2013	1.33	0.46	222.87
									6/20/2013	1.79	0.92	222.41
									8/22/2013	1.96	1.09	222.24
									10/11/2013	1.55	0.68	222.65
									12/13/2013	1.67	0.80	222.52
									2/12/2014	1.78	0.91	222.42
									2/14/2012	2.46	1.50	222.53
									MW-D5	5	224.99	224.03
3/21/2012	2.39	1.43	222.60									
6/27/2012	2.71	1.75	222.28									
9/17/2012	2.68	1.72	222.31									
4/4/2013	2.21	1.25	222.78									
4/22/2013	2.22	1.26	222.77									
6/20/2013	2.42	1.46	222.57									
8/21/2013	2.62	1.66	222.37									
12/12/2013	2.48	1.52	222.51									

Table C-1
Groundwater Elevations
Dymont's Creek Landfills

Well ID	Site Number	Monitoring Pipe Elevation (masl)	Ground Elevation (masl)	Depth to Bottom of Well (mbmp)	Depth to Bottom of Well (mbgs)	Screen Length (m)	Top of Screen Elevation (masl)	Base of Well Elevation (masl)	Date	Depth to Groundwater (mbmp)	Depth to Groundwater (mbgs)	Groundwater Elevation (masl)									
GP-D5	5	224.98	223.99	2.69	1.71	1.52	223.81	222.29	3/2/2012	2.05	1.06	222.93									
									9/17/2012	dry	dry	NA									
									12/3/2012	2.23	1.24	222.75									
									12/18/2012	2.11	1.12	222.87									
									4/4/2013	1.72	0.73	223.26									
									6/20/2013	2.21	1.22	222.77									
									8/22/2013	2.54	1.55	222.44									
									10/11/2013	2.49	1.50	222.49									
									12/13/2013	2.14	1.15	222.84									
									2/12/2014	2.37	1.38	222.61									
									MW-D6	4	224.50	223.51	8.77	7.78	3.05	218.78	215.73	2/14/2012	3.12	2.13	221.38
																		3/2/2012	3.27	2.28	221.23
3/21/2012	3.07	2.08	221.43																		
6/27/2012	3.32	2.33	221.18																		
9/17/2012	3.16	2.17	221.34																		
4/4/2013	2.98	2.00	221.51																		
4/22/2013	2.91	1.92	221.59																		
6/20/2013	3.12	2.13	221.38																		
8/21/2013	3.18	2.19	221.32																		
12/11/2013	3.23	2.24	221.27																		
GP-D6	4	224.38	223.42	3.10	2.13	1.37	222.65	221.28										3/21/2012	1.83	0.86	222.55
																		9/17/2012	1.98	1.01	222.40
									12/3/2012	2.48	1.52	221.90									
									12/18/2012	1.99	1.02	222.39									
									4/4/2013	1.72	0.75	222.66									
									6/20/2013	1.96	1.00	222.42									
									8/22/2013	2.35	1.39	222.03									
									10/11/2013	1.36	0.39	223.02									
									12/13/2013	2.18	1.22	222.20									
									2/12/2014	2.60	1.64	221.78									
									MW-D7	4	222.80	222.10	5.01	4.30	1.52	219.32	217.80	6/27/2012	2.70	2.00	220.10
																		6/29/2012	2.65	1.94	220.16
8/21/2012	2.64	1.94	220.16																		
9/17/2012	2.56	1.85	220.25																		
4/22/2013	2.32	1.62	220.48																		
6/20/2013	2.44	1.74	220.36																		
8/21/2013	2.59	1.89	220.21																		
12/11/2013	2.52	1.82	220.28																		

Table C-1
Groundwater Elevations
Dymont's Creek Landfills

Well ID	Site Number	Monitoring Pipe Elevation (masl)	Ground Elevation (masl)	Depth to Bottom of Well (mbmp)	Depth to Bottom of Well (mbgs)	Screen Length (m)	Top of Screen Elevation (masl)	Base of Well Elevation (masl)	Date	Depth to Groundwater (mbmp)	Depth to Groundwater (mbgs)	Groundwater Elevation (masl)
GP-D7	4	222.79	222.11	2.97	2.29	1.52	221.35	219.83	9/17/2012	2.56	1.88	220.24
									12/3/2012	2.53	1.85	220.27
									12/18/2012	2.53	1.85	220.27
									4/4/2013	2.39	1.70	220.41
									6/20/2013	2.43	1.75	220.36
									8/22/2013	2.60	1.92	220.20
									10/11/2013	2.53	1.85	220.26
12/13/2013	2.53	1.85	220.26									
2/13/2014	2.62	1.94	220.17									
GP-D8	6	226.51	225.58	3.98	3.05	1.52	224.05	222.53	12/3/2012	2.92	1.99	223.59
									12/18/2012	2.89	1.96	223.62
									4/4/2013	2.72	1.79	223.79
									6/20/2013	2.84	1.91	223.67
									8/22/2013	3.05	2.11	223.46
									10/11/2013	2.97	2.04	223.53
									12/13/2013	2.89	1.96	223.61
2/12/2014	3.03	2.10	223.48									
GP-D9	6	226.11	225.17	3.89	2.95	1.52	223.74	222.22	9/17/2012	3.12	2.18	223.00
									12/3/2012	2.76	1.82	223.36
									12/18/2012	2.65	1.71	223.46
									4/4/2013	2.58	1.64	223.54
									6/20/2013	2.72	1.78	223.40
									8/22/2013	2.86	1.92	223.26
									10/11/2013	2.89	1.95	223.22
12/13/2013	2.75	1.81	223.36									
2/12/2014	2.85	1.91	223.26									
GP-D10	6	226.34	225.40	3.99	3.05	1.52	223.87	222.35	12/3/2012	3.09	2.15	223.24
									12/18/2012	2.99	2.06	223.34
									4/4/2013	2.86	1.92	223.48
									6/20/2013	3.00	2.07	223.33
									8/22/2013	3.28	2.34	223.06
									10/11/2013	3.25	2.31	223.08
									12/13/2013	3.05	2.11	223.29
2/12/2014	3.24	2.30	223.09									
GP-D11	6	226.45	225.47	3.87	2.90	1.52	224.09	222.57	9/17/2012	2.94	1.97	223.50
									12/3/2012	3.13	2.15	223.32
									12/18/2012	3.10	2.13	223.34
									4/4/2013	2.92	1.95	223.52
									6/20/2013	3.09	2.12	223.36
									8/22/2013	3.50	2.53	222.94
									10/11/2013	3.18	2.21	223.27
12/13/2013	3.24	2.27	223.20									
2/12/2014	3.42	2.45	223.03									

Table C-1
Groundwater Elevations
Dymont's Creek Landfills

Well ID	Site Number	Monitoring Pipe Elevation (masl)	Ground Elevation (masl)	Depth to Bottom of Well (mbmp)	Depth to Bottom of Well (mbgs)	Screen Length (m)	Top of Screen Elevation (masl)	Base of Well Elevation (masl)	Date	Depth to Groundwater (mbmp)	Depth to Groundwater (mbgs)	Groundwater Elevation (masl)									
GP-D12	6	225.41	224.25	3.29	2.13	1.52	223.64	222.12	12/3/2012	2.21	1.17	223.09									
									12/18/2012	2.18	1.14	223.12									
									4/4/2013	2.00	0.96	223.29									
									6/20/2013	2.19	1.15	223.11									
									8/22/2013	2.52	1.36	222.90									
									10/11/2013	2.32	1.16	223.10									
									12/13/2013	2.22	1.06	223.19									
									2/12/2014	2.32	1.17	223.09									
									GP-D13	6	223.77	222.93	2.82	1.98	1.52	222.47	220.95	12/3/2012	1.25	0.37	222.56
																		12/18/2012	1.27	0.39	222.54
									4/4/2013	1.14	0.26	222.67									
									6/20/2013	1.30	0.42	222.51									
									8/22/2013	1.53	0.68	222.24									
									10/11/2013	1.28	0.43	222.50									
									12/13/2013	1.29	0.44	222.49									
									2/12/2014	1.30	0.45	222.47									
GP-D14	6	223.89	223.00	3.93	3.05	1.52	221.47	219.95	9/17/2012	2.59	1.70	221.30									
									12/3/2012	2.37	1.49	221.51									
									12/18/2012	2.42	1.53	221.47									
									4/4/2013	2.21	1.32	221.68									
									6/20/2013	2.54	1.66	221.34									
									8/22/2013	2.63	1.75	221.25									
									10/11/2013	2.50	1.62	221.39									
									12/13/2013	2.51	1.62	221.38									
									2/12/2014	2.54	1.65	221.35									
									GP-D15	5	225.44	224.54	3.04	2.13	1.52	223.92	222.40	12/3/2012	2.88	1.98	222.56
									12/18/2012	2.89	1.99	222.55									
									4/4/2013	2.80	1.89	222.64									
									6/20/2013	2.89	1.99	222.55									
									8/22/2013	3.06	2.15	222.38									
									10/11/2013	2.97	2.07	222.47									
									12/13/2013	2.90	2.00	222.54									
									2/12/2014	3.01	2.10	222.43									
GP-D16	5	226.16	225.25	3.65	2.74	1.52	224.04	222.51	9/17/2012	3.31	2.40	222.85									
									12/3/2012	3.25	2.34	222.91									
									12/18/2012	3.24	2.33	222.92									
									4/4/2013	3.09	2.18	223.07									
									6/20/2013	3.10	2.19	223.06									
									8/22/2013	3.29	2.39	222.87									
									10/11/2013	3.29	2.38	222.87									
									12/13/2013	3.24	2.33	222.92									
									2/12/2014	3.36	2.45	222.80									

Table C-1
Groundwater Elevations
Dymont's Creek Landfills

Well ID	Site Number	Monitoring Pipe Elevation (masl)	Ground Elevation (masl)	Depth to Bottom of Well (mbmp)	Depth to Bottom of Well (mbgs)	Screen Length (m)	Top of Screen Elevation (masl)	Base of Well Elevation (masl)	Date	Depth to Groundwater (mbmp)	Depth to Groundwater (mbgs)	Groundwater Elevation (masl)
GP-D17	5	223.94	224.04	2.41	2.52	1.52	223.05	221.53	12/3/2012	1.98	2.08	221.96
									12/19/2012	1.98	2.08	221.96
									4/4/2013	1.87	1.97	222.07
									6/20/2013	1.73	1.83	222.21
									8/22/2013	2.11	2.21	221.83
									10/11/2013	2.02	2.12	221.92
									12/13/2013	1.94	2.04	222.00
									2/5/2014	2.06	2.16	221.88
GP-D18	5	224.58	223.47	3.85	2.74	1.52	222.25	220.73	9/17/2012	3.37	2.26	221.21
									12/3/2012	3.19	2.08	221.39
									12/18/2012	3.18	2.07	221.39
									4/4/2013	2.89	1.78	221.69
									6/20/2013	3.22	2.11	221.36
									8/22/2013	2.44	1.33	222.14
									10/11/2013	3.24	2.13	221.34
									12/13/2013	3.26	2.15	221.32
									2/12/2014	3.37	2.26	221.21
GP-D19	5	226.33	225.34	3.73	2.74	1.52	224.12	222.60	12/3/2012	dry	dry	NA
									12/18/2012	dry	dry	NA
									4/4/2013	dry	dry	NA
									6/20/2013	dry	dry	NA
									8/22/2013	dry	dry	NA
									10/11/2013	dry	dry	NA
									12/13/2013	dry	dry	NA
									2/12/2014	3.36	2.37	222.97
GP-D20	6	228.16	227.25	5.33	4.42	3.05	225.88	222.83	8/22/2013	4.48	3.57	223.67
									10/11/2013	4.42	3.51	223.73
									12/13/2013	4.37	3.46	223.79
									2/12/2014	4.49	3.58	223.67
GP-D21	6	227.82	226.84	5.24	4.27	3.05	225.62	222.57	8/22/2013	4.48	3.50	223.34
									10/11/2013	4.42	3.44	223.40
									12/13/2013	4.34	3.36	223.48
									2/12/2014	4.50	3.53	223.32
GP-D22	6	227.03	227.15	4.45	4.57	3.05	225.63	222.58	8/22/2013	3.91	4.03	223.11
									10/11/2013	3.85	3.97	223.18
									12/13/2013	3.75	3.88	223.27
									2/25/2014	3.92	4.04	223.11
GP-D23	6	225.73	225.93	3.77	3.96	3.05	225.02	221.97	8/22/2013	2.69	2.88	223.05
									10/11/2013	2.60	2.79	223.14
									12/13/2013	2.52	2.71	223.21
									2/25/2014	2.69	2.89	223.04

Table C-1
Groundwater Elevations
Dymont's Creek Landfills

Well ID	Site Number	Monitoring Pipe Elevation (masl)	Ground Elevation (masl)	Depth to Bottom of Well (mbmp)	Depth to Bottom of Well (mbgs)	Screen Length (m)	Top of Screen Elevation (masl)	Base of Well Elevation (masl)	Date	Depth to Groundwater (mbmp)	Depth to Groundwater (mbgs)	Groundwater Elevation (masl)
GP-D24	6	226.79	227.00	5.28	5.49	3.05	224.56	221.51	8/22/2013	4.93	5.14	221.87
									10/11/2013	3.86	4.07	222.93
									12/13/2013	3.77	3.98	223.03
									2/12/2014	Buried	NA	NA
GP-D25	4	226.31	225.23	4.48	3.40	1.52	223.35	221.83	8/22/2013	4.37	3.30	221.94
									10/11/2013	4.38	3.30	221.93
									12/13/2013	4.25	3.18	222.06
									2/12/2014	4.44	3.36	221.87
MW-D26	4	224.50	224.57	4.31	4.39	3.05	223.23	220.19	8/22/2013	2.59	2.67	221.91
									12/11/2013	2.55	2.63	221.94
GP-D26	4	224.51	224.63	4.00	4.12	3.05	223.56	220.51	8/22/2013	2.70	2.81	221.81
									10/11/2013	2.66	2.77	221.86
									12/13/2013	2.55	2.67	221.96
									2/25/2014	2.68	2.80	221.83
GP-D27	4	224.60	224.74	3.83	3.96	3.05	223.83	220.78	8/22/2013	2.39	2.53	222.21
									10/11/2013	2.45	2.58	222.15
									12/13/2013	2.39	2.53	222.21
									2/25/2014	2.57	2.71	222.03
GP-D28	4	225.05	225.15	4.01	4.11	1.52	222.56	221.04	8/22/2013	3.14	3.24	221.91
									10/11/2013	3.07	3.17	221.98
									12/13/2013	3.13	3.23	221.92
									2/12/2014	Buried	NA	NA
MW-D29	4	223.35	222.42	4.92	3.98	3.05	221.48	218.43	8/21/2013	2.73	1.79	220.62
									12/11/2013	3.66	2.72	219.69

masl = metres above sea level
mbmp = metres below monitoring pipe
mbgs = metres below ground surface



APPENDIX D

Laboratory Certificates of Analysis - Soil

**CLIENT NAME: GOLDER ASSOCIATES LTD.
121 COMMERCE PARK DRIVE, UNIT L
BARRIE, ON L4N8X1
(705) 722-4492**

ATTENTION TO: Christi Groves

PROJECT NO: 11-1170-0043

AGAT WORK ORDER: 13T737770

TRACE ORGANICS REVIEWED BY: Oksana Gushyla, Trace Organics Lab Supervisor

DATE REPORTED: Jul 26, 2013

PAGES (INCLUDING COVER): 5

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

***NOTES**

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

AGAT Laboratories (V1)

Member of: Association of Professional Engineers, Geologists and Geophysicists of Alberta (APEGGA)
Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation.

Results relate only to the items tested and to all the items tested

Certificate of Analysis

AGAT WORK ORDER: 13T737770
PROJECT NO: 11-1170-0043

AGAT Laboratories

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Christl Groves

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

DATE RECEIVED: 2013-07-18		O. Reg. 153(511) - PHCs F1 - F4 (Soil)		DATE REPORTED: 2013-07-26
SAMPLE DESCRIPTION: MWD29-SA3A				
Parameter	Unit	G / S	RDL	Soil
Benzene	µg/g	0.21	0.02	<0.02
Toluene	µg/g	2.3	0.08	0.55
Ethylbenzene	µg/g	1.1	0.05	0.39
Xylene Mixture	µg/g	3.1	0.05	3.2
F1 (C6 to C10)	µg/g	55	5	2500
F1 (C6 to C10) minus BTEX	µg/g	5	5	2500
F2 (C10 to C16)	µg/g	98	10	50
F3 (C16 to C34)	µg/g	300	50	<50
F4 (C34 to C50)	µg/g	2800	50	<50
Gravimetric Heavy Hydrocarbons	µg/g	2800	50	NA
Moisture Content	%	0.1	0.1	13.7
Surrogate	Unit	Acceptable Limits		
Terphenyl	%	60-140		96

Comments: RDL - Reported Detection Limit: G / S - Guideline / Standard: Refers to T2(RPI) - Current

4563784

Results are based on sample dry weight.

The C6-C10 fraction is calculated using toluene response factor.

The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.

Gravimetric Heavy Hydrocarbons are not included in the Total C16-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.

Total C6 - C50 results are corrected for BTEX contributions.

This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.

nC6 and nC10 response factors are within 30% of Toluene response factor.

nC10, nC16 and nC34 response factors are within 10% of their average.

C50 response factor is within 70% of nC10 + nC16 + nC34 average.

Linearity is within 15%.

Extraction and holding times were met for this sample.

Fractions 1-4 are quantified with the contribution of PAHs. Under Ontario Regulation 153, results are considered valid without determining the PAH contribution if not requested by the client.

Quality Control Data is available upon request.



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

Guideline Violation

AGAT WORK ORDER: 13T737770
PROJECT NO: 11-1170-0043

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Christi Groves

AGAT

Laboratories

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	GUIDEVALUE	RESULT
4563784	MWD29-SA3A	T2(RPI) - Current	O. Reg. 153(511) - PHCs F1 - F4 (Soil)	F1 (C6 to C10) minus BTEX	55	2500
4563784	MWD29-SA3A	T2(RPI) - Current	O. Reg. 153(511) - PHCs F1 - F4 (Soil)	Xylene Mixture	3.1	3.2



Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD.
 PROJECT NO: 11-1170-0043

AGAT WORK ORDER: 13T737770
 ATTENTION TO: Christi Groves

Trace Organics Analysis

RPT Date: Jul 26, 2013

PARAMETER	Batch	Sample Id	DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
			Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - PHCs F1 - F4 (Soil)															
Benzene	1		< 0.02	< 0.02	0.0%	< 0.02	98%	50%	140%	100%	60%	130%	118%	50%	140%
Toluene	1		< 0.08	< 0.08	0.0%	< 0.08	99%	50%	140%	100%	60%	130%	128%	50%	140%
Ethylbenzene	1		< 0.05	< 0.05	0.0%	< 0.05	99%	50%	140%	100%	60%	130%	117%	50%	140%
Xylene Mixture	1		< 0.05	< 0.05	0.0%	< 0.05	98%	50%	140%	100%	60%	130%	113%	50%	140%
F1 (C6 to C10)	1		< 5	< 5	0.0%	< 5	107%	60%	140%	102%	80%	120%	105%	60%	140%
F2 (C10 to C16)	1		< 10	< 10	0.0%	< 10	110%	60%	140%	85%	80%	120%	103%	60%	140%
F3 (C16 to C34)	1		< 50	< 50	0.0%	< 50	120%	60%	140%	96%	80%	120%	102%	60%	140%
F4 (C34 to C50)	1		< 50	< 50	0.0%	< 50	100%	60%	140%	110%	80%	120%	115%	60%	140%

Certified By: _____



Method Summary

CLIENT NAME: GOLDER ASSOCIATES LTD.

AGAT WORK ORDER: 13T737770

PROJECT NO: 11-1170-0043

ATTENTION TO: Christi Groves

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Benzene	VOL-91-5009	EPA SW-846 5035 & 8260	P & T GC/MS
Toluene	VOL-91-5009	EPA SW-846 5035 & 8260	P & T GC/MS
Ethylbenzene	VOL-91-5009	EPA SW-846 5035 & 8260	P & T GC/MS
Xylene Mixture	VOL-91-5009	EPA SW-846 5035 & 8260	P & T GC/MS
F1 (C6 to C10)	VOL-91-5009	CCME Tier 1 Method	P & T GC/FID
F1 (C6 to C10) minus BTEX	VOL-91-5009	CCME Tier 1 Method	P & T GC/FID
F2 (C10 to C16)	VOL-91-5009	CCME Tier 1 Method, EPA SW846 8015	GC / FID
F3 (C16 to C34)	VOL-91-5009	CCME Tier 1 Method, EPA SW846 8015	GC / FID
F4 (C34 to C50)	VOL-91-5009	CCME Tier 1 Method, EPA SW846 8015	GC / FID
Gravimetric Heavy Hydrocarbons	VOL-91-5009	CCME Tier 1 Method	BALANCE
Moisture Content	VOL-91-5009	CCME Tier 1 Method	BALANCE
Terphenyl	VOL-91-5009		GC/FID



Encore
Laboratories

5835 Coopers Avenue
Mississauga, Ontario
L4Z 1Y2
www.agatiabs.com • webearth.agatiabs.com

Laboratory Use Only

Arrival Temperature: 66.864
AGAT WO #: 646762
Lab Temperature: 646762
Notes: 131737770

Main of Custody Record

Ph.: 905.712.5100 • Fax: 905.712.5122 • Toll Free: 800.856.6261

Client Information:

Company: Golden Associates Ltd
Contact: Christi Groves
Address: 121 Commerce Park Dr, Unit 1
Barrie, ON L4N 8X1
Phone: 705-722-4442 Fax: 705-722-3786
Quotation #: 11-170-0043 PO: 11-592

Regulatory Requirements:

Regulation 153/09
 Regulation 558
Table 2 Indicate one
 Sewer Use
 CCME
 Other (specify) _____
Region _____ Indicate one
 Sanitary
 Storm
 Prov. Water Quality Objectives (PWQO)
 None
Soil Texture (check one)
 Coarse Fine

Please note, if quotation number is not provided, client will be billed full price for analysis.

Notice To:

Same: Yes No

Is this a drinking water sample?
(potable water intended for human consumption)
 Yes No

If "Yes", please use the Drinking Water Chain of Custody Form

Client Matrix

1. Ground Water Oil
2. Surface Water Paint
Sediment Soil

Report Information - reports to be sent to:

Name: Christi Groves
Email: cgroves@golden.com
Name: _____
Email: _____

Sample Identification: UDA-SAB417-J1-B 2nd Pl. S
Date Sampled: _____
Time Sampled: _____
Sample Matrix: _____
of Containers: 2
Comments: _____
Site/Sample Information: _____

Is this submission for a Record of Site Condition?

Yes No

*TAT is exclusive of weekends and statutory holidays

Date Required (Rush surcharges may apply):

Turnaround Time Required (TAT) Required*

Regular TAT

5 to 7 Working Days

Rush TAT (please provide prior notification)

Rush Surcharges Apply

3 Working Days

2 Working Days

1 Working Day

OR

Metals and Inorganics	Metals Scan	Hydride Forming Metals	Client Custom Metals	ORPs: <input type="checkbox"/> B-HWS <input type="checkbox"/> CI <input type="checkbox"/> CN <input type="checkbox"/> EC <input type="checkbox"/> FOC <input type="checkbox"/> C+6 <input type="checkbox"/> SAR <input type="checkbox"/> pH <input type="checkbox"/> NO ₂ <input type="checkbox"/> N Total <input type="checkbox"/> Hg <input type="checkbox"/> NH ₃ <input type="checkbox"/> TKN	Nutrients: <input type="checkbox"/> TP <input type="checkbox"/> NH ₃ <input type="checkbox"/> TKN	NO ₂ <input type="checkbox"/> NO ₃ <input type="checkbox"/> NO _x	VOC: <input type="checkbox"/> VOC <input type="checkbox"/> THM <input checked="" type="checkbox"/> BTEX	CMCME Fractions 1 to 4	ABNs	PAHs	Chlorophenols	PCBs	Organochlorine Pesticides	TCLP: <input type="checkbox"/> TCLP Metals/Inorganics	Sewer Use
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APPENDIX E

Laboratory Certificates of Analysis - Groundwater

146 Colonnade Rd. Unit 8
Ottawa, ON K2E 7Y1
Ph: (613) 727-5692 Fax: (613) 727-5722

658 Norms Court
Kingston, ON K7P 3R9
Ph: (613) 624-9307 Fax: (613) 634-9308

390 Vansickle Rd., Unit 630
St Catharines, ON L2R 6P7
Ph: (905) 680-8887 Fax: (905) 680-4256

LABORATORY USE ONLY
Report #: 1307311

Company Name: Golden Associates
 Report Attention: Christie Greene
 Phone: 613-222-4492 Fax: 613-222-4492
 Address: 121 Commerce Park Drive Unit 1
 City/Prov: Paris, ON Postal Code: L4W 3X1
 Project #: 18-170-0003 * Occulsion #:
 * Waterworks Number:

Company Name: Golden Associates
 Report Attention: Christie Greene
 Phone: 613-222-4492 Fax: 613-222-4492
 Address: 121 Commerce Park Drive Unit 1
 City/Prov: Paris, ON Postal Code: L4W 3X1
 Project #: 18-170-0003 * Occulsion #:
 * Waterworks Number:

Company Name: Golden Associates
 Report Attention: Christie Greene
 Phone: 613-222-4492 Fax: 613-222-4492
 Address: 121 Commerce Park Drive Unit 1
 City/Prov: Paris, ON Postal Code: L4W 3X1
 Project #: 18-170-0003 * Occulsion #:
 * Waterworks Number:

Invoice to:

(if different from above)
Leanda Physiotherapist
P.O. Box 456, Paris, ON
L4W 4T5

SAMPLE ANALYSIS REQUIRED

Sample Matrix	Sample Type (see Codes below)	MOE Reportable? (Y=Yes, N=No)	# of Containers	** Service Required (R=Rush, S=Standard)	RHC FILL	DO-Metals	Major Ions	Other Indicators	Criteria Required (V=Res, F=Filtered, P=Prepared)	Lab. Identification
GW	1	2	11	S	X	X	X		GDNS	1007301
GW	1	2	11	S	X	X	X			09
GW	1	2	11	S	X	X	X			10
GW	1	2	11	S	X	X	X			11
GW	1	2	11	S	X	X	X			12
GW	1	2	11	S	X	X	X			13
GW	1	2	11	S	X	X	X			14
GW	1	2	11	S	X	X	X			15
GW	1	2	11	S	X	X	X			16

Sample Type Codes: for Drinking Water Systems: RW - Raw Water, RWFC - Raw Water For Consumption, TW - Treated Water at point of entry to distribution, DW - Distribution, Plumbing Water
 MOE Reportable refers to the requirements under the SDWA for immediate reporting of results, which are indicators of adverse water quality to the Owner/Operator, MOE, and MCH Medical Officer.

Printed By: Scott Fisher Date/Time: 23 Oct 13 14:00
 Sign: [Signature] Date/Time: 10 Oct 13 14:00
 Work Authorized By (signature): [Signature] Date/Time: 10 Oct 13 14:00
 Print: 519 Sign: [Signature] Date/Time: 10 Oct 13 14:00

Comments: Metals
Water
3



CHAIN OF CUSTODY

1415 Colonnade Rd., Unit B
Ottawa ON K2E 7Y1
Ph. (613) 727-5892 Fax: (613) 727-5222

608 Norris Court
Kingston, ON K7P 2R9
Ph: (613) 634-9307 Fax: (613) 634-9306

LABORATORY USE ONLY
Report # 130911

Company Name: Galdec Associates
 Report Attention: CHRISTA GORON
 Phone: 165 722-4992 Ext: 7120
 * Waterworks Name: _____
 Address: 21 Commerce Park Drive Unit 1
 City/Prov: Barrie ON Postal Code: L4M 3X1
 Project #: 10170 0043 * Quotation #: _____
 Fax Results to: _____
 E-mail Results to: christa.goron@galdec.com
 Copy of Results to: _____
 Note that for drinking water samples, all exceedances will be reported where (and how) the applicable legislation requires.

SAMPLE ANALYSIS REQUIRED

Sample ID	Date/Time Collected	Sample Matrix (a Water, Soil, Pmt)	* Sample Type (see Codes below)	* MOE Reportable? (Y = Yes, N = No)	# of Containers	** Service Required (R = Rush, S = Standard)	RHC FI-PL	Dis. Metals and Inorganics	Major Ions (See attached)	Criteria Required (Include sub-projects as appropriate)	Laboratory Identification
MW-D1	11-01-03 PM	GW	1	2	1	S	X	X	X	ODMS	1017311
MW-D2	" " PM	GW	1	2	1	S	X	X	X		11
MW-D3	" " PM	GW	1	2	1	S	X	X	X		12
MW-D4	" " PM	GW	1	2	1	S	X	X	X		13
MW-D5	" " PM	GW	1	2	1	S	X	X	X		14
MW-D6	" " PM	GW	1	2	1	S	X	X	X		15
MW-D7	" " PM	GW	1	2	1	S	X	X	X		16
15.8 Blank							X	X	X		17

Sample Type Codes for Drinking Water Systems: RW = Raw Water; RWFC = Raw Water for Consumption; TW = Treated Water at point of entry to distribution; DW = Distributor/Pumping Water
 * MOE Reportable refers to the requirements under the SDWA for immediate reporting of results, which are indicators of adverse water quality, to the Owner/Operator MOF, and MOH Medical Officer

Sampled By: Scott Vlahakis Date/Time: 15-01-03 Relinquished By: S. Vlahakis Date/Time: 23-02-03
 Print: _____ Sign: _____
 Work Authorized By (signature): _____ Received By Lab: _____
 Print: _____ Sign: _____
 * Indicates a required field. If not complete, analysis will proceed only on verification of missing information. A quotation number is required if one was provided
 ** There may be surcharges applied to "Rush" service. Please check with lab prior to submission for files for rush analysis to confirm availability and pricing



E3 Laboratories Inc.
 SS#4, 360 York Rd., Unit 10, Niagara-on-the-Lake, Ontario L0S 1J0
 Email: info@e3labs.ca
 Tel: (905) 641-9000, Fax: (905) 641-9001

CERTIFICATE OF ANALYSIS

Golder Associates Ltd.
 Christi Groves
 121 Commerce Park Drive, Unit L
 Barrie
 L4N 8X1
 Tel: 705-722-4492

Fax:
 Email: cgroves@golder.com

Work Order No.:2514382
 Received : 2013-12-12
 PO Number:
 Reported: 2014-01-13
 Project Name: C of B-Historic Waste Sites
 Chain of Custody No.: 11776

Note: Re-issued to include revised subcontracted report. (Originally reported December 19, 2013)

Client Sample ID	Sample Date	Lab ID	Parameter	Result	Unit	RDL	Date Analyzed	Method
Strip Blank	2013-12-05	352827	VOC Scan	See	Attached	N/A	2013-12-16	Subcontracted
Field Blank 1	2013-12-10	352828	Alkalinity (CaCO3)	<2.00	mg/LCaCO3	2.00	2013-12-12	APHA 2320B mod
			Ammonia (Total)	<0.03	mg/L	0.03	2013-12-18	APHA 4500
			Anions	See	Attached	N/A	2013-12-13	Subcontracted
			Conductivity	2.0	uS/cm	N/A	2013-12-13	APHA 2510
			Cyanide (Free)	See	Attached	N/A	2013-12-18	Subcontracted
			F1-F4 PHC	See	Attached	N/A	2013-12-16	Subcontracted
			Metals	See	Attached	N/A	2013-12-18	Subcontracted
			PAHs	See	Attached	N/A	2013-12-16	Subcontracted
			pH	5.96	SU	N/A	2013-12-12	APHA 4500 A,B MOD
			Phenolics	<0.004	mg/L	0.004	2013-12-13	HACH 8047
			VOC Scan	See	Attached	N/A	2013-12-16	Subcontracted
Field Blank 2	2013-12-11	352829	Alkalinity (CaCO3)	<2.00	mg/LCaCO3	2.00	2013-12-12	APHA 2320B mod
			Ammonia (Total)	<0.03	mg/L	0.03	2013-12-18	APHA 4500
			Anions	See	Attached	N/A	2013-12-13	Subcontracted
			Conductivity	1.8	uS/cm	N/A	2013-12-13	APHA 2510
			Cyanide (Free)	See	Attached	N/A	2013-12-18	Subcontracted
			F1-F4 PHC	See	Attached	N/A	2013-12-16	Subcontracted
			Metals	See	Attached	N/A	2013-12-18	Subcontracted
			PAHs	See	Attached	N/A	2013-12-16	Subcontracted
			pH	5.01	SU	N/A	2013-12-12	APHA 4500 A,B MOD
			Phenolics	<0.004	mg/L	0.004	2013-12-13	HACH 8047
			VOC Scan	See	Attached	N/A	2013-12-16	Subcontracted
MW-D1	2013-12-11	352830	Alkalinity (CaCO3)	278	mg/LCaCO3	2.00	2013-12-12	APHA 2320B mod
			Ammonia (Total)	0.33	mg/L	0.03	2013-12-18	APHA 4500
			Anions	See	Attached	N/A	2013-12-13	Subcontracted
			Conductivity	1820	uS/cm	N/A	2013-12-13	APHA 2510
			Cyanide (Free)	See	Attached	N/A	2013-12-18	Subcontracted
			F1-F4 PHC	See	Attached	N/A	2013-12-16	Subcontracted
			Metals	See	Attached	N/A	2013-12-18	Subcontracted
			PAHs	See	Attached	N/A	2013-12-16	Subcontracted
			pH	6.86	SU	N/A	2013-12-12	APHA 4500 A,B MOD
			Phenolics	<0.004	mg/L	0.004	2013-12-16	HACH 8047

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 PO Number:
 Reported: 2014-01-13
 Project Name: C of B-Historic Waste Sites
 Chain of Custody No.: 11776

Client Sample ID	Sample		Parameter	Result	Unit	RDL	Date		Method
	Date	Lab ID					Analyzed		
MW-D1	2013-12-11	352830	VOC Scan	See	Attached	N/A	2013-12-16		Subcontracted
MW-D2	2013-12-11	352831	Alkalinity (CaCO3)	848	mg/LCaCO3	2.00	2013-12-12		APHA 2320B mod
			Ammonia (Total)	68.7	mg/L	0.03	2013-12-18		APHA 4500
			Anions	See	Attached	N/A	2013-12-13		Subcontracted
			Conductivity	1620	uS/cm	N/A	2013-12-13		APHA 2510
			Cyanide (Free)	See	Attached	N/A	2013-12-18		Subcontracted
			F1-F4 PHC	See	Attached	N/A	2013-12-16		Subcontracted
			Metals	See	Attached	N/A	2013-12-18		Subcontracted
			PAHs	See	Attached	N/A	2013-12-16		Subcontracted
			pH	6.20	SU	N/A	2013-12-12		APHA 4500 A,B MOD
			Phenolics	0.028	mg/L	0.004	2013-12-16		HACH 8047
			VOC Scan	See	Attached	N/A	2013-12-16		Subcontracted
MW-D3	2013-12-11	352832	Alkalinity (CaCO3)	1670	mg/LCaCO3	2.00	2013-12-12		APHA 2320B mod
			Ammonia (Total)	261	mg/L	0.03	2013-12-18		APHA 4500
			Anions	See	Attached	N/A	2013-12-13		Subcontracted
			Conductivity	3670	uS/cm	N/A	2013-12-13		APHA 2510
			Cyanide (Free)	See	Attached	N/A	2013-12-18		Subcontracted
			F1-F4 PHC	See	Attached	N/A	2013-12-16		Subcontracted
			Metals	See	Attached	N/A	2013-12-18		Subcontracted
			PAHs	See	Attached	N/A	2013-12-16		Subcontracted
			pH	6.48	SU	N/A	2013-12-12		APHA 4500 A,B MOD
			Phenolics	0.108	mg/L	0.004	2013-12-16		HACH 8047
			VOC Scan	See	Attached	N/A	2013-12-16		Subcontracted
MW-D4	2013-12-11	352833	Alkalinity (CaCO3)	1430	mg/LCaCO3	2.00	2013-12-12		APHA 2320B mod
			Ammonia (Total)	232	mg/L	0.03	2013-12-18		APHA 4500
			Anions	See	Attached	N/A	2013-12-13		Subcontracted
			Conductivity	2880	uS/cm	N/A	2013-12-13		APHA 2510
			Cyanide (Free)	See	Attached	N/A	2013-12-18		Subcontracted
			F1-F4 PHC	See	Attached	N/A	2013-12-16		Subcontracted
			Metals	See	Attached	N/A	2013-12-18		Subcontracted
			PAHs	See	Attached	N/A	2013-12-16		Subcontracted
			pH	6.62	SU	N/A	2013-12-12		APHA 4500 A,B MOD
			Phenolics	0.080	mg/L	0.004	2013-12-16		HACH 8047
			VOC Scan	See	Attached	N/A	2013-12-16		Subcontracted

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 Chain of Custody No.: 11776

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	Date	Lab ID					Analyzed		
W-D5	2013-12-12	352834	Alkalinity (CaCO3)	782	mg/LCaCO3	2.00	2013-12-12	APHA 2320B mod	
			Ammonia (Total)	43.8	mg/L	0.03	2013-12-18	APHA 4500	
			Anions	See	Attached	N/A	2013-12-13	Subcontracted	
			Conductivity	1380	uS/cm	N/A	2013-12-13	APHA 2510	
			Cyanide (Free)	See	Attached	N/A	2013-12-18	Subcontracted	
			F1-F4 PHC	See	Attached	N/A	2013-12-16	Subcontracted	
			Metals	See	Attached	N/A	2013-12-18	Subcontracted	
			PAHs	See	Attached	N/A	2013-12-16	Subcontracted	
			pH	6.32	SU	N/A	2013-12-12	APHA 4500 A,B MOD	
			Phenolics	0.027	mg/L	0.004	2013-12-16	HACH 8047	
			VOC Scan	See	Attached	N/A	2013-12-16	Subcontracted	
			MW-D6	2013-12-11	352835	Alkalinity (CaCO3)	805	mg/LCaCO3	2.00
Ammonia (Total)	16.2	mg/L				0.03	2013-12-18	APHA 4500	
Anions	See	Attached				N/A	2013-12-13	Subcontracted	
Conductivity	1790	uS/cm				N/A	2013-12-13	APHA 2510	
Cyanide (Free)	See	Attached				N/A	2013-12-18	Subcontracted	
F1-F4 PHC	See	Attached				N/A	2013-12-16	Subcontracted	
Metals	See	Attached				N/A	2013-12-18	Subcontracted	
PAHs	See	Attached				N/A	2013-12-16	Subcontracted	
pH	6.43	SU				N/A	2013-12-12	APHA 4500 A,B MOD	
Phenolics	0.013	mg/L				0.004	2013-12-16	HACH 8047	
VOC Scan	See	Attached				N/A	2013-12-16	Subcontracted	
IW-D7	2013-12-11	352836				Alkalinity (CaCO3)	541	mg/LCaCO3	2.00
			Ammonia (Total)	16.3	mg/L	0.03	2013-12-18	APHA 4500	
			Anions	See	Attached	N/A	2013-12-13	Subcontracted	
			Conductivity	3050	uS/cm	N/A	2013-12-13	APHA 2510	
			Cyanide (Free)	See	Attached	N/A	2013-12-18	Subcontracted	
			F1-F4 PHC	See	Attached	N/A	2013-12-16	Subcontracted	
			Metals	See	Attached	N/A	2013-12-18	Subcontracted	
			PAHs	See	Attached	N/A	2013-12-16	Subcontracted	
			pH	6.56	SU	N/A	2013-12-12	APHA 4500 A,B MOD	
			Phenolics	0.007	mg/L	0.004	2013-12-16	HACH 8047	
			VOC Scan	See	Attached	N/A	2013-12-16	Subcontracted	

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	Date	Lab ID					Analyzed	Method			
MW-D26	2013-12-11	352837	Alkalinity (CaCO3)	209	mg/LCaCO3	2.00	2013-12-12	APHA 2320B mod			
			Ammonia (Total)	0.08	mg/L	0.03	2013-12-18	APHA 4500			
			Anions	See	Attached	N/A	2013-12-13	Subcontracted			
			Conductivity	869	uS/cm	N/A	2013-12-13	APHA 2510			
			Cyanide (Free)	See	Attached	N/A	2013-12-18	Subcontracted			
			F1-F4 PHC	See	Attached	N/A	2013-12-16	Subcontracted			
			Metals	See	Attached	N/A	2013-12-18	Subcontracted			
			PAHs	See	Attached	N/A	2013-12-16	Subcontracted			
			pH	7.15	SU	N/A	2013-12-12	APHA 4500 A,B MOD			
			Phenolics	<0.004	mg/L	0.004	2013-12-16	HACH 8047			
			VOC Scan	See	Attached	N/A	2013-12-16	Subcontracted			
			MW-B1	2013-12-10	352838	Alkalinity (CaCO3)	373	mg/LCaCO3	2.00	2013-12-12	APHA 2320B mod
						Ammonia (Total)	0.10	mg/L	0.03	2013-12-18	APHA 4500
Anions	See	Attached				N/A	2013-12-13	Subcontracted			
Conductivity	3740	uS/cm				N/A	2013-12-13	APHA 2510			
Cyanide (Free)	See	Attached				N/A	2013-12-18	Subcontracted			
F1-F4 PHC	See	Attached				N/A	2013-12-16	Subcontracted			
Metals	See	Attached				N/A	2013-12-18	Subcontracted			
PAHs	See	Attached				N/A	2013-12-16	Subcontracted			
pH	6.96	SU				N/A	2013-12-12	APHA 4500 A,B MOD			
Phenolics	0.004	mg/L				0.004	2013-12-16	HACH 8047			
VOC Scan	See	Attached				N/A	2013-12-16	Subcontracted			
MW-B2	2013-12-10	352839				Alkalinity (CaCO3)	565	mg/LCaCO3	2.00	2013-12-12	APHA 2320B mod
						Ammonia (Total)	12.9	mg/L	0.03	2013-12-18	APHA 4500
			Anions	See	Attached	N/A	2013-12-13	Subcontracted			
			Conductivity	1970	uS/cm	N/A	2013-12-13	APHA 2510			
			Cyanide (Free)	See	Attached	N/A	2013-12-18	Subcontracted			
			F1-F4 PHC	See	Attached	N/A	2013-12-16	Subcontracted			
			Metals	See	Attached	N/A	2013-12-18	Subcontracted			
			PAHs	See	Attached	N/A	2013-12-16	Subcontracted			
			pH	6.62	SU	N/A	2013-12-12	APHA 4500 A,B MOD			
			Phenolics	0.010	mg/L	0.004	2013-12-16	HACH 8047			
			VOC Scan	See	Attached	N/A	2013-12-16	Subcontracted			
			MW-B3	2013-12-10	352840	Alkalinity (CaCO3)	251	mg/LCaCO3	2.00	2013-12-12	APHA 2320B mod

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Client Sample ID	Sample		Parameter	Result	Unit	RDL	Date		Method
	Date	Lab ID					Analyzed		
IW-B3	2013-12-10	352840	Ammonia (Total)	0.48	mg/L	0.03	2013-12-18	APHA 4500	
			Anions	See	Attached	N/A	2013-12-13	Subcontracted	
			Conductivity	1300	uS/cm	N/A	2013-12-13	APHA 2510	
			Cyanide (Free)	See	Attached	N/A	2013-12-18	Subcontracted	
			F1-F4 PHC	See	Attached	N/A	2013-12-16	Subcontracted	
			Metals	See	Attached	N/A	2013-12-18	Subcontracted	
			PAHs	See	Attached	N/A	2013-12-16	Subcontracted	
			pH	6.94	SU	N/A	2013-12-12	APHA 4500 A,B MOD	
			Phenolics	0.108	mg/L	0.004	2013-12-17	HACH 8047	
			VOC Scan	See	Attached	N/A	2013-12-16	Subcontracted	
			4	2013-12-12	352841	Alkalinity (CaCO3)	1040	mg/LCaCO3	2.00
Ammonia (Total)	149	mg/L				0.03	2013-12-18	APHA 4500	
Anions	See	Attached				N/A	2013-12-13	Subcontracted	
Conductivity	3460	uS/cm				N/A	2013-12-13	APHA 2510	
Cyanide (Free)	See	Attached				N/A	2013-12-18	Subcontracted	
F1-F4 PHC	See	Attached				N/A	2013-12-16	Subcontracted	
Metals	See	Attached				N/A	2013-12-18	Subcontracted	
PAHs	See	Attached				N/A	2013-12-16	Subcontracted	
pH	6.48	SU				N/A	2013-12-12	APHA 4500 A,B MOD	
Phenolics	0.028	mg/L				0.004	2013-12-17	HACH 8047	
VOC Scan	See	Attached				N/A	2013-12-16	Subcontracted	
MW-B5	2013-12-10	352842	Alkalinity (CaCO3)	298	mg/LCaCO3	2.00	2013-12-12	APHA 2320B mod	
			Ammonia (Total)	2.26	mg/L	0.03	2013-12-18	APHA 4500	
			Anions	See	Attached	N/A	2013-12-13	Subcontracted	
			Conductivity	1950	uS/cm	N/A	2013-12-13	APHA 2510	
			Cyanide (Free)	See	Attached	N/A	2013-12-18	Subcontracted	
			F1-F4 PHC	See	Attached	N/A	2013-12-16	Subcontracted	
			Metals	See	Attached	N/A	2013-12-18	Subcontracted	
			PAHs	See	Attached	N/A	2013-12-16	Subcontracted	
			pH	6.78	SU	N/A	2013-12-12	APHA 4500 A,B MOD	
			Phenolics	0.006	mg/L	0.004	2013-12-17	HACH 8047	
			VOC Scan	See	Attached	N/A	2013-12-16	Subcontracted	
IW-B6	2013-12-10	352843	Alkalinity (CaCO3)	592	mg/LCaCO3	2.00	2013-12-12	APHA 2320B mod	
			Ammonia (Total)	30.3	mg/L	0.03	2013-12-18	APHA 4500	

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MW-B6	2013-12-10	352843	Anions	See	Attached	N/A	2013-12-13	Subcontracted	
			Conductivity	3290	uS/cm	N/A	2013-12-13	APHA 2510	
			Cyanide (Free)	See	Attached	N/A	2013-12-18	Subcontracted	
			F1-F4 PHC	See	Attached	N/A	2013-12-16	Subcontracted	
			Metals	See	Attached	N/A	2013-12-18	Subcontracted	
			PAHs	See	Attached	N/A	2013-12-16	Subcontracted	
			pH	6.35	SU	N/A	2013-12-12	APHA 4500 A,B MOD	
			Phenolics	0.015	mg/L	0.004	2013-12-17	HACH 8047	
			VOC Scan	See	Attached	N/A	2013-12-16	Subcontracted	
MW-B7	2013-12-10	352844	Alkalinity (CaCO3)	432	mg/LCaCO3	2.00	2013-12-12	APHA 2320B mod	
			Ammonia (Total)	8.96	mg/L	0.03	2013-12-18	APHA 4500	
			Anions	See	Attached	N/A	2013-12-13	Subcontracted	
			Conductivity	2350	uS/cm	N/A	2013-12-13	APHA 2510	
			Cyanide (Free)	See	Attached	N/A	2013-12-18	Subcontracted	
			F1-F4 PHC	See	Attached	N/A	2013-12-16	Subcontracted	
			Metals	See	Attached	N/A	2013-12-18	Subcontracted	
			PAHs	See	Attached	N/A	2013-12-16	Subcontracted	
			pH	6.60	SU	N/A	2013-12-12	APHA 4500 A,B MOD	
			Phenolics	<0.004	mg/L	0.004	2013-12-17	HACH 8047	
			VOC Scan	See	Attached	N/A	2013-12-16	Subcontracted	
			MW-B23	2013-12-10	352845	Alkalinity (CaCO3)	306	mg/LCaCO3	2.00
Ammonia (Total)	1.84	mg/L				0.03	2013-12-18	APHA 4500	
Anions	See	Attached				N/A	2013-12-13	Subcontracted	
Conductivity	3210	uS/cm				N/A	2013-12-13	APHA 2510	
Cyanide (Free)	See	Attached				N/A	2013-12-18	Subcontracted	
F1-F4 PHC	See	Attached				N/A	2013-12-16	Subcontracted	
Metals	See	Attached				N/A	2013-12-18	Subcontracted	
PAHs	See	Attached				N/A	2013-12-16	Subcontracted	
pH	6.75	SU				N/A	2013-12-12	APHA 4500 A,B MOD	
Phenolics	<0.004	mg/L				0.004	2013-12-17	HACH 8047	
VOC Scan	See	Attached				N/A	2013-12-16	Subcontracted	
Dup 1	2013-12-10	352846				Alkalinity (CaCO3)	575	mg/LCaCO3	2.00
			Ammonia (Total)	30.0	mg/L	0.03	2013-12-18	APHA 4500	
			Anions	See	Attached	N/A	2013-12-13	Subcontracted	

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up 1	2013-12-10	352846	Conductivity	3410	uS/cm	N/A	2013-12-13	APHA 2510	
			Cyanide (Free)	See	Attached	N/A	2013-12-18	Subcontracted	
			F1-F4 PHC	See	Attached	N/A	2013-12-16	Subcontracted	
			Metals	See	Attached	N/A	2013-12-18	Subcontracted	
			PAHs	See	Attached	N/A	2013-12-16	Subcontracted	
			pH	6.34	SU	N/A	2013-12-12	APHA 4500 A,B MOD	
			Phenolics	0.011	mg/L	0.004	2013-12-17	HACH 8047	
			VOC Scan	See	Attached	N/A	2013-12-16	Subcontracted	
Dup 2	2013-12-11	352847	Alkalinity (CaCO3)	546	mg/LCaCO3	2.00	2013-12-12	APHA 2320B mod	
			Ammonia (Total)	15.6	mg/L	0.03	2013-12-18	APHA 4500	
			Anions	See	Attached	N/A	2013-12-13	Subcontracted	
			Conductivity	2940	uS/cm	N/A	2013-12-13	APHA 2510	
			Cyanide (Free)	See	Attached	N/A	2013-12-18	Subcontracted	
			F1-F4 PHC	See	Attached	N/A	2013-12-16	Subcontracted	
			Metals	See	Attached	N/A	2013-12-18	Subcontracted	
			PAHs	See	Attached	N/A	2013-12-16	Subcontracted	
			pH	6.62	SU	N/A	2013-12-12	APHA 4500 A,B MOD	
			Phenolics	0.004	mg/L	0.004	2013-12-17	HACH 8047	
VOC Scan	See	Attached	N/A	2013-12-16	Subcontracted				
WB1	2013-12-10	352848	Alkalinity (CaCO3)	279	mg/LCaCO3	2.00	2013-12-12	APHA 2320B mod	
			Ammonia (Total)	0.96	mg/L	0.03	2013-12-18	APHA 4500	
			Chloride	467	mg/L	0.25	2013-12-18	HACH 8113	
			Conductivity	2110	uS/cm	N/A	2013-12-13	APHA 2510	
			F1-F4 PHC	See	Attached	N/A	2013-12-16	Subcontracted	
			Metals	See	Attached	N/A	2013-12-18	Subcontracted	
			PAHs	See	Attached	N/A	2013-12-16	Subcontracted	
			pH	7.68	SU	N/A	2013-12-12	APHA 4500 A,B MOD	
			Sulfate (SO4)	30	mg/L	10	2013-12-13	HACH 8051	
			VOC Scan	See	Attached	N/A	2013-12-16	Subcontracted	
WB2	2013-12-10	352849	Alkalinity (CaCO3)	302	mg/LCaCO3	2.00	2013-12-12	APHA 2320B mod	
			Ammonia (Total)	0.66	mg/L	0.03	2013-12-18	APHA 4500	
			Chloride	478	mg/L	0.25	2013-12-18	HACH 8113	
			Conductivity	2130	uS/cm	N/A	2013-12-13	APHA 2510	
			F1-F4 PHC	See	Attached	N/A	2013-12-16	Subcontracted	

Reported by:

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 Tel: 705-722-4492

Fax:
 Email: cgroves@golder.com

Work Order No.: 2514382
 Received : 2013-12-12
 PO Number:
 Reported: 2014-01-13
 Project Name: C of B-Historic Waste Sites
 Chain of Custody No.: 11776

Client Sample ID	Sample		Parameter	Result	Unit	RDL	Date Analyzed	Method
	Date	Lab ID						
SW B2	2013-12-10	352849	Metals	See	Attached	N/A	2013-12-18	Subcontracted
			PAHs	See	Attached	N/A	2013-12-16	Subcontracted
			pH	7.70	SU	N/A	2013-12-12	APHA 4500 A,B MOD
			Sulfate (SO4)	40	mg/L	10	2013-12-13	HACH 8051
			VOC Scan	See	Attached	N/A	2013-12-16	Subcontracted
SW B3	2013-12-10	352850	Alkalinity (CaCO3)	292	mg/LCaCO3	2.00	2013-12-12	APHA 2320B mod
			Ammonia (Total)	0.56	mg/L	0.03	2013-12-18	APHA 4500
			Chloride	522	mg/L	0.25	2013-12-18	HACH 8113
			Conductivity	2300	uS/cm	N/A	2013-12-13	APHA 2510
			F1-F4 PHC	See	Attached	N/A	2013-12-16	Subcontracted
			Metals	See	Attached	N/A	2013-12-18	Subcontracted
			PAHs	See	Attached	N/A	2013-12-16	Subcontracted
			pH	7.66	SU	N/A	2013-12-12	APHA 4500 A,B MOD
			Sulfate (SO4)	40	mg/L	10	2013-12-13	HACH 8051
			VOC Scan	See	Attached	N/A	2013-12-16	Subcontracted
SW B4	2013-12-10	352851	Alkalinity (CaCO3)	295	mg/LCaCO3	2.00	2013-12-12	APHA 2320B mod
			Ammonia (Total)	0.51	mg/L	0.03	2013-12-18	APHA 4500
			Chloride	505	mg/L	0.25	2013-12-18	HACH 8113
			Conductivity	2310	uS/cm	N/A	2013-12-13	APHA 2510
			F1-F4 PHC	See	Attached	N/A	2013-12-16	Subcontracted
			Metals	See	Attached	N/A	2013-12-18	Subcontracted
			PAHs	See	Attached	N/A	2013-12-16	Subcontracted
			pH	7.73	SU	N/A	2013-12-12	APHA 4500 A,B MOD
			Sulfate (SO4)	40	mg/L	10	2013-12-13	HACH 8051
			VOC Scan	See	Attached	N/A	2013-12-16	Subcontracted
SW B5	2013-12-10	352852	Alkalinity (CaCO3)	298	mg/LCaCO3	2.00	2013-12-12	APHA 2320B mod
			Ammonia (Total)	0.25	mg/L	0.03	2013-12-18	APHA 4500
			Chloride	469	mg/L	0.25	2013-12-18	HACH 8113
			Conductivity	2260	uS/cm	N/A	2013-12-13	APHA 2510
			F1-F4 PHC	See	Attached	N/A	2013-12-16	Subcontracted
			Metals	See	Attached	N/A	2013-12-18	Subcontracted
			PAHs	See	Attached	N/A	2013-12-16	Subcontracted
			pH	7.78	SU	N/A	2013-12-12	APHA 4500 A,B MOD
			Sulfate (SO4)	40	mg/L	10	2013-12-13	HACH 8051

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Work Order No.:2514382
 Received : 2013-12-12
 PO Number:
 Reported: 2014-01-13
 Project Name: C of B-Historic Waste Sites
 Chain of Custody No.: 11776

Client Sample ID	Sample		Parameter	Result	Unit	RDL	Date		Method
	Date	Lab ID					Analyzed		
WB5	2013-12-10	352852	VOC Scan	See	Attached	N/A	2013-12-16		Subcontracted
SW D1	2013-12-11	352853	Alkalinity (CaCO3)	318	mg/LCaCO3	2.00	2013-12-12		APHA 2320B mod
			Ammonia (Total)	0.86	mg/L	0.03	2013-12-18		APHA 4500
			Chloride	303	mg/L	0.25	2013-12-18		HACH 8113
			Conductivity	1610	uS/cm	N/A	2013-12-13		APHA 2510
			F1-F4 PHC	See	Attached	N/A	2013-12-16		Subcontracted
			Metals	See	Attached	N/A	2013-12-18		Subcontracted
			PAHs	See	Attached	N/A	2013-12-16		Subcontracted
			pH	7.62	SU	N/A	2013-12-12		APHA 4500 A,B MOD
			Sulfate (SO4)	30	mg/L	10	2013-12-13		HACH 8051
VOC Scan	See	Attached	N/A	2013-12-16		Subcontracted			
SW D2	2013-12-11	352854	Alkalinity (CaCO3)	327	mg/LCaCO3	2.00	2013-12-12		APHA 2320B mod
			Ammonia (Total)	0.62	mg/L	0.03	2013-12-18		APHA 4500
			Chloride	302	mg/L	0.25	2013-12-18		HACH 8113
			Conductivity	1560	uS/cm	N/A	2013-12-13		APHA 2510
			F1-F4 PHC	See	Attached	N/A	2013-12-16		Subcontracted
			Metals	See	Attached	N/A	2013-12-18		Subcontracted
			PAHs	See	Attached	N/A	2013-12-16		Subcontracted
			pH	7.67	SU	N/A	2013-12-12		APHA 4500 A,B MOD
			Sulfate (SO4)	30	mg/L	10	2013-12-13		HACH 8051
VOC Scan	See	Attached	N/A	2013-12-16		Subcontracted			
SW D3	2013-12-11	352855	Alkalinity (CaCO3)	325	mg/LCaCO3	2.00	2013-12-12		APHA 2320B mod
			Ammonia (Total)	0.31	mg/L	0.03	2013-12-18		APHA 4500
			Chloride	268	mg/L	0.25	2013-12-18		HACH 8113
			Conductivity	1400	uS/cm	N/A	2013-12-13		APHA 2510
			F1-F4 PHC	See	Attached	N/A	2013-12-16		Subcontracted
			Metals	See	Attached	N/A	2013-12-18		Subcontracted
			PAHs	See	Attached	N/A	2013-12-16		Subcontracted
			pH	7.68	SU	N/A	2013-12-12		APHA 4500 A,B MOD
			Sulfate (SO4)	30	mg/L	10	2013-12-13		HACH 8051
VOC Scan	See	Attached	N/A	2013-12-16		Subcontracted			
W D4	2013-12-11	352856	Alkalinity (CaCO3)	326	mg/LCaCO3	2.00	2013-12-12		APHA 2320B mod
			Ammonia (Total)	0.66	mg/L	0.03	2013-12-18		APHA 4500

Reported by:

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 Received : 2013-12-12
 PO Number:
 Reported: 2014-01-13
 Project Name: C of B-Historic Waste Sites
 Chain of Custody No.: 11776

Client Sample ID	Sample		Parameter	Result	Unit	RDL	Date		Method
	Date	Lab ID					Analyzed		
SW D4	2013-12-11	352856	Chloride	318	mg/L	0.25	2013-12-18	HACH 8113	
			Conductivity	1420	uS/cm	N/A	2013-12-13	APHA 2510	
			F1-F4 PHC	See	Attached	N/A	2013-12-16	Subcontracted	
			Metals	See	Attached	N/A	2013-12-18	Subcontracted	
			PAHs	See	Attached	N/A	2013-12-16	Subcontracted	
			pH	7.63	SU	N/A	2013-12-12	APHA 4500 A.B MOD	
			Sulfate (SO4)	40	mg/L	10	2013-12-13	HACH 8051	
			VOC Scan	See	Attached	N/A	2013-12-16	Subcontracted	
SW D5	2013-12-11	352857	Alkalinity (CaCO3)	319	mg/LCaCO3	2.00	2013-12-12	APHA 2320B mod	
			Ammonia (Total)	0.48	mg/L	0.03	2013-12-18	APHA 4500	
			Chloride	311	mg/L	0.25	2013-12-18	HACH 8113	
			Conductivity	1550	uS/cm	N/A	2013-12-13	APHA 2510	
			F1-F4 PHC	See	Attached	N/A	2013-12-16	Subcontracted	
			Metals	See	Attached	N/A	2013-12-18	Subcontracted	
			PAHs	See	Attached	N/A	2013-12-16	Subcontracted	
			pH	7.71	SU	N/A	2013-12-12	APHA 4500 A.B MOD	
			Sulfate (SO4)	40	mg/L	10	2013-12-13	HACH 8051	
			VOC Scan	See	Attached	N/A	2013-12-16	Subcontracted	
Dup 3	2013-12-11	352858	Alkalinity (CaCO3)	325	mg/LCaCO3	2.00	2013-12-12	APHA 2320B mod	
			Ammonia (Total)	0.88	mg/L	0.03	2013-12-18	APHA 4500	
			Chloride	328	mg/L	0.25	2013-12-18	HACH 8113	
			Conductivity	1570	uS/cm	N/A	2013-12-13	APHA 2510	
			F1-F4 PHC	See	Attached	N/A	2013-12-16	Subcontracted	
			Metals	See	Attached	N/A	2013-12-18	Subcontracted	
			PAHs	See	Attached	N/A	2013-12-16	Subcontracted	
			pH	7.68	SU	N/A	2013-12-12	APHA 4500 A.B MOD	
			Sulfate (SO4)	30	mg/L	10	2013-12-13	HACH 8051	
			VOC Scan	See	Attached	N/A	2013-12-16	Subcontracted	
MW D29	2013-12-11	352859	Alkalinity (CaCO3)	534	mg/LCaCO3	2.00	2013-12-16	APHA 2320B mod	
			Ammonia (Total)	6.04	mg/L	0.03	2013-12-18	APHA 4500	
			Anions	See	Attached	N/A	2013-12-13	Subcontracted	
			Conductivity	3250	uS/cm	N/A	2013-12-13	APHA 2510	
			Cyanide (Free)	See	Attached	N/A	2013-12-18	Subcontracted	
			F1-F4 PHC	See	Attached	N/A	2013-12-16	Subcontracted	

Reported by:

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 Laboratory Manager

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Work Order No.:2514382
 Received : 2013-12-12
 PO Number:
 Reported: 2014-01-13
 Project Name:
 Chain of Custody No.:

Client Sample ID	Sample		Parameter	Result	Unit	RDL	Date		Method
	Date	Lab ID					Analyzed		
W D29	2013-12-11	352859	Metals	See	Attached	N/A	2013-12-18	Subcontracted	
			PAHs	See	Attached	N/A	2013-12-16	Subcontracted	
			pH	6.68	SU	N/A	2013-12-12	APHA 4500 A,B MOD	
			Phenolics	<0.004	mg/L	0.004	2013-12-17	HACH 8047	
			VOC Scan	See	Attached	N/A	2013-12-16	Subcontracted	

Reported by:

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 Laboratory Manager

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Certificate of Analysis

E-3 Laboratories Inc.

RR#4, 360 York Rd. Unit 10
Niagara-on-the-Lake, ON L0S 1J0

Attn: Kristy LeBrasseur

Client PO: 2514382
Project: City of Barrie
Custody:

Phone: (905) 641-9000
Fax: (905) 641-9001

Report Date: 13-Jan-2014
Order Date: 12-Dec-2013

Revised Report **Order #: 1350281**

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

Paracel ID	Client ID
1350281-01	352827 - Trip Blank
1350281-02	352828 - Field Blank 1
1350281-03	352829 - Field Blank 2
1350281-04	352830 - MW D1
1350281-05	352831 - MW D2
1350281-06	352832 - MW D3
1350281-07	352833 - MW D4
1350281-08	352834 - MW D5
1350281-09	352835 - MW D6
1350281-10	352836 - MW D7
1350281-11	352837 - MW D26
1350281-12	352838 - MW B1
1350281-13	352839 - MW B2
1350281-14	352840 - MW B3
1350281-15	352841 - MW B4
1350281-16	352842 - MW B5
1350281-17	352843 - MW B6
1350281-18	352844 - MW B7
1350281-19	352845 - MW B23
1350281-20	352846 - Dup 1
1350281-21	352847 - Dup 2
1350281-22	352848 - SW B1
1350281-23	352849 - SW B2
1350281-24	352850 - SW B3
1350281-25	352851 - SW B4
1350281-26	352852 - SW B5
1350281-27	352853 - SW D1

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 Analysis

Report Date: 13-Jan-2014
Order Date: 12-Dec-2013

Client: E-3 Laboratories Inc.

Client PO: 2514382

Project Description: City of Barrie

1350281-28	352854 - SW D2
1350281-29	352855 - SW D3
1350281-30	352856 - SW D4
1350281-31	352857 - SW D5
1350281-32	352858 - Dup 3
1350281-33	352859 - MW D29

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

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

Certificate of Analysis

Client: **E-3 Laboratories Inc.**
Client PO: 2514382

Project Description: **City of Barrie**

Report Date: 13-Jan
Order Date: 12

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis
Anions	EPA 300.1 - IC	13-Dec-13	13-C
Chromium, hexavalent	MOE E3056 - colourimetric	13-Dec-13	13-C
Chromium, trivalent	Calculation	18-Dec-13	18-C
Cyanide, free	MOE E3015 - Auto Colour	17-Dec-13	18-C
Hardness	Hardness	19-Dec-13	19-C
Hardness	Hardness as CaCO3	18-Dec-13	19-C
Mercury	EPA 245.1 - Cold Vapour AA	16-Dec-13	16-C
Mercury, dissolved	EPA 245.2 - CVAA	16-Dec-13	16-C
Metals, ICP-MS	EPA 200.8 - ICP-MS	18-Dec-13	18-C
PAHs by GC-MS	EPA 625 - GC-MS, extraction	16-Dec-13	17-C
PHC F1	CWS Tier 1 - P&T GC-FID	16-Dec-13	16-C
PHC F2 - F4	CWS Tier 1 - GC-FID, extraction	13-Dec-13	13-C
VOCs by P&T GC-MS	EPA 624 - P&T GC-MS	16-Dec-13	16-C

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SARNIA
123 Christine St. N
Sarnia, ON N7T 3T7

Certificate of Analysis

Report Date: 13-Jan-2014
Order Date: 12-Dec-2013

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

	Client ID:	352827 - Trip Blank	352828 - Field Blank 1	352829 - Field Blank 2	352830 - MW D1
	Sample Date:	05-Dec-13	10-Dec-13	11-Dec-13	11-Dec-13
	Sample ID:	1350281-01	1350281-02	1350281-03	1350281-04
	MDL/Units	Water	Water	Water	Water

General Inorganics

	MDL/Units	352827 - Trip Blank	352828 - Field Blank 1	352829 - Field Blank 2	352830 - MW D1
Cyanide, free	2 ug/L	-	<2	<2	<2
Hardness	1.0 mg/L	-	<1.0	<1.0	273

Anions

	MDL/Units	352827 - Trip Blank	352828 - Field Blank 1	352829 - Field Blank 2	352830 - MW D1
Bromide	0.1 mg/L	-	<0.1	<0.1	0.1
Chloride	1 mg/L	-	<1	<1	400
Fluoride	0.1 mg/L	-	<0.1	<0.1	<0.1
Nitrate as N	0.1 mg/L	-	<0.1	<0.1	<0.1
Nitrite as N	0.05 mg/L	-	<0.05	<0.05	<0.05
Phosphate as P	1 mg/L	-	<1	<1	<1
Sulphate	1 mg/L	-	<1	<1	41

Metals

	MDL/Units	352827 - Trip Blank	352828 - Field Blank 1	352829 - Field Blank 2	352830 - MW D1
Mercury	0.1 ug/L	-	<0.1	0.1	<0.1
Antimony	0.5 ug/L	-	<0.5	<0.5	<0.5
Arsenic	1 ug/L	-	<1	<1	<1
Barium	1 ug/L	-	<1	<1	183
Beryllium	0.5 ug/L	-	<0.5	<0.5	<0.5
Boron	10 ug/L	-	<10	<10	16
Cadmium	0.1 ug/L	-	<0.1	<0.1	<0.1
Calcium	100 ug/L	-	<100	<100	97200
Chromium	1 ug/L	-	<1	<1	7
Chromium (III)	10 ug/L	-	<10	<10	<10
Chromium (VI)	10 ug/L	-	<10	<10	<10
Cobalt	0.5 ug/L	-	<0.5	<0.5	0.8
Copper	0.5 ug/L	-	<0.5	<0.5	0.6
Iron	100 ug/L	-	<100	<100	126
Lead	0.1 ug/L	-	<0.1	<0.1	<0.1
Magnesium	200 ug/L	-	<200	<200	7270
Molybdenum	0.5 ug/L	-	<0.5	<0.5	<0.5
Nickel	1 ug/L	-	<1	<1	3
Potassium	100 ug/L	-	<100	<100	1890
Selenium	1 ug/L	-	<1	<1	<1
Silver	0.1 ug/L	-	<0.1	<0.1	<0.1
Sodium	200 ug/L	-	<200	<200	280000

Certificate of Analysis

Report Date: 13-Jan-2014
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Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

	Client ID:	352827 - Trip Blank	352828 - Field Blank 1	352829 - Field Blank 2	352830 - MW D1
	Sample Date:	05-Dec-13	10-Dec-13	11-Dec-13	11-Dec-13
	Sample ID:	1350281-01	1350281-02	1350281-03	1350281-04
	MDL/Units	Water	Water	Water	Water
Thallium	0.1 ug/L	-	<0.1	<0.1	<0.1
Uranium	0.1 ug/L	-	<0.1	<0.1	0.2
Vanadium	0.5 ug/L	-	<0.5	<0.5	5.8
Zinc	5 ug/L	-	<5	<5	<5

Volatiles

	MDL/Units	<5.0 [2]	<5.0	<5.0	<5.0
Acetone	5.0 ug/L	<5.0 [2]	<5.0	<5.0	<5.0
Benzene	0.5 ug/L	<0.5 [2]	<0.5	<0.5	<0.5
Bromodichloromethane	0.5 ug/L	<0.5 [2]	<0.5	<0.5	<0.5
Bromoform	0.5 ug/L	<0.5 [2]	<0.5	<0.5	<0.5
Bromomethane	0.5 ug/L	<0.5 [2]	<0.5	<0.5	<0.5
Carbon Tetrachloride	0.2 ug/L	<0.2 [2]	<0.2	<0.2	<0.2
Chlorobenzene	0.5 ug/L	<0.5 [2]	<0.5	<0.5	<0.5
Chloroethane	1.0 ug/L	<1.0 [2]	<1.0	<1.0	<1.0
Chloroform	0.5 ug/L	<0.5 [2]	<0.5	<0.5	<0.5
Chloromethane	3.0 ug/L	<3.0 [2]	<3.0	<3.0	<3.0
Dibromochloromethane	0.5 ug/L	<0.5 [2]	<0.5	<0.5	<0.5
Dichlorodifluoromethane	1.0 ug/L	<1.0 [2]	<1.0	<1.0	<1.0
1,2-Dibromoethane	0.2 ug/L	<0.2 [2]	<0.2	<0.2	<0.2
1,2-Dichlorobenzene	0.5 ug/L	<0.5 [2]	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	0.5 ug/L	<0.5 [2]	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	0.5 ug/L	<0.5 [2]	<0.5	<0.5	<0.5
1,1-Dichloroethane	0.5 ug/L	<0.5 [2]	<0.5	<0.5	<0.5
1,2-Dichloroethane	0.5 ug/L	<0.5 [2]	<0.5	<0.5	<0.5
1,1-Dichloroethylene	0.5 ug/L	<0.5 [2]	<0.5	<0.5	<0.5
cis-1,2-Dichloroethylene	0.5 ug/L	<0.5 [2]	<0.5	<0.5	<0.5
trans-1,2-Dichloroethylene	0.5 ug/L	<0.5 [2]	<0.5	<0.5	<0.5
1,2-Dichloroethylene, total	0.5 ug/L	<0.5 [2]	<0.5	<0.5	<0.5
1,2-Dichloropropane	0.5 ug/L	<0.5 [2]	<0.5	<0.5	<0.5
cis-1,3-Dichloropropylene	0.5 ug/L	<0.5 [2]	<0.5	<0.5	<0.5
trans-1,3-Dichloropropylene	0.5 ug/L	<0.5 [2]	<0.5	<0.5	<0.5
1,3-Dichloropropene, total	0.5 ug/L	<0.5 [2]	<0.5	<0.5	<0.5
Ethylbenzene	0.5 ug/L	<0.5 [2]	<0.5	<0.5	<0.5
Hexane	1.0 ug/L	<1.0 [2]	<1.0	<1.0	<1.0

Certificate of Analysis

Report Date: 13-Jan-2014

Client: E-3 Laboratories Inc.

Order Date: 12-Dec-2013

Client PO: 2514382

Project Description: City of Barrie

	Client ID:	352827 - Trip Blank	352828 - Field Blank 1	352829 - Field Blank 2	352830 - MW D1
	Sample Date:	05-Dec-13	10-Dec-13	11-Dec-13	11-Dec-13
	Sample ID:	1350281-01	1350281-02	1350281-03	1350281-04
	MDL/Units	Water	Water	Water	Water
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	<5.0 [2]	<5.0	<5.0	<5.0
Methyl Butyl Ketone (2-Hexanone)	10.0 ug/L	<10.0 [2]	<10.0	<10.0	<10.0
Methyl Isobutyl Ketone	5.0 ug/L	<5.0 [2]	<5.0	<5.0	<5.0
Methyl tert-butyl ether	2.0 ug/L	<2.0 [2]	<2.0	<2.0	<2.0
Methylene Chloride	5.0 ug/L	<5.0 [2]	<5.0	<5.0	<5.0
Styrene	0.5 ug/L	<0.5 [2]	<0.5	<0.5	<0.5
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5 [2]	<0.5	<0.5	<0.5
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5 [2]	<0.5	<0.5	<0.5
Tetrachloroethylene	0.5 ug/L	<0.5 [2]	<0.5	<0.5	<0.5
Toluene	0.5 ug/L	<0.5 [2]	<0.5	<0.5	<0.5
1,2,4-Trichlorobenzene	0.5 ug/L	<0.5 [2]	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	0.5 ug/L	<0.5 [2]	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	0.5 ug/L	<0.5 [2]	<0.5	<0.5	<0.5
Trichloroethylene	0.5 ug/L	<0.5 [2]	<0.5	<0.5	<0.5
Trichlorofluoromethane	1.0 ug/L	<1.0 [2]	<1.0	<1.0	<1.0
1,3,5-Trimethylbenzene	0.5 ug/L	<0.5 [2]	<0.5	<0.5	<0.5
Vinyl chloride	0.5 ug/L	<0.5 [2]	<0.5	<0.5	<0.5
m,p-Xylenes	0.5 ug/L	<0.5 [2]	<0.5	<0.5	<0.5
o-Xylene	0.5 ug/L	<0.5 [2]	<0.5	<0.5	<0.5
Xylenes, total	0.5 ug/L	<0.5 [2]	<0.5	<0.5	<0.5
4-Bromofluorobenzene	Surrogate	91.7% [2]	92.2%	93.5%	93.8%
Dibromofluoromethane	Surrogate	104% [2]	103%	105%	104%
Toluene-d8	Surrogate	108% [2]	109%	109%	109%

Hydrocarbons

F1 PHCs (C6-C10)	25.0 ug/L	-	<25.0	<25.0	<25.0
F2 PHCs (C10-C16)	100 ug/L	-	<100	<100	<100
F3 PHCs (C16-C34)	100 ug/L	-	<100	<100	<100
F4 PHCs (C34-C50)	100 ug/L	-	<100	<100	<100
F1 + F2 PHCs	125 ug/L	-	<125	<125	<125
F3 + F4 PHCs	200 ug/L	-	<200	<200	<200

Semi-Volatiles

Acenaphthene	0.05 ug/L	-	<0.05	<0.05	<0.05
Acenaphthylene	0.05 ug/L	-	<0.05	<0.05	<0.05
Anthracene	0.01 ug/L	-	<0.01	<0.01	<0.01

Certificate of Analysis

Report Date: 13-Jan-2014
Order Date: 12-Dec-2013

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

	MDL/Units	Client ID:	352827 - Trip Blank	352828 - Field Blank 1	352829 - Field Blank 2	352830 - MW D1
		Sample Date:	05-Dec-13	10-Dec-13	11-Dec-13	11-Dec-13
		Sample ID:	1350281-01	1350281-02	1350281-03	1350281-04
		Water	Water	Water	Water	
Benzo [a] anthracene	0.01 ug/L	-	<0.01	<0.01	<0.01	
Benzo [a] pyrene	0.01 ug/L	-	<0.01	<0.01	<0.01	
Benzo [b] fluoranthene	0.05 ug/L	-	<0.05	<0.05	<0.05	
Benzo [g,h,i] perylene	0.05 ug/L	-	<0.05	<0.05	<0.05	
Benzo [k] fluoranthene	0.05 ug/L	-	<0.05	<0.05	<0.05	
Biphenyl	0.05 ug/L	-	<0.05	<0.05	<0.05	
Chrysene	0.05 ug/L	-	<0.05	<0.05	<0.05	
Dibenzo [a,h] anthracene	0.05 ug/L	-	<0.05	<0.05	<0.05	
Fluoranthene	0.01 ug/L	-	<0.01	<0.01	<0.01	
Fluorene	0.05 ug/L	-	<0.05	<0.05	<0.05	
Indeno [1,2,3-cd] pyrene	0.05 ug/L	-	<0.05	<0.05	<0.05	
1-Methylnaphthalene	0.05 ug/L	-	<0.05	<0.05	<0.05	
2-Methylnaphthalene	0.05 ug/L	-	<0.05	<0.05	<0.05	
Methylnaphthalene (1&2)	0.10 ug/L	-	<0.10	<0.10	<0.10	
Naphthalene	0.05 ug/L	-	<0.05	<0.05	<0.05	
Phenanthrene	0.05 ug/L	-	<0.05	<0.05	<0.05	
Pyrene	0.01 ug/L	-	<0.01	<0.01	<0.01	
2-Fluorobiphenyl	Surrogate	-	83.5%	82.4%	79.7%	
Terphenyl-d14	Surrogate	-	99.1%	97.5%	94.3%	

Certificate of Analysis

Report Date: 13-Jan-2014
Order Date: 12-Dec-2013

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

	Client ID:	352831 - MW D2	352832 - MW D3	352833 - MW D4	352834 - MW D5
	Sample Date:	11-Dec-13	11-Dec-13	11-Dec-13	12-Dec-13
	Sample ID:	1350281-05	1350281-06	1350281-07	1350281-08
	MDL/Units	Water	Water	Water	Water

General Inorganics

	MDL/Units	352831 - MW D2	352832 - MW D3	352833 - MW D4	352834 - MW D5
Cyanide, free	2 ug/L	<2	<2	<2	<2
Hardness	1.0 mg/L	650	706	468	712

Anions

	MDL/Units	352831 - MW D2	352832 - MW D3	352833 - MW D4	352834 - MW D5
Bromide	0.1 mg/L	0.1	0.9	0.6	0.1
Chloride	1 mg/L	67	277	101	21
Fluoride	0.1 mg/L	<0.1	0.1	<0.1	<0.1
Nitrate as N	0.1 mg/L	<0.1	<0.1	<0.1	<0.1
Nitrite as N	0.05 mg/L	<0.05	<0.05	<0.05	<0.05
Phosphate as P	1 mg/L	2	5	3	<1
Sulphate	1 mg/L	3	5	4	4

Metals

	MDL/Units	352831 - MW D2	352832 - MW D3	352833 - MW D4	352834 - MW D5
Mercury	0.1 ug/L	<0.1	<0.1	<0.1	<0.1
Antimony	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Arsenic	1 ug/L	2	3	2	1
Barium	1 ug/L	239	311	321	280
Beryllium	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Boron	10 ug/L	231	572	652	202
Cadmium	0.1 ug/L	0.1	<0.1	<0.1	<0.1
Calcium	100 ug/L	235000	226000	135000	258000
Chromium	1 ug/L	20	55	32	17
Chromium (III)	10 ug/L	20	55	32	17
Chromium (VI)	10 ug/L	<10	<10	<10	<10
Cobalt	0.5 ug/L	2.8	3.5	3.3	1.5
Copper	0.5 ug/L	<0.5	<0.5	0.5	<0.5
Iron	100 ug/L	53000	2570	2620	51000
Lead	0.1 ug/L	<0.1	<0.1	<0.1	0.1
Magnesium	200 ug/L	15200	34200	31400	16300
Molybdenum	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Nickel	1 ug/L	6	13	11	7
Potassium	100 ug/L	14700	20600	48100	7140
Selenium	1 ug/L	<1	3	2	<1
Silver	0.1 ug/L	<0.1	<0.1	<0.1	<0.1
Sodium	200 ug/L	40100	254000	117000	12500

Certificate of Analysis

Report Date: 13-Jan-2014
Order Date: 12-Dec-2013

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

	Client ID: Sample Date: Sample ID:	352831 - MW D2 11-Dec-13 1350281-05 Water	352832 - MW D3 11-Dec-13 1350281-06 Water	352833 - MW D4 11-Dec-13 1350281-07 Water	352834 - MW D5 12-Dec-13 1350281-08 Water
	MDL/Units				
Thallium	0.1 ug/L	<0.1	<0.1	<0.1	<0.1
Uranium	0.1 ug/L	<0.1	<0.1	<0.1	<0.1
Vanadium	0.5 ug/L	31.9	109	62.1	31.9
Zinc	5 ug/L	<5	<5	<5	<5

Volatiles

Acetone	5.0 ug/L	5.1	6.2	12.5	6.1
Benzene	0.5 ug/L	12.9	31.0	25.8	11.5
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	7.2	7.5	18.0	4.8
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	0.8	0.8	<0.5
1,3-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	0.5 ug/L	5.5	7.9	13.4	3.8
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	8.2	0.9	<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

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Certificate of Analysis

Report Date: 13-Jan-2014

Client: E-3 Laboratories Inc.

Order Date: 12-Dec-2013

Client PO: 2514382

Project Description: City of Barrie

	Client ID:	352831 - MW D2	352832 - MW D3	352833 - MW D4	352834 - MW D5
	Sample Date:	11-Dec-13	11-Dec-13	11-Dec-13	12-Dec-13
	Sample ID:	1350281-05	1350281-06	1350281-07	1350281-08
	MDL/Units	Water	Water	Water	Water
Methyl Butyl Ketone (2-Hexanone)	10.0 ug/L	<10.0	<10.0	<10.0	<10.0
Methyl Isobutyl Ketone	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Methyl tert-butyl ether	2.0 ug/L	<2.0	<2.0	<2.0	<2.0
Methylene Chloride	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Styrene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Toluene	0.5 ug/L	<0.5	2.0	0.8	0.6
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	3.8	7.7	2.1	2.5
Vinyl chloride	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
m,p-Xylenes	0.5 ug/L	40.9	155	14.3	18.6
o-Xylene	0.5 ug/L	0.5	4.5	1.9	<0.5
Xylenes, total	0.5 ug/L	41.4	159	16.2	18.6
4-Bromofluorobenzene	Surrogate	87.7%	85.0%	89.0%	87.6%
Dibromofluoromethane	Surrogate	104%	102%	102%	102%
Toluene-d8	Surrogate	108%	106%	107%	109%
Hydrocarbons					
F1 PHCs (C6-C10)	25.0 ug/L	159	585	327	105
F2 PHCs (C10-C16)	100 ug/L	<100	<100	<100	<100
F3 PHCs (C16-C34)	100 ug/L	<100	<100	363	<100
F4 PHCs (C34-C50)	100 ug/L	<100	<100	160	<100
F1 + F2 PHCs	125 ug/L	159	585	327	<125
F3 + F4 PHCs	200 ug/L	<200	<200	523	<200
Semi-Volatiles					
Acenaphthene	0.05 ug/L	<0.05	<0.05	3.57	<0.05
Acenaphthylene	0.05 ug/L	<0.05	<0.05	<1.00 [1]	<0.05
Anthracene	0.01 ug/L	<0.01	<0.01	0.99	0.07
Benzo [a] anthracene	0.01 ug/L	<0.01	<0.01	<0.20 [1]	0.18

Certificate of Analysis

Report Date: 13-Jan-2014

Client: E-3 Laboratories Inc.

Order Date: 12-Dec-2013

Client PO: 2514382

Project Description: City of Barrie

	Client ID:	352831 - MW D2	352832 - MW D3	352833 - MW D4	352834 - MW D5
	Sample Date:	11-Dec-13	11-Dec-13	11-Dec-13	12-Dec-13
	Sample ID:	1350281-05	1350281-06	1350281-07	1350281-08
	MDL/Units	Water	Water	Water	Water
Benzo [a] pyrene	0.01 ug/L	<0.01	<0.01	<0.20 [1]	0.11
Benzo [b] fluoranthene	0.05 ug/L	<0.05	<0.05	<1.00 [1]	0.18
Benzo [g,h,i] perylene	0.05 ug/L	<0.05	<0.05	<1.00 [1]	0.15
Benzo [k] fluoranthene	0.05 ug/L	<0.05	<0.05	<1.00 [1]	0.18
Biphenyl	0.05 ug/L	<0.05	<0.05	<1.00 [1]	0.58
Chrysene	0.05 ug/L	<0.05	<0.05	<1.00 [1]	0.17
Dibenzo [a,h] anthracene	0.05 ug/L	<0.05	<0.05	<1.00 [1]	0.11
Fluoranthene	0.01 ug/L	<0.01	<0.01	3.07	0.17
Fluorene	0.05 ug/L	<0.05	<0.05	3.60	0.17
Indeno [1,2,3-cd] pyrene	0.05 ug/L	<0.05	<0.05	<1.00 [1]	0.13
1-Methylnaphthalene	0.05 ug/L	0.97	1.75	6.10	2.09
2-Methylnaphthalene	0.05 ug/L	0.73	2.57	8.68	<0.05
Methylnaphthalene (1&2)	0.10 ug/L	1.71	4.32	14.8	2.09
Naphthalene	0.05 ug/L	9.20	12.5	149	7.87
Phenanthrene	0.05 ug/L	<0.05	0.10	7.48	0.25
Pyrene	0.01 ug/L	<0.01	<0.01	2.56	0.16
2-Fluorobiphenyl	Surrogate	83.1%	91.2%	85.9%	73.6%
Terphenyl-d14	Surrogate	97.4%	86.5%	99.8%	89.2%

Certificate of Analysis

Report Date: 13-Jan-2014

Order Date: 12-Dec-2013

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

	Client ID:	352835 - MW D6	352836 - MW D7	352837 - MW D26	352838 - MW B1
	Sample Date:	11-Dec-13	11-Dec-13	11-Dec-13	10-Dec-13
	Sample ID:	1350281-09	1350281-10	1350281-11	1350281-12
	MDL/Units	Water	Water	Water	Water

General Inorganics

	MDL/Units	352835 - MW D6	352836 - MW D7	352837 - MW D26	352838 - MW B1
Cyanide, free	2 ug/L	<2	<2	<2	<2
Hardness	1.0 mg/L	1120	578	286	710

Anions

	MDL/Units	352835 - MW D6	352836 - MW D7	352837 - MW D26	352838 - MW B1
Bromide	0.1 mg/L	0.8	0.3	<0.1	0.2
Chloride	1 mg/L	260	759	125	885
Fluoride	0.1 mg/L	<0.1	<0.1	<0.1	<0.1
Nitrate as N	0.1 mg/L	<0.1	<0.1	4.9	6.0
Nitrite as N	0.05 mg/L	<0.05	<0.05	<0.05	<0.05
Phosphate as P	1 mg/L	<1	<1	<1	<1
Sulphate	1 mg/L	2	2	17	80

Metals

	MDL/Units	352835 - MW D6	352836 - MW D7	352837 - MW D26	352838 - MW B1
Mercury	0.1 ug/L	0.1	<0.1	1.0	<0.1
Antimony	0.5 ug/L	<0.5	<0.5	1.2	<0.5
Arsenic	1 ug/L	1	<1	<1	<1
Barium	1 ug/L	1100	207	34	223
Beryllium	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Boron	10 ug/L	28	89	34	59
Cadmium	0.1 ug/L	<0.1	<0.1	<0.1	<0.1
Calcium	100 ug/L	370000	192000	105000	246000
Chromium	1 ug/L	9	14	5	13
Chromium (III)	10 ug/L	<10	14	<10	13
Chromium (VI)	10 ug/L	<10	<10	<10	<10
Cobalt	0.5 ug/L	1.0	0.7	<0.5	<0.5
Copper	0.5 ug/L	0.5	<0.5	1.0	1.6
Iron	100 ug/L	8450	2610	<100	<100
Lead	0.1 ug/L	<0.1	<0.1	0.1	<0.1
Magnesium	200 ug/L	48200	23400	5910	23300
Molybdenum	0.5 ug/L	<0.5	<0.5	1.1	<0.5
Nickel	1 ug/L	7	5	3	6
Potassium	100 ug/L	4880	11000	4900	10200
Selenium	1 ug/L	2	<1	1	<1
Silver	0.1 ug/L	<0.1	<0.1	<0.1	<0.1
Sodium	200 ug/L	86800	462000	71100	647000

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Certificate of Analysis

Report Date: 13-Jan-2014
Order Date: 12-Dec-2013

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

	Client ID: Sample Date: Sample ID:	352835 - MW D6 11-Dec-13 1350281-09 Water	352836 - MW D7 11-Dec-13 1350281-10 Water	352837 - MW D26 11-Dec-13 1350281-11 Water	352838 - MW B1 10-Dec-13 1350281-12 Water
	MDL/Units				
Thallium	0.1 ug/L	<0.1	<0.1	<0.1	<0.1
Uranium	0.1 ug/L	<0.1	<0.1	0.1	0.4
Vanadium	0.5 ug/L	16.6	20.2	4.9	7.9
Zinc	5 ug/L	<5	<5	23	<5
Volatiles					
Acetone	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Benzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Bromoform	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Bromomethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	0.2 ug/L	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Chloroethane	1.0 ug/L	<1.0	<1.0	<1.0	<1.0
Chloroform	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Chloromethane	3.0 ug/L	<3.0	<3.0	<3.0	<3.0
Dibromochloromethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
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

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Certificate of Analysis

Report Date: 13-Jan-2014
Order Date: 12-Dec-2013

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

	Client ID: Sample Date: Sample ID: MDL/Units	352835 - MW D6 11-Dec-13 1350281-09 Water	352836 - MW D7 11-Dec-13 1350281-10 Water	352837 - MW D26 11-Dec-13 1350281-11 Water	352838 - MW B1 10-Dec-13 1350281-12 Water
Methyl Butyl Ketone (2-Hexanone)	10.0 ug/L	<10.0	<10.0	<10.0	<10.0
Methyl Isobutyl Ketone	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Methyl tert-butyl ether	2.0 ug/L	<2.0	<2.0	<2.0	<2.0
Methylene Chloride	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Styrene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Toluene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,2,4-Trichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	1.0 ug/L	<1.0	<1.0	<1.0	<1.0
1,3,5-Trimethylbenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Vinyl chloride	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
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	90.7%	92.8%	93.5%	93.7%
Dibromofluoromethane	Surrogate	100%	102%	102%	101%
Toluene-d8	Surrogate	109%	108%	110%	108%
Hydrocarbons					
F1 PHCs (C6-C10)	25.0 ug/L	<25.0	<25.0	<25.0	<25.0
F2 PHCs (C10-C16)	100 ug/L	<100	<100	<100	<100
F3 PHCs (C16-C34)	100 ug/L	<100	<100	<100	<100
F4 PHCs (C34-C50)	100 ug/L	<100	<100	<100	<100
F1 + F2 PHCs	125 ug/L	<125	<125	<125	<125
F3 + F4 PHCs	200 ug/L	<200	<200	<200	<200
Semi-Volatiles					
Acenaphthene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
Acenaphthylene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
Anthracene	0.01 ug/L	<0.01	<0.01	<0.01	<0.01
Benzo [a] anthracene	0.01 ug/L	<0.01	<0.01	<0.01	<0.01

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Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

	Client ID: Sample Date: Sample ID:	352835 - MW D6 11-Dec-13 1350281-09 Water	352836 - MW D7 11-Dec-13 1350281-10 Water	352837 - MW D26 11-Dec-13 1350281-11 Water	352838 - MW B1 10-Dec-13 1350281-12 Water
	MDL/Units				
Benzo [a] pyrene	0.01 ug/L	<0.01	<0.01	<0.01	<0.01
Benzo [b] fluoranthene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
Benzo [g,h,i] perylene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
Benzo [k] fluoranthene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
Biphenyl	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
Chrysene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
Dibenzo [a,h] anthracene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
Fluoranthene	0.01 ug/L	0.08	0.17	<0.01	<0.01
Fluorene	0.05 ug/L	<0.05	0.11	<0.05	<0.05
Indeno [1,2,3-cd] pyrene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
1-Methylnaphthalene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
2-Methylnaphthalene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
Methylnaphthalene (1&2)	0.10 ug/L	<0.10	<0.10	<0.10	<0.10
Naphthalene	0.05 ug/L	<0.05	0.05	<0.05	<0.05
Phenanthrene	0.05 ug/L	0.09	0.09	<0.05	<0.05
Pyrene	0.01 ug/L	0.08	0.13	<0.01	<0.01
2-Fluorobiphenyl	Surrogate	79.6%	77.3%	81.5%	81.8%
Terphenyl-d14	Surrogate	99.1%	97.1%	93.5%	95.1%

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Certificate of Analysis

Report Date: 13-Jan-2014

Client: E-3 Laboratories Inc.

Order Date: 12-Dec-2013

Client PO: 2514382

Project Description: City of Barrie

	Client ID:	352839 - MW B2	352840 - MW B3	352841 - MW B4	352842 - MW B5
	Sample Date:	10-Dec-13	10-Dec-13	12-Dec-13	10-Dec-13
	Sample ID:	1350281-13	1350281-14	1350281-15	1350281-16
	MDL/Units	Water	Water	Water	Water

General Inorganics					
Cyanide, free	2 ug/L	<2	<2	<2	<2
Hardness	1.0 mg/L	565	466	716	412

Anions					
Bromide	0.1 mg/L	0.3	<0.1	0.5	<0.1
Chloride	1 mg/L	370	31	590	510
Fluoride	0.1 mg/L	<0.1	<0.1	<0.1	<0.1
Nitrate as N	0.1 mg/L	<0.1	5.4	<0.1	<0.1
Nitrite as N	0.05 mg/L	<0.05	4.82	<0.05	<0.05
Phosphate as P	1 mg/L	<1	<1	<1	<1
Sulphate	1 mg/L	2	34	2	1

Metals					
Mercury	0.1 ug/L	0.2	<0.1	<0.1	<0.1
Antimony	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Arsenic	1 ug/L	3	<1	1	8
Barium	1 ug/L	321	165	360	200
Beryllium	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Boron	10 ug/L	219	12	366	36
Cadmium	0.1 ug/L	<0.1	0.1	<0.1	<0.1
Calcium	100 ug/L	198000	152000	246000	145000
Chromium	1 ug/L	11	6	28	7
Chromium (III)	10 ug/L	11	<10	28	<10
Chromium (VI)	10 ug/L	<10	<10	<10	<10
Cobalt	0.5 ug/L	1.7	1.0	3.5	0.8
Copper	0.5 ug/L	<0.5	4.5	0.6	<0.5
Iron	100 ug/L	30000	<100	70500	23700
Lead	0.1 ug/L	<0.1	<0.1	0.1	<0.1
Magnesium	200 ug/L	17100	21200	24300	12200
Molybdenum	0.5 ug/L	<0.5	<0.5	<0.5	0.7
Nickel	1 ug/L	6	6	7	4
Potassium	100 ug/L	11500	16800	19000	2580
Selenium	1 ug/L	<1	<1	<1	<1
Silver	0.1 ug/L	<0.1	<0.1	<0.1	<0.1
Sodium	200 ug/L	233000	148000	339000	332000

Certificate of Analysis

Report Date: 13-Jan-2014

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

Order Date: 12-Dec-2013

	Client ID: Sample Date: Sample ID:	352839 - MW B2 10-Dec-13 1350281-13	352840 - MW B3 10-Dec-13 1350281-14	352841 - MW B4 12-Dec-13 1350281-15	352842 - MW B5 10-Dec-13 1350281-16
	MDL/Units	Water	Water	Water	Water
Thallium	0.1 ug/L	<0.1	<0.1	<0.1	<0.1
Uranium	0.1 ug/L	<0.1	0.5	<0.1	<0.1
Vanadium	0.5 ug/L	15.0	4.5	37.3	6.0
Zinc	5 ug/L	<5	26	<5	17

Volatiles

Acetone	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Benzene	0.5 ug/L	<0.5	<0.5	5.9	<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	4.8	<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	3.9	<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

Certificate of Analysis

Report Date: 13-Jan-2014

Order Date: 12-Dec-2013

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

	Client ID:	352839 - MW B2	352840 - MW B3	352841 - MW B4	352842 - MW B5
	Sample Date:	10-Dec-13	10-Dec-13	12-Dec-13	10-Dec-13
	Sample ID:	1350281-13	1350281-14	1350281-15	1350281-16
	MDL/Units	Water	Water	Water	Water
Methyl Butyl Ketone (2-Hexanone)	10.0 ug/L	<10.0	<10.0	<10.0	<10.0
Methyl Isobutyl Ketone	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Methyl tert-butyl ether	2.0 ug/L	<2.0	<2.0	<2.0	<2.0
Methylene Chloride	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Styrene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Toluene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,2,4-Trichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	1.0 ug/L	<1.0	<1.0	<1.0	<1.0
1,3,5-Trimethylbenzene	0.5 ug/L	<0.5	<0.5	1.9	<0.5
Vinyl chloride	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
m,p-Xylenes	0.5 ug/L	0.6	<0.5	27.8	<0.5
o-Xylene	0.5 ug/L	<0.5	<0.5	27.4	<0.5
Xylenes, total	0.5 ug/L	0.6	<0.5	55.3	<0.5
4-Bromofluorobenzene	Surrogate	88.5%	92.5%	88.1%	91.9%
Dibromofluoromethane	Surrogate	102%	103%	103%	103%
Toluene-d8	Surrogate	107%	109%	107%	109%
Hydrocarbons					
F1 PHCs (C6-C10)	25.0 ug/L	75.0	<25.0	108	<25.0
F2 PHCs (C10-C16)	100 ug/L	<100	<100	<100	<100
F3 PHCs (C16-C34)	100 ug/L	<100	<100	<100	<100
F4 PHCs (C34-C50)	100 ug/L	<100	<100	<100	<100
F1 + F2 PHCs	125 ug/L	<125	<125	<125	<125
F3 + F4 PHCs	200 ug/L	<200	<200	<200	<200
Semi-Volatiles					
Acenaphthene	0.05 ug/L	2.02	<0.05	<0.05	0.65
Acenaphthylene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
Anthracene	0.01 ug/L	0.40	<0.01	<0.01	<0.01
Benzo [a] anthracene	0.01 ug/L	0.40	<0.01	<0.01	<0.01

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Order Date: 12-Dec-2013

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

	Client ID: Sample Date: Sample ID:	352839 - MW B2 10-Dec-13 1350281-13	352840 - MW B3 10-Dec-13 1350281-14	352841 - MW B4 12-Dec-13 1350281-15	352842 - MW B5 10-Dec-13 1350281-16
	MDL/Units	Water	Water	Water	Water
Benzo [a] pyrene	0.01 ug/L	0.28	<0.01	<0.01	<0.01
Benzo [b] fluoranthene	0.05 ug/L	0.44	<0.05	<0.05	<0.05
Benzo [g,h,i] perylene	0.05 ug/L	0.21	<0.05	<0.05	<0.05
Benzo [k] fluoranthene	0.05 ug/L	0.22	<0.05	<0.05	<0.05
Biphenyl	0.05 ug/L	0.16	<0.05	<0.05	<0.05
Chrysene	0.05 ug/L	0.41	<0.05	<0.05	<0.05
Dibenzo [a,h] anthracene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
Fluoranthene	0.01 ug/L	1.20	<0.01	0.07	0.09
Fluorene	0.05 ug/L	1.05	<0.05	0.12	0.11
Indeno [1,2,3-cd] pyrene	0.05 ug/L	0.15	<0.05	<0.05	<0.05
1-Methylnaphthalene	0.05 ug/L	2.08	<0.05	1.01	0.26
2-Methylnaphthalene	0.05 ug/L	1.74	<0.05	<0.05	<0.05
Methylnaphthalene (1&2)	0.10 ug/L	3.82	<0.10	1.01	0.26
Naphthalene	0.05 ug/L	36.2	<0.05	7.28	0.54
Phenanthrene	0.05 ug/L	2.32	<0.05	0.31	0.12
Pyrene	0.01 ug/L	1.07	<0.01	<0.01	0.08
2-Fluorobiphenyl	Surrogate	77.8%	68.6%	68.3%	72.1%
Terphenyl-d14	Surrogate	89.8%	90.1%	69.5%	85.3%

Certificate of Analysis

Report Date: 13-Jan-2014
Order Date: 12-Dec-2013

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

	Client ID:	352843 - MW B6	352844 - MW B7	352845 - MW B23	352846 - Dup 1
	Sample Date:	10-Dec-13	10-Dec-13	10-Dec-13	10-Dec-13
	Sample ID:	1350281-17	1350281-18	1350281-19	1350281-20
	MDL/Units	Water	Water	Water	Water

General Inorganics

Cyanide, free	2 ug/L	<2	<2	<2	<2
Hardness	1.0 mg/L	907	588	584	963

Anions

Bromide	0.1 mg/L	0.7	0.3	0.4	0.7
Chloride	1 mg/L	916	535	952	938
Fluoride	0.1 mg/L	<0.1	<0.1	<0.1	<0.1
Nitrate as N	0.1 mg/L	<0.1	<0.1	<0.1	<0.1
Nitrite as N	0.05 mg/L	<0.05	<0.05	<0.05	<0.05
Phosphate as P	1 mg/L	<1	<1	<1	<1
Sulphate	1 mg/L	2	2	2	2

Metals

Mercury	0.1 ug/L	<0.1	<0.1	<0.1	<0.1
Antimony	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Arsenic	1 ug/L	3	2	<1	<1
Barium	1 ug/L	190	213	166	192
Beryllium	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Boron	10 ug/L	110	106	30	153
Cadmium	0.1 ug/L	<0.1	<0.1	<0.1	<0.1
Calcium	100 ug/L	310000	206000	203000	324000
Chromium	1 ug/L	12	10	11	16
Chromium (III)	10 ug/L	12	10	11	16
Chromium (VI)	10 ug/L	<10	<10	<10	<10
Cobalt	0.5 ug/L	6.5	0.8	0.6	2.4
Copper	0.5 ug/L	1.5	<0.5	<0.5	1.4
Iron	100 ug/L	9790	33000	4730	31000
Lead	0.1 ug/L	1.3	<0.1	<0.1	0.2
Magnesium	200 ug/L	31700	17400	18600	37000
Molybdenum	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Nickel	1 ug/L	20	5	5	9
Potassium	100 ug/L	9200	9450	7930	13100
Selenium	1 ug/L	<1	<1	<1	1
Silver	0.1 ug/L	<0.1	<0.1	<0.1	<0.1
Sodium	200 ug/L	381000	304000	469000	367000

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Report Date: 13-Jan-2014
Order Date: 12-Dec-2013

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

	Client ID: Sample Date: Sample ID:	352843 - MW B6 10-Dec-13 1350281-17	352844 - MW B7 10-Dec-13 1350281-18	352845 - MW B23 10-Dec-13 1350281-19	352846 - Dup 1 10-Dec-13 1350281-20
	MDL/Units	Water	Water	Water	Water
Thallium	0.1 ug/L	<0.1	<0.1	<0.1	<0.1
Uranium	0.1 ug/L	<0.1	<0.1	<0.1	<0.1
Vanadium	0.5 ug/L	9.8	12.3	6.0	18.1
Zinc	5 ug/L	139	<5	<5	<5

Volatiles

Acetone	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Benzene	0.5 ug/L	3.0	<0.5	<0.5	2.6
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	0.7	<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

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Certificate of Analysis

Report Date: 13-Jan-2014

Order Date: 12-Dec-2013

Client: E-3 Laboratories Inc.

Project Description: City of Barrie

Client PO: 2514382

	Client ID:	352843 - MW B6	352844 - MW B7	352845 - MW B23	352846 - Dup 1
	Sample Date:	10-Dec-13	10-Dec-13	10-Dec-13	10-Dec-13
	Sample ID:	1350281-17	1350281-18	1350281-19	1350281-20
	MDL/Units	Water	Water	Water	Water
Methyl Butyl Ketone (2-Hexanone)	10.0 ug/L	<10.0	<10.0	<10.0	<10.0
Methyl Isobutyl Ketone	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Methyl tert-butyl ether	2.0 ug/L	<2.0	<2.0	<2.0	<2.0
Methylene Chloride	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Styrene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Toluene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,2,4-Trichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	1.0 ug/L	<1.0	<1.0	<1.0	<1.0
1,3,5-Trimethylbenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Vinyl chloride	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
m,p-Xylenes	0.5 ug/L	7.2	<0.5	<0.5	4.0
o-Xylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Xylenes, total	0.5 ug/L	7.2	<0.5	<0.5	4.0
4-Bromofluorobenzene	Surrogate	89.7%	91.1%	92.0%	90.5%
Dibromofluoromethane	Surrogate	104%	101%	104%	101%
Toluene-d8	Surrogate	108%	108%	104%	107%
Hydrocarbons					
F1 PHCs (C6-C10)	25.0 ug/L	<25.0	<25.0	<25.0	<25.0
F2 PHCs (C10-C16)	100 ug/L	<100	<100	<100	<100
F3 PHCs (C16-C34)	100 ug/L	321	<100	<100	<100
F4 PHCs (C34-C50)	100 ug/L	112	<100	<100	<100
F1 + F2 PHCs	125 ug/L	<125	<125	<125	<125
F3 + F4 PHCs	200 ug/L	433	<200	<200	<200
Semi-Volatiles					
Acenaphthene	0.05 ug/L	0.12	0.91	<0.05	0.12
Acenaphthylene	0.05 ug/L	0.09	<0.05	<0.05	0.07
Anthracene	0.01 ug/L	0.23	0.13	0.03	0.19

Certificate of Analysis

Report Date: 13-Jan-2014
Order Date: 12-Dec-2013

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

	Client ID:	352843 - MW B6	352844 - MW B7	352845 - MW B23	352846 - Dup 1
	Sample Date:	10-Dec-13	10-Dec-13	10-Dec-13	10-Dec-13
	Sample ID:	1350281-17	1350281-18	1350281-19	1350281-20
	MDL/Units	Water	Water	Water	Water
Benzo [a] anthracene	0.01 ug/L	0.41	0.10	0.07	0.33
Benzo [a] pyrene	0.01 ug/L	0.35	0.08	0.06	0.28
Benzo [b] fluoranthene	0.05 ug/L	0.61	0.16	0.10	0.49
Benzo [g,h,i] perylene	0.05 ug/L	0.25	0.07	0.06	0.20
Benzo [k] fluoranthene	0.05 ug/L	0.28	0.07	<0.05	0.23
Biphenyl	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
Chrysene	0.05 ug/L	0.39	0.10	0.06	0.33
Dibenzo [a,h] anthracene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
Fluoranthene	0.01 ug/L	1.01	0.34	0.12	0.86
Fluorene	0.05 ug/L	0.15	0.31	<0.05	0.16
Indeno [1,2,3-cd] pyrene	0.05 ug/L	0.21	<0.05	<0.05	0.16
1-Methylnaphthalene	0.05 ug/L	0.42	<0.05	0.06	0.43
2-Methylnaphthalene	0.05 ug/L	0.48	<0.05	0.06	0.47
Methylnaphthalene (1&2)	0.10 ug/L	0.90	<0.10	0.11	0.90
Naphthalene	0.05 ug/L	2.10	<0.05	0.11	2.21
Phenanthrene	0.05 ug/L	0.87	0.52	0.07	0.83
Pyrene	0.01 ug/L	0.84	0.33	0.11	0.71
2-Fluorobiphenyl	Surrogate	70.2%	77.1%	73.9%	69.8%
Terphenyl-d14	Surrogate	90.3%	80.4%	86.4%	77.9%

Certificate of Analysis

Report Date: 13-Jan-2014
Order Date: 12-Dec-2013

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

	Client ID:	352847 - Dup 2	352848 - SW B1	352849 - SW B2	352850 - SW B3
	Sample Date:	11-Dec-13	10-Dec-13	10-Dec-13	10-Dec-13
	Sample ID:	1350281-21	1350281-22	1350281-23	1350281-24
	MDL/Units	Water	Water	Water	Water

General Inorganics

	MDL/Units	352847 - Dup 2	352848 - SW B1	352849 - SW B2	352850 - SW B3
Cyanide, free	2 ug/L	<2	-	-	-
Hardness	1.0 mg/L	-	428	384	461
Hardness	1.0 mg/L	614	-	-	-

Anions

	MDL/Units	352847 - Dup 2	352848 - SW B1	352849 - SW B2	352850 - SW B3
Bromide	0.1 mg/L	0.2	-	-	-
Chloride	1 mg/L	727	-	-	-
Fluoride	0.1 mg/L	<0.1	-	-	-
Nitrate as N	0.1 mg/L	<0.1	-	-	-
Nitrite as N	0.05 mg/L	<0.05	-	-	-
Phosphate as P	1 mg/L	<1	-	-	-
Sulphate	1 mg/L	2	-	-	-

Metals

	MDL/Units	352847 - Dup 2	352848 - SW B1	352849 - SW B2	352850 - SW B3
Aluminum, dissolved	1 ug/L	-	8	4	4
Mercury, dissolved	0.1 ug/L	-	<0.1	<0.1	<0.1
Mercury	0.1 ug/L	<0.1	-	-	-
Antimony	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Arsenic	1 ug/L	<1	<1	<1	<1
Barium	1 ug/L	255	138	139	156
Beryllium	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Boron	10 ug/L	91	21	18	18
Cadmium	0.1 ug/L	<0.1	<0.1	<0.1	<0.1
Calcium	100 ug/L	204000	145000	127000	156000
Chromium	1 ug/L	13	8	8	9
Chromium (III)	10 ug/L	13	-	-	-
Chromium (VI)	10 ug/L	<10	-	-	-
Cobalt	0.5 ug/L	0.8	<0.5	<0.5	<0.5
Copper	0.5 ug/L	<0.5	4.8	2.8	3.2
Iron	100 ug/L	18100	1480	1030	1420
Lead	0.1 ug/L	<0.1	1.7	0.8	1.3
Magnesium	200 ug/L	25000	15800	16100	17000
Manganese	5 ug/L	-	100	80	106
Molybdenum	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Nickel	1 ug/L	5	4	4	4

Certificate of Analysis

Report Date: 13-Jan-2014
 Order Date: 12-Dec-2013

Client: E-3 Laboratories Inc.
 Client PO: 2514382

Project Description: City of Barrie

	Client ID: Sample Date: Sample ID:	352847 - Dup 2 11-Dec-13 1350281-21 Water	352848 - SW B1 10-Dec-13 1350281-22 Water	352849 - SW B2 10-Dec-13 1350281-23 Water	352850 - SW B3 10-Dec-13 1350281-24 Water
	MDL/Units				
Potassium	100 ug/L	11700	2730	2670	3040
Selenium	1 ug/L	<1	<1	<1	<1
Silver	0.1 ug/L	<0.1	<0.1	<0.1	<0.1
Sodium	200 ug/L	533000	318000	301000	414000
Strontium	10 ug/L	-	454	431	559
Thallium	0.1 ug/L	<0.1	<0.1	<0.1	<0.1
Titanium	5 ug/L	-	<5	<5	6
Tungsten	10 ug/L	-	<10	<10	<10
Uranium	0.1 ug/L	<0.1	0.9	0.9	1.1
Vanadium	0.5 ug/L	13.2	2.7	2.3	3.4
Zinc	5 ug/L	<5	15	11	18
Zirconium	1 ug/L	-	<1	<1	<1

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

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Certificate of Analysis

Report Date: 13-Jan-2014
Order Date: 12-Dec-2013

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

	Client ID:	352847 - Dup 2	352848 - SW B1	352849 - SW B2	352850 - SW B3
	Sample Date:	11-Dec-13	10-Dec-13	10-Dec-13	10-Dec-13
	Sample ID:	1350281-21	1350281-22	1350281-23	1350281-24
	MDL/Units	Water	Water	Water	Water
1,2-Dichloroethylene, total	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
cis-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
trans-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene, total	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Hexane	1.0 ug/L	<1.0	<1.0	<1.0	<1.0
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Methyl Butyl Ketone (2-Hexanone)	10.0 ug/L	<10.0	<10.0	<10.0	<10.0
Methyl Isobutyl Ketone	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Methyl tert-butyl ether	2.0 ug/L	<2.0	<2.0	<2.0	<2.0
Methylene Chloride	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Styrene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Toluene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,2,4-Trichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	1.0 ug/L	<1.0	<1.0	<1.0	<1.0
1,3,5-Trimethylbenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Vinyl chloride	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
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	92.9%	92.6%	93.2%	93.4%
Dibromofluoromethane	Surrogate	105%	105%	104%	102%
Toluene-d8	Surrogate	109%	109%	109%	108%
Hydrocarbons					
F1 PHCs (C6-C10)	25.0 ug/L	<25.0	<25.0	<25.0	<25.0
F2 PHCs (C10-C16)	100 ug/L	<100	<100	<100	<100

Certificate of Analysis

Report Date: 13-Jan-2014

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

Order Date: 12-Dec-2013

	Client ID: Sample Date: Sample ID:	352847 - Dup 2 11-Dec-13 1350281-21 Water	352848 - SW B1 10-Dec-13 1350281-22 Water	352849 - SW B2 10-Dec-13 1350281-23 Water	352850 - SW B3 10-Dec-13 1350281-24 Water
	MDL/Units				
F3 PHCs (C16-C34)	100 ug/L	<100	<100	<100	<100
F4 PHCs (C34-C50)	100 ug/L	<100	<100	<100	<100
F1 + F2 PHCs	125 ug/L	<125	<125	<125	<125
F3 + F4 PHCs	200 ug/L	<200	<200	<200	<200

Semi-Volatiles

Acenaphthene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
Acenaphthylene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
Anthracene	0.01 ug/L	<0.01	<0.01	<0.01	<0.01
Benzo [a] anthracene	0.01 ug/L	0.04	<0.01	<0.01	<0.01
Benzo [a] pyrene	0.01 ug/L	<0.01	<0.01	<0.01	<0.01
Benzo [b] fluoranthene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
Benzo [g,h,i] perylene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
Benzo [k] fluoranthene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
Biphenyl	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
Chrysene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
Dibenzo [a,h] anthracene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
Fluoranthene	0.01 ug/L	0.11	<0.01	<0.01	<0.01
Fluorene	0.05 ug/L	0.09	<0.05	<0.05	<0.05
Indeno [1,2,3-cd] pyrene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
1-Methylnaphthalene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
2-Methylnaphthalene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
Methylnaphthalene (1&2)	0.10 ug/L	<0.10	<0.10	<0.10	<0.10
Naphthalene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
Phenanthrene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
Pyrene	0.01 ug/L	0.09	<0.01	<0.01	<0.01
2-Fluorobiphenyl	Surrogate	78.7%	69.9%	74.3%	73.2%
Terphenyl-d14	Surrogate	84.1%	86.4%	81.9%	86.7%

Certificate of Analysis

Report Date: 13-Jan-2014

Order Date: 12-Dec-2013

Client: E-3 Laboratories Inc.

Client PO: 2514382

Project Description: City of Barrie

	Client ID:	352851 - SW B4	352852 - SW B5	352853 - SW D1	352854 - SW D2
	Sample Date:	10-Dec-13	10-Dec-13	11-Dec-13	11-Dec-13
	Sample ID:	1350281-25	1350281-26	1350281-27	1350281-28
	MDL/Units	Water	Water	Water	Water

General Inorganics					
Hardness	1.0 mg/L	459	449	420	407

Metals					
Aluminum, dissolved	1 ug/L	6	4	7	5
Mercury, dissolved	0.1 ug/L	0.1	<0.1	<0.1	<0.1
Antimony	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Arsenic	1 ug/L	<1	<1	<1	<1
Barium	1 ug/L	137	127	138	137
Beryllium	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Boron	10 ug/L	18	15	39	40
Cadmium	0.1 ug/L	<0.1	<0.1	<0.1	<0.1
Calcium	100 ug/L	156000	151000	145000	140000
Chromium	1 ug/L	9	8	6	6
Cobalt	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Copper	0.5 ug/L	1.8	1.1	1.7	2.4
Iron	100 ug/L	1330	511	1350	1490
Lead	0.1 ug/L	0.3	0.1	0.2	0.5
Magnesium	200 ug/L	16900	17200	13600	13700
Manganese	5 ug/L	118	95	221	232
Molybdenum	0.5 ug/L	<0.5	<0.5	0.7	0.7
Nickel	1 ug/L	4	4	4	4
Potassium	100 ug/L	3190	3100	4430	4220
Selenium	1 ug/L	<1	<1	<1	<1
Silver	0.1 ug/L	<0.1	<0.1	<0.1	<0.1
Sodium	200 ug/L	369000	355000	240000	213000
Strontium	10 ug/L	614	568	659	678
Thallium	0.1 ug/L	<0.1	<0.1	<0.1	<0.1
Titanium	5 ug/L	<5	<5	<5	<5
Tungsten	10 ug/L	<10	<10	<10	<10
Uranium	0.1 ug/L	1.3	1.4	0.9	0.9
Vanadium	0.5 ug/L	4.4	4.2	3.9	3.8
Zinc	5 ug/L	6	<5	7	7
Zirconium	1 ug/L	<1	<1	<1	<1

Volatiles					
Acetone	5.0 ug/L	<5.0	<5.0	<5.0	<5.0

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Certificate of Analysis

Report Date: 13-Jan-2014
Order Date: 12-Dec-2013

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

	Client ID:	352851 - SW B4	352852 - SW B5	352853 - SW D1	352854 - SW D2
	Sample Date:	10-Dec-13	10-Dec-13	11-Dec-13	11-Dec-13
	Sample ID:	1350281-25	1350281-26	1350281-27	1350281-28
	MDL/Units	Water	Water	Water	Water
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	3.9	<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	3.9	<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-Hexanon)	10.0 ug/L	<10.0	<10.0	<10.0	<10.0
Methyl Isobutyl Ketone	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Methyl tert-butyl ether	2.0 ug/L	<2.0	<2.0	<2.0	<2.0
Methylene Chloride	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Styrene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5

Certificate of Analysis

Report Date: 13-Jan-2014
Order Date: 12-Dec-2013

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

	Client ID: Sample Date: Sample ID:	352851 - SW B4 10-Dec-13 1350281-25 Water	352852 - SW B5 10-Dec-13 1350281-26 Water	352853 - SW D1 11-Dec-13 1350281-27 Water	352854 - SW D2 11-Dec-13 1350281-28 Water
	MDL/Units				
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	5.0	<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	93.7%	93.3%	92.9%	92.8%
Dibromofluoromethane	Surrogate	103%	104%	104%	106%
Toluene-d8	Surrogate	108%	109%	108%	109%

Hydrocarbons

	MDL/Units				
F1 PHCs (C6-C10)	25.0 ug/L	<25.0	<25.0	<25.0	<25.0
F2 PHCs (C10-C16)	100 ug/L	<100	<100	<100	<100
F3 PHCs (C16-C34)	100 ug/L	<100	<100	<100	<100
F4 PHCs (C34-C50)	100 ug/L	<100	<100	<100	<100
F1 + F2 PHCs	125 ug/L	<125	<125	<125	<125
F3 + F4 PHCs	200 ug/L	<200	<200	<200	<200

Semi-Volatiles

	MDL/Units				
Acenaphthene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
Acenaphthylene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
Anthracene	0.01 ug/L	<0.01	<0.01	<0.01	<0.01
Benzo [a] anthracene	0.01 ug/L	<0.01	<0.01	<0.01	<0.01
Benzo [a] pyrene	0.01 ug/L	<0.01	<0.01	<0.01	<0.01
Benzo [b] fluoranthene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
Benzo [g,h,i] perylene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
Benzo [k] fluoranthene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
Biphenyl	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
Chrysene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
Dibenzo [a,h] anthracene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05

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Certificate of Analysis

Client: **E-3 Laboratories Inc.**
Client PO: 2514382

Report Date: 13-Jan-2014
Order Date: 12-Dec-2013

Project Description: **City of Barrie**

	Client ID:	352851 - SW B4	352852 - SW B5	352853 - SW D1	352854 - SW D2
	Sample Date:	10-Dec-13	10-Dec-13	11-Dec-13	11-Dec-13
	Sample ID:	1350281-25	1350281-26	1350281-27	1350281-28
	MDL/Units	Water	Water	Water	Water
Fluoranthene	0.01 ug/L	<0.01	<0.01	<0.01	<0.01
Fluorene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
Indeno [1,2,3-cd] pyrene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
1-Methylnaphthalene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
2-Methylnaphthalene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
Methylnaphthalene (1&2)	0.10 ug/L	<0.10	<0.10	<0.10	<0.10
Naphthalene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
Phenanthrene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
Pyrene	0.01 ug/L	<0.01	<0.01	<0.01	<0.01
2-Fluorobiphenyl	Surrogate	71.4%	67.4%	84.8%	79.9%
Terphenyl-d14	Surrogate	81.7%	76.9%	87.6%	87.9%

Certificate of Analysis

Report Date: 13-Jan-2014

Order Date: 12-Dec-2013

Client: E-3 Laboratories Inc.

Client PO: 2514382

Project Description: City of Barrie

	Client ID:	352855 - SW D3	352856 - SW D4	352857 - SW D5	352858 - Dup 3
	Sample Date:	11-Dec-13	11-Dec-13	11-Dec-13	11-Dec-13
	Sample ID:	1350281-29	1350281-30	1350281-31	1350281-32
	MDL/Units	Water	Water	Water	Water

General Inorganics

Hardness	1.0 mg/L	401	412	412	409
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Metals

Aluminum, dissolved	1 ug/L	4	4	5	3
Mercury, dissolved	0.1 ug/L	3	0.2	0.2	0.9
Antimony	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Arsenic	1 ug/L	<1	<1	<1	<1
Barium	1 ug/L	152	156	157	149
Beryllium	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Boron	10 ug/L	39	43	43	40
Cadmium	0.1 ug/L	<0.1	<0.1	<0.1	<0.1
Calcium	100 ug/L	139000	143000	144000	142000
Chromium	1 ug/L	3	4	4	4
Cobalt	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Copper	0.5 ug/L	1.8	1.8	2.4	1.5
Iron	100 ug/L	1020	1340	1340	1340
Lead	0.1 ug/L	0.4	<0.1	0.6	0.1
Magnesium	200 ug/L	13000	13400	12900	13100
Manganese	5 ug/L	216	242	215	238
Molybdenum	0.5 ug/L	<0.5	0.6	0.6	0.7
Nickel	1 ug/L	3	3	3	3
Potassium	100 ug/L	3770	4290	4190	4170
Selenium	1 ug/L	<1	<1	<1	<1
Silver	0.1 ug/L	<0.1	<0.1	<0.1	<0.1
Sodium	200 ug/L	207000	230000	226000	229000
Strontium	10 ug/L	764	767	754	752
Thallium	0.1 ug/L	<0.1	<0.1	<0.1	<0.1
Titanium	5 ug/L	<5	<5	<5	<5
Tungsten	10 ug/L	<10	<10	<10	<10
Uranium	0.1 ug/L	0.8	0.8	0.8	0.9
Vanadium	0.5 ug/L	3.3	3.3	3.2	2.5
Zinc	5 ug/L	8	6	7	<5
Zirconium	1 ug/L	<1	<1	<1	<1

Volatiles

Acetone	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
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Certificate of Analysis

Report Date: 13-Jan-2014
Order Date: 12-Dec-2013

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

	Client ID: Sample Date: Sample ID: MDL/Units	352855 - SW D3 11-Dec-13 1350281-29 Water	352856 - SW D4 11-Dec-13 1350281-30 Water	352857 - SW D5 11-Dec-13 1350281-31 Water	352858 - Dup 3 11-Dec-13 1350281-32 Water
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	3.7	<0.5	3.8
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	3.7	<0.5	3.8
1,2-Dichloropropane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
cis-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
trans-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene, total	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Hexane	1.0 ug/L	<1.0	<1.0	<1.0	<1.0
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Methyl Butyl Ketone (2-Hexanone)	10.0 ug/L	<10.0	<10.0	<10.0	<10.0
Methyl Isobutyl Ketone	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Methyl tert-butyl ether	2.0 ug/L	<2.0	<2.0	<2.0	<2.0
Methylene Chloride	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Styrene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5

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Certificate of Analysis

Report Date: 13-Jan-2014
Order Date: 12-Dec-2013

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

	Client ID: Sample Date: Sample ID:	352855 - SW D3 11-Dec-13 1350281-29 Water	352856 - SW D4 11-Dec-13 1350281-30 Water	352857 - SW D5 11-Dec-13 1350281-31 Water	352858 - Dup 3 11-Dec-13 1350281-32 Water
	MDL/Units				
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	6.1	<0.5	6.4
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	92.2%	91.8%	92.0%	92.2%
Dibromofluoromethane	Surrogate	104%	104%	106%	107%
Toluene-d8	Surrogate	109%	109%	110%	109%

Hydrocarbons

F1 PHCs (C6-C10)	25.0 ug/L	<25.0	<25.0	<25.0	<25.0
F2 PHCs (C10-C16)	100 ug/L	<100	<100	<100	<100
F3 PHCs (C16-C34)	100 ug/L	<100	<100	<100	<100
F4 PHCs (C34-C50)	100 ug/L	<100	<100	<100	<100
F1 + F2 PHCs	125 ug/L	<125	<125	<125	<125
F3 + F4 PHCs	200 ug/L	<200	<200	<200	<200

Semi-Volatiles

Acenaphthene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
Acenaphthylene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
Anthracene	0.01 ug/L	<0.01	<0.01	<0.01	<0.01
Benzo [a] anthracene	0.01 ug/L	<0.01	<0.01	<0.01	<0.01
Benzo [a] pyrene	0.01 ug/L	<0.01	<0.01	<0.01	<0.01
Benzo [b] fluoranthene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
Benzo [g,h,i] perylene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
Benzo [k] fluoranthene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
Biphenyl	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
Chrysene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
Dibenzo [a,h] anthracene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
Fluoranthene	0.01 ug/L	<0.01	<0.01	<0.01	<0.01

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Certificate of Analysis

Report Date: 13-Jan-2014

Client: E-3 Laboratories Inc.

Order Date: 12-Dec-2013

Client PO: 2514382

Project Description: City of Barrie

	Client ID:	352855 - SW D3	352856 - SW D4	352857 - SW D5	352858 - Dup 3
	Sample Date:	11-Dec-13	11-Dec-13	11-Dec-13	11-Dec-13
	Sample ID:	1350281-29	1350281-30	1350281-31	1350281-32
	MDL/Units	Water	Water	Water	Water
Fluorene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
Indeno [1,2,3-cd] pyrene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
1-Methylnaphthalene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
2-Methylnaphthalene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
Methylnaphthalene (1&2)	0.10 ug/L	<0.10	<0.10	<0.10	<0.10
Naphthalene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
Phenanthrene	0.05 ug/L	<0.05	<0.05	<0.05	<0.05
Pyrene	0.01 ug/L	<0.01	<0.01	<0.01	<0.01
2-Fluorobiphenyl	Surrogate	76.1%	90.1%	73.5%	81.4%
Terphenyl-d14	Surrogate	85.6%	89.5%	95.3%	82.5%

Certificate of Analysis

Report Date: 13-Jan-2014
Order Date: 12-Dec-2013

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

Client ID:	352859 - MW D29	-	-	-
Sample Date:	11-Dec-13	-	-	-
Sample ID:	1350281-33	-	-	-
MDL/Units	Water	-	-	-

General Inorganics

Cyanide, free	2 ug/L	<2	-	-	-
Hardness	1.0 mg/L	542	-	-	-

Anions

Bromide	0.1 mg/L	<0.1	-	-	-
Chloride	1 mg/L	781	-	-	-
Fluoride	0.1 mg/L	<0.1	-	-	-
Nitrate as N	0.1 mg/L	<0.1	-	-	-
Nitrite as N	0.05 mg/L	<0.05	-	-	-
Phosphate as P	1 mg/L	<1	-	-	-
Sulphate	1 mg/L	2	-	-	-

Metals

Mercury	0.1 ug/L	<0.1	-	-	-
Antimony	0.5 ug/L	<0.5	-	-	-
Arsenic	1 ug/L	2	-	-	-
Barium	1 ug/L	468	-	-	-
Beryllium	0.5 ug/L	<0.5	-	-	-
Boron	10 ug/L	73	-	-	-
Cadmium	0.1 ug/L	<0.1	-	-	-
Calcium	100 ug/L	195000	-	-	-
Chromium	1 ug/L	7	-	-	-
Chromium (III)	10 ug/L	<10	-	-	-
Chromium (VI)	10 ug/L	<10	-	-	-
Cobalt	0.5 ug/L	1.0	-	-	-
Copper	0.5 ug/L	<0.5	-	-	-
Iron	100 ug/L	26600	-	-	-
Lead	0.1 ug/L	0.6	-	-	-
Magnesium	200 ug/L	13000	-	-	-
Molybdenum	0.5 ug/L	<0.5	-	-	-
Nickel	1 ug/L	4	-	-	-
Potassium	100 ug/L	9120	-	-	-
Selenium	1 ug/L	<1	-	-	-
Silver	0.1 ug/L	<0.1	-	-	-
Sodium	200 ug/L	532000	-	-	-
Thallium	0.1 ug/L	<0.1	-	-	-

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Certificate of Analysis

Report Date: 13-Jan-2014
Order Date: 12-Dec-2013

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

	Client ID:	352859 - MW D29	-	-	-
	Sample Date:	11-Dec-13	-	-	-
	Sample ID:	1350281-33	-	-	-
	MDL/Units	Water	-	-	-
Uranium	0.1 ug/L	<0.1	-	-	-
Vanadium	0.5 ug/L	5.3	-	-	-
Zinc	5 ug/L	<5	-	-	-

Volatiles					
Acetone	5.0 ug/L	<5.0	-	-	-
Benzene	0.5 ug/L	<0.5	-	-	-
Bromodichloromethane	0.5 ug/L	<0.5	-	-	-
Bromoform	0.5 ug/L	<0.5	-	-	-
Bromomethane	0.5 ug/L	<0.5	-	-	-
Carbon Tetrachloride	0.2 ug/L	<0.2	-	-	-
Chlorobenzene	0.5 ug/L	<0.5	-	-	-
Chloroethane	1.0 ug/L	<1.0	-	-	-
Chloroform	0.5 ug/L	<0.5	-	-	-
Chloromethane	3.0 ug/L	<3.0	-	-	-
Dibromochloromethane	0.5 ug/L	<0.5	-	-	-
Dichlorodifluoromethane	1.0 ug/L	<1.0	-	-	-
1,2-Dibromoethane	0.2 ug/L	<0.2	-	-	-
1,2-Dichlorobenzene	0.5 ug/L	<0.5	-	-	-
1,3-Dichlorobenzene	0.5 ug/L	<0.5	-	-	-
1,4-Dichlorobenzene	0.5 ug/L	<0.5	-	-	-
1,1-Dichloroethane	0.5 ug/L	<0.5	-	-	-
1,2-Dichloroethane	0.5 ug/L	<0.5	-	-	-
1,1-Dichloroethylene	0.5 ug/L	<0.5	-	-	-
cis-1,2-Dichloroethylene	0.5 ug/L	<0.5	-	-	-
trans-1,2-Dichloroethylene	0.5 ug/L	<0.5	-	-	-
1,2-Dichloroethylene, total	0.5 ug/L	<0.5	-	-	-
1,2-Dichloropropane	0.5 ug/L	<0.5	-	-	-
cis-1,3-Dichloropropylene	0.5 ug/L	<0.5	-	-	-
trans-1,3-Dichloropropylene	0.5 ug/L	<0.5	-	-	-
1,3-Dichloropropene, total	0.5 ug/L	<0.5	-	-	-
Ethylbenzene	0.5 ug/L	<0.5	-	-	-
Hexane	1.0 ug/L	<1.0	-	-	-
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	<5.0	-	-	-
Methyl Butyl Ketone (2-Hexanone)	10.0 ug/L	<10.0	-	-	-
Methyl Isobutyl Ketone	5.0 ug/L	<5.0	-	-	-

Certificate of Analysis

Report Date: 13-Jan-2014

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

Order Date: 12-Dec-2013

	Client ID:	352859 - MW D29	-	-	-
	Sample Date:	11-Dec-13	-	-	-
	Sample ID:	1350281-33	-	-	-
	MDL/Units	Water	-	-	-
Methyl tert-butyl ether	2.0 ug/L	<2.0	-	-	-
Methylene Chloride	5.0 ug/L	<5.0	-	-	-
Styrene	0.5 ug/L	<0.5	-	-	-
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	-	-	-
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5	-	-	-
Tetrachloroethylene	0.5 ug/L	<0.5	-	-	-
Toluene	0.5 ug/L	<0.5	-	-	-
1,2,4-Trichlorobenzene	0.5 ug/L	<0.5	-	-	-
1,1,1-Trichloroethane	0.5 ug/L	<0.5	-	-	-
1,1,2-Trichloroethane	0.5 ug/L	<0.5	-	-	-
Trichloroethylene	0.5 ug/L	<0.5	-	-	-
Trichlorofluoromethane	1.0 ug/L	<1.0	-	-	-
1,3,5-Trimethylbenzene	0.5 ug/L	<0.5	-	-	-
Vinyl chloride	0.5 ug/L	<0.5	-	-	-
m,p-Xylenes	0.5 ug/L	6.8	-	-	-
o-Xylene	0.5 ug/L	3.1	-	-	-
Xylenes, total	0.5 ug/L	9.8	-	-	-
4-Bromofluorobenzene	Surrogate	91.2%	-	-	-
Dibromofluoromethane	Surrogate	85.5%	-	-	-
Toluene-d8	Surrogate	106%	-	-	-

Hydrocarbons

F1 PHCs (C6-C10)	25.0 ug/L	531	-	-	-
F2 PHCs (C10-C16)	100 ug/L	<100	-	-	-
F3 PHCs (C16-C34)	100 ug/L	<100	-	-	-
F4 PHCs (C34-C50)	100 ug/L	<100	-	-	-
F1 + F2 PHCs	125 ug/L	531	-	-	-
F3 + F4 PHCs	200 ug/L	<200	-	-	-

Semi-Volatiles

Acenaphthene	0.05 ug/L	0.30	-	-	-
Acenaphthylene	0.05 ug/L	<0.05	-	-	-
Anthracene	0.01 ug/L	0.08	-	-	-
Benzo [a] anthracene	0.01 ug/L	<0.01	-	-	-
Benzo [a] pyrene	0.01 ug/L	<0.01	-	-	-
Benzo [b] fluoranthene	0.05 ug/L	<0.05	-	-	-
Benzo [g,h,i] perylene	0.05 ug/L	<0.05	-	-	-

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Certificate of Analysis

Report Date: 13-Jan-2014

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

Order Date: 12-Dec-2013

	Client ID:	352859 - MW D29	-	-	-
	Sample Date:	11-Dec-13	-	-	-
	Sample ID:	1350281-33	-	-	-
	MDL/Units	Water	-	-	-
Benzo [k] fluoranthene	0.05 ug/L	<0.05	-	-	-
Biphenyl	0.05 ug/L	0.08	-	-	-
Chrysene	0.05 ug/L	<0.05	-	-	-
Dibenzo [a,h] anthracene	0.05 ug/L	<0.05	-	-	-
Fluoranthene	0.01 ug/L	0.15	-	-	-
Fluorene	0.05 ug/L	<0.05	-	-	-
Indeno [1,2,3-cd] pyrene	0.05 ug/L	<0.05	-	-	-
1-Methylnaphthalene	0.05 ug/L	1.30	-	-	-
2-Methylnaphthalene	0.05 ug/L	2.30	-	-	-
Methylnaphthalene (1&2)	0.10 ug/L	3.60	-	-	-
Naphthalene	0.05 ug/L	3.69	-	-	-
Phenanthrene	0.05 ug/L	0.13	-	-	-
Pyrene	0.01 ug/L	0.12	-	-	-
2-Fluorobiphenyl	Surrogate	85.1%	-	-	-
Terphenyl-d14	Surrogate	93.4%	-	-	-

Certificate of Analysis

Report Date: 13-Jan-2014

Client: E-3 Laboratories Inc.

Order Date: 12-Dec-2013

Client PO: 2514382

Project Description: City of Barrie

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Bromide	ND	0.1	mg/L						
Chloride	ND	1	mg/L						
Fluoride	ND	0.1	mg/L						
Nitrate as N	ND	0.1	mg/L						
Nitrite as N	ND	0.05	mg/L						
Phosphate as P	ND	1	mg/L						
Sulphate	ND	1	mg/L						
General Inorganics									
Cyanide, free	ND	2	ug/L						
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25.0	ug/L						
F2 PHCs (C10-C16)	ND	100	ug/L						
F3 PHCs (C16-C34)	ND	100	ug/L						
F4 PHCs (C34-C50)	ND	100	ug/L						
Metals									
Mercury, dissolved	ND	0.1	ug/L						
Aluminum, dissolved	ND	1	ug/L						
Mercury	ND	0.1	ug/L						
Antimony	ND	0.5	ug/L						
Arsenic	ND	1	ug/L						
Barium	ND	1	ug/L						
Beryllium	ND	0.5	ug/L						
Boron	ND	10	ug/L						
Cadmium	ND	0.1	ug/L						
Calcium	ND	100	ug/L						
Chromium (VI)	ND	10	ug/L						
Chromium	ND	1	ug/L						
Cobalt	ND	0.5	ug/L						
Copper	ND	0.5	ug/L						
Iron	ND	100	ug/L						
Lead	ND	0.1	ug/L						
Magnesium	ND	200	ug/L						
Manganese	ND	5	ug/L						
Molybdenum	ND	0.5	ug/L						
Nickel	ND	1	ug/L						
Potassium	ND	100	ug/L						
Selenium	ND	1	ug/L						
Silver	ND	0.1	ug/L						
Sodium	ND	200	ug/L						
Strontium	ND	10	ug/L						
Thallium	ND	0.1	ug/L						
Titanium	ND	5	ug/L						
Tungsten	ND	10	ug/L						
Uranium	ND	0.1	ug/L						
Vanadium	ND	0.5	ug/L						
Zinc	ND	5	ug/L						
Zirconium	ND	1	ug/L						
Semi-Volatiles									
Acenaphthene	ND	0.05	ug/L						
Acenaphthylene	ND	0.05	ug/L						
Anthracene	ND	0.01	ug/L						
Benzo [a] anthracene	ND	0.01	ug/L						
Benzo [a] pyrene	ND	0.01	ug/L						
Benzo [b] fluoranthene	ND	0.05	ug/L						
Benzo [g,h,i] perylene	ND	0.05	ug/L						

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Certificate of Analysis

Report Date: 13-Jan-2013
Order Date: 12-Dec-2013

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Benzo [k] fluoranthene	ND	0.05	ug/L						
Biphenyl	ND	0.05	ug/L						
Chrysene	ND	0.05	ug/L						
Dibenzo [a,h] anthracene	ND	0.05	ug/L						
Fluoranthene	ND	0.01	ug/L						
Fluorene	ND	0.05	ug/L						
Indeno [1,2,3-cd] pyrene	ND	0.05	ug/L						
1-Methylnaphthalene	ND	0.05	ug/L						
2-Methylnaphthalene	ND	0.05	ug/L						
Methylnaphthalene (1&2)	ND	0.10	ug/L						
Naphthalene	ND	0.05	ug/L						
Phenanthrene	ND	0.05	ug/L						
Pyrene	ND	0.01	ug/L						
Surrogate: 2-Fluorobiphenyl	14.5		ug/L		72.3	50-140			
Surrogate: Terphenyl-d14	19.4		ug/L		97.0	50-140			
Volatiles									
Acetone	ND	5.0	ug/L						
Benzene	ND	0.5	ug/L						
Bromodichloromethane	ND	0.5	ug/L						
Bromoform	ND	0.5	ug/L						
Bromomethane	ND	0.5	ug/L						
Carbon Tetrachloride	ND	0.2	ug/L						
Chlorobenzene	ND	0.5	ug/L						
Chloroethane	ND	1.0	ug/L						
Chloroform	ND	0.5	ug/L						
Chloromethane	ND	3.0	ug/L						
Dibromochloromethane	ND	0.5	ug/L						
Dichlorodifluoromethane	ND	1.0	ug/L						
1,2-Dibromoethane	ND	0.2	ug/L						
1,2-Dichlorobenzene	ND	0.5	ug/L						
1,3-Dichlorobenzene	ND	0.5	ug/L						
1,4-Dichlorobenzene	ND	0.5	ug/L						
1,1-Dichloroethane	ND	0.5	ug/L						
1,2-Dichloroethane	ND	0.5	ug/L						
1,1-Dichloroethylene	ND	0.5	ug/L						
cis-1,2-Dichloroethylene	ND	0.5	ug/L						
trans-1,2-Dichloroethylene	ND	0.5	ug/L						
1,2-Dichloroethylene, total	ND	0.5	ug/L						
1,2-Dichloropropane	ND	0.5	ug/L						
cis-1,3-Dichloropropylene	ND	0.5	ug/L						
trans-1,3-Dichloropropylene	ND	0.5	ug/L						
1,3-Dichloropropene, total	ND	0.5	ug/L						
Ethylbenzene	ND	0.5	ug/L						
Hexane	ND	1.0	ug/L						
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L						
Methyl Butyl Ketone (2-Hexanone)	ND	10.0	ug/L						
Methyl Isobutyl Ketone	ND	5.0	ug/L						
Methyl tert-butyl ether	ND	2.0	ug/L						
Methylene Chloride	ND	5.0	ug/L						
Styrene	ND	0.5	ug/L						
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L						
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L						
Tetrachloroethylene	ND	0.5	ug/L						
Toluene	ND	0.5	ug/L						
1,2,4-Trichlorobenzene	ND	0.5	ug/L						
1,1,1-Trichloroethane	ND	0.5	ug/L						
1,1,2-Trichloroethane	ND	0.5	ug/L						
Trichloroethylene	ND	0.5	ug/L						

Certificate of Analysis

Report Date: 13-Jan-2014

Client: E-3 Laboratories Inc.

Order Date: 12-Dec-2013

Client PO: 2514382

Project Description: City of Barrie

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Trichlorofluoromethane	ND	1.0	ug/L						
1,3,5-Trimethylbenzene	ND	0.5	ug/L						
Vinyl chloride	ND	0.5	ug/L						
m,p-Xylenes	ND	0.5	ug/L						
o-Xylene	ND	0.5	ug/L						
Xylenes, total	ND	0.5	ug/L						
Surrogate: 4-Bromofluorobenzene	73.3		ug/L		91.6	50-140			
Surrogate: Dibromofluoromethane	85.3		ug/L		107	50-140			
Surrogate: Toluene-d8	87.2		ug/L		109	50-140			

Certificate of Analysis

Report Date: 13-Jan-2013

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

Order Date: 12-Dec-2013

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Bromide	0.19	0.1	mg/L	0.17			12.7	20	
Chloride	753	10	mg/L	781			3.7	10	
Fluoride	ND	0.1	mg/L	ND				10	
Nitrate as N	0.16	0.1	mg/L	0.17			1.9	20	
Nitrite as N	ND	0.05	mg/L	ND				20	
Phosphate as P	ND	1	mg/L	ND				20	
Sulphate	70.4	1	mg/L	70.5			0.1	10	
General Inorganics									
Cyanide, free	ND	2	ug/L	ND				20	
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25.0	ug/L	ND				30	
Metals									
Mercury, dissolved	ND	0.1	ug/L	ND				27	
Aluminum, dissolved	3.0	1	ug/L	3.2			5.9	20	
Mercury	ND	0.1	ug/L	ND				20	
Antimony	0.66	0.5	ug/L	1.97			100.0	20	QR-01
Arsenic	ND	1	ug/L	ND			0.0	20	
Barium	ND	1	ug/L	ND			0.0	20	
Beryllium	ND	0.5	ug/L	ND			0.0	20	
Boron	ND	10	ug/L	ND			0.0	20	
Cadmium	ND	0.1	ug/L	ND			0.0	20	
Calcium	ND	100	ug/L	ND			0.0	20	
Chromium (VI)	ND	10	ug/L	ND				20	
Chromium	ND	1	ug/L	ND			0.0	20	
Cobalt	ND	0.5	ug/L	ND			0.0	20	
Copper	ND	0.5	ug/L	ND			0.0	20	
Iron	ND	100	ug/L	ND			0.0	20	
Lead	ND	0.1	ug/L	ND			0.0	20	
Magnesium	ND	200	ug/L	ND			0.0	20	
Manganese	ND	5	ug/L	ND			0.0	20	
Molybdenum	ND	0.5	ug/L	ND			0.0	20	
Nickel	ND	1	ug/L	ND			0.0	20	
Potassium	ND	100	ug/L	ND			0.0	20	
Selenium	ND	1	ug/L	ND			0.0	20	
Silver	ND	0.1	ug/L	ND			0.0	20	
Sodium	ND	200	ug/L	ND			0.0	20	
Strontium	ND	10	ug/L	ND			0.0	20	
Thallium	ND	0.1	ug/L	ND			0.0	20	
Titanium	ND	5	ug/L	ND			0.0	20	
Tungsten	ND	10	ug/L	ND			0.0	20	
Uranium	ND	0.1	ug/L	ND			0.0	20	
Vanadium	ND	0.5	ug/L	ND			0.0	20	
Zinc	ND	5	ug/L	ND			0.0	20	
Zirconium	ND	1	ug/L	ND			0.0	20	
Volatiles									
Acetone	9.21	5.0	ug/L	ND			0.0	30	
Benzene	3.28	0.5	ug/L	2.59			23.5	30	
Bromodichloromethane	ND	0.5	ug/L	ND				30	
Bromoform	ND	0.5	ug/L	ND				30	
Bromomethane	ND	0.5	ug/L	ND				30	
Carbon Tetrachloride	ND	0.2	ug/L	ND				30	
Chlorobenzene	0.71	0.5	ug/L	ND			0.0	30	
Chloroethane	ND	1.0	ug/L	ND				30	
Chloroform	ND	0.5	ug/L	ND				30	

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Certificate of Analysis

Report Date: 13-Jan-2014

Client: E-3 Laboratories Inc.

Order Date: 12-Dec-2013

Client PO: 2514382

Project Description: City of Barrie

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Chloromethane	ND	3.0	ug/L	ND				30	
Dibromochloromethane	ND	0.5	ug/L	ND				30	
Dichlorodifluoromethane	ND	1.0	ug/L	ND				30	
1,2-Dibromoethane	ND	0.2	ug/L	ND				30	
1,2-Dichlorobenzene	ND	0.5	ug/L	ND			0.0	30	
1,3-Dichlorobenzene	ND	0.5	ug/L	ND				30	
1,4-Dichlorobenzene	0.57	0.5	ug/L	ND			0.0	30	
1,1-Dichloroethane	ND	0.5	ug/L	ND				30	
1,2-Dichloroethane	ND	0.5	ug/L	ND				30	
1,1-Dichloroethylene	ND	0.5	ug/L	ND				30	
cis-1,2-Dichloroethylene	ND	0.5	ug/L	ND				30	
trans-1,2-Dichloroethylene	ND	0.5	ug/L	ND				30	
1,2-Dichloropropane	ND	0.5	ug/L	ND				30	
cis-1,3-Dichloropropylene	ND	0.5	ug/L	ND				30	
trans-1,3-Dichloropropylene	ND	0.5	ug/L	ND				30	
Ethylbenzene	ND	0.5	ug/L	ND			0.0	30	
Hexane	ND	1.0	ug/L	ND				30	
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L	ND				30	
Methyl Butyl Ketone (2-Hexanone)	ND	10.0	ug/L	ND				30	
Methyl Isobutyl Ketone	ND	5.0	ug/L	ND				30	
Methyl tert-butyl ether	ND	2.0	ug/L	ND				30	
Methylene Chloride	ND	5.0	ug/L	ND				30	
Styrene	ND	0.5	ug/L	ND				30	
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L	ND				30	
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L	ND				30	
Tetrachloroethylene	ND	0.5	ug/L	ND				30	
Toluene	ND	0.5	ug/L	ND			0.0	30	
1,2,4-Trichlorobenzene	ND	0.5	ug/L	ND				30	
1,1,1-Trichloroethane	ND	0.5	ug/L	ND				30	
1,1,2-Trichloroethane	ND	0.5	ug/L	ND				30	
Trichloroethylene	ND	0.5	ug/L	ND				30	
Trichlorofluoromethane	ND	1.0	ug/L	ND				30	
1,3,5-Trimethylbenzene	ND	0.5	ug/L	ND			0.0	30	
Vinyl chloride	ND	0.5	ug/L	ND				30	
m,p-Xylenes	7.59	0.5	ug/L	4.01			61.7	30	QR-07
o-Xylene	ND	0.5	ug/L	ND			0.0	30	
Surrogate: 4-Bromofluorobenzene	75.0		ug/L	ND	93.7	50-140			
Surrogate: Dibromofluoromethane	88.3		ug/L	ND	110	50-140			
Surrogate: Toluene-d8	87.0		ug/L	ND	109	50-140			

Certificate of Analysis

Report Date: 13-Jan-2013
Order Date: 12-Dec-2013

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Bromide	1.18		mg/L	0.17	101	72-106			
Chloride	9.08		mg/L	ND	90.8	78-112			
Fluoride	0.90		mg/L	ND	90.4	73-113			
Nitrate as N	1.14		mg/L	0.17	97.5	81-112			
Nitrite as N	1.02		mg/L	ND	102	76-117			
Phosphate as P	4.53		mg/L	ND	90.6	72-131			
Sulphate	80.5		mg/L	70.5	101	75-111			
General Inorganics									
Cyanide, free	30.7	2	ug/L	ND	102	70-130			
Hydrocarbons									
F1 PHCs (C6-C10)	2070	25.0	ug/L	ND	104	68-117			
F2 PHCs (C10-C16)	1570	100	ug/L	ND	87.0	60-140			
F3 PHCs (C16-C34)	3150	100	ug/L	ND	84.7	60-140			
F4 PHCs (C34-C50)	1910	100	ug/L	ND	76.9	60-140			
Metals									
Mercury, dissolved	3.2	0.1	ug/L	ND	108	74-130			
Aluminum, dissolved	50.4		ug/L	3.2	94.4	70-130			
Mercury	3.16	0.1	ug/L	ND	105	78-137			
Antimony	46.3		ug/L	1.97	88.7	80-120			
Arsenic	50.8		ug/L	0.1	101	80-120			
Barium	48.8		ug/L	ND	97.7	80-120			
Beryllium	46.5		ug/L	0.005	93.0	80-120			
Boron	46		ug/L	ND	92.6	80-120			
Cadmium	53.4		ug/L	0.03	107	80-120			
Calcium	1180		ug/L	3	118	80-120			
Chromium (VI)	188	10	ug/L	ND	94.0	70-130			
Chromium	48.8		ug/L	0.09	97.3	80-120			
Cobalt	47.4		ug/L	0.002	94.8	80-120			
Copper	47.4		ug/L	ND	94.9	80-120			
Iron	1130		ug/L	ND	114	80-120			
Lead	47.3		ug/L	ND	94.6	80-120			
Magnesium	1050		ug/L	0.4	105	80-120			
Manganese	48.0		ug/L	0.004	96.0	80-120			
Molybdenum	48.9		ug/L	0.29	97.3	80-120			
Nickel	47.1		ug/L	ND	94.1	80-120			
Potassium	1080		ug/L	0.09	108	80-120			
Selenium	51.2		ug/L	0.2	102	80-120			
Silver	52.3		ug/L	0.03	104	80-120			
Sodium	1050		ug/L	ND	105	80-120			
Strontium	49		ug/L	0.003	97.4	80-120			
Thallium	47.4		ug/L	ND	94.9	80-120			
Titanium	50.3		ug/L	ND	101	80-120			
Tungsten	45.0		ug/L	0.4	89.2	80-120			
Uranium	45.8		ug/L	0.02	91.5	80-120			
Vanadium	49.9		ug/L	0.07	99.7	80-120			
Zinc	45		ug/L	ND	92.6	80-120			
Zirconium	44.9		ug/L	ND	89.7	80-120			

Semi-Volatiles

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Certificate of Analysis

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

Report Date: 13-Jan-2014
Order Date: 12-Dec-2013

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Acenaphthene	3.74	0.05	ug/L	ND	74.8	50-140			
Acenaphthylene	3.67	0.05	ug/L	ND	73.3	50-140			
Anthracene	3.83	0.01	ug/L	ND	76.6	50-140			
Benzo [a] anthracene	3.80	0.01	ug/L	ND	76.0	50-140			
Benzo [a] pyrene	3.51	0.01	ug/L	ND	70.2	50-140			
Benzo [b] fluoranthene	4.41	0.05	ug/L	ND	88.3	50-140			
Benzo [g,h,i] perylene	4.08	0.05	ug/L	ND	81.6	50-140			
Benzo [k] fluoranthene	4.97	0.05	ug/L	ND	99.4	50-140			
Biphenyl	4.11	0.05	ug/L	ND	82.3	50-140			
Chrysene	3.94	0.05	ug/L	ND	78.7	50-140			
Dibenzo [a,h] anthracene	4.15	0.05	ug/L	ND	82.9	50-140			
Fluoranthene	4.09	0.01	ug/L	ND	81.8	50-140			
Fluorene	3.41	0.05	ug/L	ND	68.2	50-140			
Indeno [1,2,3-cd] pyrene	4.28	0.05	ug/L	ND	85.6	50-140			
1-Methylnaphthalene	3.72	0.05	ug/L	ND	74.4	50-140			
2-Methylnaphthalene	3.80	0.05	ug/L	ND	76.0	50-140			
Naphthalene	3.55	0.05	ug/L	ND	71.0	50-140			
Phenanthrene	4.04	0.05	ug/L	ND	80.8	50-140			
Pyrene	4.16	0.01	ug/L	ND	83.2	50-140			
<i>Surrogate: 2-Fluorobiphenyl</i>	<i>15.6</i>		<i>ug/L</i>		<i>78.2</i>	<i>50-140</i>			
Volatiles									
Acetone	85.6	5.0	ug/L	ND	85.6	50-140			
Benzene	44.6	0.5	ug/L	ND	112	60-130			
Bromodichloromethane	40.8	0.5	ug/L	ND	102	60-130			
Bromoform	31.4	0.5	ug/L	ND	78.5	60-130			
Bromomethane	41.3	0.5	ug/L	ND	103	50-140			
Carbon Tetrachloride	27.4	0.2	ug/L	ND	68.5	60-130			
Chlorobenzene	37.9	0.5	ug/L	ND	94.8	60-130			
Chloroethane	39.4	1.0	ug/L	ND	98.6	50-140			
Chloroform	46.4	0.5	ug/L	ND	116	60-130			
Chloromethane	32.7	3.0	ug/L	ND	81.7	50-140			
Dibromochloromethane	34.7	0.5	ug/L	ND	86.8	60-130			
Dichlorodifluoromethane	39.0	1.0	ug/L	ND	97.4	50-140			
1,2-Dibromoethane	35.5	0.2	ug/L	ND	88.8	60-130			
1,2-Dichlorobenzene	43.2	0.5	ug/L	ND	108	60-130			
1,3-Dichlorobenzene	39.4	0.5	ug/L	ND	98.4	60-130			
1,4-Dichlorobenzene	40.9	0.5	ug/L	ND	102	60-130			
1,1-Dichloroethane	40.7	0.5	ug/L	ND	102	60-130			
1,2-Dichloroethane	41.6	0.5	ug/L	ND	104	60-130			
1,1-Dichloroethylene	38.2	0.5	ug/L	ND	95.5	60-130			
cis-1,2-Dichloroethylene	40.8	0.5	ug/L	ND	102	60-130			
trans-1,2-Dichloroethylene	43.3	0.5	ug/L	ND	108	60-130			
1,2-Dichloropropane	48.9	0.5	ug/L	ND	122	60-130			
cis-1,3-Dichloropropylene	46.1	0.5	ug/L	ND	115	60-130			
trans-1,3-Dichloropropylene	42.4	0.5	ug/L	ND	106	60-130			
Ethylbenzene	38.0	0.5	ug/L	ND	95.0	60-130			
Hexane	33.3	1.0	ug/L	ND	83.4	60-130			
Methyl Ethyl Ketone (2-Butanone)	103	5.0	ug/L	ND	103	50-140			
Methyl Butyl Ketone (2-Hexanone)	108	10.0	ug/L	ND	108	50-140			
Methyl Isobutyl Ketone	113	5.0	ug/L	ND	113	50-140			

Certificate of Analysis

Report Date: 13-Jan-2013

Client: E-3 Laboratories Inc.

Order Date: 12-Dec-2013

Client PO: 2514382

Project Description: City of Barrie

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Methyl tert-butyl ether	107	2.0	ug/L	ND	107	50-140			
Methylene Chloride	35.8	5.0	ug/L	ND	89.5	60-130			
Styrene	36.3	0.5	ug/L	ND	90.8	60-130			
1,1,1,2-Tetrachloroethane	29.2	0.5	ug/L	ND	73.0	60-130			
1,1,2,2-Tetrachloroethane	38.5	0.5	ug/L	ND	96.2	60-130			
Tetrachloroethylene	36.0	0.5	ug/L	ND	89.9	60-130			
Toluene	40.2	0.5	ug/L	ND	100	60-130			
1,2,4-Trichlorobenzene	41.3	0.5	ug/L	ND	103	60-130			
1,1,1-Trichloroethane	38.3	0.5	ug/L	ND	95.7	60-130			
1,1,2-Trichloroethane	47.4	0.5	ug/L	ND	119	60-130			
Trichloroethylene	41.8	0.5	ug/L	ND	105	60-130			
Trichlorofluoromethane	35.6	1.0	ug/L	ND	88.9	60-130			
1,3,5-Trimethylbenzene	36.7	0.5	ug/L	ND	91.7	60-130			
Vinyl chloride	29.3	0.5	ug/L	ND	73.2	50-140			
m,p-Xylenes	74.0	0.5	ug/L	ND	92.5	60-130			
o-Xylene	39.8	0.5	ug/L	ND	99.6	60-130			

Certificate of Analysis

Report Date: 13-Jan-2014

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

Order Date: 12-Dec-2013

Qualifier Notes:

Sample Qualifiers :

- 1 : Elevated detection limit due to dilution required because of high target analyte concentration.
- 2 : Please note that this sample is a standard, therefore Paracels normal Holding Time does not apply.

QC Qualifiers :

- QR-01 : Duplicate RPD is high, however, the sample result is less than 10x the MDL.
- QR-07 : Duplicate result exceeds RPD limits due to non-homogeneity between multiple sample vials.

Sample Data Revisions

None

Work Order Revisions / Comments:

Revision 1 - this report includes an updated Hardness result.

Other Report Notes:

- n/a: not applicable
- ND: Not Detected
- MDL: Method Detection Limit
- Source Result: Data used as source for matrix and duplicate samples
- %REC: Percent recovery.
- RPD: Relative percent difference.

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.



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CERTIFICATE OF ANALYSIS

Golder Associates Ltd.
 Christi Groves
 121 Commerce Park Drive, Unit L
 Barrie
 L4N 8X1
 Tel: 705-722-4492

Fax:
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Work Order No.: 2509907
 Received : 2013-08-22
 PO Number:
 Reported: 2013-09-03
 Project Name: BHWS Sampling
 Chain of Custody No.: 21802

Client Sample ID	Sample Date	Lab ID	Parameter	Result	Unit	RDL	Date Analyzed	Method
MW-B2	2013-08-21	340137	F2-F4 PHC	See	Attached	N/A	2013-08-29	Subcontracted
MW-B4	2013-08-21	340138	F2-F4 PHC	See	Attached	N/A	2013-08-29	Subcontracted
MW-B5	2013-08-21	340139	F2-F4 PHC	See	Attached	N/A	2013-08-29	Subcontracted
MW-B6	2013-08-21	340140	F2-F4 PHC	See	Attached	N/A	2013-08-29	Subcontracted
MW-B23	2013-08-21	340141	Alkalinity (CaCO3)	294	mg/LCaCO3	2.00	2013-08-26	APHA 2320B mod
			Ammonia (Total)	1.70	mg/L	0.03	2013-08-22	APHA 4500
			Anions	See	Attached	N/A	2013-08-28	Subcontracted
			Calcium	290	mg/L	11	2013-08-23	EPA 6010C
			Conductivity	2640	uS/cm	N/A	2013-08-27	APHA 2510
			Cyanide (Free)	<0.005	mg/L	0.005	2013-08-23	Subcontracted
			Dissolved Metals	See	Attached	N/A	2013-08-27	Subcontracted
			F1-F4 PHC	See	Attached	N/A	2013-08-29	Subcontracted
			Hardness (CaCO3)	832	mg/LCaCO3	0.06	2013-09-03	APHA 2340B (Calc)
			Magnesium	26.2	mg/L	0.2	2013-08-23	EPA 6010C
			Metals	See	Attached	N/A	2013-08-27	Subcontracted
			PAHs	See	Attached	N/A	2013-08-28	Subcontracted
			pH	6.88	SU	N/A	2013-08-22	APHA 4500 A,B MOD
			Phenolics	0.006	mg/L	0.004	2013-08-28	HACH 8047
			Potassium	13.6	mg/L	3.0	2013-08-23	EPA 6010C
			Sodium	457	mg/L	50.0	2013-08-23	EPA 6010C
VOC Scan	See	Attached	N/A	2013-08-26	Subcontracted			
MW-B7	2013-08-21	340142	Alkalinity (CaCO3)	436	mg/LCaCO3	2.00	2013-08-26	APHA 2320B mod
			Ammonia (Total)	6.12	mg/L	0.03	2013-08-22	APHA 4500
			Anions	See	Attached	N/A	2013-08-28	Subcontracted
			Calcium	223	mg/L	11	2013-08-23	EPA 6010C
			Conductivity	1960	uS/cm	N/A	2013-08-27	APHA 2510
			Cyanide (Free)	<0.005	mg/L	0.005	2013-08-23	Subcontracted
			Dissolved Metals	See	Attached	N/A	2013-08-27	Subcontracted
			F1-F4 PHC	See	Attached	N/A	2013-08-29	Subcontracted
			Hardness (CaCO3)	632	mg/LCaCO3	0.06	2013-09-03	APHA 2340B (Calc)
			Magnesium	18.2	mg/L	0.2	2013-08-23	EPA 6010C
			Metals	See	Attached	N/A	2013-08-27	Subcontracted
			PAHs	See	Attached	N/A	2013-08-28	Subcontracted

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Work Order No.:2509907
 Received : 2013-08-22
 PO Number:
 Reported: 2013-09-03
 Project Name: BHWS Sampling
 Chain of Custody No.: 21802

Client Sample ID	Sample		Parameter	Result	Unit	RDL	Date	
	Date	Lab ID					Analyzed	Method
MW-B7	2013-08-21	340142	pH	6.65	SU	N/A	2013-08-22	APHA 4500 A,B MOD
			Phenolics	0.006	mg/L	0.004	2013-08-28	HACH 8047
			Potassium	13.0	mg/L	3.0	2013-08-23	EPA 6010C
			Sodium	295	mg/L	50.0	2013-08-23	EPA 6010C
			VOC Scan	See	Attached	N/A	2013-08-26	Subcontracted
MW-B3	2013-08-21	340143	Alkalinity (CaCO3)	255	mg/LCaCO3	2.00	2013-08-26	APHA 2320B mod
			Ammonia (Total)	0.07	mg/L	0.03	2013-08-22	APHA 4500
			Anions	See	Attached	N/A	2013-08-28	Subcontracted
			Calcium	183	mg/L	11	2013-08-23	EPA 6010C
			Conductivity	1180	uS/cm	N/A	2013-08-27	APHA 2510
			Cyanide (Free)	<0.005	mg/L	0.005	2013-08-23	Subcontracted
			Dissolved Metals	See	Attached	N/A	2013-08-27	Subcontracted
			F1-F4 PHC	See	Attached	N/A	2013-08-29	Subcontracted
			Hardness (CaCO3)	546	mg/LCaCO3	0.06	2013-09-03	APHA 2340B (Calc)
			Magnesium	21.6	mg/L	0.2	2013-08-23	EPA 6010C
			Metals	See	Attached	N/A	2013-08-27	Subcontracted
			PAHs	See	Attached	N/A	2013-08-28	Subcontracted
			pH	7.18	SU	N/A	2013-08-22	APHA 4500 A,B MOD
			Phenolics	0.025	mg/L	0.004	2013-08-28	HACH 8047
			Potassium	4.7	mg/L	3.0	2013-08-23	EPA 6010C
			Sodium	128	mg/L	50.0	2013-08-23	EPA 6010C
			VOC Scan	See	Attached	N/A	2013-08-26	Subcontracted
MW-B1	2013-08-21	340144	Alkalinity (CaCO3)	363	mg/LCaCO3	2.00	2013-08-26	APHA 2320B mod
			Ammonia (Total)	<0.03	mg/L	0.03	2013-08-22	APHA 4500
			Anions	See	Attached	N/A	2013-08-28	Subcontracted
			Calcium	192	mg/L	11	2013-08-26	EPA 6010C
			Conductivity	2920	uS/cm	N/A	2013-08-27	APHA 2510
			Cyanide (Free)	<0.005	mg/L	0.005	2013-08-23	Subcontracted
			Dissolved Metals	See	Attached	N/A	2013-08-27	Subcontracted
			F1-F4 PHC	See	Attached	N/A	2013-08-29	Subcontracted
			Hardness (CaCO3)	551	mg/LCaCO3	0.06	2013-09-03	APHA 2340B (Calc)
			Magnesium	17.3	mg/L	0.2	2013-08-26	EPA 6010C
			Metals	See	Attached	N/A	2013-08-27	Subcontracted
			PAHs	See	Attached	N/A	2013-08-28	Subcontracted

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Work Order No.:2509907
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 PO Number:
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 Project Name: BHWS Sampling
 Chain of Custody No.: 21802

Client Sample ID	Sample		Parameter	Result	Unit	RDL	Date	
	Date	Lab ID					Analyzed	Method
MW-B1	2013-08-21	340144	pH	7.14	SU	N/A	2013-08-22	APHA 4500 A.B MOD
			Phenolics	<0.004	mg/L	0.004	2013-08-28	HACH 8047
			Potassium	10.1	mg/L	3.0	2013-08-26	EPA 6010C
			Sodium	516	mg/L	50.0	2013-08-26	EPA 6010C
			VOC Scan	See	Attached	N/A	2013-08-26	Subcontracted
FIELD BLANK #1	2013-08-21	340145	Alkalinity (CaCO3)	<2.00	mg/LCaCO3	2.00	2013-08-26	APHA 2320B mod
			Ammonia (Total)	<0.03	mg/L	0.03	2013-08-22	APHA 4500
			Anions	See	Attached	N/A	2013-08-28	Subcontracted
			Calcium	<0.11	mg/L	0.11	2013-08-26	EPA 6010C
			Conductivity	6	uS/cm	N/A	2013-08-27	APHA 2510
			Cyanide (Free)	<0.005	mg/L	0.005	2013-08-23	Subcontracted
			Dissolved Metals	See	Attached	N/A	2013-08-27	Subcontracted
			F1-F4 PHC	See	Attached	N/A	2013-08-29	Subcontracted
			Hardness (CaCO3)	<0.36	mg/LCaCO3	0.06	2013-09-03	APHA 2340B (Calc)
			Magnesium	<0.02	mg/L	0.02	2013-08-26	EPA 6010C
			Metals	See	Attached	N/A	2013-08-27	Subcontracted
			PAHs	See	Attached	N/A	2013-08-28	Subcontracted
			pH	5.26	SU	N/A	2013-08-22	APHA 4500 A.B MOD
			Phenolics	<0.004	mg/L	0.004	2013-08-28	HACH 8047
			Potassium	<0.30	mg/L	0.30	2013-08-26	EPA 6010C
			Sodium	<0.500	mg/L	0.500	2013-08-26	EPA 6010C
			VOC Scan	See	Attached	N/A	2013-08-26	Subcontracted
DUP A	2013-08-21	340146	Alkalinity (CaCO3)	442	mg/LCaCO3	2.00	2013-08-26	APHA 2320B mod
			Ammonia (Total)	8.17	mg/L	0.03	2013-08-22	APHA 4500
			Anions	See	Attached	N/A	2013-08-28	Subcontracted
			Calcium	225	mg/L	11	2013-08-26	EPA 6010C
			Conductivity	2020	uS/cm	N/A	2013-08-27	APHA 2510
			Cyanide (Free)	<0.005	mg/L	0.005	2013-08-23	Subcontracted
			Dissolved Metals	See	Attached	N/A	2013-08-27	Subcontracted
			F1-F4 PHC	See	Attached	N/A	2013-08-29	Subcontracted
			Hardness (CaCO3)	638	mg/LCaCO3	0.06	2013-09-03	APHA 2340B (Calc)
			Magnesium	18.6	mg/L	0.2	2013-08-26	EPA 6010C
			Metals	See	Attached	N/A	2013-08-27	Subcontracted
			PAHs	See	Attached	N/A	2013-08-28	Subcontracted

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 Chain of Custody No.: 21802

Client Sample ID	Sample Date	Lab ID	Parameter	Result	Unit	RDL	Date Analyzed	Method
DUP A	2013-08-21	340146	pH	6.76	SU	N/A	2013-08-22	APHA 4500 A.B MOD
			Phenolics	0.007	mg/L	0.004	2013-08-28	HACH 8047
			Potassium	11.9	mg/L	3.0	2013-08-26	EPA 6010C
			Sodium	299	mg/L	50.0	2013-08-26	EPA 6010C
			VOC Scan	See	Attached	N/A	2013-08-26	Subcontracted
MW-D3	2013-08-21	340147	Alkalinity (CaCO3)	1480	mg/LCaCO3	2.00	2013-08-26	APHA 2320B mod
			Ammonia (Total)	206	mg/L	0.03	2013-08-22	APHA 4500
			Anions	See	Attached	N/A	2013-08-28	Subcontracted
			Calcium	207	mg/L	11	2013-08-23	EPA 6010C
			Conductivity	2770	uS/cm	N/A	2013-08-27	APHA 2510
			Cyanide (Free)	<0.005	mg/L	0.005	2013-08-23	Subcontracted
			Dissolved Metals	See	Attached	N/A	2013-08-27	Subcontracted
			F1-F4 PHC	See	Attached	N/A	2013-08-29	Subcontracted
			Hardness (CaCO3)	634	mg/LCaCO3	0.06	2013-09-03	APHA 2340B (Calc)
			Magnesium	28.5	mg/L	0.2	2013-08-23	EPA 6010C
			Metals	See	Attached	N/A	2013-08-27	Subcontracted
			PAHs	See	Attached	N/A	2013-08-28	Subcontracted
			pH	6.70	SU	N/A	2013-08-22	APHA 4500 A.B MOD
			Phenolics	0.149	mg/L	0.004	2013-08-28	HACH 8047
			Potassium	26.9	mg/L	3.0	2013-08-23	EPA 6010C
			Sodium	236	mg/L	50.0	2013-08-23	EPA 6010C
			VOC Scan	See	Attached	N/A	2013-08-26	Subcontracted
MW-D1	2013-08-21	340148	Alkalinity (CaCO3)	284	mg/LCaCO3	2.00	2013-08-26	APHA 2320B mod
			Ammonia (Total)	0.09	mg/L	0.03	2013-08-22	APHA 4500
			Anions	See	Attached	N/A	2013-08-28	Subcontracted
			Calcium	109	mg/L	11	2013-08-23	EPA 6010C
			Conductivity	1950	uS/cm	N/A	2013-08-27	APHA 2510
			Cyanide (Free)	<0.005	mg/L	0.005	2013-08-23	Subcontracted
			Dissolved Metals	See	Attached	N/A	2013-08-27	Subcontracted
			F1-F4 PHC	See	Attached	N/A	2013-08-29	Subcontracted
			Hardness (CaCO3)	302	mg/LCaCO3	0.06	2013-09-03	APHA 2340B (Calc)
			Magnesium	7.2	mg/L	0.2	2013-08-23	EPA 6010C
			Metals	See	Attached	N/A	2013-08-27	Subcontracted
PAHs	See	Attached	N/A	2013-08-28	Subcontracted			

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 PO Number:
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 Project Name: BHWS Sampling
 Chain of Custody No.: 21802

Client Sample ID	Sample Date	Lab ID	Parameter	Result	Unit	RDL	Date Analyzed	Method
MW-D1	2013-08-21	340148	pH	7.33	SU	N/A	2013-08-22	APHA 4500 AB MOD
			Phenolics	0.008	mg/L	0.004	2013-08-28	HACH 8047
			Potassium	4.8	mg/L	3.0	2013-08-23	EPA 6010C
			Sodium	345	mg/L	50.0	2013-08-23	EPA 6010C
			VOC Scan	See	Attached	N/A	2013-08-26	Subcontracted
MW-D2	2013-08-21	340149	Alkalinity (CaCO3)	800	mg/LCaCO3	2.00	2013-08-26	APHA 2320B mod
			Ammonia (Total)	47.7	mg/L	0.03	2013-08-22	APHA 4500
			Anions	See	Attached	N/A	2013-08-28	Subcontracted
			Calcium	215	mg/L	11	2013-08-23	EPA 6010C
			Conductivity	1500	uS/cm	N/A	2013-08-27	APHA 2510
			Cyanide (Free)	<0.005	mg/L	0.005	2013-08-23	Subcontracted
			Dissolved Metals	See	Attached	N/A	2013-08-27	Subcontracted
			F1-F4 PHC	See	Attached	N/A	2013-08-29	Subcontracted
			Hardness (CaCO3)	599	mg/LCaCO3	0.06	2013-09-03	APHA 2340B (Calc)
			Magnesium	15.0	mg/L	0.2	2013-08-23	EPA 6010C
			Metals	See	Attached	N/A	2013-08-27	Subcontracted
			PAHs	See	Attached	N/A	2013-08-28	Subcontracted
			pH	6.49	SU	N/A	2013-08-22	APHA 4500 AB MOD
			Phenolics	0.024	mg/L	0.004	2013-08-28	HACH 8047
			Potassium	18.1	mg/L	3.0	2013-08-23	EPA 6010C
			Sodium	33.6	mg/L	5.00	2013-08-23	EPA 6010C
VOC Scan	See	Attached	N/A	2013-08-26	Subcontracted			
MW-D7	2013-08-21	340150	Alkalinity (CaCO3)	553	mg/LCaCO3	2.00	2013-08-26	APHA 2320B mod
			Ammonia (Total)	16.0	mg/L	0.03	2013-08-22	APHA 4500
			Anions	See	Attached	N/A	2013-08-28	Subcontracted
			Calcium	204	mg/L	11	2013-08-26	EPA 6010C
			Conductivity	2300	uS/cm	N/A	2013-08-27	APHA 2510
			Cyanide (Free)	<0.005	mg/L	0.005	2013-08-23	Subcontracted
			Dissolved Metals	See	Attached	N/A	2013-08-27	Subcontracted
			F1-F4 PHC	See	Attached	N/A	2013-08-29	Subcontracted
			Hardness (CaCO3)	601	mg/LCaCO3	0.06	2013-09-03	APHA 2340B (Calc)
			Magnesium	22.3	mg/L	0.2	2013-08-26	EPA 6010C
			Metals	See	Attached	N/A	2013-08-27	Subcontracted
PAHs	See	Attached	N/A	2013-08-28	Subcontracted			

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	Date	Lab ID					Analyzed	Method
MW-D7	2013-08-21	340150	pH	6.84	SU	N/A	2013-08-22	APHA 4500 A,B MOD
			Phenolics	0.011	mg/L	0.004	2013-08-28	HACH 8047
			Potassium	13.8	mg/L	3.0	2013-08-26	EPA 6010C
			Sodium	326	mg/L	50.0	2013-08-26	EPA 6010C
			VOC Scan	See	Attached	N/A	2013-08-26	Subcontracted
MW-D29	2013-08-21	340151	Alkalinity (CaCO3)	500	mg/LCaCO3	2.00	2013-08-26	APHA 2320B mod
			Ammonia (Total)	5.62	mg/L	0.03	2013-08-22	APHA 4500
			Anions	See	Attached	N/A	2013-08-28	Subcontracted
			Calcium	415	mg/L	11	2013-08-26	EPA 6010C
			Conductivity	2540	uS/cm	N/A	2013-08-27	APHA 2510
			Cyanide (Free)	<0.005	mg/L	0.005	2013-08-23	Subcontracted
			Dissolved Metals	See	Attached	N/A	2013-08-27	Subcontracted
			F1-F4 PHC	See	Attached	N/A	2013-08-29	Subcontracted
			Hardness (CaCO3)	1200	mg/LCaCO3	0.06	2013-09-03	APHA 2340B (Calc)
			Magnesium	40.1	mg/L	0.2	2013-08-26	EPA 6010C
			Metals	See	Attached	N/A	2013-08-27	Subcontracted
			PAHs	See	Attached	N/A	2013-08-28	Subcontracted
			pH	6.77	SU	N/A	2013-08-22	APHA 4500 A,B MOD
			Phenolics	<0.004	mg/L	0.004	2013-08-28	HACH 8047
			Potassium	19.7	mg/L	3.0	2013-08-26	EPA 6010C
			Sodium	417	mg/L	50.0	2013-08-26	EPA 6010C
			VOC Scan	See	Attached	N/A	2013-08-26	Subcontracted
MW-D26	2013-08-21	340152	Alkalinity (CaCO3)	223	mg/LCaCO3	2.00	2013-08-26	APHA 2320B mod
			Ammonia (Total)	0.05	mg/L	0.03	2013-08-22	APHA 4500
			Anions	See	Attached	N/A	2013-08-28	Subcontracted
			Calcium	148	mg/L	11	2013-08-26	EPA 6010C
			Conductivity	819	uS/cm	N/A	2013-08-27	APHA 2510
			Cyanide (Free)	<0.005	mg/L	0.005	2013-08-23	Subcontracted
			Dissolved Metals	See	Attached	N/A	2013-08-27	Subcontracted
			F1-F4 PHC	See	Attached	N/A	2013-08-29	Subcontracted
			Hardness (CaCO3)	404	mg/LCaCO3	0.06	2013-09-03	APHA 2340B (Calc)
			Magnesium	8.4	mg/L	0.2	2013-08-26	EPA 6010C
			Metals	See	Attached	N/A	2013-08-27	Subcontracted
PAHs	See	Attached	N/A	2013-08-28	Subcontracted			

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	Date	Lab ID					Analyzed	Method
MW-D26	2013-08-21	340152	pH	7.41	SU	N/A	2013-08-22	APHA 4500 A,B MOD
			Phenolics	<0.004	mg/L	0.004	2013-08-28	HACH 8047
			Potassium	6.1	mg/L	3.0	2013-08-26	EPA 6010C
			Sodium	87.9	mg/L	50.0	2013-08-26	EPA 6010C
			VOC Scan	See	Attached	N/A	2013-08-26	Subcontracted
MW-D6	2013-08-21	340153	Alkalinity (CaCO3)	799	mg/LCaCO3	2.00	2013-08-26	APHA 2320B mod
			Ammonia (Total)	13.9	mg/L	0.03	2013-08-22	APHA 4500
			Anions	See	Attached	N/A	2013-08-28	Subcontracted
			Calcium	316	mg/L	11	2013-08-26	EPA 6010C
			Conductivity	1800	uS/cm	N/A	2013-08-27	APHA 2510
			Cyanide (Free)	<0.005	mg/L	0.005	2013-08-23	Subcontracted
			Dissolved Metals	See	Attached	N/A	2013-08-27	Subcontracted
			F1-F4 PHC	See	Attached	N/A	2013-08-29	Subcontracted
			Hardness (CaCO3)	952	mg/LCaCO3	0.06	2013-09-03	APHA 2340B (Calc)
			Magnesium	39.6	mg/L	0.2	2013-08-26	EPA 6010C
			Metals	See	Attached	N/A	2013-08-27	Subcontracted
			PAHs	See	Attached	N/A	2013-08-28	Subcontracted
			pH	6.73	SU	N/A	2013-08-22	APHA 4500 A,B MOD
			Phenolics	0.053	mg/L	0.004	2013-08-28	HACH 8047
			Potassium	5.3	mg/L	3.0	2013-08-26	EPA 6010C
			Sodium	116	mg/L	50.0	2013-08-26	EPA 6010C
			VOC Scan	See	Attached	N/A	2013-08-26	Subcontracted
MW-D5	2013-08-21	340154	Alkalinity (CaCO3)	1430	mg/LCaCO3	2.00	2013-08-26	APHA 2320B mod
			Ammonia (Total)	121	mg/L	0.03	2013-08-22	APHA 4500
			Anions	See	Attached	N/A	2013-08-28	Subcontracted
			Calcium	211	mg/L	11	2013-08-26	EPA 6010C
			Conductivity	2890	uS/cm	N/A	2013-08-27	APHA 2510
			Cyanide (Free)	<0.005	mg/L	0.005	2013-08-23	Subcontracted
			Dissolved Metals	See	Attached	N/A	2013-08-27	Subcontracted
			F1-F4 PHC	See	Attached	N/A	2013-08-29	Subcontracted
			Hardness (CaCO3)	645	mg/LCaCO3	0.06	2013-09-03	APHA 2340B (Calc)
			Magnesium	28.6	mg/L	0.2	2013-08-26	EPA 6010C
			Metals	See	Attached	N/A	2013-08-27	Subcontracted
			PAHs	See	Attached	N/A	2013-08-28	Subcontracted

Reported by:

Nilou Ghazi, Ph.D.,P.Eng.
 Laboratory Manager

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E3 Laboratories Inc.
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 Tel: (905) 641-9000, Fax: (905) 641-9001

CERTIFICATE OF ANALYSIS

Golder Associates Ltd.
 Christi Groves
 121 Commerce Park Drive, Unit L
 Barrie
 L4N 8X1
 Tel: 705-722-4492

Fax:
 Email: cgroves@golder.com

Work Order No.:2509907
 Received : 2013-08-22
 PO Number:
 Reported: 2013-09-03
 Project Name: BHWS Sampling
 Chain of Custody No.: 21802

Client Sample ID	Sample Date	Lab ID	Parameter	Result	Unit	RDL	Date Analyzed	Method
MW-D5	2013-08-21	340154	pH	6.79	SU	N/A	2013-08-22	APHA 4500 A,B MOD
			Phenolics	0.086	mg/L	0.004	2013-08-28	HACH 8047
			Potassium	30.2	mg/L	3.0	2013-08-26	EPA 6010C
			Sodium	102	mg/L	50.0	2013-08-26	EPA 6010C
			VOC Scan	See	Attached	N/A	2013-08-26	Subcontracted
MW-D4	2013-08-21	340155	Alkalinity (CaCO3)	1600	mg/LCaCO3	2.00	2013-08-26	APHA 2320B mod
			Ammonia (Total)	231	mg/L	0.03	2013-08-22	APHA 4500
			Anions	See	Attached	N/A	2013-08-28	Subcontracted
			Calcium	171	mg/L	11	2013-08-26	EPA 6010C
			Conductivity	2600	uS/cm	N/A	2013-08-27	APHA 2510
			Cyanide (Free)	<0.005	mg/L	0.005	2013-08-23	Subcontracted
			Dissolved Metals	See	Attached	N/A	2013-08-27	Subcontracted
			F1-F4 PHC	See	Attached	N/A	2013-08-29	Subcontracted
			Hardness (CaCO3)	569	mg/LCaCO3	0.06	2013-09-03	APHA 2340B (Calc)
			Magnesium	34.5	mg/L	0.2	2013-08-26	EPA 6010C
			Metals	See	Attached	N/A	2013-08-27	Subcontracted
			PAHs	See	Attached	N/A	2013-08-28	Subcontracted
			pH	6.72	SU	N/A	2013-08-22	APHA 4500 A,B MOD
			Phenolics	0.116	mg/L	0.004	2013-08-28	HACH 8047
			Potassium	55.5	mg/L	3.0	2013-08-26	EPA 6010C
			Sodium	143	mg/L	50.0	2013-08-26	EPA 6010C
VOC Scan	See	Attached	N/A	2013-08-26	Subcontracted			
TRIP BLANK	2013-08-21	340156	Alkalinity (CaCO3)	<2.00	mg/LCaCO3	2.00	2013-08-26	APHA 2320B mod
			Ammonia (Total)	<0.03	mg/L	0.03	2013-08-22	APHA 4500
			Anions	See	Attached	N/A	2013-08-28	Subcontracted
			Calcium	<0.11	mg/L	0.11	2013-08-26	EPA 6010C
			Conductivity	7	uS/cm	N/A	2013-08-27	APHA 2510
			Cyanide (Free)	<0.005	mg/L	0.005	2013-08-23	Subcontracted
			Dissolved Metals	See	Attached	N/A	2013-08-27	Subcontracted
			F1-F4 PHC	See	Attached	N/A	2013-08-29	Subcontracted
			Hardness (CaCO3)	<0.36	mg/LCaCO3	0.06	2013-09-03	APHA 2340B (Calc)
			Magnesium	<0.02	mg/L	0.02	2013-08-26	EPA 6010C
			Metals	See	Attached	N/A	2013-08-27	Subcontracted
			PAHs	See	Attached	N/A	2013-08-28	Subcontracted

Reported by:

 Nilou Ghazi, Ph.D.,P.Eng.
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Fax:
 Email: cgroves@golder.com

Work Order No.:2509907
 Received : 2013-08-22
 PO Number:
 Reported: 2013-09-03
 Project Name: BHWS Sampling
 Chain of Custody No.: 21802

Client Sample ID	Sample		Parameter	Result	Unit	RDL	Date	
	Date	Lab ID					Analyzed	Method
TRIP BLANK	2013-08-21	340156	pH	5.42	SU	N/A	2013-08-22	APHA 4500 A,B MOD
			Phenolics	<0.004	mg/L	0.004	2013-08-28	HACH 8047
			Potassium	<0.30	mg/L	0.30	2013-08-26	EPA 6010C
			Sodium	<0.500	mg/L	0.500	2013-08-26	EPA 6010C
			VOC Scan	See	Attached	N/A	2013-08-26	Subcontracted
DUP B	2013-08-21	340157	Alkalinity (CaCO3)	500	mg/LCaCO3	2.00	2013-08-28	APHA 2320B mod
			Ammonia (Total)	5.37	mg/L	0.03	2013-08-22	APHA 4500
			Anions	See	Attached	N/A	2013-08-28	Subcontracted
			Calcium	332	mg/L	11	2013-08-26	EPA 6010C
			Conductivity	2490	uS/cm	N/A	2013-08-27	APHA 2510
			Cyanide (Free)	<0.005	mg/L	0.005	2013-08-23	Subcontracted
			Dissolved Metals	See	Attached	N/A	2013-08-27	Subcontracted
			F1-F4 PHC	See	Attached	N/A	2013-08-29	Subcontracted
			Hardness (CaCO3)	953	mg/LCaCO3	0.06	2013-09-03	APHA 2340B (Calc)
			Magnesium	30.0	mg/L	0.2	2013-08-26	EPA 6010C
			Metals	See	Attached	N/A	2013-08-27	Subcontracted
			PAHs	See	Attached	N/A	2013-08-28	Subcontracted
			pH	6.81	SU	N/A	2013-08-22	APHA 4500 A,B MOD
			Phenolics	0.009	mg/L	0.004	2013-08-28	HACH 8047
			Potassium	17.2	mg/L	3.0	2013-08-26	EPA 6010C
			Sodium	406	mg/L	50.0	2013-08-26	EPA 6010C
			VOC Scan	See	Attached	N/A	2013-08-26	Subcontracted

Reported by:

 Nilou Ghazi, Ph.D.,P.Eng.
 Laboratory Manager

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REPORT No. B13-22043 (I)

Report To:

E3 Labs Inc.
 360 York Rd #10,
 NOTL ON LOS 1J0 Canada

Attention: Kristy LeBrasseur

Caduceon Environmental Laboratories

285 Dalton Ave
 Kingston Ontario K7K 6Z1
 Tel: 613-544-2001
 Fax: 613-544-2770

DATE RECEIVED: 23-Aug-13

DATE REPORTED: 30-Aug-13

SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.:

P.O. NUMBER: 2509907

WATERWORKS NO.

Parameter	Units	M.D.L.	Reference Method	Date/Site Analyzed	Client I.D.				
					340141-MW B23	340142-MW B7	340143-MW B3	340144-MW B1	
					Sample I.D.	B13-22043-5	B13-22043-6	B13-22043-7	B13-22043-8
					Data Collected	21-Aug-13	21-Aug-13	21-Aug-13	21-Aug-13
Cyanide (Free)	mg/L	0.005	SM 4500CN	23-Aug-13/K	< 0.005	< 0.005	< 0.005	< 0.005	
o-Phosphate (P)	mg/L	0.01	PE4500-S	28-Aug-13/K	0.05	0.07	0.05	0.02	
Fluoride	mg/L	0.1	SM4110C	26-Aug-13/O	0.2	0.2	0.2	0.2	
Nitrite (N)	mg/L	0.1	SM4110C	26-Aug-13/O	< 0.1	< 0.1	< 0.1	< 0.1	
Nitrate (N)	mg/L	0.1	SM4110C	26-Aug-13/O	< 0.1	< 0.1	3.9	7.3	
Bromide	mg/L	0.4	SM4110C	26-Aug-13/O	< 0.4	< 0.4	< 0.4	< 0.4	
Chloride	mg/L	0.5	SM4110C	26-Aug-13/O	921	541	242	959	
Sulphate	mg/L	1	SM4110C	26-Aug-13/O	< 1	1	24	79	
Antimony	µg/L	0.1	EPA 200.8	27-Aug-13/O	< 0.1	< 0.1	< 0.1	< 0.1	
Arsenic	µg/L	0.1	EPA 200.8	27-Aug-13/O	0.4	1.3	0.2	0.2	
Barium	µg/L	1	SM 3120	26-Aug-13/O	202	241	141	210	
Beryllium	µg/L	0.1	EPA 200.8	27-Aug-13/O	< 0.1	< 0.1	< 0.1	< 0.1	
Boron	µg/L	5	SM 3120	26-Aug-13/O	32	128	< 5	50	
Cadmium	µg/L	0.02	EPA 200.8	27-Aug-13/O	< 0.02	< 0.02	0.05	0.02	
Chromium	µg/L	2	SM 3120	26-Aug-13/O	< 2	< 2	< 2	< 2	
Chromium (VI)	µg/L	10	MOEE 3056	27-Aug-13/O	< 10	< 10	< 10	< 10	
Cobalt	µg/L	0.1	EPA 200.8	27-Aug-13/O	0.7	0.3	0.1	0.1	
Copper	µg/L	2	SM 3120	26-Aug-13/O	< 2	< 2	< 2	< 2	
Iron	mg/L	0.005	SM 3120	26-Aug-13/O	3.34	27.8	0.025	0.011	
Lead	µg/L	0.02	EPA 200.8	27-Aug-13/O	0.10	0.19	0.28	0.10	
Mercury	µg/L	0.02	SM 3112B	27-Aug-13/R	< 0.02	0.15	< 0.02	< 0.02	
Molybdenum	µg/L	0.1	EPA 200.8	27-Aug-13/O	0.1	< 0.1	0.1	0.4	
Nickel	µg/L	10	SM 3120	26-Aug-13/O	< 10	< 10	< 10	< 10	
Selenium	µg/L	1	EPA 200.8	27-Aug-13/O	< 1	< 1	< 1	< 1	
Silver	µg/L	0.02	EPA 200.8	27-Aug-13/O	< 0.02	< 0.02	< 0.02	< 0.02	
Thallium	µg/L	0.05	EPA 200.8	27-Aug-13/O	< 0.05	< 0.05	< 0.05	< 0.05	
Uranium	µg/L	0.05	EPA 200.8	27-Aug-13/O	0.08	< 0.05	0.51	0.39	
Vanadium	µg/L	0.1	EPA 200.8	27-Aug-13/O	1.5	2.2	1.7	1.9	

SB

M.D.L. = Method Detection Limit
 Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill

Scott Burrows
 Acting Lab Manager

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C.O.C.: ---

REPORT No. B13-22043 (I)

Report To:

E3 Labs Inc.
 360 York Rd #10,
 NOTL ON LOS 1J0 Canada

Attention: Kristy LeBrasseur

Caduceon Environmental Laboratories

285 Dalton Ave
 Kingston Ontario K7K 6Z1
 Tel: 613-544-2001
 Fax: 613-544-2770

DATE RECEIVED: 23-Aug-13

JOB/PROJECT NO.:

DATE REPORTED: 30-Aug-13

P.O. NUMBER: 2509907

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

Parameter	Units	M.D.L.	Reference Method	Date/Site Analyzed	Client I.D.	340141-MW B23	340142-MW B7	340143-MW B3	340144-MW B1
					Sample I.D.	B13-22043-5	B13-22043-6	B13-22043-7	B13-22043-8
Date Collected					21-Aug-13	21-Aug-13	21-Aug-13	21-Aug-13	21-Aug-13
Zinc	µg/L	5	SM 3120	26-Aug-13/O	< 5	< 5	8	< 5	< 5

1 Chromium (VI) result is based on total chromium

SB _____

Scott Burrows
 Acting Lab Manager

M.D.L. = Method Detection Limit

Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill

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 Fax: 613-544-2770

DATE RECEIVED: 23-Aug-13

DATE REPORTED: 30-Aug-13

SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.:

P.O. NUMBER: 2509907

WATERWORKS NO.

Parameter	Units	M.D.L.	Reference Method	Date/Site Analyzed	Client I.D.	340145-Field Blank #1	340146-Dup A	340147-MW D3	340148-MW D1
					Sample I.D.	B13-22043-9	B13-22043-10	B13-22043-11	B13-22043-12
					Date Collected	21-Aug-13	21-Aug-13	21-Aug-13	21-Aug-13
Cyanide (Free)	mg/L	0.005	SM 4500CN	23-Aug-13/K	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
o-Phosphate (P)	mg/L	0.01	PE4500-S	28-Aug-13/K	< 0.01	0.06	0.08	0.08	0.04
Fluoride	mg/L	0.1	SM4110C	26-Aug-13/O	< 0.1	0.2	0.3	0.3	0.2
Nitrite (N)	mg/L	0.1	SM4110C	26-Aug-13/O	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nitrate (N)	mg/L	0.1	SM4110C	26-Aug-13/O	< 0.1	< 0.1	< 0.1	< 0.1	0.2
Bromide	mg/L	0.4	SM4110C	26-Aug-13/O	< 0.4	< 0.4	1.7	< 0.4	< 0.4
Chloride	mg/L	0.5	SM4110C	26-Aug-13/O	< 0.5	540	316	532	532
Sulphate	mg/L	1	SM4110C	26-Aug-13/O	< 1	1	< 1	37	37
Antimony	µg/L	0.1	EPA 200.8	27-Aug-13/O	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Arsenic	µg/L	0.1	EPA 200.8	27-Aug-13/O	< 0.1	1.2	2.0	0.2	0.2
Barium	µg/L	1	SM 3120	26-Aug-13/O	< 1	183	336	226	226
Beryllium	µg/L	0.1	EPA 200.8	27-Aug-13/O	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Boron	µg/L	5	SM 3120	26-Aug-13/O	< 5	124	488	15	15
Cadmium	µg/L	0.02	EPA 200.8	27-Aug-13/O	< 0.02	0.03	0.23	0.04	0.04
Chromium	µg/L	2	SM 3120	26-Aug-13/O	< 2	< 2	11	< 2	< 2
Chromium (VI)	µg/L	10	MOEE 3056	27-Aug-13/O	< 10	< 10	< 10	< 10	< 10
Cobalt	µg/L	0.1	EPA 200.8	27-Aug-13/O	< 0.1	0.3	3.9	0.2	0.2
Copper	µg/L	2	SM 3120	26-Aug-13/O	< 2	< 2	< 2	< 2	< 2
Iron	mg/L	0.005	SM 3120	26-Aug-13/O	< 0.005	1.71	0.102	0.077	0.077
Lead	µg/L	0.02	EPA 200.8	27-Aug-13/O	< 0.02	0.29	1.35	0.19	0.19
Mercury	µg/L	0.02	SM 3112B	27-Aug-13/R	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Molybdenum	µg/L	0.1	EPA 200.8	27-Aug-13/O	< 0.1	0.3	0.3	0.2	0.2
Nickel	µg/L	10	SM 3120	26-Aug-13/O	< 10	< 10	< 10	< 10	< 10
Selenium	µg/L	1	EPA 200.8	27-Aug-13/O	< 1	< 1	2	< 1	< 1
Silver	µg/L	0.02	EPA 200.8	27-Aug-13/O	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Thallium	µg/L	0.05	EPA 200.8	27-Aug-13/O	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Uranium	µg/L	0.05	EPA 200.8	27-Aug-13/O	< 0.05	< 0.05	0.10	0.10	0.10
Vanadium	µg/L	0.1	EPA 200.8	27-Aug-13/O	< 0.1	1.3	8.0	2.3	2.3

SB

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Scott Burrows
 Acting Lab Manager

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Attention: Kristy LeBrasseur

Caduceon Environmental Laboratories
 285 Dalton Ave
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 Tel: 613-544-2001
 Fax: 613-544-2770

DATE RECEIVED: 23-Aug-13

DATE REPORTED: 30-Aug-13

SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.:

P.O. NUMBER: 2509907

WATERWORKS NO.

Parameter	Units	M.D.L.	Reference Method	Date/Site Analyzed	Client I.D.	340145-Field Blank #1	340146-Dup A	340147-MW D3	340148-MW D1
					Sample I.D.	B13-22043-9	B13-22043-10	B13-22043-11	B13-22043-12
Date Collected					21-Aug-13	21-Aug-13	21-Aug-13	21-Aug-13	21-Aug-13
Zinc	µg/L	5	SM 3120	26-Aug-13/O	< 5	7	< 5	< 5	< 5

1 Chromium (VI) result is based on total chromium

SB _____

Scott Burrows
 Acting Lab Manager

M.D.L. = Method Detection Limit
 Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill

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Caduceon Environmental Laboratories

285 Dalton Ave
 Kingston Ontario K7K 6Z1
 Tel: 613-544-2001
 Fax: 613-544-2770

DATE RECEIVED: 23-Aug-13

JOB/PROJECT NO.:

DATE REPORTED: 30-Aug-13

P.O. NUMBER: 2509907

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

Parameter	Units	M.D.L.	Client I.D.		340149-MW	340150-MW	340151-MW	340152-MW
			Reference Method	Date/Site Analyzed	D2	D7	D29	D26
			Sample I.D.		B13-22043-13	B13-22043-14	B13-22043-15	B13-22043-16
			Date Collected		21-Aug-13	21-Aug-13	21-Aug-13	21-Aug-13
Cyanide (Free)	mg/L	0.005	SM 4500CN	23-Aug-13/K	< 0.005	< 0.005	< 0.005	< 0.005
o-Phosphate (P)	mg/L	0.01	PE4500-S	28-Aug-13/K	0.06	0.06	0.04	0.03
Fluoride	mg/L	0.1	SM4110C	26-Aug-13/O	0.2	0.2	0.2	0.2
Nitrite (N)	mg/L	0.1	SM4110C	26-Aug-13/O	< 0.1	< 0.1	< 0.1	0.2
Nitrate (N)	mg/L	0.1	SM4110C	26-Aug-13/O	< 0.1	< 0.1	< 0.1	2.3
Bromide	mg/L	0.4	SM4110C	26-Aug-13/O	< 0.4	< 0.4	< 0.4	< 0.4
Chloride	mg/L	0.5	SM4110C	26-Aug-13/O	60.2	624	724	119
Sulphate	mg/L	1	SM4110C	26-Aug-13/O	< 1	< 1	< 1	16
Antimony	µg/L	0.1	EPA 200.8	27-Aug-13/O	< 0.1	< 0.1	< 0.1	0.8
Arsenic	µg/L	0.1	EPA 200.8	27-Aug-13/O	1.2	0.5	2.1	0.2
Barium	µg/L	1	SM 3120	26-Aug-13/O	192	360	480	38
Beryllium	µg/L	0.1	EPA 200.8	27-Aug-13/O	< 0.1	< 0.1	< 0.1	< 0.1
Boron	µg/L	5	SM 3120	26-Aug-13/O	200	100	97	28
Cadmium	µg/L	0.02	EPA 200.8	27-Aug-13/O	0.45	0.05	< 0.02	0.04
Chromium	µg/L	2	SM 3120	26-Aug-13/O	4	< 2	< 2	< 2
Chromium (VI)	µg/L	10	MOEE 3056	27-Aug-13/O	< 10	< 10	< 10	< 10
Cobalt	µg/L	0.1	EPA 200.8	27-Aug-13/O	2.2	0.7	1.9	< 0.1
Copper	µg/L	2	SM 3120	26-Aug-13/O	< 2	< 2	< 2	2
Iron	mg/L	0.005	SM 3120	26-Aug-13/O	8.20	4.02	11.7	0.027
Lead	µg/L	0.02	EPA 200.8	27-Aug-13/O	0.55	0.29	1.22	0.08
Mercury	µg/L	0.02	SM 3112B	27-Aug-13/R	< 0.02	< 0.02	< 0.02	< 0.02
Molybdenum	µg/L	0.1	EPA 200.8	27-Aug-13/O	0.5	0.2	0.3	1.0
Nickel	µg/L	10	SM 3120	26-Aug-13/O	< 10	< 10	< 10	< 10
Selenium	µg/L	1	EPA 200.8	27-Aug-13/O	< 1	< 1	< 1	< 1
Silver	µg/L	0.02	EPA 200.8	27-Aug-13/O	0.03	< 0.02	< 0.02	< 0.02
Thallium	µg/L	0.05	EPA 200.8	27-Aug-13/O	< 0.05	< 0.05	< 0.05	< 0.05
Uranium	µg/L	0.05	EPA 200.8	27-Aug-13/O	< 0.05	< 0.05	0.27	0.16
Vanadium	µg/L	0.1	EPA 200.8	27-Aug-13/O	4.4	1.5	2.6	1.3

SB

M.D.L. = Method Detection Limit
 Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill

Scott Burrows
 Acting Lab Manager

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C.O.C.: --

REPORT No. B13-22043 (I)

Report To:

E3 Labs Inc.
 360 York Rd #10,
 NOTL ON LOS 1J0 Canada

Attention: Kristy LeBrasseur

Caduceon Environmental Laboratories

285 Dalton Ave
 Kingston Ontario K7K 6Z1
 Tel: 613-544-2001
 Fax: 613-544-2770

DATE RECEIVED: 23-Aug-13

JOB/PROJECT NO.:

DATE REPORTED: 30-Aug-13

P.O. NUMBER: 2509907

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

Parameter	Units	M.D.L.	Reference Method	Date/Site Analyzed	Client I.D.	340149-MW D2	340150-MW D7	340151-MW D29	340152-MW D26
					Sample I.D.	B13-22043-13	B13-22043-14	B13-22043-15	B13-22043-16
Date Collected					21-Aug-13	21-Aug-13	21-Aug-13	21-Aug-13	21-Aug-13
Zinc	µg/L	5	SM 3120	26-Aug-13/O	< 5	5	< 5	12	

1 Chromium (VI) result is based on total chromium

SB

Scott Burrows
 Acting Lab Manager

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SAMPLE MATRIX: Groundwater

WATERWORKS NO.

Parameter	Units	M.D.L.	Client I.D.		340153-MW	340154-MW	340155-MW	340156-Trip
			Reference Method	Date/Site Analyzed	D6	D5	D4	Blank
			Sample I.D.		B13-22043-17	B13-22043-18	B13-22043-19	B13-22043-20
			Date Collected		21-Aug-13	21-Aug-13	21-Aug-13	21-Aug-13
Cyanide (Free)	mg/L	0.005	SM 4500CN	23-Aug-13/K	< 0.005	< 0.005	< 0.005	< 0.005
o-Phosphate (P)	mg/L	0.01	PE4500-S	28-Aug-13/K	0.10	0.06	0.07	< 0.01
Fluoride	mg/L	0.1	SM4110C	26-Aug-13/O	0.2	0.2	0.2	0.2
Nitrite (N)	mg/L	0.1	SM4110C	26-Aug-13/O	< 0.1	< 0.1	< 0.1	< 0.1
Nitrate (N)	mg/L	0.1	SM4110C	26-Aug-13/O	< 0.1	< 0.1	< 0.1	0.1
Bromide	mg/L	0.4	SM4110C	26-Aug-13/O	0.8	0.8	0.8	< 0.4
Chloride	mg/L	0.5	SM4110C	26-Aug-13/O	306	138	128	< 0.5
Sulphate	mg/L	1	SM4110C	26-Aug-13/O	< 1	3	< 1	< 1
Antimony	µg/L	0.1	EPA 200.8	27-Aug-13/O	< 0.1	< 0.1	< 0.1	< 0.1
Arsenic	µg/L	0.1	EPA 200.8	27-Aug-13/O	1.4	2.8	2.3	< 0.1
Barium	µg/L	1	SM 3120	26-Aug-13/O	970	346	330	< 1
Beryllium	µg/L	0.1	EPA 200.8	27-Aug-13/O	< 0.1	< 0.1	< 0.1	< 0.1
Boron	µg/L	5	SM 3120	26-Aug-13/O	22	489	715	< 5
Cadmium	µg/L	0.02	EPA 200.8	27-Aug-13/O	0.06	0.12	0.24	< 0.02
Chromium	µg/L	2	SM 3120	26-Aug-13/O	< 2	6	11	< 2
Chromium (VI)	µg/L	10	MOEE 3056	27-Aug-13/O	< 10	< 10	< 10	< 10
Cobalt	µg/L	0.1	EPA 200.8	27-Aug-13/O	0.6	4.8	4.3	< 0.1
Copper	µg/L	2	SM 3120	26-Aug-13/O	< 2	< 2	< 2	< 2
Iron	mg/L	0.005	SM 3120	26-Aug-13/O	0.301	0.222	0.419	< 0.005
Lead	µg/L	0.02	EPA 200.8	27-Aug-13/O	0.29	0.33	0.62	< 0.02
Mercury	µg/L	0.02	SM 3112B	27-Aug-13/R	< 0.02	< 0.02	< 0.02	< 0.02
Molybdenum	µg/L	0.1	EPA 200.8	27-Aug-13/O	0.2	0.2	0.4	< 0.1
Nickel	µg/L	10	SM 3120	26-Aug-13/O	< 10	< 10	< 10	< 10
Selenium	µg/L	1	EPA 200.8	27-Aug-13/O	2	2	1	< 1
Silver	µg/L	0.02	EPA 200.8	27-Aug-13/O	< 0.02	< 0.02	< 0.02	< 0.02
Thallium	µg/L	0.05	EPA 200.8	27-Aug-13/O	< 0.05	< 0.05	< 0.05	< 0.05
Uranium	µg/L	0.05	EPA 200.8	27-Aug-13/O	0.08	0.08	< 0.05	< 0.05
Vanadium	µg/L	0.1	EPA 200.8	27-Aug-13/O	4.1	7.4	11.3	0.2

SB

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill

Scott Burrows
Acting Lab Manager

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C.O.C.: ---

REPORT No. B13-22043 (I)

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 360 York Rd #10,
 NOTL ON LOS 1J0 Canada
Attention: Kristy LeBrasseur

Caduceon Environmental Laboratories
 285 Dalton Ave
 Kingston Ontario K7K 6Z1
 Tel: 613-544-2001
 Fax: 613-544-2770

DATE RECEIVED: 23-Aug-13

JOB/PROJECT NO.:

DATE REPORTED: 30-Aug-13

P.O. NUMBER: 2509907

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

Parameter	Units	M.D.L.	Reference Method	Date/Site Analyzed	Client I.D.			
					340153-MW D6	340154-MW D5	340155-MW D4	340156-Trip Blank
Zinc	µg/L	5	SM 3120	26-Aug-13/O	B13-22043-17	B13-22043-18	B13-22043-19	B13-22043-20
					21-Aug-13	21-Aug-13	21-Aug-13	21-Aug-13
					< 5	< 5	< 5	< 5

1 Chromium (VI) result is based on total chromium

SB

Scott Burrows
 Acting Lab Manager

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 Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill

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DATE RECEIVED: 23-Aug-13

DATE REPORTED: 30-Aug-13

SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.:

P.O. NUMBER: 2509907

WATERWORKS NO.

			Client I.D.	340157-Dup B			
			Sample I.D.	B13-22043-21			
			Date Collected	21-Aug-13			
Parameter	Units	M.D.L.	Reference Method	Date/Site Analyzed			
Cyanide (Free)	mg/L	0.005	SM 4500CN	23-Aug-13/K	< 0.005		
o-Phosphate (P)	mg/L	0.01	PE4500-S	28-Aug-13/K	0.05		
Fluoride	mg/L	0.1	SM4110C	26-Aug-13/O	0.2		
Nitrite (N)	mg/L	0.1	SM4110C	26-Aug-13/O	< 0.1		
Nitrate (N)	mg/L	0.1	SM4110C	26-Aug-13/O	< 0.1		
Bromide	mg/L	0.4	SM4110C	26-Aug-13/O	< 0.4		
Chloride	mg/L	0.5	SM4110C	26-Aug-13/O	721		
Sulphate	mg/L	1	SM4110C	26-Aug-13/O	< 1		
Antimony	µg/L	0.1	EPA 200.8	27-Aug-13/O	< 0.1		
Arsenic	µg/L	0.1	EPA 200.8	27-Aug-13/O	2.4		
Barium	µg/L	1	SM 3120	26-Aug-13/O	410		
Beryllium	µg/L	0.1	EPA 200.8	27-Aug-13/O	< 0.1		
Boron	µg/L	5	SM 3120	26-Aug-13/O	94		
Cadmium	µg/L	0.02	EPA 200.8	27-Aug-13/O	< 0.02		
Chromium	µg/L	2	SM 3120	26-Aug-13/O	< 2		
Chromium (VI)	µg/L	10	MOEE 3056	27-Aug-13/O	< 10		
Cobalt	µg/L	0.1	EPA 200.8	27-Aug-13/O	2.1		
Copper	µg/L	2	SM 3120	26-Aug-13/O	< 2		
Iron	mg/L	0.005	SM 3120	26-Aug-13/O	0.793		
Lead	µg/L	0.02	EPA 200.8	27-Aug-13/O	1.22		
Mercury	µg/L	0.02	SM 3112B	27-Aug-13/R	< 0.02		
Molybdenum	µg/L	0.1	EPA 200.8	27-Aug-13/O	0.4		
Nickel	µg/L	10	SM 3120	26-Aug-13/O	< 10		
Selenium	µg/L	1	EPA 200.8	27-Aug-13/O	< 1		
Silver	µg/L	0.02	EPA 200.8	27-Aug-13/O	< 0.02		
Thallium	µg/L	0.05	EPA 200.8	27-Aug-13/O	< 0.05		
Uranium	µg/L	0.05	EPA 200.8	27-Aug-13/O	0.33		
Vanadium	µg/L	0.1	EPA 200.8	27-Aug-13/O	2.8		
Zinc	µg/L	5	SM 3120	26-Aug-13/O	< 5		

SB —————

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DATE RECEIVED: 23-Aug-13

DATE REPORTED: 30-Aug-13

SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.:

P.O. NUMBER: 2509907

WATERWORKS NO.

Client I.D.	340157-Dup B			
Sample I.D.	B13-22043-21			
Date Collected	21-Aug-13			

Parameter	Units	M.D.L.	Reference Method	Date/Site Analyzed
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1 Chromium (VI) result is based on total chromium

SB 

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Scott Burrows
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Client: Golder Associates
 121 Commerce Park Drive Unit L
 Barrie, ON
 L4N 8X1
 Attention: Ms. Christy Groves
 PO#: PO25698
 Invoice to: The City of Barrie - Finance Dept.

Report Number: 1307216
 Date Submitted: 2013-04-24
 Date Reported: 2013-05-09
 Project: 11-1170-0043
 COC #: 762319

Page 1 of 41

Dear Christy Groves:

Please find attached the analytical results for your samples. If you have any questions regarding this report, please do not hesitate to call (613-727-5692).

Report Comments:

APPROVAL: _____

Lorna Wilson
 Inorganic Laboratory Supervisor

APPROVAL: _____

Tanya Baillargeon
 Organic Laboratory Team Leader

Exova (Ottawa) is certified and accredited for specific parameters by:

CALA, Canadian Association for Laboratory Accreditation (to ISO 17025), OMAF, Ontario Ministry of Agriculture, Food and Rural Affairs (for farm soils). Licensed by Ontario MOE for specific tests in drinking water.

Exova (Mississauga) is accredited for specific parameters by:

SCC, Standards Council of Canada (to ISO 17025)

Please note: Field data, where presented on the report, has been provided by the client and is presented for informational purposes only.

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COC #: 762319

Group	Analyte	MRL	Units	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	Guideline	1022308 Groundwater 2013-04-22 MW-B1	1022309 Groundwater 2013-04-22 MW-B2	1022310 Groundwater 2013-04-22 MW-B22	1022311 Groundwater 2013-04-22 MW-B3
Calculations	Hardness as CaCO3	1	mg/L	OG-100		550*	572*	574*	403*
Cyanide	Cyanide (free)	0.005	mg/L	MAC-0.2		<0.005	<0.005	<0.005	<0.005
	Alkalinity as CaCO3	5	mg/L	OG-500		541*	585*	591*	312
General Chemistry	Br	0.25	mg/L			<0.25	<0.25	<0.25	<0.25
	Cl	1	mg/L	AO-250		240	363*	360*	239
	Conductivity	5	uS/cm			1730	2160	2170	1380
	F	0.10	mg/L	MAC-1.5		<0.10	<0.10	<0.10	<0.10
Hydrocarbons	N-NO2	0.10	mg/L	MAC-1.0		<0.10	<0.10	<0.10	<0.10
	N-NO3	0.10	mg/L	MAC-10.0		2.34	<0.10	<0.10	1.59
pH	pH	1.00		6.5-8.5		7.39	7.21	7.24	7.75
	SO4	3	mg/L	AO-500		16	<3	<3	24
	F1 (C6-C10)	0.1	mg/L			<0.1	<0.1	<0.1	<0.1
	F1-BTEX (C6-C10)	0.1	mg/L			<0.1	<0.1	<0.1	<0.1
Mercury	F2 (C10-C16)	0.1	mg/L			<0.1	<0.1	<0.1	<0.1
	F3 (C16-C34)	0.2	mg/L			<0.2	0.5	0.9	<0.2
	F4 (C34-C50)	0.2	mg/L			<0.2	0.3	0.5	<0.2
	Hg	0.0001	mg/L	MAC-0.001		<0.0001	<0.0001	<0.0001	<0.0001
Metals	Ag	0.0001	mg/L			<0.0001	<0.0001	<0.0001	<0.0001
	As	0.001	mg/L	IMAC-0.025		<0.001	0.003	<0.001	<0.001
B	B	0.01	mg/L	IMAC-0.025		0.04	0.24	<0.01	<0.01
	Ba	0.01	mg/L	IMAC-5.0		0.16	0.32	0.34	0.13
	Be	0.0005	mg/L	MAC-1.0		<0.0005	<0.0005	<0.0005	<0.0005
	Ca	1	mg/L			194	201	202	135
	Cd	0.0001	mg/L	MAC-0.005		<0.0001	<0.0001	<0.0001	<0.0001
Co	0.0002	mg/L			0.0049	0.0020	0.0019	0.0004	

Guideline = odwsog
**** = Analysis completed at Mississauga, Ontario.**
 Results reported only to the parameters tested on the samples submitted.
 Methods used and/or additional QA/QC information available on request.

*** = Guideline Exceedence**

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective.

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Group	Analyte	MRL	Units	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	Guideline	1022308 Groundwater 2013-04-22 MW-B1			1022309 Groundwater 2013-04-22 MW-B2			1022310 Groundwater 2013-04-22 MW-B22			1022311 Groundwater 2013-04-22 MW-B3			
						0.001	0.001	0.001	0.005	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
Metals	Cr	0.001	mg/L	MAC-0.05		0.005	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.003	
	Cu	0.001	mg/L	AO-1.0		0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	
	Fe	0.03	mg/L	AO-0.3		1.62*	34.6*	34.6*	34.6*	34.6*	34.6*	34.6*	34.6*	34.6*	34.6*	34.6*	<0.03	
	K	0.3	mg/L	AO-0.3														
			1	mg/L			6	12	12	12	12	12	12	12	12	12	2	
	Mg		1	mg/L			16	17	17	17	17	17	17	17	17	17	16	
	Mo		0.005	mg/L			<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	
	Na		2	mg/L	AO-200		164	232*	232*	232*	232*	232*	232*	232*	232*	232*	144	
	Ni		0.005	mg/L			<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	
	Pb		0.001	mg/L	MAC-0.010		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
	Sb		0.0005	mg/L	IMAC-0.006		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
	Se		0.001	mg/L	MAC-0.01		<0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	<0.001	
	Tl		0.0001	mg/L			<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
	U		0.001	mg/L	MAC-0.02		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
V		0.001	mg/L			0.002	0.005	0.005	0.005	0.005	0.004	0.004	0.004	0.004	0.004	0.001		
Zn		0.01	mg/L	AO-5.0		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		
Nutrients	N-NH3	0.02	mg/L			1.86	13.6	13.6	13.6	13.6	13.4	13.4	13.4	13.4	13.4	0.04		
	Phenols	0.001	mg/L			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		
Semi-Volatiles	PO4 as P	0.005	mg/L			<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		
	1-methylnaphthalene	0.01	ug/L			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		
	2-methylnaphthalene	0.1	ug/L			<0.1	1.4	1.4	1.4	1.4	0.8	0.8	0.8	0.8	0.8	<0.1		
		0.5	ug/L															
		0.1	ug/L			<0.1											<0.1	
		0.5	ug/L				1.3	1.3	1.3	1.3	0.7	0.7	0.7	0.7	0.7	<0.1		
	Acenaphthene	0.1	ug/L			<0.1										<0.1		
		0.5	ug/L				1.7	1.7	1.7	1.7	0.8	0.8	0.8	0.8	0.8	<0.1		

Guideline = odwsog Y * = Guideline Exceedence
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 Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum
 Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality
 Guideline, IPWQO = Interim Provincial Water Quality Objective.

Client: Golder Associates
 121 Commerce Park Drive Unit L
 Barrie, ON
 L4N 8X1
 Attention: Ms. Chrisli Groves
 PO#: PO25698
 Invoice to: The City of Barrie - Finance Dept.

Report Number: 1307216
 Date Submitted: 2013-04-24
 Date Reported: 2013-05-09
 Project: 11-1170-0043
 COC #: 762319

Group	Analyte	MRL	Units	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D. Guideline	1022308 Groundwater 2013-04-22 MW-B1		1022309 Groundwater 2013-04-22 MW-B2		1022310 Groundwater 2013-04-22 MW-B22		1022311 Groundwater 2013-04-22 MW-B3	
					<0.1	<0.1	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1
Semi-Volatiles	Acenaphthylene	0.1	ug/L									
		0.5	ug/L									
	Anthracene	0.1	ug/L									
		0.5	ug/L			1.2						
	Benzo(a)anthracene	0.1	ug/L									
		0.5	ug/L			2.6						
	Benzo(a)pyrene	0.01	ug/L		MAC-0.01							
		0.05	ug/L		MAC-0.01	2.69*						
	Benzo(b)fluoranthene	0.05	ug/L									
		0.2	ug/L			2.4						
Benzo(g,h,i)perylene	0.1	ug/L										
	0.5	ug/L			1.7							
Benzo(k)fluoranthene	0.05	ug/L										
	0.2	ug/L			2.2							
Chrysene	0.05	ug/L										
	0.2	ug/L			2.6							
Dibenzo(a,h)anthracene	0.1	ug/L										
	0.5	ug/L			<0.5							
Fluoranthene	0.1	ug/L										
	0.5	ug/L			6.6							
Fluorene	0.1	ug/L										
	0.5	ug/L			1.2							
Indeno(1,2,3-c,d)pyrene	0.1	ug/L										
	0.5	ug/L			1.7							
Naphthalene	0.1	ug/L										
	0.5	ug/L			24.4							

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 Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality
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Group	Analyte	MRL	Units	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D. Guideline	1022308 Groundwater 2013-04-22 MW-B1	1022309 Groundwater 2013-04-22 MW-B2	1022310 Groundwater 2013-04-22 MW-B22	1022311 Groundwater 2013-04-22 MW-B3
Semi-Volatiles	Phenanthrene	0.1	ug/L		<0.1		1.0	<0.1
		0.5	ug/L		<0.1		0.3	<0.1
Subcontract	Pyrene	0.1	ug/L					
		0.5	ug/L					
VOCs	Cr(III)	0.005	mg/L		<0.005	<0.0005	<0.005	<0.005
		0.0005	mg/L		<0.0005	<0.0005	<0.0005	<0.0005
	1,1,1,2-tetrachloroethane	0.5	ug/L		<0.5	<0.5	<0.5	<0.5
		0.4	ug/L		<0.4	<0.4	<0.4	<0.4
	1,1,1-trichloroethane	0.5	ug/L		<0.5	<0.5	<0.5	<0.5
		0.4	ug/L		<0.4	<0.4	<0.4	<0.4
	1,1,2,2-tetrachloroethane	0.4	ug/L		<0.4	<0.4	<0.4	<0.4
		0.4	ug/L		<0.4	<0.4	<0.4	<0.4
	1,1-dichloroethane	0.5	ug/L		<0.5	<0.5	<0.5	<0.5
		0.5	ug/L		<0.5	<0.5	<0.5	<0.5
	1,2,4-trichlorobenzene	0.2	ug/L		<0.2	<0.2	<0.2	<0.2
		0.4	ug/L		<0.4	<0.4	<0.4	<0.4
	1,2-dibromoethane	0.2	ug/L		<0.2	<0.2	<0.2	<0.2
		1	%		106	106	107	105
1,2-dichloroethane-d4	0.5	ug/L		<0.5	<0.5	<0.5	<0.5	
	0.3	ug/L		<0.3	1.5	0.6	<0.3	
1,3,5-trimethylbenzene	0.4	ug/L		<0.4	<0.4	<0.4	<0.4	
	0.4	ug/L		<0.4	<0.4	<0.4	<0.4	
1,4-dichlorobenzene	10	ug/L		<10	<10	<10	<10	
	1	%		104	103	103	104	
4-bromofluorobenzene	50	ug/L		<50	<50	<50	<50	
	0.5	ug/L		<0.5	<0.5	<0.5	<0.5	
Benzene	0.3	ug/L		<0.3	<0.3	<0.3	<0.3	
	0.3	ug/L		<0.3	<0.3	<0.3	<0.3	

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Guideline = ODWSOG Y * = Guideline Exceedence
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Client: Golfer Associates
 121 Commerce Park Drive Unit L
 Barrie, ON
 L4N 8X1
Attention: Ms. Christi Groves
PO#: PO25698
Invoice to: The City of Barrie - Finance Dept.

Report Number: 1307216
Date Submitted: 2013-04-24
Date Reported: 2013-05-09
Project: 11-1170-0043
COC #: 762319

Group	Analyte	MRL	Units	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	Guideline
VOCs	Bromoform	0.4	ug/L	1022308 Groundwater 2013-04-22 MW-B1	<0.4
	Bromomethane	0.5	ug/L	1022309 Groundwater 2013-04-22 MW-B2	<0.4
	c-1,2-Dichloroethylene	0.4	ug/L	1022310 Groundwater 2013-04-22 MW-B22	<0.5
	c-1,3-Dichloropropylene	0.2	ug/L		<0.4
	Carbon Tetrachloride	0.2	ug/L		<0.2
	Chloroethane	0.2	ug/L	MAC-5	<0.2
	Chloroform	0.5	ug/L		<0.2
	Chloromethane	0.2	ug/L		<0.2
	Dibromochloromethane	0.3	ug/L		<0.3
	Dichlorodifluoromethane	0.5	ug/L		<0.5
	Dichloromethane	4.0	ug/L	MAC-50	<4.0
	Ethylbenzene	0.5	ug/L	AO-2.4	<0.5
	Hexane	5	ug/L		<5
	m/p-xylene	0.5	ug/L		<0.5
	Methyl Ethyl Ketone (MEK)	10	ug/L		2.0
	Methyl Isobutyl Ketone (MIBK)	10	ug/L		<10
	Methyl Tert Butyl Ether (MTBE)	10	ug/L		<10
	Monochlorobenzene	0.2	ug/L	MAC-80	<10
	o-xylene	0.5	ug/L		<0.2
	Styrene	0.5	ug/L		0.6
	t-1,2-Dichloroethylene	0.4	ug/L		<0.5
	t-1,3-Dichloropropylene	0.2	ug/L		<0.4
	Tetrachloroethylene	0.3	ug/L	MAC-30	<0.2
Toluene	0.5	ug/L	AO-24	<0.3	
Toluene-d8	1	%		<0.5	
Trichloroethylene	0.3	ug/L	MAC-5	93	
				<0.3	
				<0.3	
				<0.3	
				<0.3	
				<0.3	
				<0.3	
				<0.3	
				<0.3	
				<0.3	
				<0.3	
				<0.3	

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Client: Golder Associates
 121 Commerce Park Drive Unit L
 Barrie, ON
 L4N 8X1

Attention: Ms. Christl Groves
PO#: PO25698

Invoice to: The City of Barrie - Finance Dept.

Report Number: 1307216
Date Submitted: 2013-04-24
Date Reported: 2013-05-09
Project: 11-1170-0043
COC #: 762319

Group	Analyte	MRL	Units	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D. Guideline	1022308 Groundwater 2013-04-22 MW-B1	1022309 Groundwater 2013-04-22 MW-B2	1022310 Groundwater 2013-04-22 MW-B22	1022311 Groundwater 2013-04-22 MW-B3
VOCs	Trichlorofluoromethane	0.5	ug/L		<0.5	<0.5	<0.5	<0.5
	Vinyl Chloride	0.2	ug/L	MAC-2	<0.2	<0.2	<0.2	<0.2
	Xylene, total	1.0	ug/L	AO-300	<1.0	2.6	2.5	<1.0
Calculations Cyanide General Chemistry	Hardness as CaCO3	1	mg/L	OG-100	692*	415*	806*	540*
	Cyanide (free)	0.005	mg/L	MAC-0.2	<0.005	<0.005	<0.005	<0.005
	Alkalinity as CaCO3	5	mg/L	OG-500	948*	299	551*	442
	Br	0.25	mg/L		<0.25	<0.25	<0.25	<0.25
	Cl	1	mg/L	AO-250	558*	567*	423*	483*
	Conductivity	5	uS/cm		3500	2370	2290	2410
	F	0.10	mg/L	MAC-1.5	<0.10	<0.10	<0.10	<0.10
	N-NO2	0.10	mg/L	MAC-1.0	<0.10	<0.10	<0.10	<0.10
	N-NO3	0.10	mg/L	MAC-10.0	<0.10	<0.10	<0.10	<0.10
	pH	1.00		6.5-8.5	7.11	7.54	7.16	7.23
	SO4	3	mg/L	AO-500	11	<3	<3	<3
	F1 (C6-C10)	0.1	mg/L		<0.1	<0.1	<0.1	<0.1
	F1-BTEX (C6-C10)	0.1	mg/L		<0.1	<0.1	<0.1	<0.1
	F2 (C10-C16)	0.1	mg/L		<0.1	<0.1	<0.1	<0.1
	F3 (C16-C34)	0.2	mg/L		0.7	<0.2	0.7	0.4
F4 (C34-C50)	0.2	mg/L		0.2	<0.2	0.5	<0.2	
Hydrocarbons				Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D. Guideline	1022312 Groundwater 2013-04-22 MW-B4	1022313 Groundwater 2013-04-22 MW-B5	1022314 Groundwater 2013-04-22 MW-B6	1022315 Groundwater 2013-04-22 MW-B7

Guideline = ODWSOG **Y** *** = Guideline Exceedence**

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Client: Golder Associates
 121 Commerce Park Drive Unit L
 Barré, ON
 L4N 8X1
Attention: Ms. Christi Groves
PO#: PO25698
Invoice to: The City of Barré - Finance Dept.

Report Number: 1307216
Date Submitted: 2013-04-24
Date Reported: 2013-05-09
Project: 11-1170-0043
COC #: 762319

Group	Analyte	MRL	Units	Lab I.D.		1022312 Groundwater 2013-04-22 MW-B4	1022313 Groundwater 2013-04-22 MW-B5	1022314 Groundwater 2013-04-22 MW-B6	1022315 Groundwater 2013-04-22 MW-B7
				Sample Matrix Sample Type Sampling Date Sample I.D.	Guideline				
Mercury Metals	Hg	0.0001	mg/L	MAC-0.001		<0.0001	<0.0001	<0.0001	<0.0001
	Ag	0.0001	mg/L			<0.0001	<0.0001	<0.0001	<0.0001
	As	0.001	mg/L	IMAC-0.025					
			0.01	mg/L	IMAC-0.025		<0.01	<0.01	<0.01
	B	0.01	mg/L	IMAC-5.0		0.34	0.02	0.10	0.13
	Ba	0.01	mg/L	MAC-1.0		0.35	0.14	0.11	0.21
	Be	0.0005	mg/L			<0.0005	<0.0005	<0.0005	<0.0005
	Ca	1	mg/L			241	143	275	190
	Cd	0.0001	mg/L	MAC-0.005		<0.0001	<0.0001	<0.0001	<0.0001
	Co	0.0002	mg/L			0.0035	0.0015	0.0026	0.0008
	Cr	0.001	mg/L	MAC-0.05		0.007	0.003	0.010	0.005
			0.005	mg/L	MAC-0.05				
	Cu	0.001	mg/L	AO-1.0		<0.001	<0.001	<0.001	<0.001
	Fe	0.3	mg/L	AO-0.3		58.8*	19.5*	23.5*	34.9*
	K	1	mg/L			17	2	7	10
	Mg	1	mg/L			22	14	29	16
	Mo	0.005	mg/L			<0.005	<0.005	<0.005	<0.005
	Na	2	mg/L	AO-200		293*	318*	78	301*
	Ni	0.005	mg/L			<0.005	<0.005	<0.005	<0.005
	Pb	0.001	mg/L	MAC-0.010		<0.001	<0.001	<0.001	<0.001
Sb	0.0005	mg/L	IMAC-0.006		<0.0005	<0.0005	<0.0005	<0.0005	
Se	0.001	mg/L	MAC-0.01		<0.001	<0.001	<0.001	<0.001	
		0.01	mg/L	MAC-0.01			<0.01		
Tl	0.0001	mg/L			<0.0001	<0.0001	<0.0001	<0.0001	
U	0.001	mg/L	MAC-0.02		<0.001	<0.001	<0.001	<0.001	
V	0.001	mg/L				0.001	0.005	0.002	

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Client: Golder Associates
121 Commerce Park Drive Unit L
Barrie, ON
L4N 8X1

Attention: Ms. Chrisli Groves
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Group	Analyte	MRL	Units	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	1022312 Groundwater 2013-04-22 MW-B4	1022313 Groundwater 2013-04-22 MW-B5	1022314 Groundwater 2013-04-22 MW-B6	1022315 Groundwater 2013-04-22 MW-B7
Metals	V	0.005	mg/L		<0.005			
	Zn	0.01	mg/L	AO-5.0	<0.01	0.06	<0.01	<0.01
Nutrients	N-NH3	0.02	mg/L			2.20	18.8	7.87
	Phenols	2.0	mg/L		123			
Semi-Volatiles	PO4 as P	0.001	mg/L		<0.001	<0.01	<0.01	<0.01
	1-methylnaphthalene	0.01	mg/L		<0.01	<0.01	0.02	<0.01
	2-methylnaphthalene	0.1	ug/L		0.4	<0.1	0.1	<0.1
	Acenaphthene	0.1	ug/L		<0.1	<0.1	0.2	<0.1
	Acenaphthylene	0.1	ug/L		<0.1	0.1	<0.1	0.5
	Anthracene	0.1	ug/L		<0.1	<0.1	<0.1	<0.1
	Benzo(a)anthracene	0.1	ug/L		<0.1	<0.1	<0.1	<0.1
	Benzo(a)pyrene	0.01	ug/L	MAC-0.01	<0.01	<0.01	<0.01	<0.01
	Benzo(b)fluoranthene	0.05	ug/L		<0.05	<0.05	<0.05	<0.05
	Benzo(g,h,i)perylene	0.1	ug/L		<0.1	<0.1	<0.1	<0.1
	Benzo(k)fluoranthene	0.05	ug/L		<0.05	<0.05	<0.05	<0.05
	Chrysene	0.05	ug/L		<0.05	<0.05	<0.05	<0.05
	Dibenzo(a,h)anthracene	0.1	ug/L		<0.1	<0.1	<0.1	<0.1
	Fluoranthene	0.1	ug/L		<0.1	<0.1	<0.1	<0.1
	Fluorene	0.1	ug/L		<0.1	<0.1	<0.1	0.2
Indeno(1,2,3-c,d)pyrene	0.1	ug/L		<0.1	<0.1	<0.1	<0.1	
Naphthalene	0.1	ug/L		2.4	0.2	0.5	<0.1	
Phenanthrene	0.1	ug/L		0.1	<0.1	0.3	0.3	
Pyrene	0.1	ug/L		<0.1	<0.1	<0.1	<0.1	
Subcontract	Cr(III)	0.005	mg/L		0.006	<0.005	<0.005	<0.005

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Y * = Guideline Exceedence

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 121 Commerce Park Drive Unit L
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 L4N 8X1
Attention: Ms. Chrisi Groves
PO#: PO25698
Invoice to: The City of Barrie - Finance Dept.

Report Number: 1307216
Date Submitted: 2013-04-24
Date Reported: 2013-05-09
Project: 11-1170-0043
COC #: 762319

Group	Subcontract	Analyte	MRL	Units	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D. Guideline	1022312	1022313	1022314	1022315
						Groundwater 2013-04-22 MW-B4	Groundwater 2013-04-22 MW-B5	Groundwater 2013-04-22 MW-B6	Groundwater 2013-04-22 MW-B7
VOCs		Cr(VI)	0.0005	mg/L		<0.0005	<0.0005	<0.0005	<0.0005
		1,1,1,2-tetrachloroethane	0.5	ug/L		<0.5	<0.5	<0.5	<0.5
		1,1,1-trichloroethane	0.4	ug/L		<0.4	<0.4	<0.4	<0.4
		1,1,2,2-tetrachloroethane	0.5	ug/L		<0.5	<0.5	<0.5	<0.5
		1,1,2-trichloroethane	0.4	ug/L		<0.4	<0.4	<0.4	<0.4
		1,1-dichloroethane	0.4	ug/L		<0.4	<0.4	<0.4	<0.4
		1,1-dichloroethylene	0.5	ug/L	MAC-14	<0.5	<0.5	<0.5	<0.5
		1,2,4-trichlorobenzene	0.5	ug/L		<0.5	<0.5	<0.5	<0.5
		1,2-dibromoethane	0.2	ug/L		<0.2	<0.2	<0.2	<0.2
		1,2-dichlorobenzene	0.4	ug/L	MAC-200	<0.4	<0.4	<0.4	<0.4
		1,2-dichloroethane	0.2	ug/L	IMAC-5	<0.2	<0.2	<0.2	<0.2
		1,2-dichloroethane-d4	1	%		105	105	106	101
		1,2-dichloropropane	0.5	ug/L		<0.5	<0.5	<0.5	<0.5
		1,3,5-trimethylbenzene	0.3	ug/L		1.2	<0.3	0.3	<0.3
		1,3-dichlorobenzene	0.4	ug/L		<0.4	<0.4	<0.4	<0.4
		1,4-dichlorobenzene	0.4	ug/L	MAC-5	2.1	<0.4	0.4	<0.4
		2-Hexanone (MBK)	10	ug/L		<10	<10	<10	<10
		4-bromofluorobenzene	1	%		101	102	101	102
		Acetone	50	ug/L		<50	<50	<50	<50
		Benzene	0.5	ug/L		4.3	<0.5	1.6	<0.5
	Bromodichloromethane	0.3	ug/L	MAC-5	<0.3	<0.3	<0.3	<0.3	
	Bromoform	0.4	ug/L		<0.4	<0.4	<0.4	<0.4	
	Bromomethane	0.5	ug/L		<0.5	<0.5	<0.5	<0.5	
	c-1,2-Dichloroethylene	0.4	ug/L		<0.4	<0.4	<0.4	<0.4	
	c-1,3-Dichloropropylene	0.2	ug/L		<0.2	<0.2	<0.2	<0.2	
	Carbon Tetrachloride	0.2	ug/L	MAC-5	<0.2	<0.2	<0.2	<0.2	

Guideline = odwsog

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* = Guideline Exceedance

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational
 Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum
 Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality
 Guideline, IPWQO = Interim Provincial Water Quality Objective.

Client: Golder Associates
 121 Commerce Park Drive Unit L
 Barre, ON
 L4N 8X1
 Attention: Ms. Christil Groves
 PO#: PO25698
 Invoice to: The City of Barre - Finance Dept.

Report Number: 1307216
 Date Submitted: 2013-04-24
 Date Reported: 2013-05-09
 Project: 11-1170-0043
 COC #: 762319

Group	Analyte	MRL	Units	Lab I.D. Sample Matrix Sample Type Sampling Date Sample ID.	1022312 Groundwater 2013-04-22 MW-B4	1022313 Groundwater 2013-04-22 MW-B5	1022314 Groundwater 2013-04-22 MW-B6	1022315 Groundwater 2013-04-22 MW-B7
VOCs	Chloroethane	0.2	ug/L		<0.2	<0.2	<0.2	<0.2
	Chloroform	0.5	ug/L		<0.5	<0.5	<0.5	<0.5
	Chloromethane	0.2	ug/L		<0.2	<0.2	<0.2	<0.2
	Dibromochloromethane	0.3	ug/L		<0.3	<0.3	<0.3	<0.3
	Dichlorodifluoromethane	0.5	ug/L		0.9	<0.5	<0.5	<0.5
	Dichloromethane	4.0	ug/L	MAC-50	<4.0	<4.0	<4.0	<4.0
	Ethylbenzene	0.5	ug/L	AO-2.4	<0.5	<0.5	<0.5	<0.5
	Hexane	5	ug/L		<5	<5	<5	<5
	m/p-xylene	0.5	ug/L		9.9	<0.5	7.5	<0.5
	Methyl Ethyl Ketone (MEK)	10	ug/L		<10	<10	<10	<10
	Methyl Isobutyl Ketone (MIBK)	10	ug/L		<10	<10	<10	<10
	Methyl Tert Butyl Ether (MTBE)	10	ug/L		<10	<10	<10	<10
	Monochlorobenzene	0.2	ug/L	MAC-80	1.7	<0.2	0.3	<0.2
	o-xylene	0.5	ug/L		<0.5	<0.5	<0.5	<0.5
	Styrene	0.5	ug/L		<0.5	<0.5	<0.5	<0.5
	t-1,2-Dichloroethylene	0.4	ug/L		<0.4	<0.4	<0.4	<0.4
t-1,3-Dichloropropylene	0.2	ug/L		<0.2	<0.2	<0.2	<0.2	
Tetrachloroethylene	0.3	ug/L	MAC-30	<0.3	<0.3	<0.3	<0.3	
Toluene	0.5	ug/L	AO-24	<0.5	<0.5	<0.5	<0.5	
Toluene-d8	1	%		95	97	96	97	
Trichloroethylene	0.3	ug/L	MAC-5	<0.3	<0.3	<0.3	<0.3	
Trichlorofluoromethane	0.5	ug/L		<0.5	<0.5	<0.5	<0.5	
Vinyl Chloride	0.2	ug/L	MAC-2	<0.2	<0.2	<0.2	<0.2	
Xylene; total	1.0	ug/L	AO-300	9.9	<1.0	7.5	<1.0	

Guideline = ODWSOG Y
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Client: Golder Associates
 121 Commerce Park Drive Unit L
 Barrie, ON
 L4N 8X1
Attention: Ms. Christy Groves
PO#: PO25698
Invoice to: The City of Barrie - Finance Dept.

Report Number: 1307216
Date Submitted: 2013-04-24
Date Reported: 2013-05-09
Project: 11-1170-0043
COC #: 762319

Group	Analyte	MRL	Units	Lab ID, Sample Matrix, Sample Type, Sampling Date, Sample ID, Guideline	1022316 Groundwater 2013-04-22 Field Blank	1022317 Groundwater 2013-04-22 MWAD1	1022318 Groundwater 2013-04-22 MWAD2	1022319 Groundwater 2013-04-22 MWAD3	
Calculations	Hardness as CaCO3	1	mg/L	OG-100	<1	218*	632*	686*	
	Cyanide (free)	0.005	mg/L	MAC-0.2	<0.005	<0.005	<0.005	<0.005	
	General Chemistry	Alkalinity as CaCO3	5	mg/L	OG-500	<5	284	837*	1630*
		Br	0.25	mg/L		<0.25	<0.25	<0.25	4.02
		Cl	1	mg/L	AO-250	<1	478*	70	340*
		Conductivity	5	uS/cm		<5	2100	1690	3930
		F	0.10	mg/L	MAC-1.5	<0.10	<0.10	<0.10	0.15
		N-NO2	0.10	mg/L	MAC-1.0	<0.10	<0.10	<0.10	<0.10
		N-NO3	0.10	mg/L	MAC-10.0	<0.10	<0.10	<0.10	<0.10
		pH	1.00		6.5-8.5	6.05	7.90	6.76	6.83
	SO4	3	mg/L	AO-500	<3	34	<3	<3	
Hydrocarbons	F1 (C6-C10)	0.1	mg/L		<0.1	<0.1	0.1	0.9	
	F1-BTEX (C6-C10)	0.1	mg/L		<0.1	<0.1	<0.1	0.6	
	F2 (C10-C16)	0.1	mg/L		<0.1	<0.1	<0.1	<0.1	
	F3 (C16-C34)	0.2	mg/L		<0.2	<0.2	<0.2	0.3	
	F4 (C34-C50)	0.2	mg/L		<0.2	<0.2	<0.2	<0.2	
Mercury	Hg	0.0001	mg/L	MAC-0.001	<0.0001	<0.0001	<0.0001	<0.0001	
	Ag	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	
Metals	As	0.001	mg/L	IMAC-0.025	<0.001	<0.001	<0.001	<0.001	
		B	0.01	mg/L	IMAC-0.025			<0.01	
		Ba	0.01	mg/L	IMAC-5.0	<0.01	0.01	0.22	0.65
		Be	0.0005	mg/L	MAC-1.0	<0.01	0.17	0.23	0.42
		Ca	1	mg/L		<0.0005	<0.0005	<0.0005	<0.0005
		Cd	0.0001	mg/L		<1	79	225	222
			0.0001	mg/L	MAC-0.005	<0.0001	<0.0001	<0.0001	<0.0001
		Co	0.0002	mg/L		<0.0002	0.0006	0.0036	0.0065

Guideline = opwsog
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 Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum
 Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality
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Client: Golder Associates
 121 Commerce Park Drive Unit L
 Barrie, ON
 L4N 8X1
 Attention: Ms. Christii Groves
 PO#: PO25698
 Invoice to: The City of Barrie - Finance Dept.

Report Number: 1307216
 Date Submitted: 2013-04-24
 Date Reported: 2013-05-09
 Project: 11-1170-0043
 COC #: 762319

Group	Analyte	MRL	Units	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D. Guideline	1022316	1022317	1022318	1022319
					Groundwater 2013-04-22 Field Blank	Groundwater 2013-04-22 MW-D1	Groundwater 2013-04-22 MW-D2	Groundwater 2013-04-22 MW-D3
Metals	Cr	0.001	mg/L	MAC-0.05	<0.001	0.002		
		0.005	mg/L	MAC-0.05			0.010	0.023
	Cu	0.001	mg/L	AO-1.0	<0.001	<0.001	<0.001	<0.001
	Fe	0.03	mg/L	AO-0.3	<0.03	0.19		
		0.3	mg/L	AO-0.3			48.8*	42.7*
	K	1	mg/L		<1	2	17	25
	Mg	1	mg/L		<1	5	17	32
	Mn	0.005	mg/L		<0.005	<0.005	<0.005	<0.005
	Na	2	mg/L	AO-200	<2	355*	37	283*
	Ni	0.005	mg/L		<0.005	<0.005	<0.005	0.015
	Pb	0.001	mg/L	MAC-0.010	<0.001	<0.001	<0.001	<0.001
	Sb	0.0005	mg/L	IMAC-0.006	<0.0005	<0.0005	<0.0005	<0.0005
	Se	0.001	mg/L	MAC-0.01	<0.001	<0.001	<0.001	<0.01
		0.01	mg/L	MAC-0.01				<0.01
Nutrients	Tl	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001
	U	0.001	mg/L	MAC-0.02	<0.001	<0.001	<0.001	<0.001
	V	0.001	mg/L		<0.001	0.001		
	Zn	0.005	mg/L		<0.005	<0.005	<0.005	<0.005
	N-NH3	0.01	mg/L	AO-5.0	<0.01	<0.01	<0.01	<0.01
Semi-Volatiles	Phenols	0.02	mg/L		0.07	<0.02		
		2.0	mg/L				57.4	214
		0.001	mg/L		<0.001			0.009
	0.005	mg/L				<0.005		
	0.01	mg/L			<0.01			
	0.01	mg/L			<0.01	0.01	<0.01	
	0.1	ug/L			<0.1	0.3	0.8	

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective.

Guideline = ODWSOG
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Client: Golder Associales
 121 Commerce Park Drive Unit L
 Barrie, ON
 L4N 8X1
 Attention: Ms. Christi Groves
 PO#: PO25698
 Invoice to: The City of Barrie - Finance Dept.

Report Number: 1307216
 Date Submitted: 2013-04-24
 Date Reported: 2013-05-09
 Project: 11-1170-0043
 COC #: 762319

Group	Analyte	MRL	Units	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	Guideline			
					1022316 Groundwater 2013-04-22 Field Blank	1022317 Groundwater 2013-04-22 MWD1	1022318 Groundwater 2013-04-22 MWD2	1022319 Groundwater 2013-04-22 MWD3
Semi-Volatiles	2-methylnaphthalene	0.1	ug/L		<0.1	<0.1	0.2	1.2
	Acenaphthene	0.1	ug/L		<0.1	<0.1	<0.1	<0.1
	Acenaphthylene	0.1	ug/L		<0.1	<0.1	<0.1	<0.1
	Anthracene	0.1	ug/L		<0.1	<0.1	<0.1	<0.1
	Benzo(a)anthracene	0.1	ug/L		<0.1	<0.1	<0.1	<0.1
	Benzo(a)pyrene	0.01	ug/L	MAC-0.01	<0.01	<0.01	<0.01	<0.01
	Benzo(b)fluoranthene	0.05	ug/L		<0.05	<0.05	<0.05	<0.05
	Benzo(g,h,i)perylene	0.1	ug/L		<0.1	<0.1	<0.1	<0.1
	Benzo(k)fluoranthene	0.05	ug/L		<0.05	<0.05	<0.05	<0.05
	Chrysene	0.05	ug/L		<0.05	<0.05	<0.05	<0.05
	Dibenzo(a,h)anthracene	0.1	ug/L		<0.1	<0.1	<0.1	<0.1
	Fluoranthene	0.1	ug/L		<0.1	<0.1	<0.1	<0.1
	Fluorene	0.1	ug/L		<0.1	<0.1	<0.1	<0.1
	Indeno(1,2,3-c,d)pyrene	0.1	ug/L		<0.1	<0.1	<0.1	<0.1
	Naphthalene	0.1	ug/L		<0.1	<0.1	0.3	5.7
	Phenanthrene	0.1	ug/L		<0.1	<0.1	<0.1	0.1
	Pyrene	0.1	ug/L		<0.1	<0.1	<0.1	<0.1
Subcontract	Cr(III)	0.005	mg/L		<0.005	<0.005	0.008	0.024
	Cr(VI)	0.0005	mg/L		<0.0005	<0.0005	<0.0005	<0.0005
VOCs	1,1,1,2-tetrachloroethane	0.5	ug/L		<0.5	<0.5	<0.5	<0.5
	1,1,1-trichloroethane	0.4	ug/L		<0.4	<0.4	<0.4	<0.4
	1,1,2,2-tetrachloroethane	0.5	ug/L		<0.5	<0.5	<0.5	<0.5
	1,1,2-trichloroethane	0.4	ug/L		<0.4	<0.4	<0.4	<0.4
	1,1-dichloroethane	0.4	ug/L		<0.4	<0.4	<0.4	<0.4
	1,1-dichloroethylene	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	

Guideline = odwsgg

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Client: Golder Associates
 121 Commerce Park Drive Unit L
 Barrie, ON
 L4N 8X1
 Attention: Ms. Christil Groves
 PO#: PO25698
 Invoice to: The City of Barrie - Finance Dept.

Report Number: 1307216
 Date Submitted: 2013-04-24
 Date Reported: 2013-05-09
 Project: 11-1170-0043
 COC #: 762319

Group	Analyte	MRL	Units	Lab I.D. Sample Matrix Sample Type Sampling Date Sample ID.	1022316 Groundwater 2013-04-22 Field Blank	1022317 Groundwater 2013-04-22 MW-D1	1022318 Groundwater 2013-04-22 MW-D2	1022319 Groundwater 2013-04-22 MW-D3
VOCs	1,2-dibromoethane	0.2	ug/L		<0.2	<0.2	<0.2	<0.2
	1,2-dichlorobenzene	0.4	ug/L	MAC-200	<0.4	<0.4	<0.4	<0.4
	1,2-dichloroethane	0.2	ug/L	IMAC-5	<0.2	<0.2	<0.2	<0.2
	1,2-dichloroethane-d4	1	%		102	112	97	93
	1,2-dichloropropane	0.5	ug/L		<0.5	<0.5	<0.5	<0.5
	1,3,5-trimethylbenzene	0.3	ug/L		<0.3	<0.3	3.5	11.2
	1,3-dichlorobenzene	0.4	ug/L		<0.4	<0.4	<0.4	<0.4
	1,4-dichlorobenzene	0.4	ug/L	MAC-5	<0.4	<0.4	3.9	6.7*
	2-Hexanone (MBK)	10	ug/L		<10	<10	<10	<10
	4-bromofluorobenzene	1	%		102	101	99	98
	Acetone	50	ug/L		<50	<50	<50	<50
	Benzene	0.5	ug/L	MAC-5	<0.5	<0.5	8.1*	26.7*
	Bromodichloromethane	0.3	ug/L		<0.3	<0.3	<0.3	<0.3
	Bromoform	0.4	ug/L		<0.4	<0.4	<0.4	<0.4
	Bromomethane	0.5	ug/L		<0.5	<0.5	<0.5	<0.5
	c-1,2-Dichloroethylene	0.4	ug/L		<0.4	<0.4	<0.4	<0.4
c-1,3-Dichloropropylene	0.2	ug/L		<0.2	<0.2	<0.2	<0.2	
Carbon Tetrachloride	0.2	ug/L	MAC-5	<0.2	<0.2	<0.2	<0.2	
Chloroethane	0.2	ug/L		<0.2	<0.2	<0.2	<0.2	
Chloroform	0.5	ug/L		0.8	<0.5	<0.5	<0.5	
Chloromethane	0.2	ug/L		<0.2	<0.2	<0.2	<0.2	
Dibromochloromethane	0.3	ug/L		<0.3	<0.3	<0.3	<0.3	
Dichlorodifluoromethane	0.5	ug/L		<0.5	<0.5	<0.5	2.1	
Dichloromethane	4.0	ug/L	MAC-50	<4.0	<4.0	<4.0	<4.0	
Ethylbenzene	0.5	ug/L	AO-2.4	<0.5	<0.5	<0.5	22.9*	
Hexane	5	ug/L		<5	<5	<5	<5	

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Client: Golder Associates
 121 Commerce Park Drive Unit L
 Barrie, ON
 L4N 8X1
Attention: Ms. Christi Groves
PO#: PO25698
Invoice to: The City of Barrie - Finance Dept.

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Date Submitted: 2013-04-24
Date Reported: 2013-05-09
Project: 11-1170-0043
COC #: 762319

Group	Analyte	MRL	Units	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	Guideline		
					1022316 Groundwater 2013-04-22 Field Blank	1022317 Groundwater 2013-04-22 MW-D1	1022318 Groundwater 2013-04-22 MW-D2
VOCs	m/p-xylene	0.5	ug/L		<0.5	<0.5	39.8
	Methyl Ethyl Ketone (MEK)	10	ug/L		<10	<10	<10
	Methyl Isobutyl Ketone (MIBK)	10	ug/L		<10	<10	<10
	Methyl Tert Butyl Ether (MTBE)	10	ug/L		<10	<10	<10
	Monochlorobenzene	0.2	ug/L	MAC-80	<0.2	<0.2	4.1
	o-xylene	0.5	ug/L		<0.5	<0.5	0.8
	Styrene	0.5	ug/L		<0.5	<0.5	<0.5
	t-1,2-Dichloroethylene	0.4	ug/L		<0.4	<0.4	<0.4
	t-1,3-Dichloropropylene	0.2	ug/L		<0.2	<0.2	<0.2
	Tetrachloroethylene	0.3	ug/L	MAC-30	<0.3	<0.3	<0.3
	Toluene	0.5	ug/L	AO-24	<0.5	<0.5	<0.5
	Toluene-d8	1	%		95	96	98
	Trichloroethylene	0.3	ug/L	MAC-5	<0.3	1.0	<0.3
	Trichlorofluoromethane	0.5	ug/L		<0.5	<0.5	<0.5
	Vinyl Chloride	0.2	ug/L	MAC-2	<0.2	<0.2	0.5
Xylene; total	1.0	ug/L	AO-300	<1.0	<1.0	40.6	

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Group	Analyte	MRL	Units	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	Guideline	1022320 Groundwater 2013-04-22 MW-D4	1022321 Groundwater 2013-04-22 MW-D5	1022322 Groundwater 2013-04-22 MW-D6	1022323 Groundwater 2013-04-22 MW-D7
Calculations	Hardness as CaCO3	1	mg/L	OG-100		415*	643*	816*	711*
	Cyanide (free)	0.005	mg/L	MAC-0.2		<0.005	<0.005	<0.005	<0.005
	Alkalinity as CaCO3	5	mg/L	OG-500		823*	709*	673*	548*
		Br	0.25	mg/L			0.34	<0.25	2.04
	Cl	1	mg/L	AO-250		66	28	287*	1160*
	Conductivity	5	uS/cm			1740	1330	2010	4530
		F	0.10	mg/L	MAC-1.5		<0.10	<0.10	<0.10
	N-NO2	0.10	mg/L	MAC-1.0		<0.10	<0.10	<0.10	<0.10
	N-NO3	0.10	mg/L	MAC-10.0		<0.10	<0.10	<0.10	<0.10
	pH	1.00		6.5-8.5		7.22	7.28	7.48	7.50
SO4	3	mg/L	AO-500		<3	10	<3	4	
Hydrocarbons	F1 (C6-C10)	0.1	mg/L			0.1	0.1	<0.1	<0.1
	F1-BTEX (C6-C10)	0.1	mg/L			<0.1	<0.1	<0.1	<0.1
	F2 (C10-C16)	0.1	mg/L			0.3	<0.1	<0.1	<0.1
	F3 (C16-C34)	0.2	mg/L			2.0	<0.2	<0.2	<0.2
	F4 (C34-C50)	0.2	mg/L			0.4	<0.2	<0.2	<0.2
Mercury	Hg	0.0001	mg/L	MAC-0.001		<0.0001	<0.0001	<0.0001	<0.0001
	Ag	0.0001	mg/L			<0.0001	<0.0001	<0.0001	<0.0001
	As	0.001	mg/L	IMAC-0.025		<0.001	<0.001	<0.001	<0.001
Metals	B	0.01	mg/L	IMAC-0.025		0.26	0.18	0.04	0.06
	Ba	0.01	mg/L	IMAC-5.0		0.21	0.23	0.83	0.29
	Be	0.0005	mg/L	MAC-1.0		<0.0005	<0.0005	<0.0005	<0.0005
	Ca	1	mg/L			143	231	274	245
	Cd	0.0001	mg/L	MAC-0.005		<0.0001	<0.0001	<0.0001	<0.0001
	Co	0.0002	mg/L			0.0022	0.0018	0.0017	0.0008

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 MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective.



Client: Golder Associates
 121 Commerce Park Drive Unit L
 Barrie, ON
 L4N 8X1
Attention: Ms. Chrissil Groves
PO#: PO25698
Invoice to: The City of Barrie - Finance Dept.

Report Number: 1307216
Date Submitted: 2013-04-24
Date Reported: 2013-05-09
Project: 11-1170-0043
COC #: 762319

Group	Analyte	MRL	Units	Lab ID, Sample Matrix Sample Type Sampling Date Sample ID, Guideline	1022320	1022321	1022322	1022323
					Groundwater 2013-04-22 MWD4	Groundwater 2013-04-22 MWD5	Groundwater 2013-04-22 MWD6	Groundwater 2013-04-22 MWD7
Metals	Cr	0.001	mg/L	MAC-0.05	0.009	0.010	0.008	
		0.005	mg/L	MAC-0.05				0.029
	Cu	0.001	mg/L	AO-1.0	<0.001	<0.001	<0.001	<0.001
	Fe	0.3	mg/L	AO-0.3	21.8*	44.9*	16.9*	26.2*
	K	1	mg/L		16	8	5	12
	Mg	1	mg/L		14	16	32	24
	Mo	0.005	mg/L		<0.005	<0.005	<0.005	<0.005
	Na	2	mg/L	AO-200	55	14	116	625*
	Ni	0.005	mg/L		<0.005	<0.005	<0.005	<0.005
	Pb	0.001	mg/L	MAC-0.010	<0.001	<0.001	<0.001	<0.001
	Sb	0.0005	mg/L	IMAC-0.006	<0.0005	<0.0005	<0.0005	<0.0005
	Se	0.001	mg/L	MAC-0.01	<0.001	<0.001	<0.0005	<0.001
			0.01	mg/L	MAC-0.01			
			0.0001	mg/L		<0.0001	<0.0001	<0.0001
Nutrients	U	0.001	mg/L	MAC-0.02	<0.001	<0.001	<0.001	<0.001
	V	0.001	mg/L		0.005	0.005	0.004	0.003
	Zn	0.01	mg/L	AO-5.0	<0.01	0.02	<0.01	<0.01
	N-NH3	0.02	mg/L				13.0	12.2
		2.0	mg/L		92.4	32.1		
	Phenols	0.001	mg/L		0.014	<0.001	<0.001	<0.02
		0.02	mg/L					
	PO4 as P	0.01	mg/L		<0.01	<0.01	<0.01	<0.01
	1-methylnaphthalene	0.1	ug/L		2.4	1.1	<0.1	<0.1
	2-methylnaphthalene	0.1	ug/L		3.3	0.2	<0.1	<0.1
Acenaphthene	0.1	ug/L		1.5	<0.1	<0.1	<0.1	
Acenaphthylene	0.1	ug/L		<0.1	<0.1	<0.1	<0.1	

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Client: Golder Associates
 121 Commerce Park Drive Unit L
 Barrie, ON
 L4N 8X1
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 Invoice to: The City of Barrie - Finance Dept.

Report Number: 1307216
 Date Submitted: 2013-04-24
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 Project: 11-1170-0043
 COC #: 762319

Group	Analyte	MRL	Units	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	1022320		1022321		1022322		1022323	
					Groundwater	2013-04-22 MW-DA	Groundwater	2013-04-22 MW-DS	Groundwater	2013-04-22 MW-DE	Groundwater	2013-04-22 MW-D7
Semi-Volatiles	Anthracene	0.1	ug/L		0.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Benzo(a)anthracene	0.1	ug/L		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Benzo(a)pyrene	0.01	ug/L	MAC-0.01	0.08*	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Benzo(b)fluoranthene	0.05	ug/L		0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Benzo(g,h,i)perylene	0.1	ug/L		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Benzo(k)fluoranthene	0.05	ug/L		0.07	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Chrysene	0.05	ug/L		0.11	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Dibenzo(a,h)anthracene	0.1	ug/L		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Fluoranthene	0.1	ug/L		1.0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Fluorene	0.1	ug/L		1.9	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Indeno(1,2,3-c,d)pyrene	0.1	ug/L		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Naphthalene	0.1	ug/L		46.4	4.6	4.6	4.6	4.6	4.6	4.6	4.6
	Phenanthrene	0.1	ug/L		3.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Pyrene	0.1	ug/L		0.8	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Subcontract	Cr(III)	0.005	mg/L		0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cr(VI)		0.0005	mg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
VOCs	1,1,1,2-tetrachloroethane	0.5	ug/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	1,1,1-trichloroethane	0.4	ug/L		<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
	1,1,2,2-tetrachloroethane	0.5	ug/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	1,1,2-trichloroethane	0.4	ug/L		<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
	1,1-dichloroethane	0.4	ug/L		<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
	1,1-dichloroethylene	0.5	ug/L	MAC-14	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	1,2,4-trichlorobenzene	0.5	ug/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	1,2-dibromoethane	0.2	ug/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
1,2-dichlorobenzene	0.4	ug/L	MAC-200	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
	0.2	ug/L	IMAC-5	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

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Certificate of Analysis

EXOVA OTTAWA

Client: Golder Associates
 121 Commerce Park Drive Unit L
 Barrie, ON
 L4N 8X1

Attention: Ms. Chrisli Groves
PO#: PO25698

Invoice to: The City of Barrie - Finance Dept.

Report Number: 1307216
Date Submitted: 2013-04-24
Date Reported: 2013-05-09
Project: 11-1170-0043
COC #: 762319

Group	Analyte	MRL	Units	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D. Guideline	1022320		1022321		1022322		1022323	
					Groundwater	2013-04-22 MW-D4	Groundwater	2013-04-22 MW-D5	Groundwater	2013-04-22 MW-D6	Groundwater	2013-04-22 MW-D7
VOCs	1,2-dichloroethane-d4	1	%		92	<0.5	97	<0.5	100	<0.5	99	<0.5
	1,2-dichloropropane	0.5	ug/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	1,3,5-trimethylbenzene	0.3	ug/L		4.0	4.0	2.5	<0.3	<0.3	<0.3	<0.3	<0.3
	1,3-dichlorobenzene	0.4	ug/L		<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
	1,4-dichlorobenzene	0.4	ug/L	MAC-5	10.1*	<0.4	3.8	<0.4	<0.4	<0.4	<0.4	<0.4
	2-Hexanone (MBK)	10	ug/L		<10	<10	<10	<10	<10	<10	<10	<10
	4-bromofluorobenzene	1	%		97	97	97	104	104	104	102	102
	Acetone	50	ug/L		<50	<50	<50	<50	<50	<50	<50	<50
	Benzene	0.5	ug/L	MAC-5	16.2*	<0.3	7.1*	<0.3	<0.3	<0.3	<0.3	<0.3
	Bromodichloromethane	0.3	ug/L		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
	Bromoform	0.4	ug/L		<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
	Bromomethane	0.5	ug/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	c-1,2-Dichloroethylene	0.4	ug/L		<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
	c-1,3-Dichloropropylene	0.2	ug/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Carbon Tetrachloride	0.2	ug/L	MAC-5	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Chloroethane	0.2	ug/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Chloroform	0.5	ug/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Chloromethane	0.2	ug/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Dibromochloromethane	0.3	ug/L		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
	Dichlorodifluoromethane	0.5	ug/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloromethane	4.0	ug/L	MAC-50	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	
Ethylbenzene	0.5	ug/L	AO-2.4	1.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
Hexane	5	ug/L		<5	<5	<5	<5	<5	<5	<5	<5	
m/p-xylene	0.5	ug/L		7.1	7.1	24.8	24.8	24.8	24.8	24.8	24.8	
Methyl Ethyl Ketone (MEK)	10	ug/L		<10	<10	<10	<10	<10	<10	<10	<10	
Methyl Isobutyl Ketone (MIBK)	10	ug/L		<10	<10	<10	<10	<10	<10	<10	<10	

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Client: Golder Associates
 121 Commerce Park Drive Unit L
 Barrie, ON
 L4N 8X1
 Attention: Ms. Christl Groves
 PO#: PO25698
 Invoice to: The City of Barrie - Finance Dept.

Report Number: 1307216
 Date Submitted: 2013-04-24
 Date Reported: 2013-05-09
 Project: 11-1170-0043
 COC #: 762319

Group	Analyte	MRL	Units	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D. Guideline	1022320 Groundwater 2013-04-22 MW4D4	1022321 Groundwater 2013-04-22 MW4D5	1022322 Groundwater 2013-04-22 MW4D6	1022323 Groundwater 2013-04-22 MW4D7
VOCs	Methyl Tert Butyl Ether (MTBE)	10	ug/L		<10	<10	<10	<10
	Monochlorobenzene	0.2	ug/L	MAC-80	14.0	21.7	0.2	<0.2
	o-xylene	0.5	ug/L		1.0	0.8	<0.5	<0.5
	Styrene	0.5	ug/L		<0.5	<0.5	<0.5	<0.5
	t-1,2-Dichloroethylene	0.4	ug/L		<0.4	<0.4	<0.4	<0.4
	t-1,3-Dichloropropylene	0.2	ug/L		<0.2	<0.2	<0.2	<0.2
	Tetrachloroethylene	0.3	ug/L	MAC-30	<0.3	<0.3	<0.3	<0.3
	Toluene	0.5	ug/L	AO-24	0.7	0.6	<0.5	<0.5
	Toluene-d8	1	%		95	96	92	92
	Trichloroethylene	0.3	ug/L	MAC-5	<0.3	<0.3	<0.3	<0.3
	Trichlorofluoromethane	0.5	ug/L		<0.5	<0.5	<0.5	<0.5
	Vinyl Chloride	0.2	ug/L	MAC-2	<0.2	<0.2	<0.2	<0.2
Xylene; total	1.0	ug/L	AO-300	8.1	25.6	<1.0	<1.0	
Calculations	Hardness as CaCO3	1	mg/L	1022324 Groundwater 2013-04-22 Trip Blank	<1			
	Cyanide (free)	0.005	mg/L		<0.005			
	Alkalinity as CaCO3	5	mg/L		<5			
	Br	0.25	mg/L		<0.25			
	Cl	1	mg/L		<1			
General Chemistry	Conductivity	5	uS/cm		<5			

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 L4N 8X1

Attention: Ms. Chnsil Groves
PO#: PO25698

Invoice to: The City of Barrie - Finance Dept.

Report Number: 1307216
Date Submitted: 2013-04-24
Date Reported: 2013-05-09
Project: 11-1170-0043
COC #: 762319

Group	Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.
General Chemistry	F	0.10	mg/L	MAC-1.5	1022324 Groundwater
	N-NO2	0.10	mg/L	MAC-1.0	2013-04-22 Trip Blank
	N-NO3	0.10	mg/L	MAC-10.0	
	pH	1.00		6.5-8.5	
Hydrocarbons	SO4	3	mg/L	AO-500	
	F1 (C6-C10)	0.1	mg/L		
	F1-BTEX (C6-C10)	0.1	mg/L		
	F2 (C10-C16)	0.1	mg/L		
	F3 (C16-C34)	0.2	mg/L		
Mercury Metals	F4 (C34-C50)	0.2	mg/L		
	Hg	0.0001	mg/L	MAC-0.001	
	Ag	0.0001	mg/L		
	As	0.001	mg/L	iMAC-0.025	
	B	0.01	mg/L	iMAC-5.0	
	Ba	0.01	mg/L	MAC-1.0	
	Be	0.0005	mg/L		
	Ca	1	mg/L		
	Cd	0.0001	mg/L	MAC-0.005	
	Co	0.0002	mg/L		
Cr	0.001	mg/L	MAC-0.05		
Cu	0.001	mg/L	AO-1.0		
Fe	0.03	mg/L	AO-0.3		
K	1	mg/L			
Mg	1	mg/L			
Mo	0.005	mg/L			
Na	2	mg/L	AO-200		

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 Guideline, MAC = Maximum Acceptable Concentration, iMAC = Interim Maximum
 Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality
 Guideline, iPWQO = Interim Provincial Water Quality Objective.

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Group	Analyte	MRL	Units	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	Guideline
Metals	Ni	0.005	mg/L		<0.005
	Pb	0.001	mg/L	MAC-0.010	<0.001
	Sb	0.0005	mg/L	IMAC-0.006	<0.0005
	Se	0.001	mg/L	MAC-0.01	<0.001
	Tl	0.0001	mg/L		<0.0001
	U	0.001	mg/L	MAC-0.02	<0.001
	V	0.001	mg/L		<0.001
	Zn	0.01	mg/L	AO-5.0	<0.01
	N-NH3	0.02	mg/L		0.06
	Phenols	0.001	mg/L		<0.001
Nutrients	PO4 as P	0.01	mg/L		<0.01
	1-methylnaphthalene	0.1	ug/L		<0.1
Semi-Volatiles	2-methylnaphthalene	0.1	ug/L		<0.1
	Acenaphthene	0.1	ug/L		<0.1
	Acenaphthylene	0.1	ug/L		<0.1
	Anthracene	0.1	ug/L		<0.1
	Benzo(a)anthracene	0.1	ug/L		<0.1
	Benzo(a)pyrene	0.01	ug/L	MAC-0.01	<0.01
	Benzo(b)fluoranthene	0.05	ug/L		<0.05
	Benzo(g,h,i)perylene	0.1	ug/L		<0.1
	Benzo(k)fluoranthene	0.05	ug/L		<0.05
	Chrysene	0.05	ug/L		<0.05
	Dibenzo(a,h)anthracene	0.1	ug/L		<0.1
	Fluoranthene	0.1	ug/L		<0.1
	Fluorene	0.1	ug/L		<0.1
Indeno(1,2,3-c,d)pyrene	0.1	ug/L		<0.1	

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Attention: Ms. Christy Groves
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Group	Analyte	MRL	Units	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	Guideline
Semi-Volatiles	Naphthalene	0.1	ug/L		<0.1
	Phenanthrene	0.1	ug/L		<0.1
	Pyrene	0.1	ug/L		<0.1
Subcontract	Cr(III)	0.005	mg/L		<0.005
	Cr(VI)	0.0005	mg/L		<0.0005
VOCs	1,1,1,2-tetrachloroethane	0.5	ug/L		<0.5
	1,1,1-trichloroethane	0.4	ug/L		<0.4
	1,1,2,2-tetrachloroethane	0.5	ug/L		<0.5
	1,1,2-trichloroethane	0.4	ug/L		<0.4
	1,1-dichloroethane	0.4	ug/L		<0.4
	1,1-dichloroethylene	0.5	ug/L	MAC-14	<0.5
	1,2,4-trichlorobenzene	0.5	ug/L		<0.5
	1,2-dibromoethane	0.2	ug/L		<0.2
	1,2-dichlorobenzene	0.4	ug/L	MAC-200	<0.4
	1,2-dichloroethane	0.2	ug/L	IMAC-5	<0.2
	1,2-dichloroethane-d4	1	%		107
	1,2-dichloropropane	0.5	ug/L		<0.5
	1,3,5-trimethylbenzene	0.3	ug/L		<0.3
1,3-dichlorobenzene	0.4	ug/L		<0.4	
1,4-dichlorobenzene	0.4	ug/L	MAC-5	<0.4	
2-Hexanone (MBK)	10	ug/L		<10	
4-bromofluorobenzene	1	%		102	
Acetone	50	ug/L		<50	
Benzene	0.5	ug/L		<0.5	
Bromodichloromethane	0.3	ug/L		<0.3	
Bromoform	0.4	ug/L		<0.4	

* = Guideline Exceedence

Guideline = ODWSOG

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 Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum
 Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality
 Guideline, IPWQO = Interim Provincial Water Quality Objective.

Client: Golder Associates
 121 Commerce Park Drive Unit L
 Barrie, ON
 L4N 8X1

Attention: Ms. Christi Groves
PO#: PO25698

Invoice to: The City of Barrie - Finance Dept.

Report Number: 1307216
Date Submitted: 2013-04-24
Date Reported: 2013-05-09
Project: 11-1170-0043
COC #: 762319

Group	Analyte	MRL	Units	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	Guideline
VOCs	Bromomethane	0.5	ug/L		<0.5
	c-1,2-Dichloroethylene	0.4	ug/L		<0.4
	c-1,3-Dichloropropylene	0.2	ug/L		<0.2
	Carbon Tetrachloride	0.2	ug/L	MAC-5	<0.2
	Chloroethane	0.2	ug/L		<0.2
	Chloroform	0.5	ug/L		<0.5
	Chloromethane	0.2	ug/L		<0.2
	Dibromochloromethane	0.3	ug/L		<0.3
	Dichlorodifluoromethane	0.5	ug/L		<0.5
	Dichloromethane	4.0	ug/L	MAC-50	<4.0
	Ethylbenzene	0.5	ug/L	AO-2.4	<0.5
	Hexane	5	ug/L		<5
	m/p-xylene	0.5	ug/L		<0.5
	Methyl Ethyl Ketone (MEK)	10	ug/L		<10
	Methyl Isobutyl Ketone (MIBK)	10	ug/L		<10
	Methyl Tert Butyl Ether (MTBE)	10	ug/L		<10
	Monochlorobenzene	0.2	ug/L	MAC-80	<0.2
	o-xylene	0.5	ug/L		<0.5
Styrene	0.5	ug/L		<0.5	
t-1,2-Dichloroethylene	0.4	ug/L		<0.4	
t-1,3-Dichloropropylene	0.2	ug/L		<0.2	
Tetrachloroethylene	0.3	ug/L	MAC-30	<0.3	
Toluene	0.5	ug/L	AO-24	<0.5	
Toluene-d8	1	%		96	
Trichloroethylene	0.3	ug/L	MAC-5	<0.3	
Trichlorofluoromethane	0.5	ug/L		<0.5	

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Client: Golder Associates
 121 Commerce Park Drive Unit L
 Barrie, ON
 L4N 8X1
 Attention: Ms. Christi Groves
 PO#: PO25698
 Invoice to: The City of Barrie - Finance Dept.

Report Number: 1307216
 Date Submitted: 2013-04-24
 Date Reported: 2013-05-09
 Project: 11-1170-0043
 COC #: 762319

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Run No 0	Analysis Date 2013-05-01 Method C SM2340B		
Hardness as CaCO3			
Xylenes: total			
Run No 249307	Analysis Date 2013-04-25 Method O CCME		
F1 (C6-C10)	<0.1 mg/L	94	80-120
Run No 249389	Analysis Date 2013-04-25 Method O CCME		
E1-BTEX (E6-G10)			
Run No 249415	Analysis Date 2013-04-25 Method C SM4500-NO3-F		
NNO2	<0.10 mg/L	97	80-120
NNO3	<0.10 mg/L	100	80-120
Run No 249421	Analysis Date 2013-04-24 Method V 8260B		
1,1,1,2-tetrachloroethane	<0.5 ug/L	92	80-120
1,1,1-trichloroethane	<0.4 ug/L	94	80-120
1,1,2,2-tetrachloroethane	<0.5 ug/L	93	80-120
1,1,2-trichloroethane	<0.4 ug/L	88	80-120

Guideline = odwsog

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Client: Golder Associates
 121 Commerce Park Drive Unit L
 Barrie, ON
 L4N 8X1

Attention: Ms. Christl Groves
PO#: PO25698

Invoice to: The City of Barrie - Finance Dept.

Report Number: 1307216
Date Submitted: 2013-04-24
Date Reported: 2013-05-09
Project: 11-1170-0043
COC #: 762319

QC Summary

Analyte	Blank	QC % Rec	QC Limits
1,1-dichloroethane	<0.4 ug/L	98	80-120
1,1-dichloroethylene	<0.5 ug/L	92	80-120
1,2,4-trichlorobenzene	<0.5 ug/L	98	
1,2-dibromoethane	<0.2 ug/L	88	80-120
1,2-dichlorobenzene	<0.4 ug/L	107	80-120
1,2-dichloroethane	<0.2 ug/L	100	80-120
1,2-dichloroethane-d4	104 %	98	80-120
1,2-dichloropropane	<0.5 ug/L	94	80-120
1,3,5-trimethylbenzene	<0.3 ug/L	90	80-120
1,3-dichlorobenzene	<0.4 ug/L	93	80-120
1,4-dichlorobenzene	<0.4 ug/L	91	80-120
Benzene	<0.5 ug/L	95	80-120
Bromodichloromethane	<0.3 ug/L	88	80-120
Bromofomr	<0.4 ug/L	95	80-120
Bromomethane	<0.5 ug/L	84	70-130
c-1,2-Dichloroethylene	<0.4 ug/L	83	80-120
c-1,3-Dichloropropylene	<0.2 ug/L	86	80-120

Guideline = ODWSOG Y
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Client: Golder Associates
 121 Commerce Park Drive Unit L
 Barrie, ON
 L4N 8X1
Attention: Ms. Christil Groves
PO#: PO25698
Invoice to: The City of Barrie - Finance Dept.

Report Number: 1307216
Date Submitted: 2013-04-24
Date Reported: 2013-05-09
Project: 11-1170-0043
COC #: 762319

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Carbon Tetrachloride	<0.2 ug/L	92	80-120
Chloroethane	<0.2 ug/L	86	70-130
Chloroform	<0.5 ug/L	92	80-120
Chloromethane	<0.2 ug/L	85	70-130
Dibromochloromethane	<0.3 ug/L	83	80-120
Dichlorodifluoromethane	<0.5 ug/L	109	70-130
Dichloromethane	<4.0 ug/L	114	60-200
Ethylbenzene	<0.5 ug/L	90	80-120
Hexane	<5 ug/L	100	70-130
m/p-xylene	<0.5 ug/L	95	80-120
Monochlorobenzene	<0.2 ug/L	88	80-120
o-xylene	<0.5 ug/L	92	80-120
Styrene	<0.5 ug/L	87	80-120
t-1,2-Dichloroethylene	<0.4 ug/L	91	80-120
t-1,3-Dichloropropylene	<0.2 ug/L	90	80-120
Tetrachloroethylene	<0.3 ug/L	90	80-120
Toluene	<0.5 ug/L	98	80-120

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Client: Golder Associates
 121 Commerce Park Drive Unit L
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 L4N 8X1

Attention: Ms. Christi Groves
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Date Submitted: 2013-04-24
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Project: 11-1170-0043
COC #: 762319

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Toluene-d8	95 %	95	80-120
Trichloroethylene	<0.3 ug/L	95	80-120
Trichlorofluoromethane	<0.5 ug/L	99	80-120
Vinyl Chloride	<0.2 ug/L	117	70-130
Run No 249426	Analysis Date 2013-04-25	Method M SM3112B-3500B	
Hg	<0.0001 mg/L	100	70-130
Run No 249432	Analysis Date 2013-04-25	Method G SM4500-NO3-F	
N-NO2	<0.10 mg/L	100	80-120
N-NO3	<0.10 mg/L	100	80-120
Run No 249436	Analysis Date 2013-04-26	Method O CCME	
F2 (C10-C16)	<0.1 mg/L	88	50-120
F3 (C16-C34)	<0.2 mg/L	88	50-120
F4 (C34-C50)	<0.2 mg/L	88	50-120
Run No 249444	Analysis Date 2013-04-26	Method C SM4500-NE3B	
N-NH3	<0.02 mg/L	100	85-115
Run No 249452	Analysis Date 2013-04-26	Method O CCME	
F1 (C6-C10)	<0.1 mg/L	94	80-120

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Client: Golder Associates
 121 Commerce Park Drive Unit L
 Barrie, ON
 L4N 8X1
 Attention: Ms. Christl Groves
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 Project: 11-1170-0043
 COC #: 762319

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Run No 249453	Analysis Date 2013-04-26	Method O CCMC	
F1-BTEX (C6-C10)			
Run No 249457	Analysis Date 2013-04-26	Method EPA 200.8	
Ag	<0.0001 mg/L	93	89-111
As	<0.001 mg/L	104	81-119
B	<0.01 mg/L	91	81-119
Ba	<0.01 mg/L	95	91-109
Be	<0.0005 mg/L	90	82-118
Cd	<0.0001 mg/L	92	86-114
Co	<0.0002 mg/L	96	88-112
Cr	<0.001 mg/L	95	89-111
Cu	<0.001 mg/L	92	86-114
Fe	<0.03 mg/L	97	88-112
Mn	<0.005 mg/L	98	84-116
Ni	<0.005 mg/L	102	92-108
Pb	<0.001 mg/L	93	89-111
Sb	<0.0005 mg/L	95	77-123

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Client: Golder Associates
 121 Commerce Park Drive Unit L
 Barré, ON
 L4N 8X1
 Attention: Ms. Christl Groves
 PO#: PO25698
 Invoice to: The City of Barré - Finance Dept.

Report Number: 1307216
 Date Submitted: 2013-04-24
 Date Reported: 2013-05-09
 Project: 11-1170-0043
 COC #: 762319

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Se	<0.001 mg/L	105	77-123
Tl	<0.0001 mg/L	96	88-112
U	<0.001 mg/L	96	87-113
V	<0.001 mg/L	93	88-112
Zn	<0.01 mg/L	96	89-111
Run No 249459 Analysis Date 2013-04-26 Method P 8270			
1-methylnaphthalene	<0.1 ug/L	44	20-140
2-methylnaphthalene	<0.1 ug/L	44	20-140
Acenaphthene	<0.1 ug/L	46	20-140
Acenaphthylene	<0.1 ug/L	44	20-140
Anthracene	<0.1 ug/L	48	20-140
Benzo(a)anthracene	<0.1 ug/L	54	20-140
Benzo(a)pyrene	<0.01 ug/L	49	20-140
Benzo(b)fluoranthene	<0.05 ug/L	57	20-140
Benzo(g,h,i)perylene	<0.1 ug/L	54	20-140
Benzo(k)fluoranthene	<0.05 ug/L	97	20-140
Chrysene	<0.05 ug/L	51	20-140

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Client: Golder Associates
 121 Commerce Park Drive Unit L
 Barrie, ON
 L4N 8X1
 Attention: Ms. Christl Groves
 PO#: PO25698
 Invoice to: The City of Barrie - Finance Dept.

Report Number: 1307216
 Date Submitted: 2013-04-24
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 COC #: 762319

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Biphenyl(a,h)anthracene	<0.1 ug/L	50	20-140
Fluoranthene	<0.1 ug/L	56	20-140
Fluorene	<0.1 ug/L	46	20-140
Indeno(1,2,3-c,d)pyrene	<0.1 ug/L	66	20-140
Naphthalene	<0.1 ug/L	44	20-140
Phenanthrene	<0.1 ug/L	52	20-140
Pyrene	<0.1 ug/L	56	20-140
Run No 249460	Analysis Date 2013-04-26	Method O.C.M.E.	
F2 (C10-C16)	<0.1 mg/L	93	50-120
F3 (C16-C34)	<0.2 mg/L	93	50-120
F4 (C34-C50)	<0.2 mg/L	93	50-120
Run No 249466	Analysis Date 2013-04-26	Method C.S.M4500-PF	
PO4 as P	<0.01 mg/L	99	99-141
Run No 249467	Analysis Date 2013-04-25	Method SM 2320B	
Alkalinity as CaCO3	<5 mg/L	100	95-105
Conductivity	<5 uS/cm	99	95-105
F	<0.10 mg/L	101	90-110

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Client: Golder Associates
 121 Commerce Park Drive Unit L
 Barrie, ON
 L4N 8X1

Attention: Ms. Christl Groves
PO#: PO25698

Invoice to: The City of Barrie - Finance Dept.

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Date Submitted: 2013-04-24
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Project: 11-1170-0043
COC #: 762319

QC Summary

Analyte	Blank	QC % Rec	QC Limits
pH	5.84	100	90-110
Run No 249481 Analysis Date 2013-04-24 Method V 8260B			
2-Hexanone (MBK)	<10 ug/L	115	80-120
Acetone	<50 ug/L	87	80-120
Bromomethane		84	70-130
m,p-xylene		95	80-120
Methyl Ethyl Ketone (MEK)	<10 ug/L	97	80-120
Methyl Isobutyl Ketone (MIBK)	<10 ug/L	103	80-120
Methyl Tert Butyl Ether (MTBE)	<10 ug/L	110	80-120
Run No 249486 Analysis Date 2013-04-25 Method SM 4110C			
Br	<0.025 mg/L	98	90-110
Cl	<1 mg/L	101	90-112
SO4	<3 mg/L	101	90-110
Run No 249491 Analysis Date 2013-04-26 Method C SM5530D			
Phenols	<0.001 mg/L	93	73-127
Run No 249508 Analysis Date 2013-04-26 Method M SM3120B-3500C			
Cr	<0.005 mg/L	95	92-108

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Client: Golder Associates
 121 Commerce Park Drive Unit L
 Barrie, ON
 L4N 8X1

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 Date Submitted: 2013-04-24
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 Project: 11-1170-0043
 COC #: 762319

QC Summary

Analyte	Blank	QC % Rec	QC Limits
V	<0.005 mg/L	93	92-108
Run No 249535 Analysis Date 2013-04-26 Method M SM3120B-3500C			
Ca	<1 mg/L	98	80-120
K	<1 mg/L	102	80-120
Mg	<1 mg/L	97	80-120
Na	<2 mg/L	102	80-120
Run No 249543 Analysis Date 2013-04-29 Method G SM4500-NH3D			
NH3	<0.02 mg/L	96	85-115
Run No 249545 Analysis Date 2013-04-26 Method SM 4110C			
Br	<0.25 mg/L	99	90-110
Cl	<1 mg/L	101	90-112
SO4	<3 mg/L	99	90-110
Run No 249549 Analysis Date 2013-04-27 Method P 8270			
1-methylnaphthalene	<0.1 ug/L	44	20-140
2-methylnaphthalene	<0.1 ug/L	44	20-140
Acenaphthene	<0.1 ug/L	46	20-140
Acenaphthylene	<0.1 ug/L	44	20-140

Guideline = ODWSOG
 * = Guideline Exceedence
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 Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum
 Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality
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Client: Golder Associates
 121 Commerce Park Drive Unit L
 Barrie, ON
 L4N 8X1
 Attention: Ms. Christl Groves
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Report Number: 1307216
 Date Submitted: 2013-04-24
 Date Reported: 2013-05-09
 Project: 11-1170-0043
 COC #: 762319

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Anthracene	<0.1 ug/L	48	20-140
Benzo(a)anthracene	<0.1 ug/L	54	20-140
Benzo(a)pyrene	<0.01 ug/L	49	20-140
Benzo(b)fluoranthene	<0.05 ug/L	57	20-140
Benzo(g,h,i)perylene	<0.1 ug/L	54	20-140
Benzo(k)fluoranthene	<0.05 ug/L	97	20-140
Chrysene	<0.05 ug/L	51	20-140
Dibenzo(a,h)anthracene	<0.1 ug/L	50	20-140
Fluoranthene	<0.1 ug/L	56	20-140
Fluorene	<0.1 ug/L	46	20-140
Indeno(1,2,3-c,d)pyrene	<0.1 ug/L	66	20-140
Naphthalene	<0.1 ug/L	44	20-140
Phenanthrene	<0.1 ug/L	52	20-140
Pyrene	<0.1 ug/L	56	20-140
Run No 249550	Analysis Date 2013-04-27	Method SM 2320B	
Alkalinity as CaCO3	<5 mg/L	100	95-105
Run No 249565	Analysis Date 2013-04-29	Method M SM3120B-3500C	

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Client: Golder Associates
 121 Commerce Park Drive Unit L
 Barrie, ON
 L4N 8X1

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Project: 11-1170-0043
COC #: 762319

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Ca	<1 mg/L	93	80-120
Na	<8 mg/L	96	80-120
Run No 249597 Analysis Date 2013-04-30 Method C SM5530D			
Phenols	<0.001 mg/L	95	73-127
Run No 249601 Analysis Date 2013-04-29 Method EPA 200.8			
Ag	<0.0001 mg/L	94	89-111
As	<0.001 mg/L	99	81-119
B	<0.01 mg/L	96	81-119
Ba	<0.01 mg/L	97	91-109
Be	<0.0005 mg/L	98	82-118
Cd	<0.0001 mg/L	96	86-114
Co	<0.0002 mg/L	99	88-112
Cr	<0.001 mg/L	103	89-111
Cu	<0.001 mg/L	98	86-114
Fe	<0.03 mg/L	103	88-112
Mn	<0.005 mg/L	100	84-116
Ni	<0.005 mg/L	101	92-108

* = Guideline Exceedence

Y

Guideline = ODWSOG

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Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective.



Client: Golder Associates
121 Commerce Park Drive Unit L
Barrie, ON
L4N 8X1

Attention: Ms. Christy Groves
PO#: PO25698

Invoice to: The City of Barrie - Finance Dept.

Report Number: 1307216
Date Submitted: 2013-04-24
Date Reported: 2013-05-09
Project: 11-1170-0043
COC #: 762319

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Pb	<0.001 mg/L	96	89-111
Se	<0.001 mg/L	100	77-123
Tl	<0.0001 mg/L	95	88-112
U	<0.001 mg/L	97	87-113
V	<0.001 mg/L	100	88-112
Zn	<0.01 mg/L	96	89-111
Run No 249645 Analysis Date 2013-04-30 Method C SM5530D			
Phenols	<0.001 mg/L	99	73-127
Run No 249650 Analysis Date 2013-04-30 Method EPA 200.8			
Ag	<0.0001 mg/L	93	89-111
As	<0.01 mg/L	96	81-119
B	<0.01 mg/L	86	81-119
Ba	<0.01 mg/L	99	91-109
Be	<0.0005 mg/L	97	82-118
Cd	<0.0001 mg/L	92	86-114
Co	<0.0002 mg/L	95	88-112
Cr	<0.001 mg/L	100	89-111

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Report Number: 1307216
 Date Submitted: 2013-04-24
 Date Reported: 2013-05-09
 Project: 11-1170-0043
 COC #: 762319

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Cu	<0.001 mg/L	95	86-114
Fe	<0.3 mg/L	108	88-112
Mn	<0.005 mg/L	101	84-116
Ni	<0.005 mg/L	94	92-108
Pb	<0.001 mg/L	97	89-111
Sb	<0.005 mg/L	98	77-123
Se	<0.01 mg/L	99	77-123
Tl	<0.001 mg/L	96	88-112
U	<0.001 mg/L	95	87-113
V	<0.001 mg/L	95	88-112
Zn	<0.01 mg/L	94	89-111
Run No 249653	Analysis Date 2013-04-30	Method G SMA500-NH3E	
NH3	<2.0 mg/L	96	90-110
Run No 249665	Analysis Date 2013-04-30	Method O C3ME	
F1 (C6-C10)	<0.1 mg/L	94	80-120
Run No 249671	Analysis Date 2013-04-30	Method SM 4110C	
Ca	<1 mg/L	99	90-110

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Date Reported: 2013-05-09
Project: 11-1170-0043
COC #: 762319

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Run No 249677	Analysis Date 2013-04-30	Method C SM4500-CNC	
Cyanide (free)	<0.005 mg/L	79	75-125
Run No 249699	Analysis Date 2013-05-01	Method C SM5530D	
Phenols	<0.001 mg/L	106	78-127
Run No 249746	Analysis Date 2013-05-01	Method M SM3120B-3500C	
Cr	<0.005 mg/L	102	92-108
Run No 249750	Analysis Date 2013-05-01	Method M SM8120B-3500C	
Ca	<1 mg/L	98	80-120
Na	<2 mg/L	106	80-120
Run No 249799	Analysis Date 2013-05-02	Method SUBCONTRACT-HH-NORG	
Cr(III)			
Cr(VI)			

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 COC #: 762319

Sample Comment Summary

Sample ID: 1022308	MW-B1	Phenols MRL elevated due to matrix interference (dilution was done). Samples were subcontracted for Cr(VI) and Cr III analysis for entire report.
Sample ID: 1022309	MW-B2	Due to matrix interference 5x dilution factor required for PAHs.
Sample ID: 1022310	MW-B22	Arsenic MRL elevated due to matrix interference (dilution was done).
Sample ID: 1022312	MW-B4	Arsenic MRL elevated due to matrix interference (dilution was done).
Sample ID: 1022313	MW-B5	Arsenic MRL elevated due to matrix interference (dilution was done). Phenols MRL elevated due to matrix interference (dilution was done).
Sample ID: 1022314	MW-B6	Selenium MRL elevated due to matrix interference (dilution was done). Phenols MRL elevated due to matrix interference (dilution was done).
Sample ID: 1022315	MW-B7	Arsenic MRL elevated due to matrix interference (dilution was done). Phenols MRL elevated due to matrix interference (dilution was done).
Sample ID: 1022317	MW-B1	Phenols MRL elevated due to matrix interference (dilution was done).
Sample ID: 1022318	MW-D2	Phenols MRL elevated due to matrix interference (dilution was done).
Sample ID: 1022319	MW-B3	Arsenic and Selenium MRL elevated due to matrix interference (dilution was done).
Sample ID: 1022322	MW-D6	Arsenic and Selenium MRL elevated due to matrix interference (dilution was done).
Sample ID: 1022323	MW-B7	Phenols MRL elevated due to matrix interference (dilution was done).

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 COC #: 762319

Petroleum Hydrocarbons - CCME Checklist

Samples were analysed by Exova Ottawa Method AMCCME2, "Petroleum Hydrocarbons in Water and Soil, CCME/TPH". This method complies with the reference method for the CCME CWS PHC and is validated for use in the laboratory. Exova Ottawa is accredited by CALA (ISO 17025) for all CCME F1-F4 fractions as listed in this report. Data for QC samples (blank, duplicate, spike) are available on request.

Holding/Analysis Times	Yes/No		if NO, then reasons
	Yes	No	
All fractions analyzed within recommended hold times/analysis times?	Yes		
F1			
nC6 and nC10 response factors within 30% of toluene	Yes		
BTEX was subtracted from F1 fraction	Yes		
if YES, was F1-BTEX (C6-C10) reported	Yes		
F2			
nC10, nC16 and nC34 response factors within 10% of their average (F2-F4)	Yes		
Linearity within 15% (F2-F4)	Yes		
Naphthalene was subtracted from F2 fraction	No		Naphthalene (PAH) not requested/analysed
if YES was F2-Naphthalene reported			
F3			
PAH (selected compounds) subtracted from F3 fraction	No		PAH not requested/analysed
if YES was F3-PAH reported			
F4			
C50 response factor within 70% of nC10+nC16+nC34 average	Yes		
Chromatogram descended to baseline by retention time of C50	Yes		
if NO was F4 (C34-C50) gravimetric reported			

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APPENDIX F

Laboratory Certificates of Analysis – Surface Water



E3 Laboratories Inc.
 SS#4, 360 York Rd., Unit 10, Niagara-on-the-Lake, Ontario L0S 1J0
 Email: info@e3labs.ca
 Tel: (905) 641-9000, Fax: (905) 641-9001

CERTIFICATE OF ANALYSIS

Golder Associates Ltd.
 Christi Groves
 121 Commerce Park Drive, Unit L
 Barrie
 L4N 8X1
 Tel: 705-722-4492

Fax:
 Email: cgroves@golder.com

Work Order No.:2514382
 Received : 2013-12-12
 PO Number:
 Reported: 2014-01-13
 Project Name: C of B-Historic Waste Sites
 Chain of Custody No.: 11776

Note: Re-issued to include revised subcontracted report. (Originally reported December 19, 2013)

Client Sample ID	Sample		Parameter	Result	Unit	RDL	Date		Method
	Date	Lab ID					Analyzed		
Trip Blank	2013-12-05	352827	VOC Scan	See	Attached	N/A	2013-12-16		Subcontracted
Field Blank 1	2013-12-10	352828	Alkalinity (CaCO3)	<2.00	mg/LCaCO3	2.00	2013-12-12		APHA 2320B mod
			Ammonia (Total)	<0.03	mg/L	0.03	2013-12-18		APHA 4500
			Anions	See	Attached	N/A	2013-12-13		Subcontracted
			Conductivity	2.0	uS/cm	N/A	2013-12-13		APHA 2510
			Cyanide (Free)	See	Attached	N/A	2013-12-18		Subcontracted
			F1-F4 PHC	See	Attached	N/A	2013-12-16		Subcontracted
			Metals	See	Attached	N/A	2013-12-18		Subcontracted
			PAHs	See	Attached	N/A	2013-12-16		Subcontracted
			pH	5.96	SU	N/A	2013-12-12		APHA 4500 A,B MOD
			Phenolics	<0.004	mg/L	0.004	2013-12-13		HACH 8047
VOC Scan	See	Attached	N/A	2013-12-16		Subcontracted			
Field Blank 2	2013-12-11	352829	Alkalinity (CaCO3)	<2.00	mg/LCaCO3	2.00	2013-12-12		APHA 2320B mod
			Ammonia (Total)	<0.03	mg/L	0.03	2013-12-18		APHA 4500
			Anions	See	Attached	N/A	2013-12-13		Subcontracted
			Conductivity	1.8	uS/cm	N/A	2013-12-13		APHA 2510
			Cyanide (Free)	See	Attached	N/A	2013-12-18		Subcontracted
			F1-F4 PHC	See	Attached	N/A	2013-12-16		Subcontracted
			Metals	See	Attached	N/A	2013-12-18		Subcontracted
			PAHs	See	Attached	N/A	2013-12-16		Subcontracted
			pH	5.01	SU	N/A	2013-12-12		APHA 4500 A,B MOD
			Phenolics	<0.004	mg/L	0.004	2013-12-13		HACH 8047
VOC Scan	See	Attached	N/A	2013-12-16		Subcontracted			

Reported by:

 Nilou Ghazi, Ph.D.,P.Eng.
 Laboratory Manager

All work has been performed using accepted testing methodologies, except where otherwise agreed to by the client in writing. Our total liability in connection with this work shall be limited to the amount paid by the client. Results relate only to items tested.



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 SS#4, 360 York Rd., Unit 10, Niagara-on-the-Lake, Ontario L0S 1J0
 Email: info@e3labs.ca
 Tel: (905) 641-9000, Fax: (905) 641-9001

CERTIFICATE OF ANALYSIS

Golder Associates Ltd.
 Christi Groves
 121 Commerce Park Drive, Unit L
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 L4N 8X1
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Fax:
 Email: cgroves@golder.com

Work Order No.:2514382
 Received : 2013-12-12
 PO Number:
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 Project Name: C of B-Historic Waste Sites
 Chain of Custody No.: 11776

Client Sample ID	Sample		Parameter	Result	Unit	Date		Method
	Date	Lab ID				RDL	Analyzed	

Reported by:

 Nilou Ghazi, Ph.D.,P.Eng.
 Laboratory Manager

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	Date	Lab ID	Parameter			RDL	Analyzed	

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	Date	Lab ID				RDL	Analyzed	
SW B1	2013-12-10	352848	Alkalinity (CaCO3)	279	mg/LCaCO3	2.00	2013-12-12	APHA 2320B mod
			Ammonia (Total)	0.96	mg/L	0.03	2013-12-18	APHA 4500
			Chloride	467	mg/L	0.25	2013-12-18	HACH 8113
			Conductivity	2110	uS/cm	N/A	2013-12-13	APHA 2510
			F1-F4 PHC	See	Attached	N/A	2013-12-16	Subcontracted
			Metals	See	Attached	N/A	2013-12-18	Subcontracted
			PAHs	See	Attached	N/A	2013-12-16	Subcontracted
			pH	7.68	SU	N/A	2013-12-12	APHA 4500 A.B MOD
			Sulfate (SO4)	30	mg/L	10	2013-12-13	HACH 8051
			VOC Scan	See	Attached	N/A	2013-12-16	Subcontracted
SW B2	2013-12-10	352849	Alkalinity (CaCO3)	302	mg/LCaCO3	2.00	2013-12-12	APHA 2320B mod
			Ammonia (Total)	0.66	mg/L	0.03	2013-12-18	APHA 4500
			Chloride	478	mg/L	0.25	2013-12-18	HACH 8113
			Conductivity	2130	uS/cm	N/A	2013-12-13	APHA 2510
			F1-F4 PHC	See	Attached	N/A	2013-12-16	Subcontracted

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	Date	Lab ID					Analyzed		
SW B2	2013-12-10	352849	Metals	See	Attached	N/A	2013-12-18	Subcontracted	
			PAHs	See	Attached	N/A	2013-12-16	Subcontracted	
			pH	7.70	SU	N/A	2013-12-12	APHA 4500 A,B MOD	
			Sulfate (SO4)	40	mg/L	10	2013-12-13	HACH 8051	
			VOC Scan	See	Attached	N/A	2013-12-16	Subcontracted	
SW B3	2013-12-10	352850	Alkalinity (CaCO3)	292	mg/LCaCO3	2.00	2013-12-12	APHA 2320B mod	
			Ammonia (Total)	0.56	mg/L	0.03	2013-12-18	APHA 4500	
			Chloride	522	mg/L	0.25	2013-12-18	HACH 8113	
			Conductivity	2300	uS/cm	N/A	2013-12-13	APHA 2510	
			F1-F4 PHC	See	Attached	N/A	2013-12-16	Subcontracted	
			Metals	See	Attached	N/A	2013-12-18	Subcontracted	
			PAHs	See	Attached	N/A	2013-12-16	Subcontracted	
			pH	7.66	SU	N/A	2013-12-12	APHA 4500 A,B MOD	
			Sulfate (SO4)	40	mg/L	10	2013-12-13	HACH 8051	
			VOC Scan	See	Attached	N/A	2013-12-16	Subcontracted	
SW B4	2013-12-10	352851	Alkalinity (CaCO3)	295	mg/LCaCO3	2.00	2013-12-12	APHA 2320B mod	
			Ammonia (Total)	0.51	mg/L	0.03	2013-12-18	APHA 4500	
			Chloride	505	mg/L	0.25	2013-12-18	HACH 8113	
			Conductivity	2310	uS/cm	N/A	2013-12-13	APHA 2510	
			F1-F4 PHC	See	Attached	N/A	2013-12-16	Subcontracted	
			Metals	See	Attached	N/A	2013-12-18	Subcontracted	
			PAHs	See	Attached	N/A	2013-12-16	Subcontracted	
			pH	7.73	SU	N/A	2013-12-12	APHA 4500 A,B MOD	
			Sulfate (SO4)	40	mg/L	10	2013-12-13	HACH 8051	
			VOC Scan	See	Attached	N/A	2013-12-16	Subcontracted	
SW B5	2013-12-10	352852	Alkalinity (CaCO3)	298	mg/LCaCO3	2.00	2013-12-12	APHA 2320B mod	
			Ammonia (Total)	0.25	mg/L	0.03	2013-12-18	APHA 4500	
			Chloride	469	mg/L	0.25	2013-12-18	HACH 8113	
			Conductivity	2260	uS/cm	N/A	2013-12-13	APHA 2510	
			F1-F4 PHC	See	Attached	N/A	2013-12-16	Subcontracted	
			Metals	See	Attached	N/A	2013-12-18	Subcontracted	
			PAHs	See	Attached	N/A	2013-12-16	Subcontracted	
			pH	7.78	SU	N/A	2013-12-12	APHA 4500 A,B MOD	
			Sulfate (SO4)	40	mg/L	10	2013-12-13	HACH 8051	

Reported by:

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 Laboratory Manager

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 Email: cgroves@golder.com

Work Order No.:2514382
 Received : 2013-12-12
 PO Number:
 Reported: 2014-01-13
 Project Name: C of B-Historic Waste Sites
 Chain of Custody No.: 11776

Client Sample ID	Sample			Result	Unit	RDL	Date	
	Date	Lab ID	Parameter				Analyzed	Method
SW B5	2013-12-10	352852	VOC Scan	See	Attached	N/A	2013-12-16	Subcontracted

Reported by:

 Nilou Ghazi, Ph.D.,P.Eng.
 Laboratory Manager

All work has been performed using accepted testing methodologies, except where otherwise agreed to by the client in writing. Our total liability in connection with this work shall be limited to the amount paid by the client.
 Results relate only to items tested.



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 Email: info@e3labs.ca
 Tel: (905) 641-9000, Fax: (905) 641-9001

CERTIFICATE OF ANALYSIS

Golder Associates Ltd.
 Christi Groves
 121 Commerce Park Drive, Unit L
 Barrie
 L4N 8X1
 Tel: 705-722-4492

Fax:
 Email: cgroves@golder.com

Work Order No.:2514382
 Received : 2013-12-12
 PO Number:
 Reported: 2014-01-13
 Project Name: C of B-Historic Waste Sites
 Chain of Custody No.: 11776

Client Sample ID	Sample		Parameter	Result	Unit	RDL	Date		Method
	Date	Lab ID					Analyzed		

Reported by:

 Nilou Ghazi, Ph.D.,P.Eng.
 Laboratory Manager

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Work Order No.:2514382
 Received : 2013-12-12
 PO Number:
 Reported: 2014-01-13
 Project Name:
 Chain of Custody No.:

Client Sample ID	Sample		Parameter	Result	Unit	Date		Method
	Date	Lab ID				RDL	Analyzed	

Reported by:

 Nilou Ghazi, Ph.D.,P.Eng.
 Laboratory Manager

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 Results relate only to items tested.



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Certificate of Analysis

E-3 Laboratories Inc.

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Niagara-on-the-Lake, ON L0S 1J0
Attn: Kristy LeBrasseur

Phone: (905) 641-9000
Fax: (905) 641-9001

Client PO: 2514382
Project: City of Barrie
Custody:

Report Date: 13-Jan-2014
Order Date: 12-Dec-2013
Revised Report **Order #: 1350281**

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

Paracel ID	Client ID
1350281-01	352827 - Trip Blank
1350281-02	352828 - Field Blank 1
1350281-03	352829 - Field Blank 2

1350281-22	352848 - SW B1
1350281-23	352849 - SW B2
1350281-24	352850 - SW B3
1350281-25	352851 - SW B4
1350281-26	352852 - SW B5

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 Analysis

Client: **E-3 Laboratories Inc.**
Client PO: 2514382

Project Description: **City of Barrie**

Report Date: 13-Jan-2013
Order Date: 12-Dec-2012

Certificate of Analysis

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

Report Date: 13-Jan-2014
Order Date: 12-Dec-2013

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Anions	EPA 300.1 - IC	13-Dec-13	13-Dec-13
Chromium, hexavalent	MOE E3056 - colourimetric	13-Dec-13	13-Dec-13
Chromium, trivalent	Calculation	18-Dec-13	18-Dec-13
Cyanide, free	MOE E3015 - Auto Colour	17-Dec-13	18-Dec-13
Hardness	Hardness	19-Dec-13	19-Dec-13
Hardness	Hardness as CaCO3	18-Dec-13	19-Dec-13
Mercury	EPA 245.1 - Cold Vapour AA	16-Dec-13	16-Dec-13
Mercury, dissolved	EPA 245.2 - CVAA	16-Dec-13	16-Dec-13
Metals, ICP-MS	EPA 200.8 - ICP-MS	18-Dec-13	18-Dec-13
PAHs by GC-MS	EPA 625 - GC-MS, extraction	16-Dec-13	17-Dec-13
PHC F1	CWS Tier 1 - P&T GC-FID	16-Dec-13	16-Dec-13
PHC F2 - F4	CWS Tier 1 - GC-FID, extraction	13-Dec-13	13-Dec-13
VOCs by P&T GC-MS	EPA 624 - P&T GC-MS	16-Dec-13	16-Dec-13

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Certificate of Analysis

Report Date: 13-Jan-2013
Order Date: 12-Dec-2012

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

Client ID:	352827 - Trip Blank	352828 - Field Blank 1	352829 - Field Blank 2
Sample Date:	05-Dec-13	10-Dec-13	11-Dec-13
Sample ID:	1350281-01	1350281-02	1350281-03
MDL/Units	Water	Water	Water

General Inorganics

Cyanide, free	2 ug/L	-	<2	<2
Hardness	1.0 mg/L	-	<1.0	<1.0

Anions

Bromide	0.1 mg/L	-	<0.1	<0.1
Chloride	1 mg/L	-	<1	<1
Fluoride	0.1 mg/L	-	<0.1	<0.1
Nitrate as N	0.1 mg/L	-	<0.1	<0.1
Nitrite as N	0.05 mg/L	-	<0.05	<0.05
Phosphate as P	1 mg/L	-	<1	<1
Sulphate	1 mg/L	-	<1	<1

Metals

Mercury	0.1 ug/L	-	<0.1	0.1
Antimony	0.5 ug/L	-	<0.5	<0.5
Arsenic	1 ug/L	-	<1	<1
Barium	1 ug/L	-	<1	<1
Beryllium	0.5 ug/L	-	<0.5	<0.5
Boron	10 ug/L	-	<10	<10
Cadmium	0.1 ug/L	-	<0.1	<0.1
Calcium	100 ug/L	-	<100	<100
Chromium	1 ug/L	-	<1	<1
Chromium (III)	10 ug/L	-	<10	<10
Chromium (VI)	10 ug/L	-	<10	<10
Cobalt	0.5 ug/L	-	<0.5	<0.5
Copper	0.5 ug/L	-	<0.5	<0.5
Iron	100 ug/L	-	<100	<100
Lead	0.1 ug/L	-	<0.1	<0.1
Magnesium	200 ug/L	-	<200	<200
Molybdenum	0.5 ug/L	-	<0.5	<0.5
Nickel	1 ug/L	-	<1	<1
Potassium	100 ug/L	-	<100	<100
Selenium	1 ug/L	-	<1	<1
Silver	0.1 ug/L	-	<0.1	<0.1
Sodium	200 ug/L	-	<200	<200

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Certificate of Analysis

Report Date: 13-Jan-2014
Order Date: 12-Dec-2013

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

	Client ID:	352827 - Trip Blank	352828 - Field Blank 1	352829 - Field Blank 2
	Sample Date:	05-Dec-13	10-Dec-13	11-Dec-13
	Sample ID:	1350281-01	1350281-02	1350281-03
	MDL/Units	Water	Water	Water
Thallium	0.1 ug/L	-	<0.1	<0.1
Uranium	0.1 ug/L	-	<0.1	<0.1
Vanadium	0.5 ug/L	-	<0.5	<0.5
Zinc	5 ug/L	-	<5	<5

Volatiles

	MDL/Units	<5.0 [2]	<5.0	<5.0
Acetone	5.0 ug/L	<5.0 [2]	<5.0	<5.0
Benzene	0.5 ug/L	<0.5 [2]	<0.5	<0.5
Bromodichloromethane	0.5 ug/L	<0.5 [2]	<0.5	<0.5
Bromoform	0.5 ug/L	<0.5 [2]	<0.5	<0.5
Bromomethane	0.5 ug/L	<0.5 [2]	<0.5	<0.5
Carbon Tetrachloride	0.2 ug/L	<0.2 [2]	<0.2	<0.2
Chlorobenzene	0.5 ug/L	<0.5 [2]	<0.5	<0.5
Chloroethane	1.0 ug/L	<1.0 [2]	<1.0	<1.0
Chloroform	0.5 ug/L	<0.5 [2]	<0.5	<0.5
Chloromethane	3.0 ug/L	<3.0 [2]	<3.0	<3.0
Dibromochloromethane	0.5 ug/L	<0.5 [2]	<0.5	<0.5
Dichlorodifluoromethane	1.0 ug/L	<1.0 [2]	<1.0	<1.0
1,2-Dibromoethane	0.2 ug/L	<0.2 [2]	<0.2	<0.2
1,2-Dichlorobenzene	0.5 ug/L	<0.5 [2]	<0.5	<0.5
1,3-Dichlorobenzene	0.5 ug/L	<0.5 [2]	<0.5	<0.5
1,4-Dichlorobenzene	0.5 ug/L	<0.5 [2]	<0.5	<0.5
1,1-Dichloroethane	0.5 ug/L	<0.5 [2]	<0.5	<0.5
1,2-Dichloroethane	0.5 ug/L	<0.5 [2]	<0.5	<0.5
1,1-Dichloroethylene	0.5 ug/L	<0.5 [2]	<0.5	<0.5
cis-1,2-Dichloroethylene	0.5 ug/L	<0.5 [2]	<0.5	<0.5
trans-1,2-Dichloroethylene	0.5 ug/L	<0.5 [2]	<0.5	<0.5
1,2-Dichloroethylene, total	0.5 ug/L	<0.5 [2]	<0.5	<0.5
1,2-Dichloropropane	0.5 ug/L	<0.5 [2]	<0.5	<0.5
cis-1,3-Dichloropropylene	0.5 ug/L	<0.5 [2]	<0.5	<0.5
trans-1,3-Dichloropropylene	0.5 ug/L	<0.5 [2]	<0.5	<0.5
1,3-Dichloropropene, total	0.5 ug/L	<0.5 [2]	<0.5	<0.5
Ethylbenzene	0.5 ug/L	<0.5 [2]	<0.5	<0.5
Hexane	1.0 ug/L	<1.0 [2]	<1.0	<1.0

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Certificate of Analysis

Client: E-3 Laboratories Inc.
Client PO: 2514382

Report Date: 13-Jan-2013
Order Date: 12-Dec-2012

Project Description: City of Barrie

	MDL/Units	Client ID:	352827 - Trip Blank	352828 - Field Blank 1	352829 - Field Blank 2
		Sample Date:	05-Dec-13	10-Dec-13	11-Dec-13
		Sample ID:	1350281-01	1350281-02	1350281-03
		Water	Water	Water	
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	<5.0 [2]	<5.0	<5.0	
Methyl Butyl Ketone (2-Hexanone)	10.0 ug/L	<10.0 [2]	<10.0	<10.0	
Methyl Isobutyl Ketone	5.0 ug/L	<5.0 [2]	<5.0	<5.0	
Methyl tert-butyl ether	2.0 ug/L	<2.0 [2]	<2.0	<2.0	
Methylene Chloride	5.0 ug/L	<5.0 [2]	<5.0	<5.0	
Styrene	0.5 ug/L	<0.5 [2]	<0.5	<0.5	
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5 [2]	<0.5	<0.5	
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5 [2]	<0.5	<0.5	
Tetrachloroethylene	0.5 ug/L	<0.5 [2]	<0.5	<0.5	
Toluene	0.5 ug/L	<0.5 [2]	<0.5	<0.5	
1,2,4-Trichlorobenzene	0.5 ug/L	<0.5 [2]	<0.5	<0.5	
1,1,1-Trichloroethane	0.5 ug/L	<0.5 [2]	<0.5	<0.5	
1,1,2-Trichloroethane	0.5 ug/L	<0.5 [2]	<0.5	<0.5	
Trichloroethylene	0.5 ug/L	<0.5 [2]	<0.5	<0.5	
Trichlorofluoromethane	1.0 ug/L	<1.0 [2]	<1.0	<1.0	
1,3,5-Trimethylbenzene	0.5 ug/L	<0.5 [2]	<0.5	<0.5	
Vinyl chloride	0.5 ug/L	<0.5 [2]	<0.5	<0.5	
m,p-Xylenes	0.5 ug/L	<0.5 [2]	<0.5	<0.5	
o-Xylene	0.5 ug/L	<0.5 [2]	<0.5	<0.5	
Xylenes, total	0.5 ug/L	<0.5 [2]	<0.5	<0.5	
4-Bromofluorobenzene	Surrogate	91.7% [2]	92.2%	93.5%	
Dibromofluoromethane	Surrogate	104% [2]	103%	105%	
Toluene-d8	Surrogate	108% [2]	109%	109%	
Hydrocarbons					
F1 PHCs (C6-C10)	25.0 ug/L	-	<25.0	<25.0	
F2 PHCs (C10-C16)	100 ug/L	-	<100	<100	
F3 PHCs (C16-C34)	100 ug/L	-	<100	<100	
F4 PHCs (C34-C50)	100 ug/L	-	<100	<100	
F1 + F2 PHCs	125 ug/L	-	<125	<125	
F3 + F4 PHCs	200 ug/L	-	<200	<200	
Semi-Volatiles					
Acenaphthene	0.05 ug/L	-	<0.05	<0.05	
Acenaphthylene	0.05 ug/L	-	<0.05	<0.05	
Anthracene	0.01 ug/L	-	<0.01	<0.01	

Certificate of Analysis

Report Date: 13-Jan-2014

Order Date: 12-Dec-2013

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

	Client ID:	352827 - Trip Blank	352828 - Field Blank 1	352829 - Field Blank 2
	Sample Date:	05-Dec-13	10-Dec-13	11-Dec-13
	Sample ID:	1350281-01	1350281-02	1350281-03
	MDL/Units	Water	Water	Water
Benzo [a] anthracene	0.01 ug/L	-	<0.01	<0.01
Benzo [a] pyrene	0.01 ug/L	-	<0.01	<0.01
Benzo [b] fluoranthene	0.05 ug/L	-	<0.05	<0.05
Benzo [g,h,i] perylene	0.05 ug/L	-	<0.05	<0.05
Benzo [k] fluoranthene	0.05 ug/L	-	<0.05	<0.05
Biphenyl	0.05 ug/L	-	<0.05	<0.05
Chrysene	0.05 ug/L	-	<0.05	<0.05
Dibenzo [a,h] anthracene	0.05 ug/L	-	<0.05	<0.05
Fluoranthene	0.01 ug/L	-	<0.01	<0.01
Fluorene	0.05 ug/L	-	<0.05	<0.05
Indeno [1,2,3-cd] pyrene	0.05 ug/L	-	<0.05	<0.05
1-Methylnaphthalene	0.05 ug/L	-	<0.05	<0.05
2-Methylnaphthalene	0.05 ug/L	-	<0.05	<0.05
Methylnaphthalene (1&2)	0.10 ug/L	-	<0.10	<0.10
Naphthalene	0.05 ug/L	-	<0.05	<0.05
Phenanthrene	0.05 ug/L	-	<0.05	<0.05
Pyrene	0.01 ug/L	-	<0.01	<0.01
2-Fluorobiphenyl	Surrogate	-	83.5%	82.4%
Terphenyl-d14	Surrogate	-	99.1%	97.5%

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Certificate of Analysis

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

Report Date: 13-Jan-20
Order Date: 12-Dec-20

Client ID:	
Sample Date:	
Sample ID:	
MDL/Units	

General Inorganics

Cyanide, free	2 ug/L
Hardness	1.0 mg/L

Anions

Bromide	0.1 mg/L
Chloride	1 mg/L
Fluoride	0.1 mg/L
Nitrate as N	0.1 mg/L
Nitrite as N	0.05 mg/L
Phosphate as P	1 mg/L
Sulphate	1 mg/L

Metals

Mercury	0.1 ug/L
Antimony	0.5 ug/L
Arsenic	1 ug/L
Barium	1 ug/L
Beryllium	0.5 ug/L
Boron	10 ug/L
Cadmium	0.1 ug/L
Calcium	100 ug/L
Chromium	1 ug/L
Chromium (III)	10 ug/L
Chromium (VI)	10 ug/L
Cobalt	0.5 ug/L
Copper	0.5 ug/L
Iron	100 ug/L
Lead	0.1 ug/L
Magnesium	200 ug/L
Molybdenum	0.5 ug/L
Nickel	1 ug/L
Potassium	100 ug/L
Selenium	1 ug/L
Silver	0.1 ug/L
Sodium	200 ug/L

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Certificate of Analysis

Client: E-3 Laboratories Inc.
Client PO: 2514382

Report Date: 13-Jan-2014
Order Date: 12-Dec-2013

Project Description: City of Barrie

	Client ID: Sample Date: Sample ID:
	MDL/Units
Thallium	0.1 ug/L
Uranium	0.1 ug/L
Vanadium	0.5 ug/L
Zinc	5 ug/L

Volatiles	
Acetone	5.0 ug/L
Benzene	0.5 ug/L
Bromodichloromethane	0.5 ug/L
Bromoform	0.5 ug/L
Bromomethane	0.5 ug/L
Carbon Tetrachloride	0.2 ug/L
Chlorobenzene	0.5 ug/L
Chloroethane	1.0 ug/L
Chloroform	0.5 ug/L
Chloromethane	3.0 ug/L
Dibromochloromethane	0.5 ug/L
Dichlorodifluoromethane	1.0 ug/L
1,2-Dibromoethane	0.2 ug/L
1,2-Dichlorobenzene	0.5 ug/L
1,3-Dichlorobenzene	0.5 ug/L
1,4-Dichlorobenzene	0.5 ug/L
1,1-Dichloroethane	0.5 ug/L
1,2-Dichloroethane	0.5 ug/L
1,1-Dichloroethylene	0.5 ug/L
cis-1,2-Dichloroethylene	0.5 ug/L
trans-1,2-Dichloroethylene	0.5 ug/L
1,2-Dichloroethylene, total	0.5 ug/L
1,2-Dichloropropane	0.5 ug/L
cis-1,3-Dichloropropylene	0.5 ug/L
trans-1,3-Dichloropropylene	0.5 ug/L
1,3-Dichloropropene, total	0.5 ug/L
Ethylbenzene	0.5 ug/L
Hexane	1.0 ug/L
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L

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Certificate of Analysis

Client: **E-3 Laboratories Inc.**
Client PO: 2514382

Project Description: **City of Barrie**

Report Date: 13-Jan-2013
Order Date: 12-Dec-2012

	Client ID:
	Sample Date:
	Sample ID:
	MDL/Units
Methyl Butyl Ketone (2-Hexanone)	10.0 ug/L
Methyl Isobutyl Ketone	5.0 ug/L
Methyl tert-butyl ether	2.0 ug/L
Methylene Chloride	5.0 ug/L
Styrene	0.5 ug/L
1,1,1,2-Tetrachloroethane	0.5 ug/L
1,1,2,2-Tetrachloroethane	0.5 ug/L
Tetrachloroethylene	0.5 ug/L
Toluene	0.5 ug/L
1,2,4-Trichlorobenzene	0.5 ug/L
1,1,1-Trichloroethane	0.5 ug/L
1,1,2-Trichloroethane	0.5 ug/L
Trichloroethylene	0.5 ug/L
Trichlorofluoromethane	1.0 ug/L
1,3,5-Trimethylbenzene	0.5 ug/L
Vinyl chloride	0.5 ug/L
m,p-Xylenes	0.5 ug/L
o-Xylene	0.5 ug/L
Xylenes, total	0.5 ug/L
4-Bromofluorobenzene	Surrogate
Dibromofluoromethane	Surrogate
Toluene-d8	Surrogate

Hydrocarbons

F1 PHCs (C6-C10)	25.0 ug/L
F2 PHCs (C10-C16)	100 ug/L
F3 PHCs (C16-C34)	100 ug/L
F4 PHCs (C34-C50)	100 ug/L
F1 + F2 PHCs	125 ug/L
F3 + F4 PHCs	200 ug/L

Semi-Volatiles

Acenaphthene	0.05 ug/L
Acenaphthylene	0.05 ug/L
Anthracene	0.01 ug/L
Benzo [a] anthracene	0.01 ug/L

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Niagara Falls, ON L2J 0A3

SARNIA
123 Christina St. N
Sarnia, ON N7T 6T7

Certificate of Analysis

Report Date: 13-Jan-2014
Order Date: 12-Dec-2013

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

	Client ID: Sample Date: Sample ID:
	MDL/Units
Benzo [a] pyrene	0.01 ug/L
Benzo [b] fluoranthene	0.05 ug/L
Benzo [g,h,i] perylene	0.05 ug/L
Benzo [k] fluoranthene	0.05 ug/L
Biphenyl	0.05 ug/L
Chrysene	0.05 ug/L
Dibenzo [a,h] anthracene	0.05 ug/L
Fluoranthene	0.01 ug/L
Fluorene	0.05 ug/L
Indeno [1,2,3-cd] pyrene	0.05 ug/L
1-Methylnaphthalene	0.05 ug/L
2-Methylnaphthalene	0.05 ug/L
Methylnaphthalene (1&2)	0.10 ug/L
Naphthalene	0.05 ug/L
Phenanthrene	0.05 ug/L
Pyrene	0.01 ug/L
2-Fluorobiphenyl	Surrogate
Terphenyl-d14	Surrogate

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123 Christine St. N.
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Certificate of Analysis

Report Date: 13-Jan-20
Order Date: 12-Dec-20

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

Client ID:	
Sample Date:	
Sample ID:	
MDL/Units	

General Inorganics

Cyanide, free	2 ug/L
Hardness	1.0 mg/L

Anions

Bromide	0.1 mg/L
Chloride	1 mg/L
Fluoride	0.1 mg/L
Nitrate as N	0.1 mg/L
Nitrite as N	0.05 mg/L
Phosphate as P	1 mg/L
Sulphate	1 mg/L

Metals

Mercury	0.1 ug/L
Antimony	0.5 ug/L
Arsenic	1 ug/L
Barium	1 ug/L
Beryllium	0.5 ug/L
Boron	10 ug/L
Cadmium	0.1 ug/L
Calcium	100 ug/L
Chromium	1 ug/L
Chromium (III)	10 ug/L
Chromium (VI)	10 ug/L
Cobalt	0.5 ug/L
Copper	0.5 ug/L
Iron	100 ug/L
Lead	0.1 ug/L
Magnesium	200 ug/L
Molybdenum	0.5 ug/L
Nickel	1 ug/L
Potassium	100 ug/L
Selenium	1 ug/L
Silver	0.1 ug/L
Sodium	200 ug/L

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Certificate of Analysis

Client: E-3 Laboratories Inc.
Client PO: 2514382

Report Date: 13-Jan-2014
Order Date: 12-Dec-2013

Project Description: City of Barrie

	Client ID: Sample Date: Sample ID:
	MDL/Units
Thallium	0.1 ug/L
Uranium	0.1 ug/L
Vanadium	0.5 ug/L
Zinc	5 ug/L

Volatiles	
Acetone	5.0 ug/L
Benzene	0.5 ug/L
Bromodichloromethane	0.5 ug/L
Bromoform	0.5 ug/L
Bromomethane	0.5 ug/L
Carbon Tetrachloride	0.2 ug/L
Chlorobenzene	0.5 ug/L
Chloroethane	1.0 ug/L
Chloroform	0.5 ug/L
Chloromethane	3.0 ug/L
Dibromochloromethane	0.5 ug/L
Dichlorodifluoromethane	1.0 ug/L
1,2-Dibromoethane	0.2 ug/L
1,2-Dichlorobenzene	0.5 ug/L
1,3-Dichlorobenzene	0.5 ug/L
1,4-Dichlorobenzene	0.5 ug/L
1,1-Dichloroethane	0.5 ug/L
1,2-Dichloroethane	0.5 ug/L
1,1-Dichloroethylene	0.5 ug/L
cis-1,2-Dichloroethylene	0.5 ug/L
trans-1,2-Dichloroethylene	0.5 ug/L
1,2-Dichloroethylene, total	0.5 ug/L
1,2-Dichloropropane	0.5 ug/L
cis-1,3-Dichloropropylene	0.5 ug/L
trans-1,3-Dichloropropylene	0.5 ug/L
1,3-Dichloropropene, total	0.5 ug/L
Ethylbenzene	0.5 ug/L
Hexane	1.0 ug/L
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L

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

Certificate of Analysis

Client: **E-3 Laboratories Inc.**
Client PO: 2514382

Project Description: **City of Barrie**

Report Date: 13-Jan-2011
Order Date: 12-Dec-2010

	Client ID: Sample Date: Sample ID: MDL/Units
Methyl Butyl Ketone (2-Hexanone)	10.0 ug/L
Methyl Isobutyl Ketone	5.0 ug/L
Methyl tert-butyl ether	2.0 ug/L
Methylene Chloride	5.0 ug/L
Styrene	0.5 ug/L
1,1,1,2-Tetrachloroethane	0.5 ug/L
1,1,2,2-Tetrachloroethane	0.5 ug/L
Tetrachloroethylene	0.5 ug/L
Toluene	0.5 ug/L
1,2,4-Trichlorobenzene	0.5 ug/L
1,1,1-Trichloroethane	0.5 ug/L
1,1,2-Trichloroethane	0.5 ug/L
Trichloroethylene	0.5 ug/L
Trichlorofluoromethane	1.0 ug/L
1,3,5-Trimethylbenzene	0.5 ug/L
Vinyl chloride	0.5 ug/L
m,p-Xylenes	0.5 ug/L
o-Xylene	0.5 ug/L
Xylenes, total	0.5 ug/L
4-Bromofluorobenzene	Surrogate
Dibromofluoromethane	Surrogate
Toluene-d8	Surrogate

Hydrocarbons

F1 PHCs (C6-C10)	25.0 ug/L
F2 PHCs (C10-C16)	100 ug/L
F3 PHCs (C16-C34)	100 ug/L
F4 PHCs (C34-C50)	100 ug/L
F1 + F2 PHCs	125 ug/L
F3 + F4 PHCs	200 ug/L

Semi-Volatiles

Acenaphthene	0.05 ug/L
Acenaphthylene	0.05 ug/L
Anthracene	0.01 ug/L
Benzo [a] anthracene	0.01 ug/L

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Certificate of Analysis

Client: **E-3 Laboratories Inc.**
Client PO: 2514382

Report Date: 13-Jan-2014
Order Date: 12-Dec-2013

Project Description: City of Barrie

	Client ID:
	Sample Date:
	Sample ID:
	MDL/Units
Benzo [a] pyrene	0.01 ug/L
Benzo [b] fluoranthene	0.05 ug/L
Benzo [g,h,i] perylene	0.05 ug/L
Benzo [k] fluoranthene	0.05 ug/L
Biphenyl	0.05 ug/L
Chrysene	0.05 ug/L
Dibenzo [a,h] anthracene	0.05 ug/L
Fluoranthene	0.01 ug/L
Fluorene	0.05 ug/L
Indeno [1,2,3-cd] pyrene	0.05 ug/L
1-Methylnaphthalene	0.05 ug/L
2-Methylnaphthalene	0.05 ug/L
Methylnaphthalene (1&2)	0.10 ug/L
Naphthalene	0.05 ug/L
Phenanthrene	0.05 ug/L
Pyrene	0.01 ug/L
2-Fluorobiphenyl	Surrogate
Terphenyl-d14	Surrogate

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Certificate of Analysis

Report Date: 13-Jan-201
Order Date: 12-Dec-201

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

Client ID:	
Sample Date:	
Sample ID:	
MDL/Units	

General Inorganics

Cyanide, free	2 ug/L
Hardness	1.0 mg/L

Anions

Bromide	0.1 mg/L
Chloride	1 mg/L
Fluoride	0.1 mg/L
Nitrate as N	0.1 mg/L
Nitrite as N	0.05 mg/L
Phosphate as P	1 mg/L
Sulphate	1 mg/L

Metals

Mercury	0.1 ug/L
Antimony	0.5 ug/L
Arsenic	1 ug/L
Barium	1 ug/L
Beryllium	0.5 ug/L
Boron	10 ug/L
Cadmium	0.1 ug/L
Calcium	100 ug/L
Chromium	1 ug/L
Chromium (III)	10 ug/L
Chromium (VI)	10 ug/L
Cobalt	0.5 ug/L
Copper	0.5 ug/L
Iron	100 ug/L
Lead	0.1 ug/L
Magnesium	200 ug/L
Molybdenum	0.5 ug/L
Nickel	1 ug/L
Potassium	100 ug/L
Selenium	1 ug/L
Silver	0.1 ug/L
Sodium	200 ug/L

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Certificate of Analysis

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

Report Date: 13-Jan-2014
Order Date: 12-Dec-2013

	Client ID: Sample Date: Sample ID:
	MDL/Units
Thallium	0.1 ug/L
Uranium	0.1 ug/L
Vanadium	0.5 ug/L
Zinc	5 ug/L
Volatiles	
Acetone	5.0 ug/L
Benzene	0.5 ug/L
Bromodichloromethane	0.5 ug/L
Bromoform	0.5 ug/L
Bromomethane	0.5 ug/L
Carbon Tetrachloride	0.2 ug/L
Chlorobenzene	0.5 ug/L
Chloroethane	1.0 ug/L
Chloroform	0.5 ug/L
Chloromethane	3.0 ug/L
Dibromochloromethane	0.5 ug/L
Dichlorodifluoromethane	1.0 ug/L
1,2-Dibromoethane	0.2 ug/L
1,2-Dichlorobenzene	0.5 ug/L
1,3-Dichlorobenzene	0.5 ug/L
1,4-Dichlorobenzene	0.5 ug/L
1,1-Dichloroethane	0.5 ug/L
1,2-Dichloroethane	0.5 ug/L
1,1-Dichloroethylene	0.5 ug/L
cis-1,2-Dichloroethylene	0.5 ug/L
trans-1,2-Dichloroethylene	0.5 ug/L
1,2-Dichloroethylene, total	0.5 ug/L
1,2-Dichloropropane	0.5 ug/L
cis-1,3-Dichloropropylene	0.5 ug/L
trans-1,3-Dichloropropylene	0.5 ug/L
1,3-Dichloropropene, total	0.5 ug/L
Ethylbenzene	0.5 ug/L
Hexane	1.0 ug/L
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L

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123 Christine St. N.
Sarnia, ON N7T 5T7

Certificate of Analysis

Report Date: 13-Jan-201

Order Date: 12-Dec-201

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

	Client ID:
	Sample Date:
	Sample ID:
	MDL/Units
Methyl Butyl Ketone (2-Hexanone)	10.0 ug/L
Methyl Isobutyl Ketone	5.0 ug/L
Methyl tert-butyl ether	2.0 ug/L
Methylene Chloride	5.0 ug/L
Styrene	0.5 ug/L
1,1,1,2-Tetrachloroethane	0.5 ug/L
1,1,2,2-Tetrachloroethane	0.5 ug/L
Tetrachloroethylene	0.5 ug/L
Toluene	0.5 ug/L
1,2,4-Trichlorobenzene	0.5 ug/L
1,1,1-Trichloroethane	0.5 ug/L
1,1,2-Trichloroethane	0.5 ug/L
Trichloroethylene	0.5 ug/L
Trichlorofluoromethane	1.0 ug/L
1,3,5-Trimethylbenzene	0.5 ug/L
Vinyl chloride	0.5 ug/L
m,p-Xylenes	0.5 ug/L
o-Xylene	0.5 ug/L
Xylenes, total	0.5 ug/L
4-Bromofluorobenzene	Surrogate
Dibromofluoromethane	Surrogate
Toluene-d8	Surrogate

Hydrocarbons

F1 PHCs (C6-C10)	25.0 ug/L
F2 PHCs (C10-C16)	100 ug/L
F3 PHCs (C16-C34)	100 ug/L
F4 PHCs (C34-C50)	100 ug/L
F1 + F2 PHCs	125 ug/L
F3 + F4 PHCs	200 ug/L

Semi-Volatiles

Acenaphthene	0.05 ug/L
Acenaphthylene	0.05 ug/L
Anthracene	0.01 ug/L
Benzo [a] anthracene	0.01 ug/L

Certificate of Analysis

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

Report Date: 13-Jan-2014
Order Date: 12-Dec-2013

	Client ID: Sample Date: Sample ID:
	MDL/Units
Benzo [a] pyrene	0.01 ug/L
Benzo [b] fluoranthene	0.05 ug/L
Benzo [g,h,i] perylene	0.05 ug/L
Benzo [k] fluoranthene	0.05 ug/L
Biphenyl	0.05 ug/L
Chrysene	0.05 ug/L
Dibenzo [a,h] anthracene	0.05 ug/L
Fluoranthene	0.01 ug/L
Fluorene	0.05 ug/L
Indeno [1,2,3-cd] pyrene	0.05 ug/L
1-Methylnaphthalene	0.05 ug/L
2-Methylnaphthalene	0.05 ug/L
Methylnaphthalene (1&2)	0.10 ug/L
Naphthalene	0.05 ug/L
Phenanthrene	0.05 ug/L
Pyrene	0.01 ug/L
2-Fluorobiphenyl	Surrogate
Terphenyl-d14	Surrogate

Certificate of Analysis

Report Date: 13-Jan-2011
Order Date: 12-Dec-2010

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

Client ID:	
Sample Date:	
Sample ID:	
MDL/Units	

General Inorganics

Cyanide, free	2 ug/L
Hardness	1.0 mg/L

Anions

Bromide	0.1 mg/L
Chloride	1 mg/L
Fluoride	0.1 mg/L
Nitrate as N	0.1 mg/L
Nitrite as N	0.05 mg/L
Phosphate as P	1 mg/L
Sulphate	1 mg/L

Metals

Mercury	0.1 ug/L
Antimony	0.5 ug/L
Arsenic	1 ug/L
Barium	1 ug/L
Beryllium	0.5 ug/L
Boron	10 ug/L
Cadmium	0.1 ug/L
Calcium	100 ug/L
Chromium	1 ug/L
Chromium (III)	10 ug/L
Chromium (VI)	10 ug/L
Cobalt	0.5 ug/L
Copper	0.5 ug/L
Iron	100 ug/L
Lead	0.1 ug/L
Magnesium	200 ug/L
Molybdenum	0.5 ug/L
Nickel	1 ug/L
Potassium	100 ug/L
Selenium	1 ug/L
Silver	0.1 ug/L
Sodium	200 ug/L

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

Certificate of Analysis

Client: E-3 Laboratories Inc.
Client PO: 2514382

Report Date: 13-Jan-2014
Order Date: 12-Dec-2013

Project Description: City of Barrie

	Client ID: Sample Date: Sample ID:
	MDL/Units
Thallium	0.1 ug/L
Uranium	0.1 ug/L
Vanadium	0.5 ug/L
Zinc	5 ug/L

Volatiles

Acetone	5.0 ug/L
Benzene	0.5 ug/L
Bromodichloromethane	0.5 ug/L
Bromoform	0.5 ug/L
Bromomethane	0.5 ug/L
Carbon Tetrachloride	0.2 ug/L
Chlorobenzene	0.5 ug/L
Chloroethane	1.0 ug/L
Chloroform	0.5 ug/L
Chloromethane	3.0 ug/L
Dibromochloromethane	0.5 ug/L
Dichlorodifluoromethane	1.0 ug/L
1,2-Dibromoethane	0.2 ug/L
1,2-Dichlorobenzene	0.5 ug/L
1,3-Dichlorobenzene	0.5 ug/L
1,4-Dichlorobenzene	0.5 ug/L
1,1-Dichloroethane	0.5 ug/L
1,2-Dichloroethane	0.5 ug/L
1,1-Dichloroethylene	0.5 ug/L
cis-1,2-Dichloroethylene	0.5 ug/L
trans-1,2-Dichloroethylene	0.5 ug/L
1,2-Dichloroethylene, total	0.5 ug/L
1,2-Dichloropropane	0.5 ug/L
cis-1,3-Dichloropropylene	0.5 ug/L
trans-1,3-Dichloropropylene	0.5 ug/L
1,3-Dichloropropene, total	0.5 ug/L
Ethylbenzene	0.5 ug/L
Hexane	1.0 ug/L
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L

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123 Christine St. N.
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Certificate of Analysis

Report Date: 13-Jan-201

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

Order Date: 12-Dec-201

	Client ID: Sample Date: Sample ID:
	MDL/Units
Methyl Butyl Ketone (2-Hexanone)	10.0 ug/L
Methyl Isobutyl Ketone	5.0 ug/L
Methyl tert-butyl ether	2.0 ug/L
Methylene Chloride	5.0 ug/L
Styrene	0.5 ug/L
1,1,1,2-Tetrachloroethane	0.5 ug/L
1,1,2,2-Tetrachloroethane	0.5 ug/L
Tetrachloroethylene	0.5 ug/L
Toluene	0.5 ug/L
1,2,4-Trichlorobenzene	0.5 ug/L
1,1,1-Trichloroethane	0.5 ug/L
1,1,2-Trichloroethane	0.5 ug/L
Trichloroethylene	0.5 ug/L
Trichlorofluoromethane	1.0 ug/L
1,3,5-Trimethylbenzene	0.5 ug/L
Vinyl chloride	0.5 ug/L
m,p-Xylenes	0.5 ug/L
o-Xylene	0.5 ug/L
Xylenes, total	0.5 ug/L
4-Bromofluorobenzene	Surrogate
Dibromofluoromethane	Surrogate
Toluene-d8	Surrogate

Hydrocarbons

F1 PHCs (C6-C10)	25.0 ug/L
F2 PHCs (C10-C16)	100 ug/L
F3 PHCs (C16-C34)	100 ug/L
F4 PHCs (C34-C50)	100 ug/L
F1 + F2 PHCs	125 ug/L
F3 + F4 PHCs	200 ug/L

Semi-Volatiles

Acenaphthene	0.05 ug/L
Acenaphthylene	0.05 ug/L
Anthracene	0.01 ug/L

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SARNIA
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Certificate of Analysis

Report Date: 13-Jan-2014
 Order Date: 12-Dec-2013

Client: E-3 Laboratories Inc.
 Client PO: 2514382

Project Description: City of Barrie

	Client ID:
	Sample Date:
	Sample ID:
	MDL/Units
Benzo [a] anthracene	0.01 ug/L
Benzo [a] pyrene	0.01 ug/L
Benzo [b] fluoranthene	0.05 ug/L
Benzo [g,h,i] perylene	0.05 ug/L
Benzo [k] fluoranthene	0.05 ug/L
Biphenyl	0.05 ug/L
Chrysene	0.05 ug/L
Dibenzo [a,h] anthracene	0.05 ug/L
Fluoranthene	0.01 ug/L
Fluorene	0.05 ug/L
Indeno [1,2,3-cd] pyrene	0.05 ug/L
1-Methylnaphthalene	0.05 ug/L
2-Methylnaphthalene	0.05 ug/L
Methylnaphthalene (1&2)	0.10 ug/L
Naphthalene	0.05 ug/L
Phenanthrene	0.05 ug/L
Pyrene	0.01 ug/L
2-Fluorobiphenyl	Surrogate
Terphenyl-d14	Surrogate

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Certificate of Analysis

Report Date: 13-Jan-2014
Order Date: 12-Dec-2013

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

Client ID: Sample Date: Sample ID: MDL/Units	352848 - SW B1	352849 - SW B2	352850 - SW B3
	10-Dec-13 1350281-22 Water	10-Dec-13 1350281-23 Water	10-Dec-13 1350281-24 Water
General Inorganics			
Cyanide, free	2 ug/L	-	-
Hardness	1.0 mg/L	428	384
Hardness	1.0 mg/L	-	461
Anions			
Bromide	0.1 mg/L	-	-
Chloride	1 mg/L	-	-
Fluoride	0.1 mg/L	-	-
Nitrate as N	0.1 mg/L	-	-
Nitrite as N	0.05 mg/L	-	-
Phosphate as P	1 mg/L	-	-
Sulphate	1 mg/L	-	-
Metals			
Aluminum, dissolved	1 ug/L	8	4
Mercury, dissolved	0.1 ug/L	<0.1	<0.1
Mercury	0.1 ug/L	-	-
Antimony	0.5 ug/L	<0.5	<0.5
Arsenic	1 ug/L	<1	<1
Barium	1 ug/L	138	139
Beryllium	0.5 ug/L	<0.5	<0.5
Boron	10 ug/L	21	18
Cadmium	0.1 ug/L	<0.1	<0.1
Calcium	100 ug/L	145000	127000
Chromium	1 ug/L	8	8
Chromium (III)	10 ug/L	-	-
Chromium (VI)	10 ug/L	-	-
Cobalt	0.5 ug/L	<0.5	<0.5
Copper	0.5 ug/L	4.8	2.8
Iron	100 ug/L	1480	1030
Lead	0.1 ug/L	1.7	0.8
Magnesium	200 ug/L	15800	16100
Manganese	5 ug/L	100	80
Molybdenum	0.5 ug/L	<0.5	<0.5
Nickel	1 ug/L	4	4

Certificate of Analysis

Report Date: 13-Jan-2014

Client: E-3 Laboratories Inc.

Order Date: 12-Dec-2013

Client PO: 2514382

Project Description: City of Barrie

	Client ID:	352848 - SW B1	352849 - SW B2	352850 - SW B3
	Sample Date:	10-Dec-13	10-Dec-13	10-Dec-13
	Sample ID:	1350281-22	1350281-23	1350281-24
	MDL/Units	Water	Water	Water
Potassium	100 ug/L	2730	2670	3040
Selenium	1 ug/L	<1	<1	<1
Silver	0.1 ug/L	<0.1	<0.1	<0.1
Sodium	200 ug/L	318000	301000	414000
Strontium	10 ug/L	454	431	559
Thallium	0.1 ug/L	<0.1	<0.1	<0.1
Titanium	5 ug/L	<5	<5	6
Tungsten	10 ug/L	<10	<10	<10
Uranium	0.1 ug/L	0.9	0.9	1.1
Vanadium	0.5 ug/L	2.7	2.3	3.4
Zinc	5 ug/L	15	11	18
Zirconium	1 ug/L	<1	<1	<1
Volatiles				
Acetone	5.0 ug/L	<5.0	<5.0	<5.0
Benzene	0.5 ug/L	<0.5	<0.5	<0.5
Bromodichloromethane	0.5 ug/L	<0.5	<0.5	<0.5
Bromoform	0.5 ug/L	<0.5	<0.5	<0.5
Bromomethane	0.5 ug/L	<0.5	<0.5	<0.5
Carbon Tetrachloride	0.2 ug/L	<0.2	<0.2	<0.2
Chlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5
Chloroethane	1.0 ug/L	<1.0	<1.0	<1.0
Chloroform	0.5 ug/L	<0.5	<0.5	<0.5
Chloromethane	3.0 ug/L	<3.0	<3.0	<3.0
Dibromochloromethane	0.5 ug/L	<0.5	<0.5	<0.5
Dichlorodifluoromethane	1.0 ug/L	<1.0	<1.0	<1.0
1,2-Dibromoethane	0.2 ug/L	<0.2	<0.2	<0.2
1,2-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5
1,1-Dichloroethane	0.5 ug/L	<0.5	<0.5	<0.5
1,2-Dichloroethane	0.5 ug/L	<0.5	<0.5	<0.5
1,1-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5
cis-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5
trans-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5

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Certificate of Analysis

Report Date: 13-Jan-201

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

Order Date: 12-Dec-201

	Client ID:	352848 - SW B1	352849 - SW B2	352850 - SW B3
	Sample Date:	10-Dec-13	10-Dec-13	10-Dec-13
	Sample ID:	1350281-22	1350281-23	1350281-24
	MDL/Units	Water	Water	Water
1,2-Dichloroethylene, total	0.5 ug/L	<0.5	<0.5	<0.5
1,2-Dichloropropane	0.5 ug/L	<0.5	<0.5	<0.5
cis-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	<0.5
trans-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	<0.5
1,3-Dichloropropene, total	0.5 ug/L	<0.5	<0.5	<0.5
Ethylbenzene	0.5 ug/L	<0.5	<0.5	<0.5
Hexane	1.0 ug/L	<1.0	<1.0	<1.0
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	<5.0	<5.0	<5.0
Methyl Butyl Ketone (2-Hexanone)	10.0 ug/L	<10.0	<10.0	<10.0
Methyl Isobutyl Ketone	5.0 ug/L	<5.0	<5.0	<5.0
Methyl tert-butyl ether	2.0 ug/L	<2.0	<2.0	<2.0
Methylene Chloride	5.0 ug/L	<5.0	<5.0	<5.0
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	92.6%	93.2%	93.4%
Dibromofluoromethane	Surrogate	105%	104%	102%
Toluene-d8	Surrogate	109%	109%	108%
Hydrocarbons				
F1 PHCs (C6-C10)	25.0 ug/L	<25.0	<25.0	<25.0
F2 PHCs (C10-C16)	100 ug/L	<100	<100	<100

Certificate of Analysis

Report Date: 13-Jan-2014

Client: E-3 Laboratories Inc.

Order Date: 12-Dec-2013

Client PO: 2514382

Project Description: City of Barrie

	Client ID: Sample Date: Sample ID:	352848 - SW B1 10-Dec-13 1350281-22 Water	352849 - SW B2 10-Dec-13 1350281-23 Water	352850 - SW B3 10-Dec-13 1350281-24 Water
	MDL/Units			
F3 PHCs (C16-C34)	100 ug/L	<100	<100	<100
F4 PHCs (C34-C50)	100 ug/L	<100	<100	<100
F1 + F2 PHCs	125 ug/L	<125	<125	<125
F3 + F4 PHCs	200 ug/L	<200	<200	<200
Semi-Volatiles				
Acenaphthene	0.05 ug/L	<0.05	<0.05	<0.05
Acenaphthylene	0.05 ug/L	<0.05	<0.05	<0.05
Anthracene	0.01 ug/L	<0.01	<0.01	<0.01
Benzo [a] anthracene	0.01 ug/L	<0.01	<0.01	<0.01
Benzo [a] pyrene	0.01 ug/L	<0.01	<0.01	<0.01
Benzo [b] fluoranthene	0.05 ug/L	<0.05	<0.05	<0.05
Benzo [g,h,i] perylene	0.05 ug/L	<0.05	<0.05	<0.05
Benzo [k] fluoranthene	0.05 ug/L	<0.05	<0.05	<0.05
Biphenyl	0.05 ug/L	<0.05	<0.05	<0.05
Chrysene	0.05 ug/L	<0.05	<0.05	<0.05
Dibenzo [a,h] anthracene	0.05 ug/L	<0.05	<0.05	<0.05
Fluoranthene	0.01 ug/L	<0.01	<0.01	<0.01
Fluorene	0.05 ug/L	<0.05	<0.05	<0.05
Indeno [1,2,3-cd] pyrene	0.05 ug/L	<0.05	<0.05	<0.05
1-Methylnaphthalene	0.05 ug/L	<0.05	<0.05	<0.05
2-Methylnaphthalene	0.05 ug/L	<0.05	<0.05	<0.05
Methylnaphthalene (1&2)	0.10 ug/L	<0.10	<0.10	<0.10
Naphthalene	0.05 ug/L	<0.05	<0.05	<0.05
Phenanthrene	0.05 ug/L	<0.05	<0.05	<0.05
Pyrene	0.01 ug/L	<0.01	<0.01	<0.01
2-Fluorobiphenyl	Surrogate	69.9%	74.3%	73.2%
Terphenyl-d14	Surrogate	86.4%	81.9%	86.7%

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Certificate of Analysis

Report Date: 13-Jan-2014

Client: E-3 Laboratories Inc.

Order Date: 12-Dec-2013

Client PO: 2514382

Project Description: City of Barrie

Client ID:	352851 - SW B4	352852 - SW B5
Sample Date:	10-Dec-13	10-Dec-13
Sample ID:	1350281-25	1350281-26
MDL/Units	Water	Water

General Inorganics

Hardness	1.0 mg/L	459	449
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Metals

Aluminum, dissolved	1 ug/L	6	4
Mercury, dissolved	0.1 ug/L	0.1	<0.1
Antimony	0.5 ug/L	<0.5	<0.5
Arsenic	1 ug/L	<1	<1
Barium	1 ug/L	137	127
Beryllium	0.5 ug/L	<0.5	<0.5
Boron	10 ug/L	18	15
Cadmium	0.1 ug/L	<0.1	<0.1
Calcium	100 ug/L	156000	151000
Chromium	1 ug/L	9	8
Cobalt	0.5 ug/L	<0.5	<0.5
Copper	0.5 ug/L	1.8	1.1
Iron	100 ug/L	1330	511
Lead	0.1 ug/L	0.3	0.1
Magnesium	200 ug/L	16900	17200
Manganese	5 ug/L	118	95
Molybdenum	0.5 ug/L	<0.5	<0.5
Nickel	1 ug/L	4	4
Potassium	100 ug/L	3190	3100
Selenium	1 ug/L	<1	<1
Silver	0.1 ug/L	<0.1	<0.1
Sodium	200 ug/L	369000	355000
Strontium	10 ug/L	614	568
Thallium	0.1 ug/L	<0.1	<0.1
Titanium	5 ug/L	<5	<5
Tungsten	10 ug/L	<10	<10
Uranium	0.1 ug/L	1.3	1.4
Vanadium	0.5 ug/L	4.4	4.2
Zinc	5 ug/L	6	<5
Zirconium	1 ug/L	<1	<1

Volatiles

Acetone	5.0 ug/L	<5.0	<5.0
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Certificate of Analysis

Client: E-3 Laboratories Inc.
Client PO: 2514382

Report Date: 13-Jan-2014
Order Date: 12-Dec-2013

Project Description: City of Barrie

	Client ID:	352851 - SW B4	352852 - SW B5
	Sample Date:	10-Dec-13	10-Dec-13
	Sample ID:	1350281-25	1350281-26
	MDL/Units	Water	Water
Benzene	0.5 ug/L	<0.5	<0.5
Bromodichloromethane	0.5 ug/L	<0.5	<0.5
Bromoform	0.5 ug/L	<0.5	<0.5
Bromomethane	0.5 ug/L	<0.5	<0.5
Carbon Tetrachloride	0.2 ug/L	<0.2	<0.2
Chlorobenzene	0.5 ug/L	<0.5	<0.5
Chloroethane	1.0 ug/L	<1.0	<1.0
Chloroform	0.5 ug/L	<0.5	<0.5
Chloromethane	3.0 ug/L	<3.0	<3.0
Dibromochloromethane	0.5 ug/L	<0.5	<0.5
Dichlorodifluoromethane	1.0 ug/L	<1.0	<1.0
1,2-Dibromoethane	0.2 ug/L	<0.2	<0.2
1,2-Dichlorobenzene	0.5 ug/L	<0.5	<0.5
1,3-Dichlorobenzene	0.5 ug/L	<0.5	<0.5
1,4-Dichlorobenzene	0.5 ug/L	<0.5	<0.5
1,1-Dichloroethane	0.5 ug/L	<0.5	<0.5
1,2-Dichloroethane	0.5 ug/L	<0.5	<0.5
1,1-Dichloroethylene	0.5 ug/L	<0.5	<0.5
cis-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5
trans-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5
1,2-Dichloroethylene, total	0.5 ug/L	<0.5	<0.5
1,2-Dichloropropane	0.5 ug/L	<0.5	<0.5
cis-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5
trans-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5
1,3-Dichloropropene, total	0.5 ug/L	<0.5	<0.5
Ethylbenzene	0.5 ug/L	<0.5	<0.5
Hexane	1.0 ug/L	<1.0	<1.0
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	<5.0	<5.0
Methyl Butyl Ketone (2-Hexanon)	10.0 ug/L	<10.0	<10.0
Methyl Isobutyl Ketone	5.0 ug/L	<5.0	<5.0
Methyl tert-butyl ether	2.0 ug/L	<2.0	<2.0
Methylene Chloride	5.0 ug/L	<5.0	<5.0
Styrene	0.5 ug/L	<0.5	<0.5
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5

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Certificate of Analysis

Client: **E-3 Laboratories Inc.**
Client PO: 2514382

Report Date: 13-Jan-20
Order Date: 12-Dec-20

Project Description: **City of Barrie**

	Client ID: Sample Date: Sample ID:	352851 - SW B4 10-Dec-13 1350281-25 Water	352852 - SW B5 10-Dec-13 1350281-26 Water
	MDL/Units		
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5
Tetrachloroethylene	0.5 ug/L	<0.5	<0.5
Toluene	0.5 ug/L	<0.5	<0.5
1,2,4-Trichlorobenzene	0.5 ug/L	<0.5	<0.5
1,1,1-Trichloroethane	0.5 ug/L	<0.5	<0.5
1,1,2-Trichloroethane	0.5 ug/L	<0.5	<0.5
Trichloroethylene	0.5 ug/L	<0.5	<0.5
Trichlorofluoromethane	1.0 ug/L	<1.0	<1.0
1,3,5-Trimethylbenzene	0.5 ug/L	<0.5	<0.5
Vinyl chloride	0.5 ug/L	<0.5	<0.5
m,p-Xylenes	0.5 ug/L	<0.5	<0.5
o-Xylene	0.5 ug/L	<0.5	<0.5
Xylenes, total	0.5 ug/L	<0.5	<0.5
4-Bromofluorobenzene	Surrogate	93.7%	93.3%
Dibromofluoromethane	Surrogate	103%	104%
Toluene-d8	Surrogate	108%	109%

Hydrocarbons

	MDL/Units		
F1 PHCs (C6-C10)	25.0 ug/L	<25.0	<25.0
F2 PHCs (C10-C16)	100 ug/L	<100	<100
F3 PHCs (C16-C34)	100 ug/L	<100	<100
F4 PHCs (C34-C50)	100 ug/L	<100	<100
F1 + F2 PHCs	125 ug/L	<125	<125
F3 + F4 PHCs	200 ug/L	<200	<200

Semi-Volatiles

	MDL/Units		
Acenaphthene	0.05 ug/L	<0.05	<0.05
Acenaphthylene	0.05 ug/L	<0.05	<0.05
Anthracene	0.01 ug/L	<0.01	<0.01
Benzo [a] anthracene	0.01 ug/L	<0.01	<0.01
Benzo [a] pyrene	0.01 ug/L	<0.01	<0.01
Benzo [b] fluoranthene	0.05 ug/L	<0.05	<0.05
Benzo [g,h,i] perylene	0.05 ug/L	<0.05	<0.05
Benzo [k] fluoranthene	0.05 ug/L	<0.05	<0.05
Biphenyl	0.05 ug/L	<0.05	<0.05
Chrysene	0.05 ug/L	<0.05	<0.05
Dibenzo [a,h] anthracene	0.05 ug/L	<0.05	<0.05

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Certificate of Analysis

Report Date: 13-Jan-2014
Order Date: 12-Dec-2013

Client: **E-3 Laboratories Inc.**
Client PO: 2514382

Project Description: City of Barrie

	Client ID:	352851 - SW B4	352852 - SW B5
	Sample Date:	10-Dec-13	10-Dec-13
	Sample ID:	1350281-25	1350281-26
	MDL/Units	Water	Water
Fluoranthene	0.01 ug/L	<0.01	<0.01
Fluorene	0.05 ug/L	<0.05	<0.05
Indeno [1,2,3-cd] pyrene	0.05 ug/L	<0.05	<0.05
1-Methylnaphthalene	0.05 ug/L	<0.05	<0.05
2-Methylnaphthalene	0.05 ug/L	<0.05	<0.05
Methylnaphthalene (1&2)	0.10 ug/L	<0.10	<0.10
Naphthalene	0.05 ug/L	<0.05	<0.05
Phenanthrene	0.05 ug/L	<0.05	<0.05
Pyrene	0.01 ug/L	<0.01	<0.01
2-Fluorobiphenyl	Surrogate	71.4%	67.4%
Terphenyl-d14	Surrogate	81.7%	76.9%

Certificate of Analysis

Client: E-3 Laboratories Inc.
Client PO: 2514382

Report Date: 13-Jan-2011
Order Date: 12-Dec-2010

Project Description: City of Barrie

Client ID:
Sample Date:
Sample ID:

MDL/Units

General Inorganics	
Hardness	1.0 mg/L
Metals	
Aluminum, dissolved	1 ug/L
Mercury, dissolved	0.1 ug/L
Antimony	0.5 ug/L
Arsenic	1 ug/L
Barium	1 ug/L
Beryllium	0.5 ug/L
Boron	10 ug/L
Cadmium	0.1 ug/L
Calcium	100 ug/L
Chromium	1 ug/L
Cobalt	0.5 ug/L
Copper	0.5 ug/L
Iron	100 ug/L
Lead	0.1 ug/L
Magnesium	200 ug/L
Manganese	5 ug/L
Molybdenum	0.5 ug/L
Nickel	1 ug/L
Potassium	100 ug/L
Selenium	1 ug/L
Silver	0.1 ug/L
Sodium	200 ug/L
Strontium	10 ug/L
Thallium	0.1 ug/L
Titanium	5 ug/L
Tungsten	10 ug/L
Uranium	0.1 ug/L
Vanadium	0.5 ug/L
Zinc	5 ug/L
Zirconium	1 ug/L
Volatiles	
Acetone	5.0 ug/L

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Certificate of Analysis

Report Date: 13-Jan-2014
Order Date: 12-Dec-2013

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

	Client ID: Sample Date: Sample ID:
	MDL/Units
Benzene	0.5 ug/L
Bromodichloromethane	0.5 ug/L
Bromoform	0.5 ug/L
Bromomethane	0.5 ug/L
Carbon Tetrachloride	0.2 ug/L
Chlorobenzene	0.5 ug/L
Chloroethane	1.0 ug/L
Chloroform	0.5 ug/L
Chloromethane	3.0 ug/L
Dibromochloromethane	0.5 ug/L
Dichlorodifluoromethane	1.0 ug/L
1,2-Dibromoethane	0.2 ug/L
1,2-Dichlorobenzene	0.5 ug/L
1,3-Dichlorobenzene	0.5 ug/L
1,4-Dichlorobenzene	0.5 ug/L
1,1-Dichloroethane	0.5 ug/L
1,2-Dichloroethane	0.5 ug/L
1,1-Dichloroethylene	0.5 ug/L
cis-1,2-Dichloroethylene	0.5 ug/L
trans-1,2-Dichloroethylene	0.5 ug/L
1,2-Dichloroethylene, total	0.5 ug/L
1,2-Dichloropropane	0.5 ug/L
cis-1,3-Dichloropropylene	0.5 ug/L
trans-1,3-Dichloropropylene	0.5 ug/L
1,3-Dichloropropene, total	0.5 ug/L
Ethylbenzene	0.5 ug/L
Hexane	1.0 ug/L
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L
Methyl Butyl Ketone (2-Hexanon)	10.0 ug/L
Methyl Isobutyl Ketone	5.0 ug/L
Methyl tert-butyl ether	2.0 ug/L
Methylene Chloride	5.0 ug/L
Styrene	0.5 ug/L
1,1,1,2-Tetrachloroethane	0.5 ug/L
1,1,2,2-Tetrachloroethane	0.5 ug/L

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SARNIA
123 Christine St. N.
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Certificate of Analysis

Report Date: 13-Jan-2011

Client: E-3 Laboratories Inc.

Order Date: 12-Dec-2010

Client PO: 2514382

Project Description: City of Barrie

Client ID:
Sample Date:
Sample ID:

	MDL/Units
Tetrachloroethylene	0.5 ug/L
Toluene	0.5 ug/L
1,2,4-Trichlorobenzene	0.5 ug/L
1,1,1-Trichloroethane	0.5 ug/L
1,1,2-Trichloroethane	0.5 ug/L
Trichloroethylene	0.5 ug/L
Trichlorofluoromethane	1.0 ug/L
1,3,5-Trimethylbenzene	0.5 ug/L
Vinyl chloride	0.5 ug/L
m,p-Xylenes	0.5 ug/L
o-Xylene	0.5 ug/L
Xylenes, total	0.5 ug/L
4-Bromofluorobenzene	Surrogate
Dibromofluoromethane	Surrogate
Toluene-d8	Surrogate

Hydrocarbons

F1 PHCs (C6-C10)	25.0 ug/L
F2 PHCs (C10-C16)	100 ug/L
F3 PHCs (C16-C34)	100 ug/L
F4 PHCs (C34-C50)	100 ug/L
F1 + F2 PHCs	125 ug/L
F3 + F4 PHCs	200 ug/L

Semi-Volatiles

Acenaphthene	0.05 ug/L
Acenaphthylene	0.05 ug/L
Anthracene	0.01 ug/L
Benzo [a] anthracene	0.01 ug/L
Benzo [a] pyrene	0.01 ug/L
Benzo [b] fluoranthene	0.05 ug/L
Benzo [g,h,i] perylene	0.05 ug/L
Benzo [k] fluoranthene	0.05 ug/L
Biphenyl	0.05 ug/L
Chrysene	0.05 ug/L
Dibenzo [a,h] anthracene	0.05 ug/L
Fluoranthene	0.01 ug/L

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Certificate of Analysis

Report Date: 13-Jan-2014

Order Date: 12-Dec-2013

Client: E-3 Laboratories Inc.

Project Description: City of Barrie

Client PO: 2514382

Client ID:
Sample Date:
Sample ID:

	MDL/Units
Fluorene	0.05 ug/L
Indeno [1,2,3-cd] pyrene	0.05 ug/L
1-Methylnaphthalene	0.05 ug/L
2-Methylnaphthalene	0.05 ug/L
Methylnaphthalene (1&2)	0.10 ug/L
Naphthalene	0.05 ug/L
Phenanthrene	0.05 ug/L
Pyrene	0.01 ug/L
2-Fluorobiphenyl	Surrogate
Terphenyl-d14	Surrogate

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SARNIA
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Certificate of Analysis

Report Date: 13-Jan-201

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

Order Date: 12-Dec-201

Client ID:
Sample Date:
Sample ID:

MDL/Units

General Inorganics

Cyanide, free	2 ug/L
Hardness	1.0 mg/L

Anions

Bromide	0.1 mg/L
Chloride	1 mg/L
Fluoride	0.1 mg/L
Nitrate as N	0.1 mg/L
Nitrite as N	0.05 mg/L
Phosphate as P	1 mg/L
Sulphate	1 mg/L

Metals

Mercury	0.1 ug/L
Antimony	0.5 ug/L
Arsenic	1 ug/L
Barium	1 ug/L
Beryllium	0.5 ug/L
Boron	10 ug/L
Cadmium	0.1 ug/L
Calcium	100 ug/L
Chromium	1 ug/L
Chromium (III)	10 ug/L
Chromium (VI)	10 ug/L
Cobalt	0.5 ug/L
Copper	0.5 ug/L
Iron	100 ug/L
Lead	0.1 ug/L
Magnesium	200 ug/L
Molybdenum	0.5 ug/L
Nickel	1 ug/L
Potassium	100 ug/L
Selenium	1 ug/L
Silver	0.1 ug/L
Sodium	200 ug/L
Thallium	0.1 ug/L

Certificate of Analysis

Report Date: 13-Jan-2014
Order Date: 12-Dec-2013

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

	Client ID:
	Sample Date:
	Sample ID:
	MDL/Units
Uranium	0.1 ug/L
Vanadium	0.5 ug/L
Zinc	5 ug/L

Volatiles

Acetone	5.0 ug/L
Benzene	0.5 ug/L
Bromodichloromethane	0.5 ug/L
Bromoform	0.5 ug/L
Bromomethane	0.5 ug/L
Carbon Tetrachloride	0.2 ug/L
Chlorobenzene	0.5 ug/L
Chloroethane	1.0 ug/L
Chloroform	0.5 ug/L
Chloromethane	3.0 ug/L
Dibromochloromethane	0.5 ug/L
Dichlorodifluoromethane	1.0 ug/L
1,2-Dibromoethane	0.2 ug/L
1,2-Dichlorobenzene	0.5 ug/L
1,3-Dichlorobenzene	0.5 ug/L
1,4-Dichlorobenzene	0.5 ug/L
1,1-Dichloroethane	0.5 ug/L
1,2-Dichloroethane	0.5 ug/L
1,1-Dichloroethylene	0.5 ug/L
cis-1,2-Dichloroethylene	0.5 ug/L
trans-1,2-Dichloroethylene	0.5 ug/L
1,2-Dichloroethylene, total	0.5 ug/L
1,2-Dichloropropane	0.5 ug/L
cis-1,3-Dichloropropylene	0.5 ug/L
trans-1,3-Dichloropropylene	0.5 ug/L
1,3-Dichloropropene, total	0.5 ug/L
Ethylbenzene	0.5 ug/L
Hexane	1.0 ug/L
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L
Methyl Butyl Ketone (2-Hexanone)	10.0 ug/L
Methyl Isobutyl Ketone	5.0 ug/L

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Certificate of Analysis

Report Date: 13-Jan-20

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

Order Date: 12-Dec-20

	Client ID: Sample Date: Sample ID:
	MDL/Units
Methyl tert-butyl ether	2.0 ug/L
Methylene Chloride	5.0 ug/L
Styrene	0.5 ug/L
1,1,1,2-Tetrachloroethane	0.5 ug/L
1,1,2,2-Tetrachloroethane	0.5 ug/L
Tetrachloroethylene	0.5 ug/L
Toluene	0.5 ug/L
1,2,4-Trichlorobenzene	0.5 ug/L
1,1,1-Trichloroethane	0.5 ug/L
1,1,2-Trichloroethane	0.5 ug/L
Trichloroethylene	0.5 ug/L
Trichlorofluoromethane	1.0 ug/L
1,3,5-Trimethylbenzene	0.5 ug/L
Vinyl chloride	0.5 ug/L
m,p-Xylenes	0.5 ug/L
o-Xylene	0.5 ug/L
Xylenes, total	0.5 ug/L
4-Bromofluorobenzene	Surrogate
Dibromofluoromethane	Surrogate
Toluene-d8	Surrogate

Hydrocarbons

F1 PHCs (C6-C10)	25.0 ug/L
F2 PHCs (C10-C16)	100 ug/L
F3 PHCs (C16-C34)	100 ug/L
F4 PHCs (C34-C50)	100 ug/L
F1 + F2 PHCs	125 ug/L
F3 + F4 PHCs	200 ug/L

Semi-Volatiles

Acenaphthene	0.05 ug/L
Acenaphthylene	0.05 ug/L
Anthracene	0.01 ug/L
Benzo [a] anthracene	0.01 ug/L
Benzo [a] pyrene	0.01 ug/L
Benzo [b] fluoranthene	0.05 ug/L
Benzo [g,h,i] perylene	0.05 ug/L

Certificate of Analysis

Report Date: 13-Jan-2014
Order Date: 12-Dec-2013

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

	Client ID: Sample Date: Sample ID:
	MDL/Units
Benzo [k] fluoranthene	0.05 ug/L
Biphenyl	0.05 ug/L
Chrysene	0.05 ug/L
Dibenzo [a,h] anthracene	0.05 ug/L
Fluoranthene	0.01 ug/L
Fluorene	0.05 ug/L
Indeno [1,2,3-cd] pyrene	0.05 ug/L
1-Methylnaphthalene	0.05 ug/L
2-Methylnaphthalene	0.05 ug/L
Methylnaphthalene (1&2)	0.10 ug/L
Naphthalene	0.05 ug/L
Phenanthrene	0.05 ug/L
Pyrene	0.01 ug/L
2-Fluorobiphenyl	Surrogate
Terphenyl-d14	Surrogate

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Certificate of Analysis

Report Date: 13-Jan-2011

Client: E-3 Laboratories Inc.

Order Date: 12-Dec-2010

Client PO: 2514382

Project Description: City of Barrie

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Bromide	ND	0.1	mg/L						
Chloride	ND	1	mg/L						
Fluoride	ND	0.1	mg/L						
Nitrate as N	ND	0.1	mg/L						
Nitrite as N	ND	0.05	mg/L						
Phosphate as P	ND	1	mg/L						
Sulphate	ND	1	mg/L						
General Inorganics									
Cyanide, free	ND	2	ug/L						
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25.0	ug/L						
F2 PHCs (C10-C16)	ND	100	ug/L						
F3 PHCs (C16-C34)	ND	100	ug/L						
F4 PHCs (C34-C50)	ND	100	ug/L						
Metals									
Mercury, dissolved	ND	0.1	ug/L						
Aluminum, dissolved	ND	1	ug/L						
Mercury	ND	0.1	ug/L						
Antimony	ND	0.5	ug/L						
Arsenic	ND	1	ug/L						
Barium	ND	1	ug/L						
Beryllium	ND	0.5	ug/L						
Boron	ND	10	ug/L						
Cadmium	ND	0.1	ug/L						
Calcium	ND	100	ug/L						
Chromium (VI)	ND	10	ug/L						
Chromium	ND	1	ug/L						
Cobalt	ND	0.5	ug/L						
Copper	ND	0.5	ug/L						
Iron	ND	100	ug/L						
Lead	ND	0.1	ug/L						
Magnesium	ND	200	ug/L						
Manganese	ND	5	ug/L						
Molybdenum	ND	0.5	ug/L						
Nickel	ND	1	ug/L						
Potassium	ND	100	ug/L						
Selenium	ND	1	ug/L						
Silver	ND	0.1	ug/L						
Sodium	ND	200	ug/L						
Strontium	ND	10	ug/L						
Thallium	ND	0.1	ug/L						
Titanium	ND	5	ug/L						
Tungsten	ND	10	ug/L						
Uranium	ND	0.1	ug/L						
Vanadium	ND	0.5	ug/L						
Zinc	ND	5	ug/L						
Zirconium	ND	1	ug/L						
Semi-Volatiles									
Acenaphthene	ND	0.05	ug/L						
Acenaphthylene	ND	0.05	ug/L						
Anthracene	ND	0.01	ug/L						
Benzo [a] anthracene	ND	0.01	ug/L						
Benzo [a] pyrene	ND	0.01	ug/L						
Benzo [b] fluoranthene	ND	0.05	ug/L						
Benzo [g,h,i] perylene	ND	0.05	ug/L						

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SARNIA
123 Christina St. N
Sarnia, ON N7T 6T7

Certificate of Analysis

Report Date: 13-Jan-2014

Client: E-3 Laboratories Inc.

Order Date: 12-Dec-2013

Client PO: 2514382

Project Description: City of Barrie

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Benzo [k] fluoranthene	ND	0.05	ug/L						
Biphenyl	ND	0.05	ug/L						
Chrysene	ND	0.05	ug/L						
Dibenzo [a,h] anthracene	ND	0.05	ug/L						
Fluoranthene	ND	0.01	ug/L						
Fluorene	ND	0.05	ug/L						
Indeno [1,2,3-cd] pyrene	ND	0.05	ug/L						
1-Methylnaphthalene	ND	0.05	ug/L						
2-Methylnaphthalene	ND	0.05	ug/L						
Methylnaphthalene (1&2)	ND	0.10	ug/L						
Naphthalene	ND	0.05	ug/L						
Phenanthrene	ND	0.05	ug/L						
Pyrene	ND	0.01	ug/L						
Surrogate: 2-Fluorobiphenyl	14.5		ug/L		72.3	50-140			
Surrogate: Terphenyl-d14	19.4		ug/L		97.0	50-140			
Volatiles									
Acetone	ND	5.0	ug/L						
Benzene	ND	0.5	ug/L						
Bromodichloromethane	ND	0.5	ug/L						
Bromoform	ND	0.5	ug/L						
Bromomethane	ND	0.5	ug/L						
Carbon Tetrachloride	ND	0.2	ug/L						
Chlorobenzene	ND	0.5	ug/L						
Chloroethane	ND	1.0	ug/L						
Chloroform	ND	0.5	ug/L						
Chloromethane	ND	3.0	ug/L						
Dibromochloromethane	ND	0.5	ug/L						
Dichlorodifluoromethane	ND	1.0	ug/L						
1,2-Dibromoethane	ND	0.2	ug/L						
1,2-Dichlorobenzene	ND	0.5	ug/L						
1,3-Dichlorobenzene	ND	0.5	ug/L						
1,4-Dichlorobenzene	ND	0.5	ug/L						
1,1-Dichloroethane	ND	0.5	ug/L						
1,2-Dichloroethane	ND	0.5	ug/L						
1,1-Dichloroethylene	ND	0.5	ug/L						
cis-1,2-Dichloroethylene	ND	0.5	ug/L						
trans-1,2-Dichloroethylene	ND	0.5	ug/L						
1,2-Dichloroethylene, total	ND	0.5	ug/L						
1,2-Dichloropropane	ND	0.5	ug/L						
cis-1,3-Dichloropropylene	ND	0.5	ug/L						
trans-1,3-Dichloropropylene	ND	0.5	ug/L						
1,3-Dichloropropene, total	ND	0.5	ug/L						
Ethylbenzene	ND	0.5	ug/L						
Hexane	ND	1.0	ug/L						
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L						
Methyl Butyl Ketone (2-Hexanone)	ND	10.0	ug/L						
Methyl Isobutyl Ketone	ND	5.0	ug/L						
Methyl tert-butyl ether	ND	2.0	ug/L						
Methylene Chloride	ND	5.0	ug/L						
Styrene	ND	0.5	ug/L						
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L						
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L						
Tetrachloroethylene	ND	0.5	ug/L						
Toluene	ND	0.5	ug/L						
1,2,4-Trichlorobenzene	ND	0.5	ug/L						
1,1,1-Trichloroethane	ND	0.5	ug/L						
1,1,2-Trichloroethane	ND	0.5	ug/L						
Trichloroethylene	ND	0.5	ug/L						

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Niagara Falls, ON L2J 0A3

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

Certificate of Analysis

Report Date: 13-Jan-2011
Order Date: 12-Dec-2010

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Trichlorofluoromethane	ND	1.0	ug/L						
1,3,5-Trimethylbenzene	ND	0.5	ug/L						
Vinyl chloride	ND	0.5	ug/L						
m,p-Xylenes	ND	0.5	ug/L						
o-Xylene	ND	0.5	ug/L						
Xylenes, total	ND	0.5	ug/L						
Surrogate: 4-Bromofluorobenzene	73.3		ug/L		91.6	50-140			
Surrogate: Dibromofluoromethane	85.3		ug/L		107	50-140			
Surrogate: Toluene-d8	87.2		ug/L		109	50-140			

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SARNIA
123 Christina St. N
Sarnia, ON N7T 6T7

Certificate of Analysis

Report Date: 13-Jan-2014

Client: E-3 Laboratories Inc.

Order Date: 12-Dec-2013

Client PO: 2514382

Project Description: City of Barrie

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Bromide	0.19	0.1	mg/L	0.17			12.7	20	
Chloride	753	10	mg/L	781			3.7	10	
Fluoride	ND	0.1	mg/L	ND				10	
Nitrate as N	0.16	0.1	mg/L	0.17			1.9	20	
Nitrite as N	ND	0.05	mg/L	ND				20	
Phosphate as P	ND	1	mg/L	ND				20	
Sulphate	70.4	1	mg/L	70.5			0.1	10	
General Inorganics									
Cyanide, free	ND	2	ug/L	ND				20	
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25.0	ug/L	ND				30	
Metals									
Mercury, dissolved	ND	0.1	ug/L	ND				27	
Aluminum, dissolved	3.0	1	ug/L	3.2			5.9	20	
Mercury	ND	0.1	ug/L	ND				20	
Antimony	0.66	0.5	ug/L	1.97			100.0	20	QR-01
Arsenic	ND	1	ug/L	ND			0.0	20	
Barium	ND	1	ug/L	ND			0.0	20	
Beryllium	ND	0.5	ug/L	ND			0.0	20	
Boron	ND	10	ug/L	ND			0.0	20	
Cadmium	ND	0.1	ug/L	ND			0.0	20	
Calcium	ND	100	ug/L	ND			0.0	20	
Chromium (VI)	ND	10	ug/L	ND				20	
Chromium	ND	1	ug/L	ND			0.0	20	
Cobalt	ND	0.5	ug/L	ND			0.0	20	
Copper	ND	0.5	ug/L	ND			0.0	20	
Iron	ND	100	ug/L	ND			0.0	20	
Lead	ND	0.1	ug/L	ND			0.0	20	
Magnesium	ND	200	ug/L	ND			0.0	20	
Manganese	ND	5	ug/L	ND			0.0	20	
Molybdenum	ND	0.5	ug/L	ND			0.0	20	
Nickel	ND	1	ug/L	ND			0.0	20	
Potassium	ND	100	ug/L	ND			0.0	20	
Selenium	ND	1	ug/L	ND			0.0	20	
Silver	ND	0.1	ug/L	ND			0.0	20	
Sodium	ND	200	ug/L	ND			0.0	20	
Strontium	ND	10	ug/L	ND			0.0	20	
Thallium	ND	0.1	ug/L	ND			0.0	20	
Titanium	ND	5	ug/L	ND			0.0	20	
Tungsten	ND	10	ug/L	ND			0.0	20	
Uranium	ND	0.1	ug/L	ND			0.0	20	
Vanadium	ND	0.5	ug/L	ND			0.0	20	
Zinc	ND	5	ug/L	ND			0.0	20	
Zirconium	ND	1	ug/L	ND			0.0	20	
Volatiles									
Acetone	9.21	5.0	ug/L	ND			0.0	30	
Benzene	3.28	0.5	ug/L	2.59			23.5	30	
Bromodichloromethane	ND	0.5	ug/L	ND				30	
Bromoform	ND	0.5	ug/L	ND				30	
Bromomethane	ND	0.5	ug/L	ND				30	
Carbon Tetrachloride	ND	0.2	ug/L	ND				30	
Chlorobenzene	0.71	0.5	ug/L	ND			0.0	30	
Chloroethane	ND	1.0	ug/L	ND				30	
Chloroform	ND	0.5	ug/L	ND				30	

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SARNIA
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Sarnia, ON N7T 5T7

Certificate of Analysis

Report Date: 13-Jan-201

Client: E-3 Laboratories Inc.

Order Date: 12-Dec-201

Client PO: 2514382

Project Description: City of Barrie

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Chloromethane	ND	3.0	ug/L	ND				30	
Dibromochloromethane	ND	0.5	ug/L	ND				30	
Dichlorodifluoromethane	ND	1.0	ug/L	ND				30	
1,2-Dibromoethane	ND	0.2	ug/L	ND				30	
1,2-Dichlorobenzene	ND	0.5	ug/L	ND			0.0	30	
1,3-Dichlorobenzene	ND	0.5	ug/L	ND				30	
1,4-Dichlorobenzene	0.57	0.5	ug/L	ND			0.0	30	
1,1-Dichloroethane	ND	0.5	ug/L	ND				30	
1,2-Dichloroethane	ND	0.5	ug/L	ND				30	
1,1-Dichloroethylene	ND	0.5	ug/L	ND				30	
cis-1,2-Dichloroethylene	ND	0.5	ug/L	ND				30	
trans-1,2-Dichloroethylene	ND	0.5	ug/L	ND				30	
1,2-Dichloropropane	ND	0.5	ug/L	ND				30	
cis-1,3-Dichloropropylene	ND	0.5	ug/L	ND				30	
trans-1,3-Dichloropropylene	ND	0.5	ug/L	ND				30	
Ethylbenzene	ND	0.5	ug/L	ND			0.0	30	
Hexane	ND	1.0	ug/L	ND				30	
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L	ND				30	
Methyl Butyl Ketone (2-Hexanone)	ND	10.0	ug/L	ND				30	
Methyl Isobutyl Ketone	ND	5.0	ug/L	ND				30	
Methyl tert-butyl ether	ND	2.0	ug/L	ND				30	
Methylene Chloride	ND	5.0	ug/L	ND				30	
Styrene	ND	0.5	ug/L	ND				30	
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L	ND				30	
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L	ND				30	
Tetrachloroethylene	ND	0.5	ug/L	ND				30	
Toluene	ND	0.5	ug/L	ND			0.0	30	
1,2,4-Trichlorobenzene	ND	0.5	ug/L	ND				30	
1,1,1-Trichloroethane	ND	0.5	ug/L	ND				30	
1,1,2-Trichloroethane	ND	0.5	ug/L	ND				30	
Trichloroethylene	ND	0.5	ug/L	ND				30	
Trichlorofluoromethane	ND	1.0	ug/L	ND				30	
1,3,5-Trimethylbenzene	ND	0.5	ug/L	ND			0.0	30	
Vinyl chloride	ND	0.5	ug/L	ND				30	
m,p-Xylenes	7.59	0.5	ug/L	4.01			61.7	30	QR-07
o-Xylene	ND	0.5	ug/L	ND			0.0	30	
Surrogate: 4-Bromofluorobenzene	75.0		ug/L	ND	93.7	50-140			
Surrogate: Dibromofluoromethane	88.3		ug/L	ND	110	50-140			
Surrogate: Toluene-d8	87.0		ug/L	ND	109	50-140			

Certificate of Analysis

Report Date: 13-Jan-2014
Order Date: 12-Dec-2013

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Bromide	1.18		mg/L	0.17	101	72-106			
Chloride	9.08		mg/L	ND	90.8	78-112			
Fluoride	0.90		mg/L	ND	90.4	73-113			
Nitrate as N	1.14		mg/L	0.17	97.5	81-112			
Nitrite as N	1.02		mg/L	ND	102	76-117			
Phosphate as P	4.53		mg/L	ND	90.6	72-131			
Sulphate	80.5		mg/L	70.5	101	75-111			
General Inorganics									
Cyanide, free	30.7	2	ug/L	ND	102	70-130			
Hydrocarbons									
F1 PHCs (C6-C10)	2070	25.0	ug/L	ND	104	68-117			
F2 PHCs (C10-C16)	1570	100	ug/L	ND	87.0	60-140			
F3 PHCs (C16-C34)	3150	100	ug/L	ND	84.7	60-140			
F4 PHCs (C34-C50)	1910	100	ug/L	ND	76.9	60-140			
Metals									
Mercury, dissolved	3.2	0.1	ug/L	ND	108	74-130			
Aluminum, dissolved	50.4		ug/L	3.2	94.4	70-130			
Mercury	3.16	0.1	ug/L	ND	105	78-137			
Antimony	46.3		ug/L	1.97	88.7	80-120			
Arsenic	50.8		ug/L	0.1	101	80-120			
Barium	48.8		ug/L	ND	97.7	80-120			
Beryllium	46.5		ug/L	0.005	93.0	80-120			
Boron	46		ug/L	ND	92.6	80-120			
Cadmium	53.4		ug/L	0.03	107	80-120			
Calcium	1180		ug/L	3	118	80-120			
Chromium (VI)	188	10	ug/L	ND	94.0	70-130			
Chromium	48.8		ug/L	0.09	97.3	80-120			
Cobalt	47.4		ug/L	0.002	94.8	80-120			
Copper	47.4		ug/L	ND	94.9	80-120			
Iron	1130		ug/L	ND	114	80-120			
Lead	47.3		ug/L	ND	94.6	80-120			
Magnesium	1050		ug/L	0.4	105	80-120			
Manganese	48.0		ug/L	0.004	96.0	80-120			
Molybdenum	48.9		ug/L	0.29	97.3	80-120			
Nickel	47.1		ug/L	ND	94.1	80-120			
Potassium	1080		ug/L	0.09	108	80-120			
Selenium	51.2		ug/L	0.2	102	80-120			
Silver	52.3		ug/L	0.03	104	80-120			
Sodium	1050		ug/L	ND	105	80-120			
Strontium	49		ug/L	0.003	97.4	80-120			
Thallium	47.4		ug/L	ND	94.9	80-120			
Titanium	50.3		ug/L	ND	101	80-120			
Tungsten	45.0		ug/L	0.4	89.2	80-120			
Uranium	45.8		ug/L	0.02	91.5	80-120			
Vanadium	49.9		ug/L	0.07	99.7	80-120			
Zinc	45		ug/L	ND	92.6	80-120			
Zirconium	44.9		ug/L	ND	89.7	80-120			
Semi-Volatiles									

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Certificate of Analysis

Report Date: 13-Jan-201

Client: E-3 Laboratories Inc.

Order Date: 12-Dec-201

Client PO: 2514382

Project Description: City of Barrie

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Acenaphthene	3.74	0.05	ug/L	ND	74.8	50-140			
Acenaphthylene	3.67	0.05	ug/L	ND	73.3	50-140			
Anthracene	3.83	0.01	ug/L	ND	76.6	50-140			
Benzo [a] anthracene	3.80	0.01	ug/L	ND	76.0	50-140			
Benzo [a] pyrene	3.51	0.01	ug/L	ND	70.2	50-140			
Benzo [b] fluoranthene	4.41	0.05	ug/L	ND	88.3	50-140			
Benzo [g,h,i] perylene	4.08	0.05	ug/L	ND	81.6	50-140			
Benzo [k] fluoranthene	4.97	0.05	ug/L	ND	99.4	50-140			
Biphenyl	4.11	0.05	ug/L	ND	82.3	50-140			
Chrysene	3.94	0.05	ug/L	ND	78.7	50-140			
Dibenzo [a,h] anthracene	4.15	0.05	ug/L	ND	82.9	50-140			
Fluoranthene	4.09	0.01	ug/L	ND	81.8	50-140			
Fluorene	3.41	0.05	ug/L	ND	68.2	50-140			
Indeno [1,2,3-cd] pyrene	4.28	0.05	ug/L	ND	85.6	50-140			
1-Methylnaphthalene	3.72	0.05	ug/L	ND	74.4	50-140			
2-Methylnaphthalene	3.80	0.05	ug/L	ND	76.0	50-140			
Naphthalene	3.55	0.05	ug/L	ND	71.0	50-140			
Phenanthrene	4.04	0.05	ug/L	ND	80.8	50-140			
Pyrene	4.16	0.01	ug/L	ND	83.2	50-140			
Surrogate: 2-Fluorobiphenyl	15.6		ug/L		78.2	50-140			
Volatiles									
Acetone	85.6	5.0	ug/L	ND	85.6	50-140			
Benzene	44.6	0.5	ug/L	ND	112	60-130			
Bromodichloromethane	40.8	0.5	ug/L	ND	102	60-130			
Bromoform	31.4	0.5	ug/L	ND	78.5	60-130			
Bromomethane	41.3	0.5	ug/L	ND	103	50-140			
Carbon Tetrachloride	27.4	0.2	ug/L	ND	68.5	60-130			
Chlorobenzene	37.9	0.5	ug/L	ND	94.8	60-130			
Chloroethane	39.4	1.0	ug/L	ND	98.6	50-140			
Chloroform	46.4	0.5	ug/L	ND	116	60-130			
Chloromethane	32.7	3.0	ug/L	ND	81.7	50-140			
Dibromochloromethane	34.7	0.5	ug/L	ND	86.8	60-130			
Dichlorodifluoromethane	39.0	1.0	ug/L	ND	97.4	50-140			
1,2-Dibromoethane	35.5	0.2	ug/L	ND	88.8	60-130			
1,2-Dichlorobenzene	43.2	0.5	ug/L	ND	108	60-130			
1,3-Dichlorobenzene	39.4	0.5	ug/L	ND	98.4	60-130			
1,4-Dichlorobenzene	40.9	0.5	ug/L	ND	102	60-130			
1,1-Dichloroethane	40.7	0.5	ug/L	ND	102	60-130			
1,2-Dichloroethane	41.6	0.5	ug/L	ND	104	60-130			
1,1-Dichloroethylene	38.2	0.5	ug/L	ND	95.5	60-130			
cis-1,2-Dichloroethylene	40.8	0.5	ug/L	ND	102	60-130			
trans-1,2-Dichloroethylene	43.3	0.5	ug/L	ND	108	60-130			
1,2-Dichloropropane	48.9	0.5	ug/L	ND	122	60-130			
cis-1,3-Dichloropropylene	46.1	0.5	ug/L	ND	115	60-130			
trans-1,3-Dichloropropylene	42.4	0.5	ug/L	ND	106	60-130			
Ethylbenzene	38.0	0.5	ug/L	ND	95.0	60-130			
Hexane	33.3	1.0	ug/L	ND	83.4	60-130			
Methyl Ethyl Ketone (2-Butanone)	103	5.0	ug/L	ND	103	50-140			
Methyl Butyl Ketone (2-Hexanone)	108	10.0	ug/L	ND	108	50-140			
Methyl Isobutyl Ketone	113	5.0	ug/L	ND	113	50-140			

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Certificate of Analysis

Report Date: 13-Jan-2014
Order Date: 12-Dec-2013

Client: E-3 Laboratories Inc.
Client PO: 2514382

Project Description: City of Barrie

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Methyl tert-butyl ether	107	2.0	ug/L	ND	107	50-140			
Methylene Chloride	35.8	5.0	ug/L	ND	89.5	60-130			
Styrene	36.3	0.5	ug/L	ND	90.8	60-130			
1,1,1,2-Tetrachloroethane	29.2	0.5	ug/L	ND	73.0	60-130			
1,1,2-Tetrachloroethane	38.5	0.5	ug/L	ND	96.2	60-130			
Tetrachloroethylene	36.0	0.5	ug/L	ND	89.9	60-130			
Toluene	40.2	0.5	ug/L	ND	100	60-130			
1,2,4-Trichlorobenzene	41.3	0.5	ug/L	ND	103	60-130			
1,1,1-Trichloroethane	38.3	0.5	ug/L	ND	95.7	60-130			
1,1,2-Trichloroethane	47.4	0.5	ug/L	ND	119	60-130			
Trichloroethylene	41.8	0.5	ug/L	ND	105	60-130			
Trichlorofluoromethane	35.6	1.0	ug/L	ND	88.9	60-130			
1,3,5-Trimethylbenzene	36.7	0.5	ug/L	ND	91.7	60-130			
Vinyl chloride	29.3	0.5	ug/L	ND	73.2	50-140			
m,p-Xylenes	74.0	0.5	ug/L	ND	92.5	60-130			
o-Xylene	39.8	0.5	ug/L	ND	99.6	60-130			

Certificate of Analysis

Client: **E-3 Laboratories Inc.**
Client PO: 2514382

Project Description: **City of Barrie**

Report Date: 13-Jan-2011
Order Date: 12-Dec-2010

Qualifier Notes:

Sample Qualifiers :

- 1 : Elevated detection limit due to dilution required because of high target analyte concentration.
- 2 : Please note that this sample is a standard, therefore Paracels normal Holding Time does not apply.

QC Qualifiers :

- QR-01 : Duplicate RPD is high, however, the sample result is less than 10x the MDL.
- QR-07 : Duplicate result exceeds RPD limits due to non-homogeneity between multiple sample vials.

Sample Data Revisions

None

Work Order Revisions / Comments:

Revision 1 - this report includes an updated Hardness result.

Other Report Notes:

- n/a: not applicable
- ND: Not Detected
- MDL: Method Detection Limit
- Source Result: Data used as source for matrix and duplicate samples
- %REC: Percent recovery.
- RPD: Relative percent difference.

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.



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CERTIFICATE OF ANALYSIS

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 Christi Groves
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 L4N 8X1
 Tel: 705-722-4492

Fax:
 Email: cgroves@golder.com

Work Order No.:2510043
 Received : 2013-08-24
 PO Number:
 Reported: 2013-09-04
 Project Name: Barrie Historic Waste
 Chain of Custody No.: 21806

Client Sample ID	Sample		Parameter	Result	Unit	RDL	Date Analyzed	Method
	Date	Lab ID						
Dup 1	2013-08-23	340446	Alkalinity (CaCO3)	270	mg/LCaCO3	2.00	2013-08-30	APHA 2320B mod
			Ammonia (Total)	0.18	mg/L	0.03	2013-08-27	APHA 4500
			Chloride	286	mg/L	0.25	2013-09-03	HACH 8113
			Conductivity	1410	uS/cm	N/A	2013-08-27	APHA 2510
			F1-F4 PHC	See	Attached	N/A	2013-08-30	Subcontracted
			Metals	See	Attached	N/A	2013-08-29	Subcontracted
			PAHs	See	Attached	N/A	2013-08-30	Subcontracted
			pH	7.76	SU	N/A	2013-08-26	APHA 4500 A.B MOD
			Sulfate (SO4)	30	mg/L	10	2013-09-03	HACH 8051
			VOC Scan	See	Attached	N/A	2013-08-30	Subcontracted
SW B1	2013-08-23	340447	Alkalinity (CaCO3)	264	mg/LCaCO3	2.00	2013-08-30	APHA 2320B mod
			Ammonia (Total)	0.29	mg/L	0.03	2013-08-27	APHA 4500
			Chloride	312	mg/L	0.25	2013-09-03	HACH 8113
			Conductivity	1400	uS/cm	N/A	2013-08-27	APHA 2510
			F1-F4 PHC	See	Attached	N/A	2013-08-30	Subcontracted
			Metals	See	Attached	N/A	2013-08-29	Subcontracted
			PAHs	See	Attached	N/A	2013-08-30	Subcontracted
			pH	7.70	SU	N/A	2013-08-26	APHA 4500 A.B MOD
			Sulfate (SO4)	30	mg/L	10	2013-09-03	HACH 8051
			VOC Scan	See	Attached	N/A	2013-08-30	Subcontracted
SW B2	2013-08-23	340448	Alkalinity (CaCO3)	269	mg/LCaCO3	2.00	2013-08-30	APHA 2320B mod
			Ammonia (Total)	0.11	mg/L	0.03	2013-08-27	APHA 4500
			Chloride	370	mg/L	0.25	2013-09-03	HACH 8113
			Conductivity	1380	uS/cm	N/A	2013-08-27	APHA 2510
			F1-F4 PHC	See	Attached	N/A	2013-08-30	Subcontracted
			Metals	See	Attached	N/A	2013-08-29	Subcontracted
			PAHs	See	Attached	N/A	2013-08-30	Subcontracted
			pH	7.72	SU	N/A	2013-08-26	APHA 4500 A.B MOD
			Sulfate (SO4)	30	mg/L	10	2013-09-03	HACH 8051
			VOC Scan	See	Attached	N/A	2013-08-30	Subcontracted
SW B3	2013-08-23	340449	Alkalinity (CaCO3)	259	mg/LCaCO3	2.00	2013-08-30	APHA 2320B mod
			Ammonia (Total)	0.11	mg/L	0.03	2013-08-27	APHA 4500
			Chloride	394	mg/L	0.25	2013-09-03	HACH 8113
			Conductivity	1390	uS/cm	N/A	2013-08-27	APHA 2510

Reported by:

 Nilou Ghazi, Ph.D.,P.Eng.
 Laboratory Manager

All work has been performed using accepted testing methodologies, except where otherwise agreed to by the client in writing. Our total liability in connection with this work shall be limited to the amount paid by the client. Results relate only to items tested.



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CERTIFICATE OF ANALYSIS

Golder Associates Ltd.
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 L4N 8X1
 Tel: 705-722-4492

Fax:
 Email: cgroves@golder.com

Work Order No.:2510043
 Received : 2013-08-24
 PO Number:
 Reported: 2013-09-04
 Project Name: Barrie Historic Waste
 Chain of Custody No.: 21806

Client Sample ID	Sample		Parameter	Result	Unit	RDL	Date	
	Date	Lab ID					Analyzed	Method
SW B3	2013-08-23	340449	F1-F4 PHC	See	Attached	N/A	2013-08-30	Subcontracted
			Metals	See	Attached	N/A	2013-08-29	Subcontracted
			PAHs	See	Attached	N/A	2013-08-30	Subcontracted
			pH	7.76	SU	N/A	2013-08-26	APHA 4500 A,B MOD
			Sulfate (SO4)	30	mg/L	10	2013-09-03	HACH 8051
			VOC Scan	See	Attached	N/A	2013-08-30	Subcontracted
SW B4	2013-08-23	340450	Alkalinity (CaCO3)	268	mg/LCaCO3	2.00	2013-08-30	APHA 2320B mod
			Ammonia (Total)	0.15	mg/L	0.03	2013-08-27	APHA 4500
			Chloride	414	mg/L	0.25	2013-09-03	HACH 8113
			Conductivity	1450	uS/cm	N/A	2013-08-27	APHA 2510
			F1-F4 PHC	See	Attached	N/A	2013-08-30	Subcontracted
			Metals	See	Attached	N/A	2013-08-29	Subcontracted
			PAHs	See	Attached	N/A	2013-08-30	Subcontracted
			pH	7.72	SU	N/A	2013-08-26	APHA 4500 A,B MOD
			Sulfate (SO4)	30	mg/L	10	2013-09-03	HACH 8051
			VOC Scan	See	Attached	N/A	2013-08-30	Subcontracted
SW B5	2013-08-23	340451	Alkalinity (CaCO3)	259	mg/LCaCO3	2.00	2013-08-30	APHA 2320B mod
			Ammonia (Total)	<0.03	mg/L	0.03	2013-08-27	APHA 4500
			Chloride	358	mg/L	0.25	2013-09-03	HACH 8113
			Conductivity	1410	uS/cm	N/A	2013-08-27	APHA 2510
			F1-F4 PHC	See	Attached	N/A	2013-08-30	Subcontracted
			Metals	See	Attached	N/A	2013-08-29	Subcontracted
			PAHs	See	Attached	N/A	2013-08-30	Subcontracted
			pH	7.80	SU	N/A	2013-08-26	APHA 4500 A,B MOD
			Sulfate (SO4)	40	mg/L	10	2013-09-03	HACH 8051
			VOC Scan	See	Attached	N/A	2013-08-30	Subcontracted

Reported by:

 Nilou Ghazi, Ph.D.,P.Eng.
 Laboratory Manager

All work has been performed using accepted testing methodologies, except where otherwise agreed to by the client in writing. Our total liability in connection with this work shall be limited to the amount paid by the client.
 Results relate only to items tested.



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CERTIFICATE OF ANALYSIS

Golder Associates Ltd.
Christi Groves
121 Commerce Park Drive, Unit L
Barrie
L4N 8X1
Tel: 705-722-4492

Fax:
Email: cgroves@golder.com

Work Order No.: 2510043
Received : 2013-08-24
PO Number:
Reported: 2013-09-04
Project Name: Barrie Historic Waste
Chain of Custody No.: 21806

Client Sample ID	Sample			Result	Unit	RDL	Date	
	Date	Lab ID	Parameter				Analyzed	Method

Reported by:

Nilou Ghazi, Ph.D., P.Eng.
Laboratory Manager

All work has been performed using accepted testing methodologies, except where otherwise agreed to by the client in writing. Our total liability in connection with this work shall be limited to the amount paid by the client.
Results relate only to items tested.



E3 Laboratories Inc.
 SS#4, 360 York Rd., Unit 10, Niagara-on-the-Lake, Ontario L0S 1J0
 Email: info@e3labs.ca
 Tel: (905) 641-9000, Fax: (905) 641-9001

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 Results relate only to items tested.

C.O.C.: --

REPORT No. B13-22318 (I)

Report To:

E3 Labs Inc.
 360 York Rd #10,
 NOTL ON LOS 1J0 Canada
Attention: Kristy LeBrasseur

Caduceon Environmental Laboratories

285 Dalton Ave
 Kingston Ontario K7K 6Z1
 Tel: 613-544-2001
 Fax: 613-544-2770

DATE RECEIVED: 27-Aug-13

JOB/PROJECT NO.:

DATE REPORTED: 04-Sep-13

P.O. NUMBER: 2510043

SAMPLE MATRIX: Surface Water

WATERWORKS NO.

Parameter	Units	M.D.L.	Reference Method	Date/Site Analyzed	Client I.D.	340446-Dup 1	340447-SW B1	340448-SW B2	340449-SW B3
					Sample I.D.	B13-22318-1	B13-22318-2	B13-22318-3	B13-22318-4
Date Collected					23-Aug-13	23-Aug-13	23-Aug-13	23-Aug-13	23-Aug-13
Hardness (as CaCO3)	mg/L	1	SM 3120	29-Aug-13/O	360	340	335	347	
Aluminum	mg/L	0.01	SM 3120	29-Aug-13/O	0.05	0.04	0.04	0.04	0.04
Aluminum (total)	mg/L	0.01	SM 3120	29-Aug-13/O	0.16	0.08	0.11	0.20	
Antimony	mg/L	0.0001	EPA 200.8	29-Aug-13/O	0.0001	0.0002	< 0.0001	0.0001	
Arsenic	mg/L	0.0001	EPA 200.8	29-Aug-13/O	0.0004	0.0003	0.0003	0.0004	
Barium	mg/L	0.001	SM 3120	29-Aug-13/O	0.163	0.163	0.173	0.181	
Beryllium	mg/L	0.0001	EPA 200.8	29-Aug-13/O	< 0.0001	< 0.0001	< 0.0001	< 0.0001	
Boron	mg/L	0.005	SM 3120	29-Aug-13/O	0.018	0.019	0.018	0.019	
Cadmium	mg/L	0.00002	EPA 200.8	29-Aug-13/O	0.00025	0.00013	0.00008	0.00008	
Calcium	mg/L	0.02	SM 3120	29-Aug-13/O	121	123	132	136	
Chromium	mg/L	0.0002	EPA 200.8	29-Aug-13/O	0.0042	0.0033	0.0021	0.0025	
Cobalt	mg/L	0.0001	EPA 200.8	29-Aug-13/O	0.0003	0.0002	< 0.0001	0.0001	
Copper	mg/L	0.0001	EPA 200.8	29-Aug-13/O	0.0100	0.0091	0.0053	0.0069	
Iron (Total)	mg/L	0.005	SM 3120	29-Aug-13/O	1.02	0.675	0.731	1.20	
Lead	mg/L	0.00002	EPA 200.8	29-Aug-13/O	0.00282	0.00207	0.00083	0.00162	
Magnesium	mg/L	0.01	SM 3120	29-Aug-13/O	14.3	14.6	15.7	16.0	
Manganese (Total)	mg/L	0.001	SM 3120	29-Aug-13/O	0.080	0.077	0.030	0.098	
Mercury	mg/L	0.00002	SM 3112B	29-Aug-13/R	< 0.00002	< 0.00002	< 0.00002	< 0.00002	
Molybdenum	mg/L	0.0001	EPA 200.8	29-Aug-13/O	0.0008	0.0008	0.0007	0.0007	
Nickel	mg/L	0.01	SM 3120	29-Aug-13/O	< 0.01	< 0.01	< 0.01	< 0.01	
Potassium	mg/L	0.1	SM 3120	29-Aug-13/O	2.5	2.6	2.7	2.8	
Selenium	mg/L	0.001	EPA 200.8	29-Aug-13/O	< 0.001	< 0.001	< 0.001	< 0.001	
Silver	mg/L	0.00002	EPA 200.8	29-Aug-13/O	0.00005	0.00002	< 0.00002	< 0.00002	
Sodium	mg/L	0.2	SM 3120	29-Aug-13/O	163	170	179	180	
Strontium	mg/L	0.001	SM 3120	29-Aug-13/O	0.482	0.490	0.519	0.530	
Thallium	mg/L	0.00005	EPA 200.8	29-Aug-13/O	0.00006	< 0.00005	< 0.00005	< 0.00005	
Titanium	mg/L	0.005	SM 3120	29-Aug-13/O	0.009	< 0.005	< 0.005	0.010	
Tungsten	mg/L	0.01	SM 3120	29-Aug-13/O	0.03	0.02	0.02	0.01	



Michelle Dubien
 Lab Manager

M.D.L. = Method Detection Limit
 Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill

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C.O.C.: --

REPORT No. B13-22318 (I)

Report To:

E3 Labs Inc.
 360 York Rd #10,
 NOTL ON L0S 1J0 Canada
Attention: Kristy LeBrasseur

Caduceon Environmental Laboratories

285 Dalton Ave
 Kingston Ontario K7K 6Z1
 Tel: 613-544-2001
 Fax: 613-544-2770

DATE RECEIVED: 27-Aug-13

JOB/PROJECT NO.:

DATE REPORTED: 04-Sep-13

P.O. NUMBER: 2510043

SAMPLE MATRIX: Surface Water

WATERWORKS NO.

Parameter	Units	M.D.L.	Client I.D.		340446-Dup 1	340447-SW B1	340448-SW B2	340449-SW B3
			Reference Method	Date/Site Analyzed	B13-22318-1	B13-22318-2	B13-22318-3	B13-22318-4
Uranium	mg/L	0.00005	EPA 200.8	29-Aug-13/O	0.00115	0.00110	0.00134	0.00146
Vanadium	mg/L	0.0001	EPA 200.8	29-Aug-13/O	0.0009	0.0004	0.0005	0.0008
Zinc	mg/L	0.005	SM 3120	29-Aug-13/O	0.023	0.015	0.014	0.029
Zirconium	mg/L	0.003	SM 3120	29-Aug-13/O	< 0.003	< 0.003	< 0.003	< 0.003



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 DATE REPORTED: 04-Sep-13
 SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.:
 P.O. NUMBER: 2510043
 WATERWORKS NO.

Client I.D.	340450-SW B4	340451-SW B5
Sample I.D.	B13-22318-5	B13-22318-6
Date Collected	23-Aug-13	23-Aug-13

Parameter	Units	M.D.L.	Reference Method	Date/Site Analyzed		
Hardness (as CaCO3)	mg/L	1	SM 3120	29-Aug-13/O	335	359
Aluminum	mg/L	0.01	SM 3120	29-Aug-13/O	0.04	0.04
Aluminum (total)	mg/L	0.01	SM 3120	29-Aug-13/O	0.07	0.07
Antimony	mg/L	0.0001	EPA 200.8	29-Aug-13/O	0.0002	< 0.0001
Arsenic	mg/L	0.0001	EPA 200.8	29-Aug-13/O	0.0006	0.0004
Barium	mg/L	0.001	SM 3120	29-Aug-13/O	0.163	0.154
Beryllium	mg/L	0.0001	EPA 200.8	29-Aug-13/O	< 0.0001	< 0.0001
Boron	mg/L	0.005	SM 3120	29-Aug-13/O	0.022	0.016
Cadmium	mg/L	0.00002	EPA 200.8	29-Aug-13/O	0.00010	0.00012
Calcium	mg/L	0.02	SM 3120	29-Aug-13/O	130	133
Chromium	mg/L	0.0002	EPA 200.8	29-Aug-13/O	0.0026	0.0049
Cobalt	mg/L	0.0001	EPA 200.8	29-Aug-13/O	0.0001	0.0001
Copper	mg/L	0.0001	EPA 200.8	29-Aug-13/O	0.0089	0.0100
Iron (Total)	mg/L	0.005	SM 3120	29-Aug-13/O	1.01	0.605
Lead	mg/L	0.00002	EPA 200.8	29-Aug-13/O	0.00541	0.00142
Magnesium	mg/L	0.01	SM 3120	29-Aug-13/O	15.1	15.6
Manganese (Total)	mg/L	0.001	SM 3120	29-Aug-13/O	0.079	0.064
Mercury	mg/L	0.00002	SM 3112B	29-Aug-13/R	< 0.00002	< 0.00002
Molybdenum	mg/L	0.0001	EPA 200.8	29-Aug-13/O	0.0008	0.0015
Nickel	mg/L	0.01	SM 3120	29-Aug-13/O	< 0.01	< 0.01
Potassium	mg/L	0.1	SM 3120	29-Aug-13/O	2.8	2.7
Selenium	mg/L	0.001	EPA 200.8	29-Aug-13/O	< 0.001	< 0.001
Silver	mg/L	0.00002	EPA 200.8	29-Aug-13/O	0.00002	0.00002
Sodium	mg/L	0.2	SM 3120	29-Aug-13/O	221	212
Strontium	mg/L	0.001	SM 3120	29-Aug-13/O	0.690	0.636
Thallium	mg/L	0.00005	EPA 200.8	29-Aug-13/O	< 0.00005	< 0.00005
Titanium	mg/L	0.005	SM 3120	29-Aug-13/O	< 0.005	< 0.005
Tungsten	mg/L	0.01	SM 3120	29-Aug-13/O	0.02	0.02



Michelle Dubien
 Lab Manager

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 Site Analyzed=K-Kingston, W-Windsor, O-Ottawa, R-Richmond Hill

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Attention: Kristy LeBrasseur

Caduceon Environmental Laboratories
 285 Dalton Ave
 Kingston Ontario K7K 6Z1
 Tel: 613-544-2001
 Fax: 613-544-2770

DATE RECEIVED: 27-Aug-13

JOB/PROJECT NO.:

DATE REPORTED: 04-Sep-13

P.O. NUMBER: 2510043

SAMPLE MATRIX: Surface Water

WATERWORKS NO.

Parameter	Units	M.D.L.	Reference Method	Date/Site Analyzed	Client I.D.	
					340450-SW B4	340451-SW B5
Uranium	mg/L	0.00005	EPA 200.8	29-Aug-13/O	0.00144	0.00172
Vanadium	mg/L	0.0001	EPA 200.8	29-Aug-13/O	0.0006	0.0008
Zinc	mg/L	0.005	SM 3120	29-Aug-13/O	0.013	0.013
Zirconium	mg/L	0.003	SM 3120	29-Aug-13/O	< 0.003	< 0.003



Michelle Dubien
 Lab Manager

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DATE RECEIVED: 27-Aug-13
 DATE REPORTED: 04-Sep-13
 SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.:
 P.O. NUMBER: 2510043
 WATERWORKS NO.

Parameter	Units	M.D.L.	Client I.D.	
			Reference Method	Date/Site Analyzed
Hardness (as CaCO3)	mg/L	1	SM 3120	29-Aug-13/O
Aluminum	mg/L	0.01	SM 3120	29-Aug-13/O
Aluminum (total)	mg/L	0.01	SM 3120	29-Aug-13/O
Antimony	mg/L	0.0001	EPA 200.8	29-Aug-13/O
Arsenic	mg/L	0.0001	EPA 200.8	29-Aug-13/O
Barium	mg/L	0.001	SM 3120	29-Aug-13/O
Beryllium	mg/L	0.0001	EPA 200.8	29-Aug-13/O
Boron	mg/L	0.005	SM 3120	29-Aug-13/O
Cadmium	mg/L	0.00002	EPA 200.8	29-Aug-13/O
Calcium	mg/L	0.02	SM 3120	29-Aug-13/O
Chromium	mg/L	0.0002	EPA 200.8	29-Aug-13/O
Cobalt	mg/L	0.0001	EPA 200.8	29-Aug-13/O
Copper	mg/L	0.0001	EPA 200.8	29-Aug-13/O
Iron (Total)	mg/L	0.005	SM 3120	29-Aug-13/O
Lead	mg/L	0.00002	EPA 200.8	29-Aug-13/O
Magnesium	mg/L	0.01	SM 3120	29-Aug-13/O
Manganese (Total)	mg/L	0.001	SM 3120	29-Aug-13/O
Mercury	mg/L	0.00002	SM 3112B	29-Aug-13/R
Molybdenum	mg/L	0.0001	EPA 200.8	29-Aug-13/O
Nickel	mg/L	0.01	SM 3120	29-Aug-13/O
Potassium	mg/L	0.1	SM 3120	29-Aug-13/O
Selenium	mg/L	0.001	EPA 200.8	29-Aug-13/O
Silver	mg/L	0.00002	EPA 200.8	29-Aug-13/O
Sodium	mg/L	0.2	SM 3120	29-Aug-13/O
Strontium	mg/L	0.001	SM 3120	29-Aug-13/O
Thallium	mg/L	0.00005	EPA 200.8	29-Aug-13/O
Titanium	mg/L	0.005	SM 3120	29-Aug-13/O
Tungsten	mg/L	0.01	SM 3120	29-Aug-13/O



Michelle Dubien
 Lab Manager

M.D.L. = Method Detection Limit
 Site Analyzed=K-Kingston, W-Windsor, O-Ottawa, R-Richmond Hill

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REPORT No. B13-22318 (i)

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 360 York Rd #10,
 NOTL ON LOS 1J0 Canada
Attention: Kristy LeBrasseur

Caduceon Environmental Laboratories
 285 Dalton Ave
 Kingston Ontario K7K 6Z1
 Tel: 613-544-2001
 Fax: 613-544-2770

DATE RECEIVED: 27-Aug-13
 DATE REPORTED: 04-Sep-13
 SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.:
 P.O. NUMBER: 2510043
 WATERWORKS NO.

Parameter	Units	M.D.L.	Client I.D.	
			Reference Method	Date/Site Analyzed
Uranium	mg/L	0.00005	EPA 200.8	29-Aug-13/O
Vanadium	mg/L	0.0001	EPA 200.8	29-Aug-13/O
Zinc	mg/L	0.005	SM 3120	29-Aug-13/O
Zirconium	mg/L	0.003	SM 3120	29-Aug-13/O



Michelle Dubien
 Lab Manager

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REPORT No. B13-22318 (II)

Report To:

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 360 York Rd #10,
 NOTL ON LOS 1J0 Canada
Attention: Kristy LeBrasseur

Caduceon Environmental Laboratories

285 Dalton Ave
 Kingston Ontario K7K 6Z1
 Tel: 613-544-2001
 Fax: 613-544-2770

DATE RECEIVED: 27-Aug-13

JOB/PROJECT NO.:

DATE REPORTED: 04-Sep-13

P.O. NUMBER: 2510043

SAMPLE MATRIX: Surface Water

WATERWORKS NO.:

Parameter	Units	M.D.L.	Reference Method	Date/Site Analyzed	Client I.D.				
					340446-Dup 1	340447-SW B1	340448-SW B2	340449-SW B3	
					Sample I.D.	B13-22318-1	B13-22318-2	B13-22318-3	B13-22318-4
					Date Collected	23-Aug-13	23-Aug-13	23-Aug-13	23-Aug-13
Acetone	µg/L	30	EPA 8260	30-Aug-13/R	< 30	< 30	< 30	< 30	
Benzene	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5	< 0.5	< 0.5	
Bromodichloromethane	µg/L	2	EPA 8260	30-Aug-13/R	< 2	< 2	< 2	< 2	
Bromoform	µg/L	5	EPA 8260	30-Aug-13/R	< 5	< 5	< 5	< 5	
Bromomethane	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5	< 0.5	< 0.5	
Carbon Tetrachloride	µg/L	0.2	EPA 8260	30-Aug-13/R	< 0.2	< 0.2	< 0.2	< 0.2	
Monochlorobenzene (Chlorobenzene)	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5	< 0.5	< 0.5	
Chloroform	µg/L	1	EPA 8260	30-Aug-13/R	< 1	< 1	< 1	< 1	
Dibromochloromethane	µg/L	2	EPA 8260	30-Aug-13/R	< 2	< 2	< 2	< 2	
Dichlorobenzene, 1,2-	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5	< 0.5	< 0.5	
Dichlorobenzene, 1,3-	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5	< 0.5	< 0.5	
Dichlorobenzene, 1,4-	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5	< 0.5	< 0.5	
Dichlorodifluoromethane	µg/L	2	EPA 8260	30-Aug-13/R	< 2	< 2	< 2	< 2	
Dichloroethane, 1,1-	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5	< 0.5	< 0.5	
Dichloroethane, 1,2-	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5	< 0.5	< 0.5	
Dichloroethylene, 1,1-	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5	< 0.5	< 0.5	
Dichloroethene, cis-1,2-	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5	< 0.5	< 0.5	
Dichloroethene, trans-1,2-	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5	< 0.5	< 0.5	
Dichloropropane, 1,2-	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5	< 0.5	< 0.5	
Dichloropropene, cis-1,3-	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5	< 0.5	< 0.5	
Dichloropropene, trans-1,3-	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5	< 0.5	< 0.5	
Dichloropropene 1,3-cis+trans	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5	< 0.5	< 0.5	
Ethylbenzene	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5	< 0.5	< 0.5	
Dibromoethane, 1,2- (Ethylene Dibromide)	µg/L	0.2	EPA 8260	30-Aug-13/R	< 0.2	< 0.2	< 0.2	< 0.2	
Hexane	µg/L	5	EPA 8260	30-Aug-13/R	< 5	< 5	< 5	< 5	



Michelle Dubien
 Lab Manager

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 Site Analyzed=K-Kingston, W-Windsor, O-Ottawa, R-Richmond Hill

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C.O.C.: ---

REPORT No. B13-22318 (ii)

Report To:

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360 York Rd #10,
NOTL ON L0S 1J0 Canada
Attention: Kristy LeBrasseur

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285 Dalton Ave
Kingston Ontario K7K 6Z1
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Fax: 613-544-2770

DATE RECEIVED: 27-Aug-13

JOB/PROJECT NO.:

DATE REPORTED: 04-Sep-13

P.O. NUMBER: 2510043

SAMPLE MATRIX: Surface Water

WATERWORKS NO.

Parameter	Units	M.D.L.	Client I.D.				Sample I.D.					
			Reference Method	Date/Site Analyzed	340446-Dup 1	340447-SW B1	340448-SW B2	340449-SW B3	B13-22318-1	B13-22318-2	B13-22318-3	B13-22318-4
					23-Aug-13	23-Aug-13	23-Aug-13	23-Aug-13	23-Aug-13	23-Aug-13		
Methyl Ethyl Ketone	µg/L	20	EPA 8260	30-Aug-13/R	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Methyl Isobutyl Ketone	µg/L	20	EPA 8260	30-Aug-13/R	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Methyl-t-butyl Ether	µg/L	2	EPA 8260	30-Aug-13/R	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dichloromethane (Methylene Chloride)	µg/L	5	EPA 8260	30-Aug-13/R	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Styrene	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethane, 1,1,1,2-	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethane, 1,1,2,2-	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethylene	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Toluene	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichlorobenzene, 1,2,4-	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethane, 1,1,1-	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethane, 1,1,2-	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethylene	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichlorofluoromethane	µg/L	5	EPA 8260	30-Aug-13/R	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Vinyl Chloride	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Xylene, m,p-	µg/L	1.0	EPA 8260	30-Aug-13/R	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Xylene, o-	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Xylene, m,p,o-	µg/L	1.1	EPA 8260	30-Aug-13/R	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1
PHC F1 (C6-C10)	µg/L	50	MOE TPH- E3397A	30-Aug-13/R	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
Comment-purgeable PHC F2 (>C10-C16)	µg/L	50	-	30-Aug-13	-	-	-	-	-	-	-	-
PHC F3 (>C16-C34)	µg/L	400	MOE PHC E3421	29-Aug-13/K	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
PHC F4 (>C34-C50)	µg/L	400	MOE PHC E3421	29-Aug-13/K	< 400	< 400	< 400	< 400	< 400	< 400	< 400	< 400
Comment-extractable	-	-	-	29-Aug-13	-	-	-	-	-	-	-	-

M. Dubien

Michelle Dubien
Lab Manager

M.D.L. = Method Detection Limit

Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill

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C.O.C.: ---

REPORT No. B13-22318 (II)

Report To:

E3 Labs Inc.
 360 York Rd #10,
 NOTL ON LOS 1J0 Canada

Attention: Kristy LeBrasseur

Caduceon Environmental Laboratories

285 Dalton Ave
 Kingston Ontario K7K 6Z1
 Tel: 613-544-2001
 Fax: 613-544-2770

DATE RECEIVED: 27-Aug-13

DATE REPORTED: 04-Sep-13

SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.:

P.O. NUMBER: 2510043

WATERWORKS NO.

Client I.D.	340446-Dup 1	340447-SW B1	340448-SW B2	340449-SW B3
Sample I.D.	B13-22318-1	B13-22318-2	B13-22318-3	B13-22318-4
Date Collected	23-Aug-13	23-Aug-13	23-Aug-13	23-Aug-13

Parameter	Units	M.D.L.	Reference Method	Date/Site Analyzed
1 Note: Elevated MDL due to low sample volume.				



Michelle Dubien
Lab Manager

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 Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill

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DATE RECEIVED: 27-Aug-13
 DATE REPORTED: 04-Sep-13
 SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.:
 P.O. NUMBER: 2510043
 WATERWORKS NO.

Parameter	Units	M.D.L.	Client I.D.		340450-SW B4	340451-SW B5
			Sample I.D.	Date Collected	B13-22318-5	B13-22318-6
			Reference Method	Date/Site Analyzed		
Acetone	µg/L	30	EPA 8260	30-Aug-13/R	< 30	< 30
Benzene	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5
Bromodichloromethane	µg/L	2	EPA 8260	30-Aug-13/R	< 2	< 2
Bromoform	µg/L	5	EPA 8260	30-Aug-13/R	< 5	< 5
Bromomethane	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5
Carbon Tetrachloride	µg/L	0.2	EPA 8260	30-Aug-13/R	< 0.2	< 0.2
Monochlorobenzene (Chlorobenzene)	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5
Chloroform	µg/L	1	EPA 8260	30-Aug-13/R	< 1	< 1
Dibromochloromethane	µg/L	2	EPA 8260	30-Aug-13/R	< 2	< 2
Dichlorobenzene, 1,2-	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5
Dichlorobenzene, 1,3-	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5
Dichlorobenzene, 1,4-	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5
Dichlorodifluoromethane	µg/L	2	EPA 8260	30-Aug-13/R	< 2	< 2
Dichloroethane, 1,1-	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5
Dichloroethane, 1,2-	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5
Dichloroethylene, 1,1-	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5
Dichloroethene, cis-1,2-	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5
Dichloroethene, trans-1,2-	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5
Dichloropropane, 1,2-	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5
Dichloropropene, cis-1,3-	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5
Dichloropropene, trans-1,3-	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5
Dichloropropene 1,3-cis+trans	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5
Ethylbenzene	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5
Dibromoethane, 1,2- (Ethylene Dibromide)	µg/L	0.2	EPA 8260	30-Aug-13/R	< 0.2	< 0.2
Hexane	µg/L	5	EPA 8260	30-Aug-13/R	< 5	< 5



Michelle Dubien
 Lab Manager

M.D.L. = Method Detection Limit
 Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill

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REPORT No. B13-22318 (II)

Report To:

E3 Labs Inc.
 360 York Rd #10,
 NOTL ON LOS 1J0 Canada
Attention: Kristy LeBrasseur

Caduceon Environmental Laboratories
 285 Dalton Ave
 Kingston Ontario K7K 6Z1
 Tel: 613-544-2001
 Fax: 613-544-2770

DATE RECEIVED: 27-Aug-13
 DATE REPORTED: 04-Sep-13
 SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.:
 P.O. NUMBER: 2510043
 WATERWORKS NO.

Client I.D.	340450-SW B4	340451-SW B5
Sample I.D.	B13-22318-5	B13-22318-6
Date Collected	23-Aug-13	23-Aug-13

Parameter	Units	M.D.L.	Reference Method	Date/Site Analyzed		
Methyl Ethyl Ketone	µg/L	20	EPA 8260	30-Aug-13/R	< 20	< 20
Methyl isobutyl Ketone	µg/L	20	EPA 8260	30-Aug-13/R	< 20	< 20
Methyl-t-butyl Ether	µg/L	2	EPA 8260	30-Aug-13/R	< 2	< 2
Dichloromethane (Methylene Chloride)	µg/L	5	EPA 8260	30-Aug-13/R	< 5	< 5
Styrene	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5
Tetrachloroethane, 1, 1, 1, 2-	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5
Tetrachloroethane, 1, 1, 2, 2-	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5
Tetrachloroethylene	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5
Toluene	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5
Trichlorobenzene, 1, 2, 4-	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5
Trichloroethane, 1, 1, 1-	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5
Trichloroethane, 1, 1, 2-	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5
Trichloroethylene	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5
Trichlorofluoromethane	µg/L	5	EPA 8260	30-Aug-13/R	< 5	< 5
Vinyl Chloride	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5
Xylene, m,p-	µg/L	1.0	EPA 8260	30-Aug-13/R	< 1.0	< 1.0
Xylene, o-	µg/L	0.5	EPA 8260	30-Aug-13/R	< 0.5	< 0.5
Xylene, m,p,o-	µg/L	1.1	EPA 8260	30-Aug-13/R	< 1.1	< 1.1
PHC F1 (C6-C10)	µg/L	50	MOE TPH-E3397A	30-Aug-13/R	60	< 50
Comment-purgeable	-	-	-	30-Aug-13	NDP	-
PHC F2 (>C10-C16)	µg/L	50	MOE PHC E3421	29-Aug-13/K	< 50	< 50
PHC F3 (>C16-C34)	µg/L	400	MOE PHC E3421	29-Aug-13/K	< 400	< 400
PHC F4 (>C34-C50)	µg/L	400	MOE PHC E3421	29-Aug-13/K	< 400	< 400
Comment-extractable	-	-	-	29-Aug-13	-	-



Michelle Dubien
 Lab Manager

M.D.L. = Method Detection Limit
 Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill

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REPORT No. B13-22318 (ii)

Report To:

E3 Labs Inc.
 360 York Rd #10,
 NOTL ON LOS 1J0 Canada
Attention: Kristy LeBrasseur

Caduceon Environmental Laboratories
 285 Dalton Ave
 Kingston Ontario K7K 6Z1
 Tel: 613-544-2001
 Fax: 613-544-2770

DATE RECEIVED: 27-Aug-13

JOB/PROJECT NO.:

DATE REPORTED: 04-Sep-13

P.O. NUMBER: 2510043

SAMPLE MATRIX: Surface Water

WATERWORKS NO.

Client I.D.	340450-SW B4	340451-SW B5
Sample I.D.	B13-22318-5	B13-22318-6
Date Collected	23-Aug-13	23-Aug-13

Parameter	Units	M.D.L.	Reference Method	Date/Site Analyzed
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1 Note: Elevated MDL due to low sample volume.



Michelle Dubien
 Lab Manager

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 Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill

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 Tel: 613-544-2001
 Fax: 613-544-2770

DATE RECEIVED: 27-Aug-13

DATE REPORTED: 04-Sep-13

SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.:

P.O. NUMBER: 2510043

WATERWORKS NO.

Parameter	Units	M.D.L.	Client I.D.	
			Reference Method	Date/Site Analyzed
Acetone	µg/L	30	EPA 8260	30-Aug-13/R
Benzene	µg/L	0.5	EPA 8260	30-Aug-13/R
Bromodichloromethane	µg/L	2	EPA 8260	30-Aug-13/R
Bromoform	µg/L	5	EPA 8260	30-Aug-13/R
Bromomethane	µg/L	0.5	EPA 8260	30-Aug-13/R
Carbon Tetrachloride	µg/L	0.2	EPA 8260	30-Aug-13/R
Monochlorobenzene (Chlorobenzene)	µg/L	0.5	EPA 8260	30-Aug-13/R
Chloroform	µg/L	1	EPA 8260	30-Aug-13/R
Dibromochloromethane	µg/L	2	EPA 8260	30-Aug-13/R
Dichlorobenzene, 1,2-	µg/L	0.5	EPA 8260	30-Aug-13/R
Dichlorobenzene, 1,3-	µg/L	0.5	EPA 8260	30-Aug-13/R
Dichlorobenzene, 1,4-	µg/L	0.5	EPA 8260	30-Aug-13/R
Dichlorodifluoromethane	µg/L	2	EPA 8260	30-Aug-13/R
Dichloroethane, 1,1-	µg/L	0.5	EPA 8260	30-Aug-13/R
Dichloroethane, 1,2-	µg/L	0.5	EPA 8260	30-Aug-13/R
Dichloroethylene, 1,1-	µg/L	0.5	EPA 8260	30-Aug-13/R
Dichloroethene, cis-1,2-	µg/L	0.5	EPA 8260	30-Aug-13/R
Dichloroethene, trans-1,2-	µg/L	0.5	EPA 8260	30-Aug-13/R
Dichloropropane, 1,2-	µg/L	0.5	EPA 8260	30-Aug-13/R
Dichloropropene, cis-1,3-	µg/L	0.5	EPA 8260	30-Aug-13/R
Dichloropropene, trans-1,3-	µg/L	0.5	EPA 8260	30-Aug-13/R
Dichloropropene 1,3-cis+trans	µg/L	0.5	EPA 8260	30-Aug-13/R
Ethylbenzene	µg/L	0.5	EPA 8260	30-Aug-13/R
Dibromoethane, 1,2- (Ethylene Dibromide)	µg/L	0.2	EPA 8260	30-Aug-13/R
Hexane	µg/L	5	EPA 8260	30-Aug-13/R

Michelle Dubien
 Lab Manager

M.D.L. = Method Detection Limit
 Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill

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REPORT No. B13-22318 (II)

Report To:

E3 Labs Inc.
 360 York Rd #10,
 NOTL ON LOS 1J0 Canada
Attention: Kristy LeBrasseur

Caduceon Environmental Laboratories

285 Dalton Ave
 Kingston Ontario K7K 6Z1
 Tel: 613-544-2001
 Fax: 613-544-2770

DATE RECEIVED: 27-Aug-13
 DATE REPORTED: 04-Sep-13
 SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.:
 P.O. NUMBER: 2510043
 WATERWORKS NO.

Parameter	Units	M.D.L.	Client I.D.	
			Reference Method	Date/Site Analyzed
Methyl Ethyl Ketone	µg/L	20	EPA 8260	30-Aug-13/R
Methyl Isobutyl Ketone	µg/L	20	EPA 8260	30-Aug-13/R
Methyl-t-butyl Ether	µg/L	2	EPA 8260	30-Aug-13/R
Dichloromethane (Methylene Chloride)	µg/L	5	EPA 8260	30-Aug-13/R
Styrene	µg/L	0.5	EPA 8260	30-Aug-13/R
Tetrachloroethane, 1,1,1,2-	µg/L	0.5	EPA 8260	30-Aug-13/R
Tetrachloroethane, 1,1,2,2-	µg/L	0.5	EPA 8260	30-Aug-13/R
Tetrachloroethylene	µg/L	0.5	EPA 8260	30-Aug-13/R
Toluene	µg/L	0.5	EPA 8260	30-Aug-13/R
Trichlorobenzene, 1,2,4-	µg/L	0.5	EPA 8260	30-Aug-13/R
Trichloroethane, 1,1,1-	µg/L	0.5	EPA 8260	30-Aug-13/R
Trichloroethane, 1,1,2-	µg/L	0.5	EPA 8260	30-Aug-13/R
Trichloroethylene	µg/L	0.5	EPA 8260	30-Aug-13/R
Trichlorofluoromethane	µg/L	5	EPA 8260	30-Aug-13/R
Vinyl Chloride	µg/L	0.5	EPA 8260	30-Aug-13/R
Xylene, m,p-	µg/L	1.0	EPA 8260	30-Aug-13/R
Xylene, o-	µg/L	0.5	EPA 8260	30-Aug-13/R
Xylene, m,p,o-	µg/L	1.1	EPA 8260	30-Aug-13/R
PHC F1 (C6-C10)	µg/L	50	MOE TPH- E3397A	30-Aug-13/R
Comment-purgeable	-	-	-	30-Aug-13
PHC F2 (>C10-C16)	µg/L	50	MOE PHC E3421	29-Aug-13/K
PHC F3 (>C16-C34)	µg/L	400	MOE PHC E3421	29-Aug-13/K
PHC F4 (>C34-C50)	µg/L	400	MOE PHC E3421	29-Aug-13/K
Comment-extractable	-	-	-	29-Aug-13



Michelle Dubien
 Lab Manager

M.D.L. = Method Detection Limit
 Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill

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 Fax: 613-544-2770

DATE RECEIVED: 27-Aug-13

DATE REPORTED: 04-Sep-13

SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.:

P.O. NUMBER: 2510043

WATERWORKS NO.:

Client I.D.
Sample I.D.
Date Collected

Parameter	Units	M.D.L.	Reference Method	Date/Site Analyzed
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1. Note: Elevated MDL due to low sample volume.



Michelle Dubien
 Lab Manager

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 Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill

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Attention: Kristy LeBrasseur

Caduceon Environmental Laboratories

285 Dalton Ave
 Kingston Ontario K7K 6Z1
 Tel: 613-544-2001
 Fax: 613-544-2770

DATE RECEIVED: 27-Aug-13

JOB/PROJECT NO.:

DATE REPORTED: 04-Sep-13

P.O. NUMBER: 2510043

SAMPLE MATRIX: Surface Water

WATERWORKS NO.

Parameter	Units	M.D.L.	Client I.D.		340446-Dup 1	340447-SW B1	340448-SW B2	340449-SW B3
			Reference Method	Date/Site Analyzed	Sample I.D.	B13-22318-1	B13-22318-2	B13-22318-3
			Date Collected					
Acenaphthene	µg/L	0.05	EPA 8270	30-Aug-13/K	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	µg/L	0.05	EPA 8270	30-Aug-13/K	< 0.05	< 0.05	< 0.05	< 0.05
Anthracene	µg/L	0.05	EPA 8270	30-Aug-13/K	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)anthracene	µg/L	0.05	EPA 8270	30-Aug-13/K	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)pyrene	µg/L	0.01	EPA 8270	30-Aug-13/K	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/L	0.05	EPA 8270	30-Aug-13/K	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(b+k)fluoranthene	µg/L	0.1	EPA 8270	30-Aug-13/K	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(g,h,i)perylene	µg/L	0.05	EPA 8270	30-Aug-13/K	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(k)fluoranthene	µg/L	0.05	EPA 8270	30-Aug-13/K	< 0.05	< 0.05	< 0.05	< 0.05
Chrysene	µg/L	0.05	EPA 8270	30-Aug-13/K	< 0.05	< 0.05	< 0.05	< 0.05
Dibenzo(a,h)anthracene	µg/L	0.05	EPA 8270	30-Aug-13/K	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	µg/L	0.05	EPA 8270	30-Aug-13/K	< 0.05	< 0.05	< 0.05	0.09
Fluorene	µg/L	0.05	EPA 8270	30-Aug-13/K	< 0.05	< 0.05	< 0.05	< 0.05
Indeno(1,2,3,-cd)pyrene	µg/L	0.05	EPA 8270	30-Aug-13/K	< 0.05	< 0.05	< 0.05	< 0.05
Methylnaphthalene, 1-	µg/L	0.05	EPA 8270	30-Aug-13/K	< 0.05	< 0.05	< 0.05	< 0.05
Methylnaphthalene, 2-	µg/L	0.05	EPA 8270	30-Aug-13/K	< 0.05	< 0.05	< 0.05	< 0.05
Naphthalene	µg/L	0.05	EPA 8270	30-Aug-13/K	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	µg/L	0.05	EPA 8270	30-Aug-13/K	< 0.05	< 0.05	< 0.05	< 0.05
Pyrene	µg/L	0.05	EPA 8270	30-Aug-13/K	< 0.05	< 0.05	< 0.05	< 0.05

Elevated MDLs due to matrix interferences



Michelle Dubien
 Lab Manager

M.D.L. = Method Detection Limit

Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill

The analytical results reported herein refer to the samples as received. Reproduction of this analytical report in full or in part is prohibited without prior consent from Caduceon Environmental Laboratories.

C.O.C.: --

REPORT No. B13-22318 (III)

Report To:

E3 Labs Inc.
 360 York Rd #10,
 NOTL ON LOS 1J0 Canada

Attention: Kristy LeBrasseur

Caduceon Environmental Laboratories
 285 Dalton Ave
 Kingston Ontario K7K 6Z1
 Tel: 613-544-2001
 Fax: 613-544-2770

DATE RECEIVED: 27-Aug-13

JOB/PROJECT NO.:

DATE REPORTED: 04-Sep-13

P.O. NUMBER: 2510043

SAMPLE MATRIX: Surface Water

WATERWORKS NO.

Client I.D.	340450-SW B4	340451-SW B5
Sample I.D.	B13-22318-5	B13-22318-6
Date Collected	23-Aug-13	23-Aug-13

Parameter	Units	M.D.L.	Reference Method	Date/Site Analyzed		
Acenaphthene	µg/L	0.05	EPA 8270	30-Aug-13/K	< 0.05	< 0.05
Acenaphthylene	µg/L	0.05	EPA 8270	30-Aug-13/K	< 0.05	< 0.05
Anthracene	µg/L	0.05	EPA 8270	30-Aug-13/K	< 0.05	< 0.05
Benzo(a)anthracene	µg/L	0.05	EPA 8270	30-Aug-13/K	< 0.05	< 0.05
Benzo(a)pyrene	µg/L	0.01	EPA 8270	30-Aug-13/K	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/L	0.05	EPA 8270	30-Aug-13/K	< 0.05	< 0.05
Benzo(b+k)fluoranthene	µg/L	0.1	EPA 8270	30-Aug-13/K	< 0.1	< 0.1
Benzo(g,h,i)perylene	µg/L	0.05	EPA 8270	30-Aug-13/K	< 0.05	< 0.05
Benzo(k)fluoranthene	µg/L	0.05	EPA 8270	30-Aug-13/K	< 0.05	< 0.05
Chrysene	µg/L	0.05	EPA 8270	30-Aug-13/K	< 0.05	< 0.05
Dibenzo(a,h)anthracene	µg/L	0.05	EPA 8270	30-Aug-13/K	< 0.05	< 0.05
Fluoranthene	µg/L	0.05	EPA 8270	30-Aug-13/K	< 0.05	< 0.05
Fluorene	µg/L	0.05	EPA 8270	30-Aug-13/K	< 0.05	< 0.05
Indeno(1,2,3,-cd)pyrene	µg/L	0.05	EPA 8270	30-Aug-13/K	< 0.05	< 0.05
Methylnaphthalene, 1-	µg/L	0.05	EPA 8270	30-Aug-13/K	< 0.05	< 0.05
Methylnaphthalene, 2-	µg/L	0.05	EPA 8270	30-Aug-13/K	< 0.05	< 0.05
Naphthalene	µg/L	0.05	EPA 8270	30-Aug-13/K	< 0.05	< 0.05
Phenanthrene	µg/L	0.05	EPA 8270	30-Aug-13/K	< 0.05	< 0.05
Pyrene	µg/L	0.05	EPA 8270	30-Aug-13/K	< 0.05	< 0.05

Elevated MDLs due to matrix interferences



Michelle Dubien
 Lab Manager

M.D.L. = Method Detection Limit
 Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill

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Client: Golder Associates
 121 Commerce Park Drive Unit L
 Barrie, ON
 L4N 8X1
Attention: Ms. Christli Groves
PO#: PO25698
Invoice to: The City of Barrie - Finance Dept.

Report Number: 1307214
Date Submitted: 2013-04-24
Date Reported: 2013-05-10
Project: 11-1170-0043
COC #: 762318

Group	Analyte	MRL	Units	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	Guideline
Metals	K	1	mg/L	1022297 Surfacewater 2013-04-23 SWB1	3
	Mg	1	mg/L	1022298 Surfacewater 2013-04-23 SWB2	3
	Mn	0.01	mg/L	1022299 Surfacewater 2013-04-23 SWB3	14
	Mo	0.005	mg/L	1022300 Surfacewater 2013-04-23 SWB4	0.13
	Na	2	mg/L		<0.005
	Ni	0.005	mg/L		315
	Pb	0.001	mg/L		<0.005
	Sb	0.0005	mg/L		<0.001
	Se	0.001	mg/L		<0.0005
	Sr	0.001	mg/L		<0.001
	Ti	0.01	mg/L		0.615
	Tl	0.0001	mg/L		<0.01
	U	0.001	mg/L		<0.0001
	V	0.001	mg/L		0.001
	Zn	0.01	mg/L		0.002
Zr	0.002	mg/L		<0.01	
Nutrients Semi-Volatiles	N-NH3	0.02	mg/L		<0.002
	1-methylnaphthalene	0.1	ug/L		0.72
	2-methylnaphthalene	0.1	ug/L		<0.1
	Acenaphthene	0.1	ug/L		<0.1
	Acenaphthylene	0.1	ug/L		<0.1
	Anthracene	0.1	ug/L		<0.1
	Benzo(a)anthracene	0.1	ug/L		<0.1
	Benzo(a)pyrene	0.01	ug/L		<0.1
	Benzo(b)fluoranthene	0.05	ug/L		<0.01
	Benzo(g,h,i)perylene	0.1	ug/L		<0.05

Guideline = PWQO - Ontario
**** = Analysis completed at Mississauga, Ontario.**
Results relate only to the parameters tested on the samples submitted.
Method references and/or additional QA/QC information available on request.

*** = Guideline Exceedence**

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective.

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 L4N 8X1

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Report Number: 1307214
 Date Submitted: 2013-04-24
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Group	Analyte	MRL	Units	Guideline	Lab I.D.			
					Sample Matrix	Sample Type	Sampling Date	Sample I.D.
Semi-Volatiles	Benzo(k)fluoranthene	0.05	ug/L	IPWQO-0.0002	1022297	1022298	1022299	1022300
	Chrysene	0.05	ug/L	IPWQO-0.0001	2013-04-23	2013-04-23	2013-04-23	2013-04-23
	Dibenzo(a,h)anthracene	0.1	ug/L	IPWQO-0.002	SWB1	SWB2	SWB3	SWB4
	Fluoranthene	0.1	ug/L	IPWQO-0.0008				
	Fluorene	0.1	ug/L	IPWQO-0.2				
	Indeno(1,2,3-c,d)pyrene	0.1	ug/L					
	Naphthalene	0.1	ug/L	IPWQO-7				
	Phenanthrene	0.1	ug/L	IPWQO-0.03				
	Pyrene	0.1	ug/L					
	W							
Subcontract VOCs	1,1,1,2-tetrachloroethane	0.005	mg/L	IPWQO-0.030				
	1,1,1-trichloroethane	0.5	ug/L	IPWQO-20				
	1,1,2,2-tetrachloroethane	0.4	ug/L	IPWQO-10				
	1,1,2-trichloroethane	0.5	ug/L	IPWQO-70				
	1,1,2-trichloroethane	0.4	ug/L	IPWQO-800				
	1,1-dichloroethane	0.4	ug/L	IPWQO-200				
	1,1-dichloroethylene	0.5	ug/L	IPWQO-40				
	1,2,4-trichlorobenzene	0.5	ug/L	IPWQO-0.5				
	1,2-dibromoethane	0.2	ug/L					
	1,2-dichlorobenzene	0.4	ug/L	IPWQO-2.5				
	1,2-dichloroethane	0.2	ug/L	IPWQO-100				
	1,2-dichloroethane-d4	1	%					
	1,2-dichloropropane	0.5	ug/L	IPWQO-0.7				
	1,3,5-trimethylbenzene	0.3	ug/L					
1,3-dichlorobenzene	0.4	ug/L	IPWQO-2.5					
1,4-dichlorobenzene	0.4	ug/L	IPWQO-4.0					
2-Hexanone (MBK)	10	ug/L						

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Client: Golder Associates
 121 Commerce Park Drive Unit L
 Barrie, ON
 L4N 8X1
 Attention: Ms. Christl Groves
 PO#: PO25698
 Invoice to: The City of Barrie - Finance Dept.

Report Number: 1307214
 Date Submitted: 2013-04-24
 Date Reported: 2013-05-10
 Project: 11-1170-0043
 COC #: 762318

Group	Analyte	MRL	Units	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D. Guideline	1022297 Surfacewater 2013-04-23 SWB1	1022298 Surfacewater 2013-04-23 SWB2	1022299 Surfacewater 2013-04-23 SWB3	1022300 Surfacewater 2013-04-23 SWB4	
									0.3 ug/L
VOCs	Tetrachloroethylene	0.3	ug/L	IPWQO-50	<0.3	<0.3	0.5	<0.3	
	Toluene	0.5	ug/L	IPWQO-0.8	<0.5	<0.5	<0.5	<0.5	
	Toluene-d8	1	%		92	93	93	92	
	Trichloroethylene	0.3	ug/L	IPWQO-20	<0.3	<0.3	<0.3	<0.3	
	Trichlorofluoromethane	0.5	ug/L		<0.5	<0.5	<0.5	<0.5	
	Vinyl Chloride	0.2	ug/L	IPWQO-600	<0.2	0.9	<0.2	<0.2	
	Xylene, total	1.0	ug/L		<1.0	<1.0	<1.0	<1.0	

Group	Analyte	MRL	Units	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D. Guideline	1022301 Surfacewater 2013-04-23 SWB5	1022302 Surfacewater 2013-04-23 Field Blank 2
Calculations	Hardness as CaCO3	1	mg/L			<1
	Alkalinity as CaCO3	5	mg/L			<5
General Chemistry	Cl	1	mg/L			<1
	Conductivity	5	uS/cm			<5
	pH	1.00		6.5-8.5		5.79
	SO4	3	mg/L			<3
	F1 (C6-C10)	0.1	mg/L			<0.1
Hydrocarbons	F1-BTEX (C6-C10)	0.1	mg/L			<0.1
	F2 (C10-C16)	0.1	mg/L			<0.1
	F3 (C16-C34)	0.2	mg/L			<0.2
	F4 (C34-C50)	0.2	mg/L			<0.2
Mercury	Hg	0.0001	mg/L	PWQO-0.0002	<0.0001	<0.0001

Guideline = PWQO - Ontario
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Client: Golder Associates
 121 Commerce Park Drive Unit L
 Barrie, ON
 L4N 8X1
Attention: Ms. Chrisli Groves
PO#: PO25698
Invoice to: The City of Barrie - Finance Dept.

Report Number: 1307214
Date Submitted: 2013-04-24
Date Reported: 2013-05-10
Project: 11-1170-0043
COC#: 762318

Group	Analyte	MRL	Units	Guideline	Lab I.D.	
					Sample Matrix	Sample Type
Mercury Metals	Hg Dissolved	0.0001	mg/L	PWQO-0.0001	1022301	1022302
	Ag	0.0001	mg/L	PWQO-0.0001	Surfacewater	Surfacewater
	Al	0.01	mg/L	IPWQO-0.075	2013-04-23	2013-04-23
	As	0.001	mg/L	PWQO-0.100	SWB5	Field Blank 2
	B	0.01	mg/L	IPWQO-0.200		
	Ba	0.01	mg/L			
	Be	0.0005	mg/L	PWQO-0.011		
	Ca	1	mg/L		125	<1
	Cd	0.0001	mg/L	PWQO-0.0002		<0.0001
	Co	0.0002	mg/L	PWQO-0.0009	0.0004	<0.0002
	Cr	0.001	mg/L		0.003	<0.001
	Cu	0.001	mg/L	PWQO-0.005	0.002	<0.001
	Fe	0.03	mg/L	PWQO-0.30	0.54*	<0.03
	K	1	mg/L		3	<1
	Mg	1	mg/L		13	<1
	Mn	0.01	mg/L		0.10	<0.01
	Mo	0.005	mg/L		<0.005	<0.005
	Na	2	mg/L		416	<2
	Ni	0.005	mg/L		PWQO-0.025	<0.005
	Pb	0.001	mg/L		PWQO-0.005	<0.001
Sb	0.0005	mg/L		IPWQO-0.020	<0.0005	
Se	0.001	mg/L		PWQO-0.100	<0.001	
Sr	0.001	mg/L			0.684	
Tl	0.01	mg/L			<0.01	
Tl	0.0001	mg/L		IPWQO-0.0003	<0.0001	
U	0.001	mg/L		IPWQO-0.005	0.001	

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Client: Golder Associates
 121 Commerce Park Drive Unit L
 Bame, ON
 L4N 8X1
 Attention: Ms. Christii Groves
 PO#: PO25698
 Invoice to: The City of Barrie - Finance Dept.

Report Number: 1307214
 Date Submitted: 2013-04-24
 Date Reported: 2013-05-10
 Project: 11-1170-0043
 COC #: 762318

Group	Analyte	MRL	Units	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	Guideline
Metals	V	0.001	mg/L	IPWQO-0.006	1022302 Surfacewater 2013-04-23 Field Blank 2
	Zn	0.01	mg/L	PWQO-0.030	1022301 Surfacewater 2013-04-23 SWB5
	Zr	0.002	mg/L	IPWQO-0.004	
Nutrients Semi-Volatiles	N-NH3	0.02	mg/L		0.14
	1-methylnaphthalene	0.1	ug/L	IPWQO-2	<0.1
	2-methylnaphthalene	0.1	ug/L	IPWQO-2	<0.1
	Acenaphthene	0.1	ug/L		<0.1
	Acenaphthylene	0.1	ug/L		<0.1
	Anthracene	0.1	ug/L	IPWQO-0.0008	<0.1
	Benzo(a)anthracene	0.1	ug/L	IPWQO-0.0004	<0.1
	Benzo(a)pyrene	0.01	ug/L		<0.01
	Benzo(b)fluoranthene	0.05	ug/L		<0.05
	Benzo(g,h,i)perylene	0.1	ug/L	IPWQO-0.00002	<0.1
Subcontract VOCs	Benzo(k)fluoranthene	0.05	ug/L	IPWQO-0.0002	<0.05
	Chrysene	0.05	ug/L	IPWQO-0.0001	<0.05
	Dibenzo(a,h)anthracene	0.1	ug/L	IPWQO-0.002	<0.1
	Fluoranthene	0.1	ug/L	IPWQO-0.0008	<0.1
	Fluorene	0.1	ug/L	IPWQO-0.2	<0.1
	Indeno(1,2,3-c,d)pyrene	0.1	ug/L		<0.1
	Naphthalene	0.1	ug/L	IPWQO-7	<0.1
	Phenanthrene	0.1	ug/L	IPWQO-0.03	<0.1
	Pyrene	0.1	ug/L		<0.1
	W	0.005	mg/L	IPWQO-0.030	<0.005
VOCs	1,1,1,2-tetrachloroethane	0.5	ug/L	IPWQO-20	<0.5
	1,1,1-trichloroethane	0.4	ug/L	IPWQO-10	<0.4
	1,1,2,2-tetrachloroethane	0.5	ug/L	IPWQO-70	<0.5

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Certificate of Analysis

EXOVA OTTAWA

Client: Golder Associates
121 Commerce Park Drive Unit L
Barrie, ON
L4N 8X1
Attention: Ms. Christli Groves
PO#: PO25698
Invoice to: The City of Barrie - Finance Dept

Report Number: 1307214
Date Submitted: 2013-04-24
Date Reported: 2013-05-10
Project: 11-1170-0043
COC #: 762318

Table with columns: Group, Analyte, MRL, Units, Lab I.D., Sample Matrix, Sampling Date, Sample I.D., Guideline. Rows include VOCs, 1,1,2-trichloroethane, 1,1-dichloroethane, etc.

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Client: Golder Associates
 121 Commerce Park Drive Unit L
 Bame, ON
 L4N 8X1
 Attention: Ms. Christl Groves
 PO#: PO25698
 Invoice to: The City of Bame - Finance Dept.

Report Number: 1307214
 Date Submitted: 2013-04-24
 Date Reported: 2013-05-10
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 COC #: 762318

Group	Analyte	MRL	Units	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	Guideline
VOCs	Dichlorodifluoromethane	0.5	ug/L	1022301 Surfacewater	<0.5
	Dichloromethane	4.0	ug/L	1022302 Surfacewater	<4.0
	Ethylbenzene	0.5	ug/L	2013-04-23 Field Blank 2	<0.5
	Hexane	5	ug/L		<5
	m/p-xylene	0.5	ug/L		<0.5
	Methyl Ethyl Ketone (MEK)	10	ug/L		<10
	Methyl Isobutyl Ketone (MIBK)	10	ug/L		<10
	Methyl Tert Butyl Ether (MTBE)	10	ug/L		<10
	Monochlorobenzene	0.2	ug/L		<0.2
	o-xylene	0.5	ug/L		<0.5
	Styrene	0.5	ug/L		<0.5
	t-1,2-Dichloroethylene	0.4	ug/L		<0.4
	t-1,3-Dichloropropylene	0.2	ug/L		<0.2
	Tetrachloroethylene	0.3	ug/L		<0.3
	Toluene	0.5	ug/L		<0.5
Toluene-d8	1	%		90	
Trichloroethylene	0.3	ug/L		<0.3	
Trichlorofluoromethane	0.5	ug/L		<0.5	
Vinyl Chloride	0.2	ug/L		<0.2	
Xylene; total	1.0	ug/L		<1.0	

Guideline = PWQO - Ontario Y
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Client: Golder Associates
 121 Commerce Park Drive Unit L
 Barrie, ON
 L4N 8X1

Attention: Ms. Chrsli Groves
PO#: PO25698

Invoice to: The City of Barrie - Finance Dept.

Report Number: 1307214
Date Submitted: 2013-04-24
Date Reported: 2013-05-10
Project: 11-1170-0043
COC #: 762318

Group	Analyte	MRL	Units	Lab ID, Sample Matrix Sample Type Sampling Date Sample I.D. Guideline
Calculations General Chemistry	Hardness as CaCO3	1	mg/L	
	Alkalinity as CaCO3	5	mg/L	
	Cl	1	mg/L	
	Conductivity	5	uS/cm	
	pH	1.00		6.5-8.5
	SO4	3	mg/L	
Hydrocarbons	F1 (C6-C10)	0.1	mg/L	
	F1-BTEX (C6-C10)	0.1	mg/L	
	F2 (C10-C16)	0.1	mg/L	
	F3 (C16-C34)	0.2	mg/L	
	F4 (C34-C50)	0.2	mg/L	
Mercury	Hg	0.0001	mg/L	PWQO-0.0002
Metals	Hg Dissolved	0.0001	mg/L	
	Ag	0.0001	mg/L	PWQO-0.0001
	Al	0.01	mg/L	IPWQO-0.075
	As	0.001	mg/L	PWQO-0.100
	B	0.01	mg/L	IPWQO-0.200
	Ba	0.01	mg/L	
	Be	0.0005	mg/L	PWQO-0.011
	Ca	1	mg/L	
	Cd	0.0001	mg/L	PWQO-0.0002
	Co	0.0002	mg/L	PWQO-0.0009
Cr	0.001	mg/L		
Cu	0.001	mg/L	PWQO-0.005	
Fe	0.03	mg/L	PWQO-0.30	
	K	1	mg/L	

Guideline = PWQO - Ontario *** = Guideline Exceedence**

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 121 Commerce Park Drive Unit L
 Barrie, ON
 L4N 8X1

Attention: Ms. Christa Groves
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Lab I.D.
 Sample Matrix
 Sample Type
 Sampling Date
 Sample I.D.

Group	Analyte	MRL	Units	Guideline	
Metals	Mg	1	mg/L		
	Mn	0.01	mg/L		
	Mo	0.005	mg/L	IPWQO-0.040	
	Na	2	mg/L		
	Ni	0.005	mg/L	PWQO-0.025	
	Pb	0.001	mg/L	PWQO-0.005	
	Sb	0.0005	mg/L	IPWQO-0.020	
	Se	0.001	mg/L	PWQO-0.100	
	Sr	0.001	mg/L		
	Ti	0.01	mg/L		
	Tl	0.0001	mg/L	IPWQO-0.0003	
	U	0.001	mg/L	IPWQO-0.005	
	V	0.001	mg/L	IPWQO-0.006	
	Zn	0.01	mg/L	PWQO-0.030	
	Zr	0.002	mg/L	IPWQO-0.004	
	Nutrients	N-NH3	0.02	mg/L	
		Semi-Volatiles	1-methylnaphthalene	0.1	ug/L
2-methylnaphthalene			0.1	ug/L	IPWQO-2
Acenaphthene		0.1	ug/L		
Acenaphthylene		0.1	ug/L		
Anthracene		0.1	ug/L	IPWQO-0.0008	
Benzo(a)anthracene		0.1	ug/L	IPWQO-0.0004	
Benzo(a)pyrene		0.01	ug/L		
Benzo(b)fluoranthene	0.05	ug/L			
Benzo(g,h,i)perylene	0.1	ug/L	IPWQO-0.00002		
Benzo(k)fluoranthene	0.05	ug/L	IPWQO-0.0002		

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Client: Golder Associates
 121 Commerce Park Drive Unit L
 Barrie, ON
 L4N 8X1

Attention: Ms. Christli Groves
PO#: PO25698

Invoice to: The City of Barrie - Finance Dept.

Report Number: 1307214
Date Submitted: 2013-04-24
Date Reported: 2013-05-10
Project: 11-1170-0043
COC #: 762318

Group	Analyte	MRL	Units	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.
VOCs	Acetone	50	ug/L	
	Benzene	0.5	ug/L	IPWQO-100
	Bromodichloromethane	0.3	ug/L	IPWQO-200
	Bromoform	0.4	ug/L	IPWQO-60
	Bromomethane	0.5	ug/L	IPWQO-0.9
	c-1,2-Dichloroethylene	0.4	ug/L	IPWQO-200
	c-1,3-Dichloropropylene	0.2	ug/L	
	Carbon Tetrachloride	0.2	ug/L	
	Chloroethane	0.2	ug/L	
	Chloroform	0.5	ug/L	
	Chloromethane	0.2	ug/L	IPWQO-700
	Dibromochloromethane	0.3	ug/L	IPWQO-40
	Dichlorodifluoromethane	0.5	ug/L	
	Dichloromethane	4.0	ug/L	IPWQO-100
	Ethylbenzene	0.5	ug/L	IPWQO-8
	Hexane	5	ug/L	
	m/p-xylene	0.5	ug/L	IPWQO-2
	Methyl Ethyl Ketone (MEK)	10	ug/L	IPWQO-400
	Methyl Isobutyl Ketone (MIBK)	10	ug/L	
	Methyl Tert Butyl Ether (MTBE)	10	ug/L	IPWQO-200
Monochlorobenzene	0.2	ug/L	IPWQO-15	
o-xylene	0.5	ug/L	IPWQO-40	
Styrene	0.5	ug/L	IPWQO-4	
t-1,2-Dichloroethylene	0.4	ug/L	IPWQO-200	
t-1,3-Dichloropropylene	0.2	ug/L	IPWQO-7	
Tetrachloroethylene	0.3	ug/L	IPWQO-50	

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Date Submitted: 2013-04-24
Date Reported: 2013-05-10
Project: 11-1170-0043
COC #: 762318

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Run No 0	Analysis Date 2013-04-29	Method C SM2340B	
Hardness as CaCO3			
Xylene, total			
Run No 249387	Analysis Date 2013-04-25	Method O CEME	
F1 (C6-C10)	<0.1 mg/L	94	80-120
Run No 249389	Analysis Date 2013-04-25	Method O CEME	
F1-BTEX (06-C10)			
Run No 249421	Analysis Date 2013-04-24	Method V 8260B	
1,1,1,2-tetrachloroethane	<0.5 ug/L	92	80-120
1,1,1-trichloroethane	<0.4 ug/L	94	80-120
1,1,2,2-tetrachloroethane	<0.5 ug/L	93	80-120
1,1,2-trichloroethane	<0.4 ug/L	88	80-120
1,1-dichloroethane	<0.4 ug/L	98	80-120
1,1-dichloroethylene	<0.5 ug/L	92	80-120
1,2,4-trichlorobenzene	<0.5 ug/L	94	

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Report Number: 1307214
Date Submitted: 2013-04-24
Date Reported: 2013-05-10
Project: 11-1170-0043
COC #: 762318

QC Summary

Analyte	Blank	QC % Rec	QC Limits
1,2-dibromoethane	<0.2 ug/L	88	80-120
1,2-dichlorobenzene	<0.4 ug/L	107	80-120
1,2-dichloroethane	<0.2 ug/L	100	80-120
1,2-dichloroethane-d4	104 %	98	80-120
1,2-dichloropropane	<0.5 ug/L	94	80-120
1,3,5-trimethylbenzene	<0.3 ug/L	90	80-120
1,3-dichlorobenzene	<0.4 ug/L	93	80-120
1,4-dichlorobenzene	<0.4 ug/L	91	80-120
Benzene	<0.5 ug/L	95	80-120
Bromodichloromethane	<0.3 ug/L	88	80-120
Bromoform	<0.4 ug/L	95	80-120
Bromomethane	<0.5 ug/L	84	70-130
c-1,2-Dichloroethylene	<0.4 ug/L	83	80-120
c-1,3-Dichloropropylene	<0.2 ug/L	86	80-120
Carbon Tetrachloride	<0.2 ug/L	92	80-120
Chloroethane	<0.2 ug/L	86	70-130
Chloroform	<0.5 ug/L	92	80-120

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Project: 11-1170-0043
COC #: 762318

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Chloromethane	<0.2 ug/L	85	70-130
Dibromochloromethane	<0.3 ug/L	83	80-120
Dichlorodifluoromethane	<0.5 ug/L	109	70-130
Dichloromethane	<4.0 ug/L	114	60-200
Ethylbenzene	<0.5 ug/L	90	80-120
Hexane	<5 ug/L	108	70-130
m/p-xylene	<0.5 ug/L	95	80-120
Monochlorobenzene	<0.2 ug/L	88	80-120
o-xylene	<0.5 ug/L	92	80-120
Styrene	<0.5 ug/L	87	80-120
1-1,2-Dichloroethylene	<0.4 ug/L	91	80-120
1,1,3-Dichloropropylene	<0.2 ug/L	90	80-120
Tetrachloroethylene	<0.3 ug/L	90	80-120
Toluene	<0.5 ug/L	98	80-120
Toluene-d8	95 %	95	80-120
Trichloroethylene	<0.3 ug/L	95	80-120
Trichlorofluoromethane	<0.5 ug/L	99	80-120

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Client: Golder Associates
 121 Commerce Park Drive Unit L
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 L4N 8X1
 Attention: Ms. Christl Groves
 PO#: PO25698
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Report Number: 1307214
 Date Submitted: 2013-04-24
 Date Reported: 2013-05-10
 Project: 11-1170-0043
 COC #: 762318

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Vinyl Chloride	<0.2 ug/L	117	70-130
Run No 249436 Analysis Date 2013-04-26 Method O CME			
F2 (C10-C16)	<0.1 mg/L	88	50-120
F3 (G16-C34)	<0.2 mg/L	88	50-120
F4 (C34-C50)	<0.2 mg/L	88	50-120
Run No 249444 Analysis Date 2013-04-26 Method C SM4500-NF30			
NH3	<0.02 mg/L	100	85-115
Run No 249448 Analysis Date 2013-04-25 Method P 8270			
1-methylnaphthalene	<0.1 ug/L	44	20-140
2-methylnaphthalene	<0.1 ug/L	44	20-140
Acenaphthene	<0.1 ug/L	46	20-140
Acenaphthylene	<0.1 ug/L	44	20-140
Anthracene	<0.1 ug/L	48	20-140
Benzo(a)anthracene	<0.1 ug/L	54	20-140
Benzo(a)pyrene	<0.01 ug/L	49	20-140
Benzo(b)fluoranthene	<0.05 ug/L	57	20-140
Benzo(g,h,i)perylene	<0.1 ug/L	54	20-140

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Client: Golder Associates
 121 Commerce Park Drive Unit L
 Barrie, ON
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Attention: Ms. Christl Groves
PO#: PO25698
Invoice to: The City of Barrie - Finance Dept.

Report Number: 1307214
Date Submitted: 2013-04-24
Date Reported: 2013-05-10
Project: 11-1170-0043
COC #: 762318

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Benzo(K)fluoranthene	<0.05 ug/L	97	20-140
Chrysene	<0.05 ug/L	51	20-140
Biphenyl(a,b)anthracene	<0.1 ug/L	50	20-140
Fluoranthene	<0.1 ug/L	56	20-140
Fluorene	<0.1 ug/L	46	20-140
Indeno(1,2,3-c,d)pyrene	<0.1 ug/L	66	20-140
Naphthalene	<0.1 ug/L	44	20-140
Phenanthrene	<0.1 ug/L	52	20-140
Pyrene	<0.1 ug/L	56	20-140
Run No 249467 Analysis Date 2013-04-25 Method SM 2320B			
Alkalinity as CaCO3	<5 mg/L	100	95-105
Conductivity	<5 uS/cm	99	95-105
pH	5.84	100	90-110
Run No 249481 Analysis Date 2013-04-24 Method V 8260B			
2-Hexanone (MBK)	<10 ug/L	115	80-120
Acetone	<50 ug/L	87	80-120
Methyl Ethyl Ketone (MEK)	<10 ug/L	97	80-120

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Client: **Goldier Associates**
 121 Commerce Park Drive Unit L
 Barrie, ON
 L4N 8X1
 Attention: **Ms. Christi Groves**
 PO#: **PO25698**
 Invoice to: **The City of Barrie - Finance Dept.**

Report Number: **1307214**
 Date Submitted: **2013-04-24**
 Date Reported: **2013-05-10**
 Project: **11-1170-0043**
 COC #: **762318**

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Methyl Isobutyl Ketone (MIBK)	<10 ug/L	103	80-120
Methyl Tert-Butyl Ether (MTBE)	<10 ug/L	119	80-120
Run No 249496	Analysis Date 2013-04-26	Method SM 4110C	
Cl	<1 mg/L	101	90-110
SO4	<3 mg/L	106	90-110
Run No 249512	Analysis Date 2013-04-26	Method EPA 200.8	
Zr	<0.002 mg/L	90	0-1000
Run No 249535	Analysis Date 2013-04-26	Method M SM3120B-3500C	
Ca	<1 mg/L	98	80-120
K	<1 mg/L	102	80-120
Mg	<1 mg/L	97	80-120
Na	<2 mg/L	102	80-120
Run No 249543	Analysis Date 2013-04-29	Method C SMA500-NE3D	
NH3	<0.02 mg/L	96	85-115
Run No 249545	Analysis Date 2013-04-26	Method SM 4110C	
Cl	<1 mg/L	101	90-112
Run No 249565	Analysis Date 2013-04-29	Method M SM3120B-3500C	

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 Acceptable Concentration, STD = Standard, PWQO = Provincial Water Qua
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 Barrie, ON
 L4N 8X1
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Date Submitted: 2013-04-24
Date Reported: 2013-05-10
Project: 11-1170-0043
COC#: 762318

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Ni	<2 mg/L	96	80-120
Run No 249600 Analysis Date 2013-04-29 Method EPA 200.8			
Ag	<0.0001 mg/L	98	89-111
Al	<0.01 mg/L	99	90-110
As	<0.001 mg/L	102	81-119
B	<0.01 mg/L	96	81-119
Ba	<0.01 mg/L	101	91-109
Be	<0.0005 mg/L	98	82-118
Cd	<0.0001 mg/L	98	86-114
Co	<0.0002 mg/L	97	88-112
Cr	<0.001 mg/L	98	89-111
Cu	<0.001 mg/L	101	86-114
Fe	<0.03 mg/L	107	88-112
Filtration			
Mn	<0.01 mg/L	100	91-109
Mo	<0.005 mg/L	102	84-116
Ni	<0.005 mg/L	99	92-108

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interim Provincial Water Quality Objective.

At Golder Associates we strive to be the most respected global company providing consulting, design, and construction services in earth, environment, and related areas of energy. Employee owned since our formation in 1960, our focus, unique culture and operating environment offer opportunities and the freedom to excel, which attracts the leading specialists in our fields. Golder professionals take the time to build an understanding of client needs and of the specific environments in which they operate. We continue to expand our technical capabilities and have experienced steady growth with employees who operate from offices located throughout Africa, Asia, Australasia, Europe, North America, and South America.

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